

# MECHANISM STIMULATION OF INNOVATIVE ACTIVITY IN INDUSTRIAL ENTERPRISES

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**Abstract:** *The purpose of the dissertation research is to develop theoretical provisions and practical recommendations for managing the innovative activity of industrial enterprises on the basis of an integrated assessment system. The stated goal of the study predetermined the need to solve the following tasks: to reveal the key concepts, the main features of the innovative activity of enterprises; to conduct a comparative analysis of methods for assessing the innovative activity of industrial enterprises; to identify socio-economic and institutional factors of inhibition of innovation processes; to develop a methodological framework for assessing the patterns and problems of innovative development of industrial enterprises; to develop guidelines for the formation of mechanisms to stimulate the innovative activity of industrial enterprises. The results of the study are based on a refined conceptual apparatus for innovative activity, which made it possible to identify the most significant areas for assessing the innovative activity of industrial enterprises, characterized by an integrated approach to assessing the following components: creative innovativeness, innovative loyalty, process innovativeness.*

**Key Words:** *Innovative activity, incentive, process, mechanism, industrial enterprises.*

## 1. INTRODUCTION:

Increasing the innovative activity of industrial enterprises is one of the key problems that make it possible not only to change the nature of production activities in this area of the economy, but also to provide conditions for the innovative growth of other industries. Innovative activity presupposes the creation of an innovation that will be recognized as unique, will allow the transition to a new organizational and technological structure of production and ensure the competitiveness of the products obtained with its help in the sales markets. The relevance of the study of the problems of managing innovative activity is due to the lack of an unambiguous assessment of the directions of its development, and the methodological level of its development does not fully reveal the essence of the innovative activity of enterprises. Analysis of the state of modern economic thought in the field of conceptual views on this issue indicates that each author has his own arguments and rating scales, which indicates a divergence of theoretical positions. In this regard, the development of parameters for managing the innovative activity of enterprises in the modern economy using the mechanism of formation and practical application of the innovation management system is a relatively new direction, which predetermined the choice of the topic of scientific research and the issues considered in it.

## 2. LITERATURE REVIEW AND PROBLEM STATEMENT:

In scientific sources, the essence of innovation, assessment methods and the effectiveness of innovation are widely covered. Special mention should be made of the studies carried out by Durmanov, A., Umarov, S., Rakhimova, K., Khodjimukhamedova, S., Akhmedov, A., & Mirzayev, S. (2021), Nurimbetov, T., Umarov, S., Khafizova, Z., Bayjanov, S., Nazarbaev, O., Mirkurbanova, R., (2021), Nazarova F., Sangirova U., Abdurazakova N, Beknazarov Z. (2020), Li M., Khushvaktova K., Yakubova K., Shanasirova N. (2021), Yusupov E., Yakubova S., Saipova M., Mamasadikov A., Khamrayeva S., Durmanov A. (2021) and others.

Foreign scientists paid close attention to this topic, who showed the role of innovation at the present stage of development of the macroeconomic system, entrepreneurial activity and proved the need for rational management of innovative activity. These include: Hontaruk, Y. (2020), Bogachev, Yu. S., Moreva, E. L., & Tyutyunnik, I. G. (2018), Ganea, V., Oglindă, L., & Țiganu, A. (2015) and others. These authors significantly expanded our understanding of certain aspects and problems of innovation. At the same time, many issues of innovative activity require serious study, which requires further comprehensive consideration and indicates the relevance of this study.

## 3. THE AIM AND OBJECTIVE S OF THE STUDY:

The purpose of the study is to develop theoretical provisions and practical recommendations for managing the innovative activity of industrial enterprises on the basis of an integrated assessment system.

To achieve this goal, the following tasks were set:

- the main features of the innovative activity of enterprises, to conduct a comparative analysis of methods for assessing the innovative activity of industrial enterprises;
- to identify socio-economic and institutional factors of inhibition of innovation processes, to develop a methodological framework for assessing the patterns and problems of innovative development of industrial enterprises;
- to develop guidelines for the formation of mechanisms to stimulate the innovative activity of industrial enterprises.

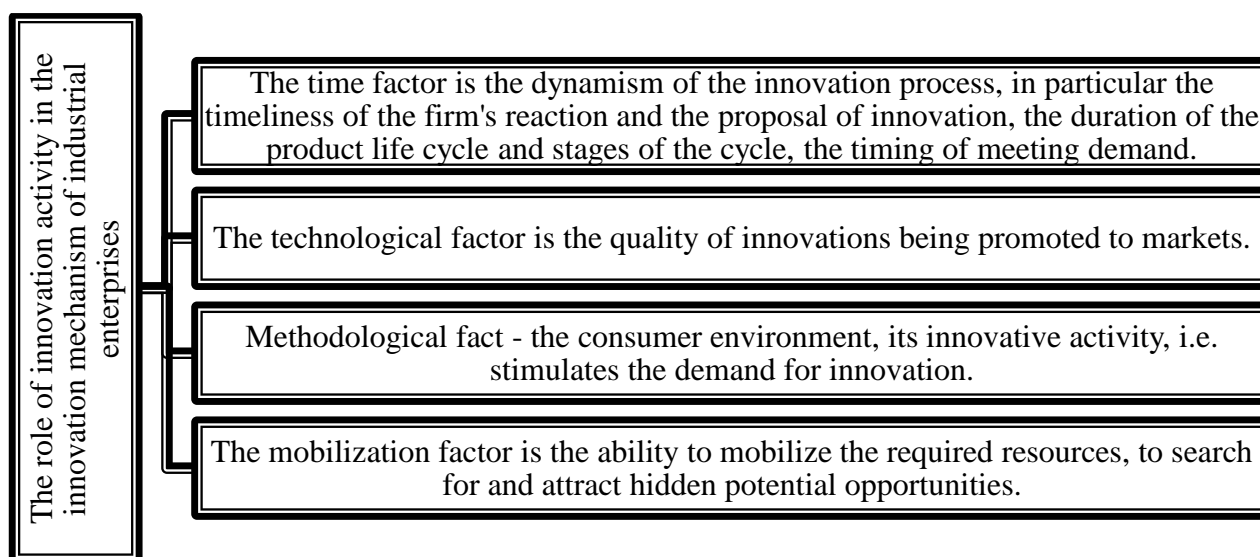
#### 4. MATERIALS AND METHODS:

The meaning of the category "innovative activity" is that it is used to assess the nature of the innovative activity of an industrial enterprise. Based on the results of considering various aspects of the concept of "innovative activity", the following definition was proposed. The innovative activity of an industrial enterprise is a complex characteristic of its innovative activity, including the degree of intensity of its actions and their timeliness, the ability to mobilize the necessary resources and use the existing potential, the validity and progressiveness of the methods used, the rationality of the technology of the innovation process in terms of the composition and sequence of operations. From the point of view of strategy and tactics, innovative activity can be interpreted in different ways (Table 1).

**Table 1 - Characteristics of the category "innovative activity"**

Strategically	Tactically
The quality of the organization's innovation strategy. The level of mobilization or use of innovative potential. The size of attracted capital investments - investments. The quality of the methods used to carry out innovative changes. Substantiation of the implemented level of innovation activity.	The conformity of the firm's response to the nature of the competitive strategic situation. The speed (pace) of actions and implementation of strategic innovative changes.

Taking into account that industrial enterprises and other participants in the innovation process need not just activity, but useful activity, the role of innovation activity in the innovation mechanism should be as follows (Figure 1).



**Figure 1 - The role of innovation activity in the innovation mechanism of industrial enterprises**

The analysis of existing approaches to the problem of assessing innovative activity allows us to conclude that the characteristics under consideration are multifaceted and that it is necessary to model its integral, covering all aspects of the problem and at the same time, accessible for understanding and research, an indicator. It is proposed to

use three main criteria for assessing the innovative activity of an enterprise: creative innovativeness, innovative loyalty, process innovativeness (Table 2).

**Table 2 - Complex characteristics of innovative activity**

Criteria	Qualitative characteristic
<b>Creative innovativeness, <math>K_{ic}</math></b>	Carrying out research and development on our own; creation of creative teams for solving specific problems; the presence of innovations with the purchase of rights under a patent; the presence of informal structures engaged in solving creative problems; use of the results of research and development carried out by third parties on request, etc.
<b>Innovative loyalty, <math>K_{il}</math></b>	Positive perception of innovations and, in general, the innovative development model by the company's employees.
<b>Process innovation, <math>K_{ip}</math></b>	Transformation of innovations into new market formats; transformation of innovations into new products.

Based on the above characteristics of the three main criteria for the innovative activity of an industrial enterprise, it is possible to conduct a full-scale study of the intensity and regularity of the enterprise's efforts to create and implement innovations. It is recommended to calculate the generalized integral indicator of innovative activity by the formula:

$$K_{ia} = a * K_{ic} + b * K_{il} + c * K_{ip} \quad (1)$$

where a, b, c is the significance of each indicator, established by the expert method, depending on the scale and industry sector of the enterprise.

When forming a methodology for express diagnostics of innovative activity, the principles of analyzing the financial and economic state and features of the system of business activity of enterprises can be used as a methodological basis. Similarly, you can calculate the coefficients and compare them with the established values (table 3).

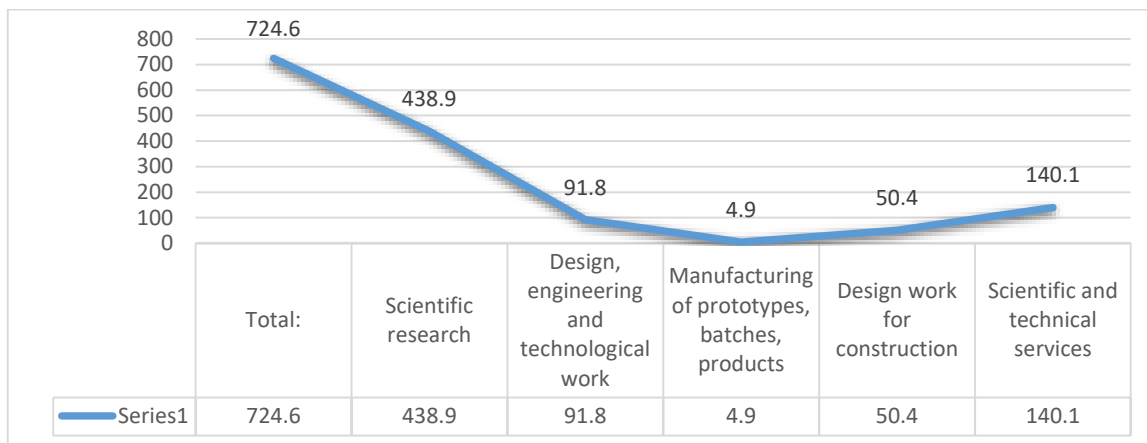
**Table 3 - Odds Express - diagnostics of innovative activity of industrial enterprises**

Indicator	Calculation formula	Range of values	
		leader's strategy	strategy follower
$K_{is}$ - coefficient of provision of intellectual property	$K_{is} = C_i / A_{na}$ , where $C_i$ is intellectual property, A - non-current assets	$K_{is} \geq 0.10$ ... 0.15	$K_{is} \leq 0.10$ ... 0.05
$K_{pr}$ - the coefficient of personnel employed in research and development	$K_{pr} = P_n / Ch_p$ , where $P_n$ is the number of people employed in the field of research and development, $Ch_p$ is the average number of employees	$K_{pr} \geq 0.20$ ... 0.25	$K_{pr} \leq 0.20$ ... 0.15
$K_{ni}$ - coefficient of property intended for research and development	$K_{ni} = C_{he} / O_{mon}$ , where $O_{op}$ is the cost of experimental equipment, $O_{mon}$ is the cost of industrial equipment	$K_{ni} \geq 0.25$ ... 0.30	$K_{ni} \leq 0.25$ ... 0.20
$K_{nt}$ - the coefficient of mastering new technology	$K_{nt} = I_n / I_{cf}$ , where $I_n$ is the cost of newly introduced fixed assets, $I_{cf}$ annual cost of fixed assets of the enterprise	$K_{nt} \geq 0.35$ ... 0.40	$K_{nt} \leq 0.35$ ... 0.30
$K_{op}$ - coefficient of development of new products	$K_{op} = V_{np} / V_{about}$ , where $V_{np}$ is the proceeds from the sale of new products and products manufactured using new technologies, B summarizing the proceeds from the sale of all products	$K_{op} \geq 0.45$ ... 0.50	$K_{op} \leq 0.45$ ... 0.40
$K_{ir}$ - coefficient of innovative growth	$K_{ir} = I_{ci} / I_{ti}$ , where $I_{ci}$ - the cost of research and educational and methodological investment projects, $I_{ti}$ - the total cost of other investment costs	$K_{ir} \geq 0.55$ ... 0.60	$K_{ir} \leq 0.55$ ... 0.50

Basic, comparative values can be indicators for the past period (or for past innovative projects), average industry values or values of indicators from competitors.

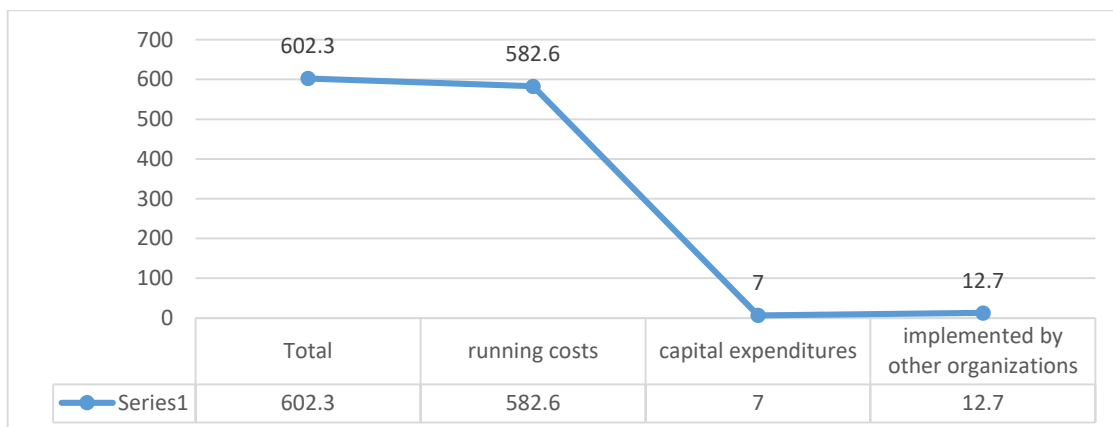
### 5. RESULTS OF EXPERIMENTAL STUDIES:

It is known that in recent years in science, as in other areas, special attention has been paid to the effectiveness of innovative research activities, the widespread introduction of scientific results in this direction. The Resolution of the President of the Republic "On additional measures to improve the mechanisms for introducing innovations in the industry and the economy" PP-3698 dated May 7, 2018 serves as a programmatic one for carrying out work in this area of activity.



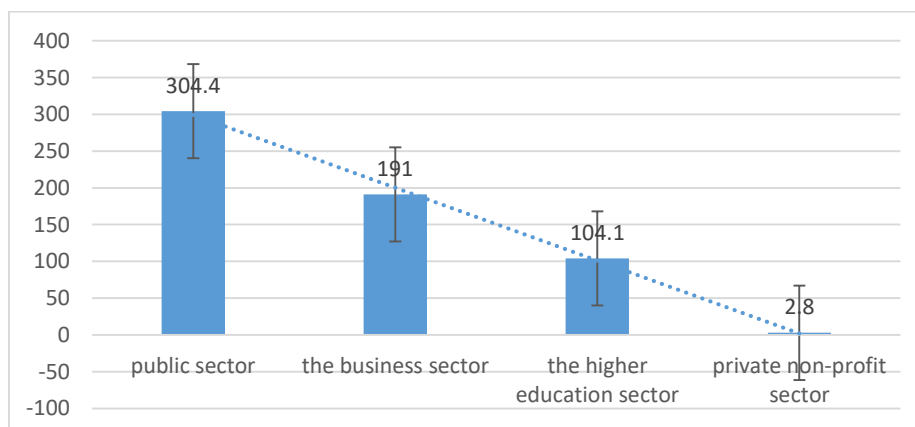
**Figure - 2. The volume of research and development projects in the Republic of Uzbekistan, carried out by organizations by type of work on their own (2019, billion UZS)**

Total expenditures by branches of science, compared to last year, increased to 602.3 billion UZS, of which in natural and sciences - 387.0, medical and agricultural sciences - 106, 6, social and human sciences - 108.7 billion sum.



**Figure 3. R&D expenditures in the Republic of Uzbekistan (2019, billion UZS)**

General research and development projects 602.3 billion UZS: public sector - 304.4, business sector - 191.0, higher education sector - 104.1, private non-profit sector - 2.8 billion UZS.



**Figure 4. R&D expenditures by spheres of the Republic of Uzbekistan (2019, billion UZS)**

An enterprise is considered to be innovative if it has introduced a certain innovation. During the specified period of statistical accounting. Based on the data presented below, it becomes obvious that the number of organizations engaged in innovative activities amounted to 3916, the highest indicator was recorded in the city of Tashkent, as well as in Navoi and Fergana regions. In 2019, the number of small enterprises and micro firms that implemented innovative projects amounted to 3,753 units, by type of economic activity, the largest indicator was recorded in the manufacturing industry - 1,979 units. Enterprises and organizations that have submitted statistical reports are grouped by type of economic activity. The volume of innovative work done by them amounted to 53.7% of the total, mainly in the manufacturing industry. Based on the value of innovations, they are a certain number of them, which are organizations, the internal market or the whole world.



**Figure 5. The volume of sold innovative products, works, services by region Republic of Uzbekistan (2019, %)**

The volume of implemented innovations in 2019 amounted to 26293.8 billion UZS, higher indicators were achieved in the city of Tashkent - 47.6% and Andijan region - 15.0%.

The minimum requirement to be considered innovation is whether the product or process has been new or significantly improved.

The volume of sold innovative products by type of economic activity in 2019 amounted to 262 93.8 billion UZS, the highest indicator was recorded in the manufacturing industry (53.4%). Innovation encompasses scientific, technological, organizational, financial and commercial measures that lead to improved products or processes.

In general, expenses on technological, marketing and organizational innovations amounted to 6603.5 billion UZS, of which expenses at the expense of organizations' own funds - 3342.9 billion UZS, due to foreign investments - 1,083.7, loans from commercial banks - 1,060.1, budgetary funds - 727.9, targeted off-budget funds - 307.2, other sources of financing - 81.8 billion UZS.

Innovation is divided into three types: technological, marketing, and organizational. In 2019, the total number of implemented innovations was 4689, of which 4427 were technological, 128 were marketing, and 134 were organizational. Innovation activities are activities that are synchronized with the introduction to the market of a new or improved product related to the transformation of ideas.

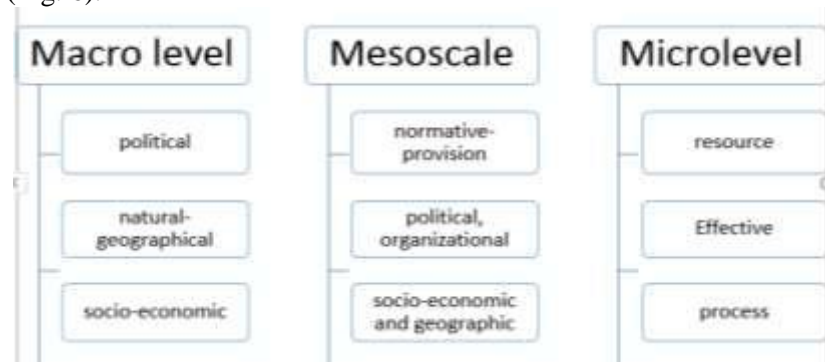
The results of a sample survey conducted in the country showed that the level of innovation impact of business entities is estimated lower by 17.8%, on average by 42.1%, higher by 21.5%, and in 18.7% of cases there was no impact. The basis of selective observation is made by organizations registered in the Unified State Register of Enterprises and Organizations operating on the territory of our republic. The sample size is 10% of the corresponding stratum for each area.

## 6. DISCUSSION OF EXPERIMENTAL RESULTS:

A system-wide classification of the factors of innovative activity of industrial enterprises has been developed, which makes it possible to develop effective mechanisms for managing innovative activities, form new relationships between innovative institutions, and effectively use the available resources of the state as a whole or its regions, in particular. The proposed classification is distinguished by the property of universality and applicability for any regions, regardless of their specialization, size, territorial location, etc.

The lack of a unified systematic understanding of the combination of factors of innovative activity leads to the absence of an effective state strategy for innovative development in Uzbekistan and, as a result, to the absence of

effective mechanisms for enhancing innovation. The study of the factors that have the greatest influence on innovation activity made it possible to develop their system-wide classification, which has the property of universality and applicability for enterprises in any region, regardless of their specialization, size, territorial location, etc. (Fig. 6).



**Figure 6. Identify factors of innovative activity of industrial x enterprises**

Multiple indicative and multilevel systemic classification of factors of innovative activity of industrial enterprises can be used to solve the problem of forming a new model for managing the innovative activity of industrial enterprises. The construction of such a management system is extremely relevant for industrial enterprises, the problem of competitiveness of which (both external and internal) is becoming more and more urgent in conditions of increasing instability, threats and challenges of the external environment.

**Table 4 - Barriers and incentives for innovative activity of industrial enterprises**

Significance	Barriers to innovation activity in enterprises	Barriers hindering innovation activity of enterprises in the country as a whole
1 place	Difficulties in export and import control, difficulty in attracting financing, excessive bureaucracy, lack of risk assessment and return on investment procedures.	Excessive bureaucracy, imperfect legislative environment, inaccessibility of funding for startups and innovative projects, living and working conditions are unattractive for creative people
2 place	Insufficient protection of intellectual property, lack of management personnel, insufficient demand for innovative products, shortage of employees.	Insufficient state support for innovation, lack of "brains" in the country, macroeconomic instability.
3 place	Lack of "culture of innovation" within the company, competitive pressure on the company, problems of commercialization.	The raw material structure of the national economy, a significant presence of the state in the economy.
<b>Government Measures to Promote the Growth of Innovative Activity of Companies</b>		
1 place	Improving the quality of higher education, increasing government funding for R&D, tax incentives, improving legislation.	
2 place	Investments in the creation of infrastructure, attraction of highly qualified foreign specialists, accession to the WTO.	
3 place	Protection of the Uzbek market from foreign competitors, political and organizational support for the promotion of national products to the international market, investment in venture funds.	

A model has been developed for assessing the innovative activity of an industrial enterprise and the personnel of an industrial enterprise, which is characterized by the ability to identify weaknesses in development, make corrective management decisions in the field of doing business, determine priority areas for increasing competitiveness, on the basis of which it is possible to choose the optimal strategy for managing the innovation process, which allows increasing the innovation the receptivity of each employee, the efficiency and competitiveness of the organization as a whole.

A method has been developed for the selection of methods, conditions and principles for stimulating the innovative activity of industrial enterprises, which is distinguished by taking into account the action of factors

that hinder or contribute to the innovative activity of an industrial enterprise; tools of stimulating influence on the innovative activity of an industrial enterprise are proposed, depending on the stages of the innovation cycle.

Selection of a particular method, conditions and principles stimulation depends on the factors that prevent or promote innovation of industrial enterprises, bunching 's in Table 5. The formation and implementation of measures to stimulate the innovative activity of industrial enterprises is based on the creation of such a management, economic and financial system that will make it possible to use the intellectual, scientific, technical and industrial potential of the country with high efficiency in the real sector on a new institutional and legal basis.

**Table 5 - Factors affecting the choice of a method to stimulate innovation**

Factor groups	Stimulating / hindering innovation activity	Measures of influence
<b>Technological</b>	The presence / absence of modern scientific and technical means of production, scientific developments in this area and the possibility of their organization.	Stimulation of scientific research by the state.
<b>Organizational and legal</b>	State support for innovations, presence / absence of a legal framework regulating innovation activity.	Creation and adjustment of the existing regulatory framework.
<b>Organizational and managerial</b>	The presence / absence of a system of strategic planning of innovation activities, organizational innovation structures, target problem groups.	Formation of the organizational structure of innovative development at the enterprise.
<b>Economic</b>	Availability / absence of a system of material incentives for innovative activities; presence / absence of financial, material and technical and other means for the implementation of innovations.	Creation at the enterprise and at the state level of a system of material incentives for innovative activity and providing access to resources for the implementation of innovations.
<b>Social</b>	The presence / absence of the possibility of creative development and self-realization in the team; presence / absence of a personnel adaptation system to innovations.	Creation of a system for stimulating the innovative activity of personnel at the enterprise.

The paper proposes a system of measures to stimulate innovative activity and the introduction of high-tech technologies into production, depending on the following stages of the sequential cycle: ensuring expanded reproduction of knowledge; creation and commercialization and innovation; industrial modernization based on innovation. It is proposed to use the following main groups of instruments for stimulating modernization (Table 6). The implementation of the proposed system of measures for industrial modernization based on innovations will allow obtaining a positive effect of using the country's competitive advantages associated with the availability of raw materials and intellectual potential.

**Table 6 - Directions and instruments of stimulating influence on the innovative activity of industrial enterprises at the stage of modernization based on innovations**

Stage	Principles	Directions	Instruments
Industrial modernization based on innovation	The state, business and science jointly form and implement large projects, participating in them with the resources available to them; the processes of integration of Uzbek companies into the world market through the creation of transnational corporations or participation in them are supported; stimulated	Stimulating the sales market for competitive products and services	Development of mechanisms aimed at purchasing predominantly domestic science intensive products for state needs on a competitive and equal basis. Creation of a system of long-term orders for the supply of high-tech products for government needs and natural monopolies. The use of intergovernmental commissions, offices of trade missions and embassies to assess world markets and political support for the promotion of Uzbek companies there. Assistance in the promotion of innovative goods and services to foreign markets by improving tax and customs policies, including the establishment of a simplified procedure for customs clearance and customs control of the export of

the development and consolidation of small and medium-sized high-tech companies, the formation of new major 's industrial owners of the number of successful managers and entrepreneurs		scientific and technical products. Ensuring fair competition and protection of the domestic science-intensive industry from dishonest practices in trade used by national and foreign firms.
	Encouraging investment in industrial modernization based on innovation	Expansion of practice and improvement of mechanisms of equity financing of large innovative projects by the state and private business. Restricting the use of state-controlled financial institutions to finance the raw materials sector and stimulating financing for the modernization of the manufacturing industry, facilitating access to financial resources for small and medium-sized high-tech companies.
	Encouraging businesses to embrace innovation	Establishing advanced standards for scientific and technical products and introducing measures to stimulate the acquisition by the domestic industry of modern materialized and non-materialized technologies created by Uzbek developers; formation of a forecast for the development of promising "technological corridors".
	Stimulating industrial reform processes	Creation of a system of criteria for the economic efficiency of state scientific and technical organizations and industrial enterprises with the aim of reforming ineffective state organizations and enterprises, including through the transfer of state property on the basis of tenders to the organization of any form of ownership that can ensure the growth of production of high value added products, as well as the development small innovative business. Assistance in the creation and strengthening of corporate structures in the scientific and technical and production and technological spheres, including their scientific and educational organizations.

Reducing the energy and material consumption of production will contribute to the realization of the competitive advantage of proximity to fuel and raw materials. Technological modernization will stimulate the improvement of organizational management of enterprises, will lead to an increase in labor productivity, thereby realizing the advantage of the availability of qualified personnel at a relatively low cost.

## 7. CONCLUSIONS:

- The study has established a system of indicators to measure the innovative activity of industrial enterprises, distinguished by its complex approach to the assessment of the individual components of Dunn first category.
- • A mechanism for classifying the factors of innovative activity of industrial enterprises is proposed, which allows taking into account the interrelationships between innovative institutions, effectively using the available resources for conducting innovative activities.
- The most significant factors stimulating and inhibiting the innovative activity of industrial enterprises have been identified.
- Models for assessing the innovative activity of an industrial enterprise and its personnel are proposed to improve the efficiency and effectiveness of management decisions in the conduct of innovative activities.
- Proposed measures stimulating effects on innovative activity indust 's enterprises in depending on the stages of the innovation cycle and the presence of barriers to conducting innovative activity.

## 8. ACKNOWLEDGMENTS.

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## REFERENCES:

1. Hontaruk, Y. (2020). Development of innovative activity at processing enterprises of agro-industrial complex. *"Economy. finances. management: Topical Issues of Science and Practical Activity,"* (1 (50)), 199–215. <https://doi.org/10.37128/2411-4413-2020-1-14>
2. Bogachev, Yu. S., Moreva, E. L., & Tyutyunnik, I. G. (2018). Conception of the Economic and Financial System, Organizational and the Innovations State Stimulation Administrative Mechanisms in industrial Enterprises Based on the Network Method. *Management Science*, 8(3), 48–63. <https://doi.org/10.26794/2404-022x-2018-8-3-48-63>
3. Ganea, V., Oglindă, L., & Țiganu, A. (2015). Determination of Company Financing Efficiency based on Evaluation Indices of Innovation Performance. *Economy Transdisciplinarity Cognition Www.Ugb.Ro/Etc*, 18(1), 151–156.
4. Durmanov, A., Umarov, S., Rakhimova, K., Khodjimukhamedova, S., Akhmedov, A., & Mirzayev, S. (2021). Development of the organizational and economic mechanisms of greenhouse industry in the Republic of Uzbekistan. *Journal of Environmental Management and Tourism*, 12(2), 331–340. [https://doi.org/10.14505/jemt.v12.2\(50\).03](https://doi.org/10.14505/jemt.v12.2(50).03)
5. S.Umarov Investment and Innovative Development Ways of Water Resources. *American Journal of Business, Economics and Management*. 2016; 4(6): 170-174.
6. Nurimbetov, T., Umarov, S., Khafizova, Z., Bayjanov, S., Nazarbaev, O., Mirkurbanova, R., Durmanov, A. (2021). Optimization of the main parameters of the support-lump-breaking coil. *Eastern-European Journal of Enterprise Technologies*, 2 (1 (110)), 27–36. <https://doi.org/10.15587/1729-4061.2021.229184>
7. Nazarova F., Sangirova U., Abdurazakova N, Beknazarov Z. (2020). Development of human capital management at the transition to the digital economy of the republic of Uzbekistan. *Solid State Technology*, 63 (4), pp. 283-296.3.
8. Horbach L., Hilorme T., Nazarova F., Andriichenko N. (2020). Corporate Restructuring in the Coordinate of the Life Cycle Model. 35th IBIMA Conference: Sustainable Economic Development in Era Digitization, Seville, Spain. URL:<https://ibima.org/accepted-paper/corporate-restructuring-in-the-coordinate-of-the-life-cycle-model-2>
9. Umarov S., Durmanov A., Li M., Khushvaktova K., Yakubova K., Shanasirova N. (2021). Features of the application of game theory in the tasks organizational and economic mechanisms greenhouse economy. *Turkish Journal of Computer and Mathematics Education*, 12 (11) pp. 3544-3550
10. Umarov S., Yusupov E., Yakubova S., Saipova M., Mamasadikov A., Khamrayeva S., Durmanov A. (2021). The cognitive model and its implementation of the enterprise Uzmobil. *Turkish Journal of Computer and Mathematics Education*, 12 (11) pp. 3479-3486
11. Turdieva M.U. (2020). Impact of covid-19 virus on tourism in Uzbekistan. *Bulletin of Science and Education*, 23 (101) pp. 32-34