

AZERBAIJAN REPUBLIC

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**The system of regulation of investment processes in the
innovative development of industrial enterprises**

Speciality: 5311.01 – Organization and management of enterprises

Sphere of science: on the Economy

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ABSTRACT

of the dissertation submitted for the scientific degree of Doctor of
Philosophy

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The dissertation work was implemented at the "Economics and Statistics" department of Azerbaijan Technical University.

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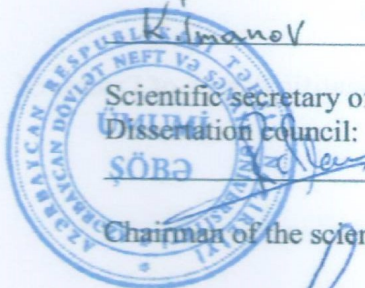
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GENERAL CHARACTERISTICS OF WORK

The actuality of the subject: In the modern era of intensification of globalization processes, technical and technological progress has become a decisive condition for the development of the national economy, increases the importance of industry in the absence of alternatives to innovative development. The growing attention on the most modern areas of industry requires the formation of an adequate production infrastructure that realizes the opportunities of market self-regulation. The diversification of activities in the industry of the XXI century and the restructuring of the field on a scientific basis and the application of resource-saving technologies are accompanied by comprehensively justified approaches, not only from an economic, but also from a social and environmental point of view. All this indicates the objective necessity of innovative development, dominated by science-based activities in industry.

The “State Program on Industrial Development in the Republic of Azerbaijan for the years of 2015-2020” approved by the Order of the President of the Republic of Azerbaijan, Mr. Ilham Aliyev dated of December 26, 2014 stated the priority of innovative development. Based on the program approach, it is planned to ensure the superior development of the non-oil industry, the formation of adequate investment in innovative activities, import substitution and strengthening export potential through the development of local raw materials processing industry, the creation of industrial zones and neighborhoods. For this purpose, systematic measures are being taken to meet investment needs.

The main goal of the document "Main directions of the Strategic Road Map for the national economy and key sectors of the economy" approved by the President of Azerbaijan dated on March 16, 2016 is to accelerate structural reforms in the economy, development of entrepreneurship and accelerate the formation of a healthy competitive environment, also, was to achieve an increase in economic efficiency by involving investments. As a result of the implementation of these state programs, significant progress has been made in increasing investment in the non-oil sector, further expanding

the entrepreneurial and shareholder sectors, and creating or restoring new jobs in the country.

In addition, those programs have facilitated the expansion of economic potential in Azerbaijan, the creation of a free competitive environment, as well as the application of modern management methods by most countries. Benefiting from the experience of developed countries, Azerbaijan continues the promotion activity the liberalization of state property and in the direction of the development of the private sector. The country is preparing a new bill aimed at increasing the efficiency of state property, improving its management and privatization.

Although the level of use of these opportunities is satisfactory, the unused opportunities are greater. In particular, the possibility of organizing the production of competitive industrial products through the widespread use of new, low-waste and waste-free technologies for the use of local raw materials, a fundamentally new approach deserves attention. In the case of new approach, the issues of increasing the level of benefitting from transit transport of the country should be noted especially. For this purpose, the measures should be taken to increase transit traffic through flexible regulation of transportation tariffs, and the system of energy price regulation should be optimized.

In order to fulfill these tasks, it is necessary to create a system of regulation of investment processes adequate to the requirements of innovative industrial production. For this purpose, scientific-theoretical and practical aspects of the regulation of investment processes of innovations in the enterprise should be comprehensively studied.

The provisions substantiated by Azerbaijani economist scientists studying the problems of innovative activity in industrial enterprises and its investment provision, regulation of investment processes of innovative development, and the results obtained are of great scientific and practical importance. Scientific-theoretical, methodological and practical aspects of a number of problems of improving the efficiency of investment processes of innovative production activities in industrial enterprises, the formation of a system of regulation of these processes have been studied in depth by

Nadirov A.A., Samadzada Z.A., Aliyev T.N., Alirzayev A.G., Hasanov R.T., Isgandarov R.K., Gasimov F.H., Guliyev T.A., Najafov Z.M., Novruzov V.T., Safarov G.A., Taghiyev A.H., Taghiyev N.F., Aslanzada I.A., Jafarov N.A., Seyfullayev I.Z., also, Kondratyev N.D., Kushlin V.I., Dinkin A.A., Ivanova N.I., Akimov A.A., Kolosov V.G., Kucheba P.K., Pavlyuk N.Y., Ablyazov V.I., Sheremetyeva Y.N., Perekhodov V.N., Abramov S.I., Baburin V.L., Boldov O.N., Y. Shumpeter, T. Andreassi, S. Basu, J.G. Fernald, M.S. Kimball, G.P. Peter, L.D. Daniel, J.A. Roger, M.K. Edward, C.B. Richard, L.R. Steven and by other scientists of foreign countries. At the same time, it should be noted that the scientists dealt with did not set a goal to comprehensively set a goal the settlement of the system of regulation and improvement of investment processes in the innovative development of industrial enterprises. In the XXI century, there is a serious need for a comprehensive study of the problems of formation and improvement of the system of regulation of investment processes in innovative intensive industrial production in the world and in Azerbaijan.

Objectives and tasks of the research. It consists of studying the theoretical and practical aspects of the formation of the system of regulation of investment processes in innovative industrial enterprises, identifying opportunities for solving economic problems of innovative development in the enterprise, substantiating the priorities of the system of regulation of investment processes and preparing proposals and recommendations.

The following tasks have been identified in accordance with the a goal that has been set forward.:

- ✓ research of conceptual bases of innovative production activity, revealing of its main features in industrial enterprises;
- ✓ Substantiation of theoretical and methodological provisions for joint implementation of innovation and investment policies in industrial enterprises and sustainable development of the enterprise;
- ✓ identification of opportunities for the use of mathematical and statistical models related to innovative development;

- ✓ Analysis of the characteristics of the subsystems of regulation of investment processes of innovative production activities in industrial enterprises;
- ✓ Identify opportunities for the development of an innovative production environment and a system for regulating investment processes in the non-oil industry of Azerbaijan;
- ✓ Identification of directions to increase the investment attractiveness of innovative production in the enterprise;
- ✓ Substantiation of priorities for improving the environment for innovative use of investment potential in industrial enterprises;
- ✓ Preparation of proposals and recommendations on improving the system of regulation of investment processes in innovative industrial production.

The object of research is production enterprises operating in non-oil industries of the country.

The subject of the research is the factors determining the efficiency of an innovative industrial enterprise, the trends and patterns of formation and development of a system of adequate regulation of investment processes to the requirements of innovative activity.

Theoretical and methodological bases of research. Works of Azerbaijani and foreign economists dedicated to the improvement of the environment of innovative production activities in industry, the formation of the system of regulation of investment processes, decrees and orders of the President of the Republic of Azerbaijan, laws adopted by the National Assembly, Cabinet of Ministers and other normative documents were accepted.

Provisions reflecting the effectiveness of the system of regulation of investment processes for the development of innovative industrial production in the conditions of civil market relations, property pluralism form the methodological basis of the research.

Data from the State Statistics Committee of the Republic of Azerbaijan, the Ministry of Economy and other ministries, normative-reference and technological documents of industrial organizations and research institutes belonging to the non-oil sector, as well as special examination and survey materials were used in the work. Statistical-

economic, monographic, target-program and other methods were applied in the dissertation work.

Research methods. Statistical-economic, monographic, target-program and other methods were applied in the dissertation work.

The main provisions for the defense. The openness of the production system in industry to innovation depends on the composition of the factors that shape the purpose of the activity. Determining in which cases the effective management of the environment formed as a result of the influence of these factors can play a significant role in increasing the innovation activity of enterprises.

Substantiation of the priority of innovative development in investment of development resulting in a combination of investment and innovation policy priorities.

Investment analysis and appreciation of the results obtained from the application of most methods of risk management, in many cases the ability to guarantee the reliability of investment decisions.

Identification of the indicators that reflect the innovation activity of industrial enterprises and the indicators that characterize them, taking into account that there are significant differences due to the influence of objective and subjective factors.

Appreciation of the place and role of resource-saving and energy-saving, alternative, renewable energy technologies in increasing the investment attractiveness of innovative production in the industry.

Substantiation of priorities for increasing the investment attractiveness of innovative production in industry.

Proof of the need to support innovative development and create a favorable environment for increasing the competitiveness of science-based activities, including the widespread use of high technologies and complex modernization as a key priority in improving the system of regulation of investment processes in innovative industrial production.

To study the relationship between investment and the factors that affect it for industry, including the processing industry, as well as

the relationship between labor productivity and the factors that affect it as a task of innovation.

Identification of criteria for joint application in a multidimensional approach that takes into account the requirements of innovative intensification and sustainable development in industrial production.

Scientific novelty of the research. The following scientific innovations were obtained in the dissertation work as one of the first steps in the complex study of the problems of formation and development of the system of regulation of investment processes in innovative industrial enterprises:

- Prerequisites for the formation of an innovative environment for the development of industrial enterprises and the circumstances in which this environment can play a significant role in increasing the innovation activity of the industry have been identified;

- Opportunities to ensure the coherence of the priorities of innovation and investment policies in the industry and their implementation, a number of factors that hinder the sustainable development of the enterprise were identified;

- The main characteristics of the systems of regulation of investment processes that serve the sustainable development of the enterprise of innovative production are provided;

- Innovation and investment activity in the non-oil sector of the industry was assessed, opportunities for the development of the system of regulation of investment processes in production innovations were identified;

- Mathematical-statistical model of labor productivity and factors influencing it in the processing industry was obtained as a result of innovation processes, its adequacy was checked by statistical criteria, economic interpretation was provided;

- directions for increasing the investment attractiveness of innovative industrial enterprises have been identified;

- Priorities for improving the environment for innovative use of investment potential in industrial enterprises have been substantiated;

- Proposals and recommendations on improving the efficiency of the investment process regulation system in innovative industrial enterprises have been prepared.

Practical significance of the research. Theoretical and methodological provisions, proposals and recommendations substantiated in the dissertation work allow to accelerate the implementation of new tasks facing the industry of Azerbaijan by applying proposals to improve the system of regulation of investment processes of innovative production activities in industrial spheres.

The proposed approaches are directed to the identification of real prospects for the implementation of opportunities to improve the system of cleaning investment processes in the environment of innovative industrial production. Substantiated proposals and recommendations can be used to increase the economic efficiency of innovation activities in industry, to solve social problems in the conditions of adequate regulation of investment processes for innovative development.

Application of research results. The main provisions, results and proposals of the dissertation were discussed at international and national conferences held in 2014-2020.

During the research, the topic of the dissertation was in line with the general direction of scientific research conducted at the Azerbaijan Technical University. The main provisions and results of the research, substantiated proposals were presented at scientific seminars.

Published materials on the results of the study. The main provisions of the dissertation work were tested in the author's speeches at international and national scientific-practical conferences. The author has published 12 articles and 7 thesis on the topic of the dissertation.

The structure and scope of the dissertation. The dissertation consists of an introduction, 3 chapters, a conclusion, a list of 143 references, the total volume is 144 pages. There are 13 tables, 3 mathematical and statistical models, 1 figure and 3 graphs.

STRUCTURE OF DISSERTATION WORK

INTRODUCTION

CHAPTER I. SCIENTIFIC AND THEORETICAL BASIS OF REGULATION OF INNOVATION AND INVESTMENT PROCESSES IN INDUSTRIAL ENTERPRISES

1.1. Prerequisites for innovative production activities in industrial institutions and factors shaping the development environment

1.2. The matter of integration of innovation and investment policy priorities and theoretical and methodological aspects of sustainable development of industrial enterprises

1.3. Subsystems that ensure the regulation of processes of investing in innovations in industrial enterprises

CHAPTER II. INVESTMENT SUPPLY OF INNOVATIVE PRODUCTION ACTIVITIES IN AZERBAIJANI INDUSTRIAL ENTERPRISES

2.1. Economic analysis of the current state of production of industrial enterprises in Azerbaijan

2.2. Evaluation of innovation and investment activity in the enterprise

2.3. Characteristics of the existing system of regulation of investment processes in the innovative industrial production of enterprises

CHAPTER III. IMPROVEMENT OF INVESTMENT SYSTEM IN PRODUCTION ACTIVITY

3.1. Increasing the investment attractiveness of innovative production in the enterprise

3.2. Improving the environment for innovative use of investment potential

3.3. Directions of improvement of investment processes in innovative industrial enterprises

KEY PROVISIONS PROVIDED FOR DEFENSE

1. Prerequisites for the formation of an innovative environment for the development of industrial enterprises and the circumstances in which this environment can play a significant role in increasing the innovation activity of the industry was identified. (12, p. 1137-1140).

Attempts are made in industry to differentiate the initial conditions of innovative production activities at the industry and enterprise levels. If we try to generalize the results of these attempts, we come to the following classification in the initial approach. Prerequisites for innovative production activities in the field should include the followings: the reality of the danger of moral deterioration of industrial products (shortening the life cycle of products); changes in consumer preferences and the emergence of customer demand for new products; minimizing the possibility of imitation of a new product by competitors, etc.

Prerequisites for innovative production activities at the level of industrial enterprises include: creation of experimental conditions required for the development of priority areas of scientific research; promotion and coordination of collective efforts aimed at innovation, innovation activity in industry in general; recognition of the fact of intensification of competition and acceptance of the need for realistic risk management; elimination of bureaucratic obstacles, etc. should be included.

The openness of the production system in industry to innovation depends on the composition of the factors that form the purpose of the activity. Effective management of the environment formed as a result of these factors can play a significant role in increasing the innovation activity of enterprises in the following cases: the existence of a network-forming structure that creates a multiplier effect on interconnected activities; environmental protection, including the innovation of the mechanism of application of resource-saving technologies; selection of a perspective model of production system, innovative, intensive behavior that meets environmental requirements; modernity of the information system in terms of optimal management of information flows; organic unity of interests of the individual, collective and society in relation to innovative development; availability of functional decomposition capabilities of the main structural units of production and commercial activity.

2. Opportunities to ensure the coherence of the priorities of innovation and investment policies in the industry and their implementation, a number of factors that hinder the sustainable development of the enterprise were identified (1, p.124-129).

The combination of innovation and investment policy priorities in industrial enterprises is crucial for the renewal of fixed assets in a highly competitive environment; implementation of the accelerated depreciation policy; in general, due to the lack of alternatives to the adaptation of the main parameters of large-scale reproduction to the requirements of innovative-intensive development. In order for innovation to become a leading direction of investment activity in an industrial institution, it is necessary to form an optimal economic and institutional provision for the combination of innovation and investment policy priorities.

Factors that delay sustainable development in industrial enterprises should include, first of all: environmental and economic interests, as well as conflicts between individual, collective and field (management) interests; neglect of negative anthropogenic influences and one-sided approaches to their popularization; methodological and informational problems that arise in the process of evaluating the results of relevant monitoring and cannot be eliminated in the course of the work; Presence of normative-legal base for substantiation and implementation of sustainable development decisions at the stage of formation; bureaucratic obstacles in the process of creating an adequate management mechanism for sustainable development; the need for innovation in sustainable development and innovative activity, as a rule, large financial and labor capacity, and etc.

Let's take a look at the factors that delay innovation in the enterprise and the relevant measures that neutralize them, as well as the measures that need to be taken to support innovative activities in the field (Figure 1):

Figure 1.

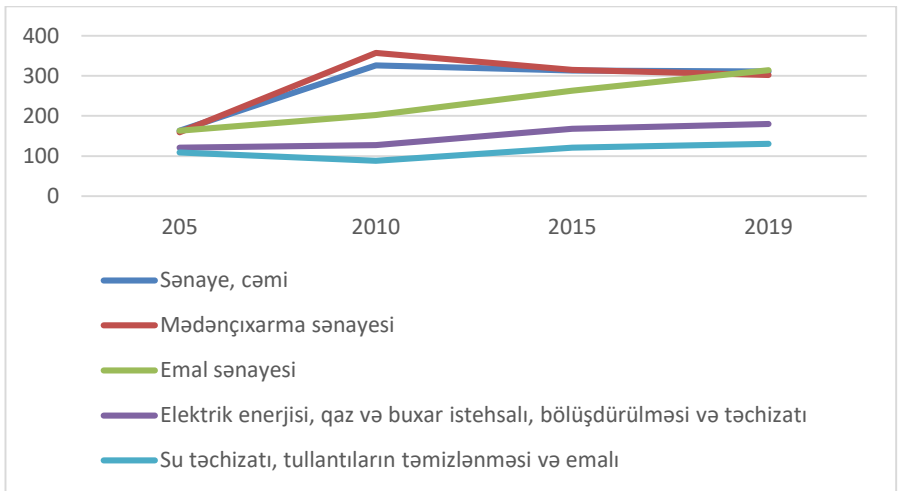
Factors hindering innovative activity in the industry and necessary measures to neutralize them

Factors delay innovative activity	Measures to support innovative activities
<i>Group of economic and technological factors</i>	
Obsolescence of material and technical base	Modernization of material and technical base
Lack of funds to finance innovation projects	Joint use of financial resources and improvement of public-private partnership mechanism
The predominance of current production interests	Promoting the application of advanced technologies and the formation of innovation infrastructure
<i>Group of legal factors</i>	
Restrictions arising from tax, patent-license, antitrust and depreciation legislation	Legislative measures to encourage innovative activities and relevant state protection
<i>Group of organizational and managerial factors</i>	
Possession of the enterprise to a traditional organizational structure	Ensuring the flexibility of the organizational structure
Authoritarian rule and excessive centralization	Democratization of governance
Predominance of vertical information flows of the management	Providing the advantage of horizontal information flows
Problems of interaction between industries and enterprises	Providing the intensity and dynamism of relations
Difficulties in reconciling interests of participants in innovation processes	Formation of target working groups
<i>Group of socio-psychological and cultural factors</i>	

3. The main characteristics of the systems of regulation of investment processes that serve the sustainable development of innovative production of the enterprise are provided. verilmişdir (2, p.73-79).

To promote innovative sustainable development, the tax base in industry should be expanded, the mechanism for targeting tax incentives for innovative activities should be improved by appreciating the possibility of reducing the tax burden, as well as the criteria for minimizing transaction costs should be taken into consideration. Optimization of tax incentives for the part of the enterprise's profits going to reinvestment should be an important aspect of the effective use of investments in innovations, the scope of application of non-linear methods of depreciation should be determined.

Analysis of the dynamics of industrial production indices in different sectors of the country (2000 = 100) shows that the growth rate in the mining industry was higher, especially in 2005-2010. The dynamics of indices in the industrial sectors of Azerbaijan during 2010-2019, with some hesitation, allows us to say that sustainable growth in the processing industry was provided (Graph 1).



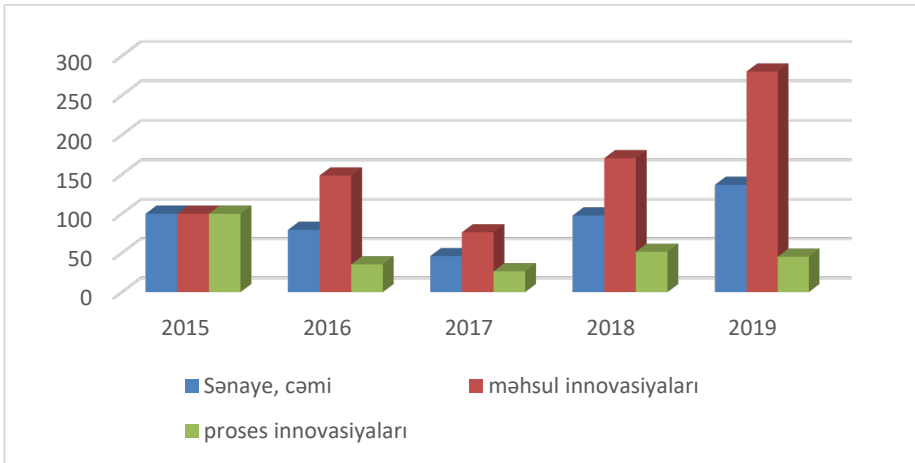
Graph 1. Dynamics of industrial production indexes in Azerbaijan

Source: www.stat.gov.az Industry of Azerbaijan. Baku, 2020, p.16

4. Innovation and investment activity in the non-oil sector of the industry was appreciated, and opportunities for the development of a system for regulating the investment processes of production innovations were identified (4, pp. 83-89; 9, pp. 23-31).

Although the investment attractiveness of a particular sector in the non-oil sector of Azerbaijan's industry is a factor that creates an environment, there is a growing role of information, intellectual and financial resources in the innovation activity of existing enterprises, especially in recent years. The fact that the growth rate of costs for process innovations in the processing industry is constantly exceeding the growth rate of costs for product innovations, does not allow to realize the opportunities to increase the competitiveness of industrial enterprises at the desired level.

Expenditures on technological innovations in product and process innovation in the country's industry fluctuated significantly during 2015-2019 (Figure 2).



Graph 2. Dynamics of costs for technological innovations by types of innovations in industry

Source: www.stat.gov.az Industry of Azerbaijan. Baku, 2020, p.60

In the processing industry during 2015-2019, the growth rate of expenditures on technological innovations on product innovations

was higher than on process innovations. Expenditures on technological innovations on product innovations in the processing industry increased 3.4 times during 2015-2019.

The share of own funds of enterprises in the financing of technological innovations in the country's industry was large, it increased rapidly during 2011-2019 and in 2019 took 48037.1 thousand manats.

The largest amount of funds allocated from the state budget for this purpose is in 2011, which was 8593.0 thousand manats of expenditures on technological innovations in industry. Similar trends are observed in the processing industry. Thus, the share of own funds of enterprises in the financing of technological innovations increased at a high pace during the analysis period, from 20,926.0 thousand manats to 46999.5 thousand manats.

Table 1.

Expenditures spent on technological innovations by types of activities in industry and financial sources, by sthousand manats

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Industry total, thousand manats	31589,0	9326,0	13877,2	21534,1	35179,0	27929,0	16135,7	34353,6	48037,1
Including own funds of enterprises, thousand manats	22996,0	9174,0	12376,9	21133,5	34779,2	14286,5	16076,0	34278,0	47319,7
state budget, thousand manats	8593,0	-	551,2	-	-	-	-	3,6	-
other, thousand manats	-	151,8	949,1	400,6	399,9	1834,3	23,7	-	-
Processing industry	29319,0	8083,0	4066,6	17383,6	32492,5	27744,4	16104,0	32967,6	47658,5
Including own funds of enterprises, thousand manats	20726,0	7931,0	2566,3	16983,0	32092,6	14101,9	16044,3	32892,0	46999,5
state budget, thousand manats	8593,0	-	551,2	-	-	-	-	3,6	-
other, thousand manats	-	151,8	949,1	400,6	399,9	1834,3	23,7	-	-

Source: The table was prepared by the author. Industry of Azerbaijan. Baku, 2020, p.60

5. Directions for increasing the investment attractiveness of an innovative industrial enterprise were identified (3, pp.392-394).

The following areas of increasing the investment attractiveness of innovative production in industry should be considered a priority: large-scale renewal of physically obsolete and obsolete production equipment; modernization of the industry, bringing the output to advanced standards in terms of the ratio of quality and technical and economic parameters; involvement of advanced technology; application of resource-saving and energy-saving, alternative, renewable energy sources; improving the organization of production; modernization of investment infrastructure; ensuring the optimal ratio of incentives, concessions and guarantees to form an effective investment regime; support for cluster development with a well-known entity at the center; development of outsourcing.

6. Priorities for improving the environment for innovative use of investment potential in industrial enterprises were substantiated (6, pp. 348-349).

When preparing investment management decisions for innovative development: imitation experiments should be used in the selection of compromise-based options to ensure the mutual interest of project participants in innovation; Scenarios should be developed and implemented to find the optimal ratio of the mechanism of financing the innovative development process, accompanied by the transformation of uncertainty into risk, the parameters of the use of all possible tools, means and resources; Radical changes in the scientific-theoretical, theoretical-methodological and practical directions of innovation in industry should accelerate the adaptation of the institutional environment to the requirements of innovative development.

The application of investments is carried out on a number of conditions, including political stability in the country, investment attractiveness and so on. aiddir. In this sense, the volume of investment, the factors affecting it should be investigated and the relationship should be analyzed.

Among the factors influencing the volume of investments in industry, including the processing industry in the Republic of

Azerbaijan, many factors, mathematical and statistical models were established, concrete models have been obtained as a result of computer solutions. The obtained models were tested by statistical criteria, and their adequacy was described.

It is known that the application of innovation processes is also reflected in increasing labor productivity. From this point of view, the relationship between labor productivity in the processing industry and the factors affecting it is modeled using the "Statistics" software, the adequacy and interpretation of the model is provided.

Taking this into account, we determined that this relationship is $y=F(X_i), i = \overline{1, n}$ (3.1)

If we write the formula (1.1) openly

$$Y=a_0+a_1x_1+a_2x_2+....a_4x_4 \quad (3.2)$$

Here: y-function

X_i - factor are arguments.

Factors influencing the manufacturing industry include product production (X1), average monthly wage per employee (X2), and availability of fixed assets (X3). Data for 2011-2019 were taken as the analysis period. The following relationships between functions and factors were found while solving a database with a computer correlation program (Table 2).

Table 2.

Correlation analysis

	Y	X1	X2	X3
Y	1			
X1	0.689513	1		
X2	0.472	0.939132	1	
X3	0.195718	0.835794	0.933899	1

As can be seen from Table 2, the relationship between the factors X2X1 and X3X2 is close, so the double correlation between them is $R_{x2x1} = 0.939132$ and $R_{x3x1} = 0.933899$.

However, the relationship between Y and X3 is weak, so $R_{yx3} = 0.195718$.

Then, using the "Statistics" program, the following mathematical-statistical model was obtained between the investment in the processing industry and the factors:

$$Y_1 = -157.198649655748 + 0,573497352X_2 + 1,945522654X_2 - 0,655198716X_3$$

Dispersion analysis

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Appraisal F</i>
Regression	3	21551362.78	7183787.594	17.32096522	0.004501888875
Balance	5	2073726.118	414745.2237		
Total	8	23625088.9			

	<i>Ratios</i>		<i>Standart error</i>		<i>t-statistics</i>	<i>P-Value</i>
Y-transition		5953.586025		3796.272172	1.56827165	0.177605975
X1		-0.129177586		0.073174748	-1.765330102	0.137773967
X2		5.449077086		5.984175939	0.910581029	0.404276324
X3		0.032193487		0.040363634	0.797586437	0.461292096
	<i>Low 95%</i>	<i>Top 95,0%</i>	<i>Low 95,0 %</i>	<i>Top 95,0%</i>		
	-3805.042265	15712.21431	-3805.042265	15712.21431		
	-0.317279264	0.058924093	-0.317279264	0.058924093		
	-9.933736883	20.83189106	-9.933736883	20.83189106		
	-0.071564537	0.13595151	-0.071564537	0.13595151		

Output residue

<i>Obseravtion</i>	<i>Predictable Y</i>	<i>Balance</i>	<i>Standard Balance</i>
1	5605.355264	-235.3552637	-0.46226734
2	6209.720346	-169.7203461	-0.333352106
3	6735.287204	764.7127959	1.501992112
4	7581.559732	58.4402681	0.114784037
5	9274.443668	-774.5436682	-1.521301182
6	9563.892921	385.9070789	0.75797004
7	10054.5614	555.5386047	1.091147692
8	9083.596436	-586.3964363	-1.151756354
9	9256.583033	1.416966615	0.002783101

Let's look at the analysis of the obtained model by statistical criteria: the total correlation coefficient is $R = 0.979506231$, the determination coefficient is $R^2 = 959432457$, the standard error is 161.8213428.

The reported values of the t-Student coefficients that characterize the individual factors of the model are as follows:

$$t_{Y_{hes}}=0,497775111; t_{X1_{hes}}=5,73409532; t_{X2_{hes}}=0,66055948; \\ t_{X3_{hes}}= -5,241696286.$$

With a probability of 95%, the table (critical) value of this indicator is $t_{krit} = 2.78$. So this case, t-Student values of some factors are conditional; $t_{krit} \geq t_{xi}$ does not pay. As for the evaluation of the model as a whole, it is determined by the F-Fisher coefficient. The reported value of the Fisher coefficient of the model is $F_{hes} = 39.4170797$. With a probability of 95%, its table (critical) value is $F_{krit} = 4.12$, and it appears that the condition $F_{hes} > F_{krit}$ is satisfied. Taking all this into account, we note that the model is adequate

This model was obtained by us for investment in the industry as a whole (Y2). The “Correlation” analysis of this model is provided in the table below (table 3).

Table 3

correlation analysis				
	<i>Y</i>	<i>X1</i>	<i>X2</i>	<i>X3</i>
<i>Y</i>	1			
<i>X1</i>	0.256128	1		
<i>X2</i>	0.908473	0.537394	1	
<i>X3</i>	0.805331	0.736958	0.948831	1

As can be seen from the Table 3. the double correlation coefficient is $R_{X3X2} = 0.948831$ and is high, this is also, higher than $R_{Y2X2} = 0.908473$. The weakest link is $R_{Y2X1} = 0.256128$.

The model obtained is as follows:

General results

<i>Regression statistics</i>	
R set	0.955103954
R-square	0.912223563
Normalized R square	0.859557701
Standart Error	644.0071612
Observations	9

Dispersion analysis

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Appraisal F</i>
Regression	3	21551362.78	7183787.594	17.32096522	0.004501888875
Balance	5	2073726.118	414745.2237		
Total	8	23625088.9			

	<i>Ratios</i>		<i>Standart error</i>		<i>t-statistics</i>	<i>P-Value</i>
Y-transition	5953.586025		3796.272172		1.56827165	0.177605975
X1	-0.129177586		0.073174748		-1.765330102	0.137773967
X2	5.449077086		5.984175939		0.910581029	0.404276324
X3	0.032193487		0.040363634		0.797586437	0.461292096
	<i>Low 95%</i>	<i>Top 95,0%</i>	<i>Low 95,0 %</i>	<i>Top 95,0%</i>		
	-3805.042265	15712.21431	-3805.042265	15712.21431		
	-0.317279264	0.058924093	-0.317279264	0.058924093		
	-9.933736883	20.83189106	-9.933736883	20.83189106		
	-0.071564537	0.13595151	-0.071564537	0.13595151		

Output residue

<i>Observation</i>	<i>Predictable Y</i>	<i>Balance</i>	<i>Standard Balance</i>
1	5605.355264	-235.3552637	-0.46226734
2	6209.720346	-169.7203461	-0.333352106
3	6735.287204	764.7127959	1.501992112
4	7581.559732	58.4402681	0.114784037
5	9274.443668	-774.5436682	-1.521301182
6	9563.892921	385.9070789	0.75797004
7	10054.5614	555.5386047	1.091147692
8	9083.596436	-586.3964363	-1.151756354
9	9256.583033	1.416966615	0.002783101

$$Y_2 = 5953,5860250,129177586X_1 + 5,449077086X_2 + 0,032193487X_3 \quad (1.4).$$

Here, the total correlation coefficient is $R = 0.955103954$, the determination coefficient is $R^2 = 0.912223563$, the standard error is 644.0071612.

Reporting values of T-Student ratios:

$t_{y2hes} = 1,56827165$;

$t_{x1hes} = -1,765330102$; $t_{x2hes} = 0.910581029$;

$t_{x3hes} = 0.797586437$.

With a 95% probability, the critical value of the table is $t_{krit} = 2.78$, and none of these ratios satisfies $t_{hes} > t_{krit}$.

The reported value of the Fisher coefficient is $F_{hes} = 17,32096522$, with a table (critical) probability of 95%, $F_{krit} = 4.1$, and the condition $F_{hes} > F_{krit}$ is satisfied for this model.

It is accepted that, the scope of its analysis can be expanded by including other factors in this model and obtaining a new model. However, from the models we received, it is possible to predict investment in processing and industry as a whole.

By the application of innovations, a mathematical-statistical model was established between the factors affecting labor productivity and its level in the enterprises of the non-oil sector of the refining industry. Productivity to labor productivity, mln. man. (X1), value of fixed industrial production assets, mln.man. (X2), number of employees, thousand people (X3). To learn the correlation-regression relationship between these factors, a linear model was selected and the following regression model was obtained:

$$Y = 23206,7607 + 13,01364X_1 - 4,02907X_2 - 106,3678X_3 \quad (3.5)$$

The total correlation coefficient of the obtained model is $R = 0.99135$; The reported value of the F-Fisher coefficient characterizing the model is $F = 76,064$, and its critical value with a probability of 95% is 3.62. So, the reported value of the F-Fisher coefficient is many times higher than its critical value, which is an indication of the adequacy of the model. As for the evaluation of the individual coefficients of the model, this is executed by the t-Student coefficient. The coefficients of the model are compared with the t-Student values and its critical value. It should be noted that with a 95% probability, the critical (table) value of the t_Student ratio is 2.57. In case if, the reported value is greater than the critical value, the

coefficients of the model are considered adequate. Therefore, in our model, only X1 factor satisfies this condition. Other parameters of the model are shown in the table. The model is simple and usable

7. Proposals and recommendations were developed to increase the efficiency of the investment process regulation system in innovative industrial enterprises (5, p. 89-94).

When determining investment needs as priorities for improving the system of regulating the flow of investment resources by industry, enterprise and type of activity, artificial intelligence, as well as, expert systems should be actively applied, the capabilities of neural networks should be realized in the main stages of the transformation of information characterizing investment needs, and simulation scenarios should be established to analyze all the key factors determining the efficiency of financial resources. In a multidimensional approach that takes into account the requirements of innovative intensification and sustainable development in industrial production, it is purposeful to include the following in the criteria for joint application: improving the efficiency of joint management of economic (financial) and environmental risks; increase tax concessions in terms of activating potential investors who will allocate funds for projects that eliminate sharp differences in technological development.

The main content of the research is described in the following published scientific works of the author:

1. İnnovasiya və investisiya siyasətinin prioritetlərinin birgəliyi və sənayenin dayanıqlı inkişafı/ İqtisadiyyat İnstitutu AMEA. Elmi əsərlər №2 Bakı, «Elm», 2015, səh.124-129
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3. İnnovasiyalı sənaye istehsalının investisiya cəlbediciliyinin yüksəldilməsi/ Doktorantların və gənc tədqiqatçıların XX Respublika elmi konfransı “Təhsil nazirliyi” Bakı. 2016, səh.392-394
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- problemləri elmi-praktiki jurnal, Bakı, 2016, №2 (46), səh.83-89
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GA.

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