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IMPROVING INNOVATIVE MANAGEMENT OF INDUSTRY IN THE REPUBLIC OF AZERBAIJAN

Specialty: 5306.01 – Economics of technological innovations

Field of science: 53 – Economy

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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

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Scientific supervisor: doctor of economic science

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GENERAL DESCRIPTION OF THE DISSERTATION

Actuality and development of the topic. In the road map of economic development in Azerbaijan, the increase of export-oriented product production is defined as one of the main directions, and the application of innovative management in industrial enterprises has become particularly relevant. Currently, innovative management methods are not sufficiently applied in the Azerbaijani industry, and scientific research works on the subject are also in the minority. Therefore, it is very important to analyze the level of improvement of innovative management in the Azerbaijani industry and make new proposals. The works of scientists in many countries of the world have been devoted to the investigation of innovative management issues in industrial enterprises. Among them Afuah A., Brousseau E., Christensen C.M., Casper, S., Hurley, R.F, Anisimov U.P., Ogarkov S.A., Baryutin L.S., Garmashova E.P., Asaul A.N., Yakovets Y.V, Duran C., Aygoren, H., Ozcher, N., Ozchiftchi V., Sarichay H., and others can be mentioned. At the national level, the works of many prominent scientists such as Arzu Huseynova, Farman Gasimov, Tabriz Aliyev, Ramiz Humbatov, Kamil Shahbazov, Isa Gasimov, Ali Nuriyev, etc. Although these scientists studied the stimulation of industrial innovations from various aspects, they did not carry out a comprehensive study of the issue of improving the innovative management of the industry. Therefore, at a time when the dynamic development of the industry is supported by the state, a comprehensive study of the issue is an objective necessity.

The object and suject of the research. The object of the research is the innovative management of industries operating in our country. The subject of the study is the investigation of the methods of improving the innovative management of manufacturing enterprises operating in Azerbaijan's industry and the factors that determine the stimulation of their effectiveness.

Goals and tasks of the research. The goal of the dissertation work is to analyze the theoretical and methodological bases of the improvement of innovative management of industry in Azerbaijan,

and to implement the application in industrial enterprises, to prepare important theoretical and practical recommendations for the improvement of innovative management.

In accordance with the purpose of the research, the following tasks were set in the dissertation work:

1. Summarize theoretical views on the nature and content of innovative management in industry and express your attitude to these views.
2. Investigating modern trends and application criteria of innovative management of industry, making proposals that will create positive changes for our country.
3. Analyzing the legal and economic mechanisms of the innovative management of Azerbaijan's industry, and making the necessary recommendations.
4. To compare the industrial potential of economic regions using the "localization coefficient" and "rating evaluation" methods and evaluate the needs of innovative management of the Azerbaijani industry.
5. To assess the efficiency of management innovations and identify the factors that hinder innovative development by conducting statistical analyzes of technological innovations in Azerbaijan's industry.
6. Making proposals for the formation of an innovative management model in the Azerbaijani industry.
7. Putting forward recommendations on the organization models of innovative management in industry across the country and directions for their application control.
8. Preparation of proposals for ensuring the intensification of innovative processes in the Azerbaijani industry.

Methods of the research. The information base of the research is made up of decrees and orders of the President of the Republic of Azerbaijan, various normative-legal documents and methodological tools, information of the Ministry of Economy and the State Statistics Committee, materials of the Economic Scientific Research Institute and scientific practical conferences, internet materials, information

given in the periodical press, as well as SOCAR Polymer LLC. , the existing materials of a number of industrial enterprises such as Azertechnoline LLC, organizes the works of Azerbaijani and foreign scientists dedicated to innovative management, stimulation of innovations and evaluation of the efficiency of innovative development.

Research methods are analysis, synthesis, generalization, comparison and statistical analysis methods.

The main provisions of the defense. The main provisions of the dissertation submitted for defense are as follows:

- The lack of a unified methodological approach and system of indicators for improving the innovative development of the industry creates serious obstacles in determining priorities in this field.
- In order to ensure the innovative development of the industry, it is important to define a strategic approach to innovation development.
- The level of innovative development of industry is determined by the development of innovative activities of industrial parks, industrial districts, technoparks and other industrial enterprises in economic regions.
- The strategy of technological orientation of innovations for the Azerbaijani industry can bring more important results.

Scientific innovations of the research:

1. Using the methods of rating evaluation and localization coefficient, the economic regions of Azerbaijan were analyzed according to the industrial potential according to the new division, and specific economic regions that could give higher results in a short time were determined.
2. Statistical analyzes of economic, production and other factors that hinder innovative development were carried out and it was determined that such factors as insufficient funds, insufficient financial assistance from the state, high economic risk, low innovation potential of the enterprise and high cost of innovations are decisive and important. .

3. Regression analysis was carried out and it was determined that there is a positive correlation between the entire industry and product innovations, and there is no correlation between them and process innovations.
4. A new hybrid model has been defined for our country on the basis of organizational models of innovative management in industry and cost-effective production methods.

Theoretical and practical significance of the research. The results obtained in the current dissertation work are aimed at improving innovative management in the Azerbaijani industry, therefore, justified proposals and recommendations can be used in the analysis and planning of industrial activity.

Approbation and application. The main theoretical propositions, conclusions, proposals of the dissertation were discussed at various scientific-practical conferences and scientific articles were published in scientific journals.

6 articles, including **1** article abroad, and **4** conference materials, including **1** conference material, were published based on the general content of the dissertation work and scientifically verified proposals.

The name of the institution where the dissertation work was performed. The dissertation was completed at the Economic Scientific Research Institute of the Ministry of Economy of the Republic of Azerbaijan.

The structure of the dissertation. Dissertation title page - **1** page, table of contents - **1** page (1047 marks), introduction - **5** pages (9588 marks), chapter 1 **26** pages (50639 marks), chapter 2 **55** pages (80464 marks), 3- The chapter consists of **32** pages (50191 marks), main results - **6** pages (10095 marks), **12** pages of the reference list of **108** names - **149** pages in total. The total volume of the dissertation, excluding the **14** tables, **8** graphs and **4** pictures, bibliography and appendices used in the dissertation work, is 202024 marks.

THE CONTENT OF THE DISSERTATION

MAIN CONTENT OF THE RESEARCH

In the introduction, the relevance of the topic is justified, the level of study of the problem, goals and tasks, the main propositions defended, theoretical-methodological bases, methods, scientific innovations and practical importance are indicated.

The essence of innovative management in industry, modern trends and application criteria of innovative management were investigated in the first chapter of the thesis, which is called the theoretical-methodological basis of the organization of innovative management in industry. The main goal in the application of innovations in the industry is to achieve a continuous increase in productivity. It is impossible to develop innovative products and services without an effective coordination mechanism between state authorities and industrial enterprises. One of the evaluation tools used in the field of innovation is the Global Innovation Index, which is based on the calculation of the variables used by countries to achieve the target strategy. According to the indicators of 2022, Azerbaijan ranks 93rd in this rating with 21.5 points. Considering the high potential of our country, this rating is not a good result, and unfortunately, Azerbaijan was the last among the countries of the South Caucasus. Even here, one negative thing is that our country has fallen 13 places compared to the result of 2021. So, if we look at the scores of our country on various parameters, it has the lowest scores among South Caucasus countries in areas such as knowledge creation, access to ICT, export of ICT services, industrial designs by origin, online creativity, github usage and mobile application creation. Taking these into account, it is necessary to develop a joint strategy with reputable international consulting companies and conduct purposeful activities on the indicators in order to increase the rating of our country in this index.

In order to investigate innovative development at the international level, the technology park experience of developed countries should also be studied. Technoparks are considered as one of the important details of economic and technological progress in countries that have reached a high level of development. In order for

Azerbaijan to rise as a country with a high level of industrial technological development, more importance should be given to the spread of technological parks. Many nuances should always be in focus to increase efficiency in technology parks that have started to operate. Thus, there should be comprehensively developed infrastructure and scientific-research institutes in the regions where technoparks are located. Another important issue is related to the patent. It is natural that the industrialist who thinks that the profit of his innovative activity and the production he realizes will return to him in the future will work with greater incentive. International experience also shows that state support and tax incentives play a more serious role in the first years of operation of technological parks. However, this support should not be spontaneous, but should be implemented through deep analysis, the formation of a transparent business environment, and the provision of low-interest loans to residents.

In the second chapter, devoted to the analysis of the current state of innovative management in the Azerbaijani industry, the legal and economic mechanisms of innovative management, development directions were examined and the efficiency of management innovations was evaluated.

Effective establishment of industrial enterprises in the regions should be carried out with a comprehensive assessment, taking into account the territorial location and strategic planning. Different rating evaluation methods can be used to compare the industrial potential of different regions in the Republic of Azerbaijan. The essence of the rating evaluation is based on the comparison of the evaluated object with its highest state. This methodology helps to concretely calculate the ranking of administrative regions for different years for different indicators. In this case, the mathematical function will be:

$$R_i^a = 1 + (n-1) * (A_{max} - A_i)/(A_{max} - A_{min})$$

Here, $\mathbf{R_i^a}$ is the rating of the i region on the A indicator, n is the number of economic regions for which the rating is calculated, $\mathbf{A_{max}}$ is the maximum value on the A indicator, $\mathbf{A_i}$ is the indicator itself, $\mathbf{A_{min}}$ is the minimum value on the A indicator. Then, to calculate the final

rating for economic region i, the numerical average of the ratings calculated for various indicators is calculated as follows. Here, m is the number of indicators.

$R_i^{total} = \left(R_i^a + R_i^b + \ldots + R_i^z\right)/m$

A rating assessment was made for the period from 2013 to 2021 using the economic statistical data of the State Statistics Committee of the Republic of Azerbaijan. The industry statistics used for rating evaluation are shown below:

- Value of industrial products by regions at actual prices (thousand manats)
- The number of enterprises operating by region
- Number of private entrepreneurs registered to engage in industrial activity (people)
- Specific weight of the non-state sector in the volume of industrial output by region (percentage)
- Loaded goods, (million manats)
- End of year balance of finished products stock (million manats)

Later, the rating evaluation method was applied using the statistical values for the regions and a comparative analysis of the Azerbaijani industry by regions was carried out. The highest industrialization process in our republic belongs to the city of Baku and the Absheron-Khizi economic district, and the area with the lowest industrialization belongs to the Karabakh and Eastern-Zangezur economic districts, which have been occupied for a long time. So, if we pay attention to the value of industrial products in actual prices by region, Baku city differs sharply from other regions. By applying the rating assessment method, rating calculations were performed among 13 other economic regions of the Republic of Azerbaijan, excluding Baku city, and priority regions for the establishment of industrial zones were determined. Since Baku city's industrial indicators are generally the main part of the country's industry and are significantly higher than other economic regions, the indicators of Baku city were not included in the calculations in order to see the difference between

economic regions more clearly. As a result, according to the main indicators of the industry, it was determined that Absheron-Khizi, Ganja-Dashkasan and Nakhchivan economic regions have greater prospects for the future development of the industry and the creation of new enterprises. It can be concluded that the development of industry in the mentioned economic regions is a priority for our state. The fact that the East-Zangezur and Karabakh economic regions were under the occupation of Armenia for a long time resulted in the collapse of the infrastructure there.

In Sheki-Zagatala, Guba-Khachmaz and Lankaran-Astara economic regions, industrial production was formed at a level below its potential.

In Table 1, the overall final ratings for all these 6 criteria are calculated.

Economic Regions	Absheron-Khizi	Ganja-Dashkasan	Kazakh-Tovuz	Sheki-Zagatala	Lankaran-Astara	Guba-Khachmaz	Central - Aran	Mil-Mugan	Shirvan-Salyan	Karabakh	Eastern Zangezur	Mountainous Shirvan	Nakhchivan	Years
Final Rating	4	6	9	8	9	9	8	9	7	11	13	11	5	2013
	4	6	9	7	9	9	8	9	8	11	13	11	5	2014
	4	6	9	8	9	10	9	9	9	11	13	11	5	2015
	2	5	9	7	9	9	9	7	8	10	13	11	5	2016
	2	6	9	7	9	10	8	8	8	10	13	11	6	2017
	2	6	9	8	8	10	9	9	7	10	13	11	6	2018
	2	6	9	8	9	10	9	9	9	10	13	11	8	2019
	1	6	9	8	9	9	9	9	8	11	13	10	8	2020
	2	8	10	9	9	10	10	9	9	11	12	11	9	2021

* Prepared by the author based on the data of the State Statistics Committee of the Republic of Azerbaijan.

Here, Empig – shows the production output of i sector in economic region g, Empg – total production output in economic region g, Empi – total production output of i sector in the country, Emp – total production output of the country. In the period from 2013 to 2021, "Localization coefficient" for the city of Baku and other economic regions based on actual prices and values of output and industrial output in the main sectors of the economy for the Republic of Azerbaijan in general, Baku city and 13 economic regions separately. calculated. The values obtained as a result of the calculation are listed in the table below.

Table 2 "Coefficient of localization" of economic regions of Azerbaijan for 2013-2021

Economic Regions	Baku	Absheron-Khizi	Ganja-Dashkasan	Kazakh-Tovuz	Sheki-Zagatala	Lankaran-Astara	Guba-Khachmaz	Central - Aran	Mil-Mugan	Shirvan-Salyan	Karabakh	Eastern Zangezur	Mountainous Shirvan	Nakhchivan	Years
Localization coefficient	1.3	0.7	0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.6	0.1	0	0.1	0.6	2013
	1.2	0.7	0.3	0.1	0.2	0.1	0.1	0.3	0.3	0.7	0.1	0	0.1	0.6	2014
	1.2	0.9	0.5	0.2	0.2	0.1	0.1	0.4	0.3	0.6	0.1	0	0.1	0.7	2015
	1.2	1.1	0.6	0.3	0.3	0.1	0.1	0.4	0.6	0.6	0.1	0	0.1	0.6	2016
	1.2	1.1	0.6	0.3	0.3	0.1	0.2	0.5	0.4	0.6	0.1	0.1	0.1	0.6	2017
	1.2	0.9	0.6	0.3	0.3	0.1	0.2	0.4	0.3	0.6	0.1	0	0.1	0.5	2018
	1.2	0.8	0.7	0.3	0.4	0.2	0.3	0.4	0.5	0.7	0.2	0	0.1	0.5	2019
	1.2	1	0.7	0.3	0.5	0.2	0.3	0.5	0.6	0.7	0.2	0	0.2	0.6	2020
	1.2	1.2	0.7	0.3	0.5	0.3	0.3	0.5	0.5	0.7	0.1	0	0.2	0.5	2021

When analyzing the results in the above table, it should be taken into account that the obtained values greater than 1 or equal to 1 indicate the presence of high potential in the region in that area, and close to 0 indicates very low potential. As can be seen from the table, the regions with the highest industrial potential are Baku city and Absheron-Khizi economic region. Then Ganja-Dashkasan, Shirvan-Salyan and

Nakhchivan economic regions are ahead of other regions in terms of industrial potential. According to the localization coefficient, the economic regions with the lowest potential were calculated as Lankaran-Astara, Mountainous -Shirvan, and Karabakh and East-Zangezur economic regions, which were under enemy occupation for nearly 30 years. Thus, economic regions with a high localization coefficient have a more favorable opportunity to establish new industrial enterprises.

Then, based on the data of the State Statistics Committee, the factors influencing the innovative development of industrial enterprises in our country were statistically analyzed for the 14-year period from 2008 to 2021. Here, various economic, production and other factors were used for detailed analysis, and mainly the following statistical operations were carried out:

- The 95% statistical confidence interval of decisive, important and minor factors that hinder the implementation of innovations in industrial enterprises was calculated.
- Alternative Hypothesis H_A: $\mu_1 > \mu_2$ versus Null Hypothesis H_0: $\mu_1 \leq \mu_2$ was calculated and determined which are considered crucial and important among economic, production etc.

The factors used for statistical analysis are listed below:

Economic factors:

- Lack of own funds
- Lack of financial assistance from the state
- Low paying demand for fresh products
- High value of innovations
- High economic risk
- Long payback periods for fresh products

Factors of production:

- Low innovation potential of the enterprise
- Lack of qualified workers
- Lack of information about new technologies
- Non-acceptance of innovations by enterprises
- Lack of information about sales markets

- Lack of opportunities for cooperation with other institutions and other scientific organizations

Other reasons:

- Lack of need for new products as a result of earlier innovations
- Absence of legislation and normative-legal documents regulating and encouraging innovation activities
- Indeterminacy of innovation process duration
- Lack of development of innovation infrastructure (mediation, information, legal, banking, etc. services).
- Lack of development of the technology market

Then, a t-test was performed for decisive, important and less important factors that are an obstacle to innovative development, and the alternative hypothesis $H_A: \mu_1 \geq \mu_2$ versus the null hypothesis $H_0: \mu_1 < \mu_2$ was statistically analyzed. Here t was calculated and confidence coefficient $\alpha=0.05$ was compared with $t\alpha$ corresponding to n_1+n_2-2 degrees of freedom. The reliability coefficient of t_α is $\alpha=0.05$, and its value corresponding to the degree of freedom 14+14-2=26 is equal to 2.0555.

$$t = (\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)/S_p * \sqrt{(1/n_1 + 1/n_2)}$$

$$S_p = \sqrt{(n_1 - 1) * S_1^2 + (n_2 - 1) * S_2^2}/(n_1 + n_2 - 2)$$

The S_p and t values obtained as a result of the calculation are given in Table 3.

Table 3. t-test for decisive, important and less important factors that hinder innovative development in industrial enterprises

The number of enterprises that consider the following factors as obstacles to innovative development		Decisive and important		Little important			
	N	Average	Standard deviation	Average	Standard deviation	S_p	Calculated t value
Economic factors							
Lack of own funds	14	53	10.5	20.86	12.58	11.59	7.3

Lack of financial assistance from the state	14	30.07	9.42	17.71	3.12	7.02	4.63
Low solvency demand for fresh produce	14	24.93	7.59	20.64	9.94	8.84	1.28
High value of innovations	14	35.43	7.82	19.29	11.77	9.99	4.25
High economic risk	14	27.07	6.26	19.93	9.59	8.1	2.32
Long payback periods for fresh produce	14	22.86	10.52	27.57	9.14	9.85	-1.26
Factors of production							
Low innovation potential of the enterprise	14	33.93	8.15	18.29	8.7	8.43	4.88
Lack of qualified workers	14	19.57	6.76	25.14	6.53	6.65	-2.2
Lack of information about new technologies	14	23.07	7.52	18.71	4.63	6.24	1.84
Failure to adopt innovations by enterprises	14	17.36	6.87	19.79	6.7	6.79	-0.94
Lack of information about sales markets	14	16.93	6.98	18.64	7.72	7.36	-0.61
Lack of opportunities for cooperation with other institutions and other scientific organizations	14	10.64	8.72	22.71	5.22	7.19	-4.42
Other reasons							
Lack of need for new products	14	14.07	7.9	22.21	11.81	10.05	-2.13

because of earlier innovations							
Lack of legislation and normative-legal documents regulating and encouraging innovation activity	14	21.36	6.56	16.43	5.98	6.28	2.07
Indeterminacy of innovation process duration	14	13.43	7.5	19.21	6.33	6.94	-2.19
Lack of development of innovation infrastructure (mediation, information, legal, banking, etc. services).	14	21.43	6.24	17.14	7.2	6.74	1.67
Lack of development of technology market	14	23.29	9.08	20.57	7.45	8.31	0.86

Source: based on the data of the state statistical committee

Among the calculated t values, the null hypothesis is discarded and the alternative hypothesis is accepted in the statistical analysis conducted for factors greater than 2.0555 with a value of t_{α}=0.05 for 26 degrees of freedom. The calculated t values are equal to 7.3 in the factor of insufficient own funds, 4.63 in the factor of insufficient financial assistance from the state, 2.32 in the factor of high economic risk, 4.88 in the factor of low innovation potential of the enterprise, and 4.25 in the factor of high value of innovations. Since the calculated results of these mentioned factors are greater than 2.0555, the Alternative Hypothesis H_A: $\mu_1 \geq \mu_2$ is accepted and it is statistically proven that these factors are considered decisive and important by most enterprises. On the other hand, since the calculated t values for

other factors in the table are smaller than 2.0555, the alternative hypothesis is not accepted, and we cannot come to the conclusion that these factors are decisive and significant.

Thus, it is statistically proven that some of the above-mentioned economic, production and other factors that hinder innovative development by a large number of industrial enterprises are decisive and significant. Therefore, in order to ensure innovative development of industrial enterprises, it is recommended to pay more attention to the factors of lack of own funds, lack of sufficient financial assistance from the state, high economic risk, low innovation potential of the enterprise, and high cost of innovations, and first of all, these difficulties should be eliminated.

Then, by conducting a simple linear regression analysis, the linear relationship between product innovations and industrial innovations as a whole was determined and the regression equation was calculated. Using the following formula, we calculate the correlation coefficient as r=0.92.

$$r = \sum(x - \bar{x}) * (y - \bar{y}) / \sqrt{\sum(x - \bar{x})^2 * \sum(y - \bar{y})^2}$$

Then the t test was performed and the alternative hypothesis H_A: $\rho \neq 0$ (Correlation exists) against the null hypothesis, H_0: $\rho = 0$ (Correlation does not exist) was statistically analyzed. Here, the t value is calculated using the following formula:

$$t = r / \sqrt{(1 - r^2)} / (n - 2)$$

was calculated as 9.33 with the formula and $\alpha=0.05$ reliability coefficient was compared with t_α in the student t table corresponding to n-2 degrees of freedom. In the table, the reliability coefficient of $t_{\alpha/2}$ is $\alpha=0.025$, and the value corresponding to the degree of freedom 17-2=15 is equal to 2.13. If $t>t_{0.025}$ or $t<-t_{0.025}$ H_0 $\rho=0$ (null hypothesis) is rejected and Alternative Hypothesis H_A: $\rho \neq 0$ is accepted. Otherwise, H_0 $\rho=0$ (null hypothesis) should be accepted. Here, since 9.33>2.13, the Alternative hypothesis H_A: $\rho \neq 0$ is accepted and it is confirmed that there is a correlation between these quantities. The alternative hypothesis H_A: $\rho^2>0$ versus the null hypothesis, H_0: $\rho^2=0$ was statistically analyzed by applying the F test for the coefficient of determination. Here F=(SSR/1)/(SSE/n-2) df degree of freedom is

calculated based on (D_1=1, D_2=n-2) and α=0.05 reliability coefficient, D_1=1, D_2=n-2=17 The value in the f table corresponding to n-2=15 degrees of freedom is compared to 4.5431. If the calculated f value is greater than $f_{0.05}$ (D_1=1, D_2=15), H_0 ρ=0 (null hypothesis) is rejected, otherwise H_0 ρ=0 (null hypothesis) is accepted. In the present case, since SSR=3787183329, SSE=653216294, and SST=4440399623, F=86.97 is calculated, and since F=86.97> $f_{0.05}$ (D_1=1, D_2=15)=4.5431, the alternative hypothesis H_A: $\rho^2>0$ is accepted. This means that it is statistically proven that the independent variable explains a large part of the dependent variable.

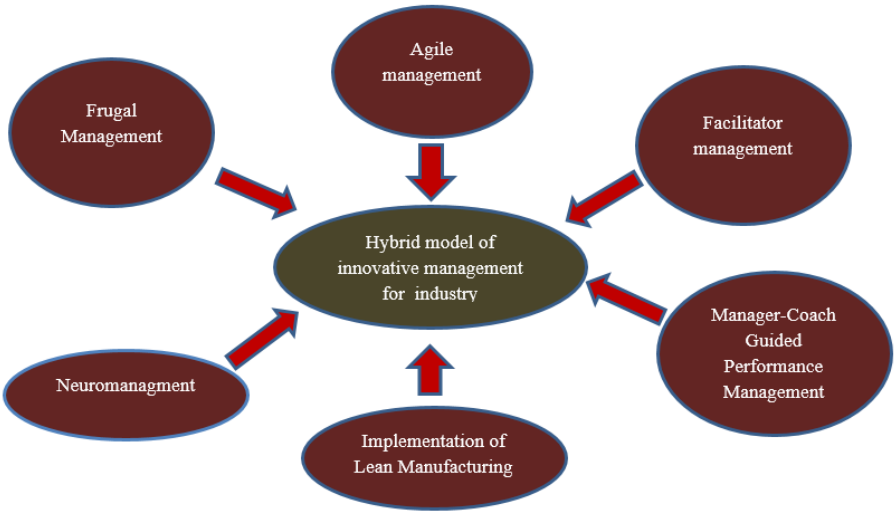
Then, we calculate the correlation coefficient as r=0.43 based on the statistical calculations of expenditures on technological innovations for all industrial and process innovations. A t test is performed and the alternative hypothesis H_A: ρ≠0 (Correlation exists) versus the null hypothesis, H_0: ρ=0 (Correlation does not exist) is statistically analyzed. Here, the t value was calculated as 1.83 and the confidence coefficient α=0.05 was compared with t_α in the student t table corresponding to n-2 degrees of freedom. In the table, the reliability coefficient of $t_{\alpha/2}$ is α=0.025, and the value corresponding to the degree of freedom 17-2=15 is equal to 2.13. If t>$t_{0.025}$ or t<- $t_{0.025}$ H_0 ρ=0 (null hypothesis) is rejected and Alternative Hypothesis H_A: ρ≠0 is accepted. Otherwise, H_0 ρ=0 (null hypothesis) should be accepted. Here, since 1.83<2.13, H_0 ρ=0 (null hypothesis) is accepted and it is statistically confirmed that there is no correlation between these quantities. The alternative hypothesis H_A: $\rho^2>0$ versus the null hypothesis, H_0: $\rho^2=0$ was statistically analyzed by applying the F test for the coefficient of determination. Here F=(SSR/1)/(SSE/n-2) df degree of freedom is calculated based on (D_1=1, D_2=n-2) and α=0.05 reliability coefficient, D_1=1, D_2=n-2=17-2=15 The value in the f table corresponding to n-2=15 degrees of freedom is compared to 4.5431. If the calculated f value is greater than $f_{0.05}$ (D_1=1, D_2=15), H_0 ρ=0 (null hypothesis) is rejected, otherwise H_0 ρ=0 (null hypothesis) is accepted. In the present case, since SSR=807770425, SSE=3632629198, and SST=4440399623, F=3.3355 is calculated, and since F=3.3355< $f_{0.05}$ (D_1=1, D_2=15)= 4.5431, the null hypothesis H_0: $\rho^2=0$ is accepted. This

means that we cannot statistically prove that the independent variable explains a large part of the dependent variable.

In the third chapter of the dissertation work, which is called the formation of priorities and application of innovative management in the Azerbaijani industry, the innovative management model for the Azerbaijani industry was formed by examining the organization models of the innovative management of the industry and the control directions of their application. It was recommended to allocate venture capital as a financial mechanism for promising and risky activities of new small companies and start-ups based on scientific and technical innovations. The importance of realizing the venture capital to newly created innovative industrial enterprises not only by investors in the form of private investment, but also by the investments of state institutions was reported. It has been advised that investors operating in traditional business fields in our country should create venture companies and venture funds and encourage the innovative development of the industry in a more organized manner. Such venture funds can help in the development of innovation infrastructure, optimization of the business sphere, inviting foreign investors to Azerbaijan, and even the operation of local projects in foreign countries. It was also recommended to expand relations between industrial enterprises and give preference to purchasing raw materials, spare parts and other products from other residents of industrial parks. As a generalized suggestion, industrial enterprises operating in Azerbaijan can accelerate their innovative development by working together with scientific educational institutions in technological parks, industrial parks concessions, using venture capital and applying cost-effective production methods.

On the basis of various innovative management models, a hybrid model was proposed for the industry of our country, taking into account the scope and structure of enterprises. This model envisages the symbiotic use of flexible management, cost-effective management, mental management, facilitator-led and management-led management in accordance with needs, taking into account continuous development and changing conditions. Thus, continuous contact with customers,

flexible response to changes, quick adaptation to a changing environment, cost reduction through cost-effective methods, elimination of unprofitable activities, reduction of stress in the work environment, stimulation of creativity, creation of team spirit and



coordination among employees, not just by directive methods, are the main features of this model. . In the hybrid model of innovative management of industry, the application of various elements from cost-effective production methods in accordance with the field of activity of industrial enterprises is envisaged.

Picture 3.2.3. Hybrid model of innovative management for industry

Using the features of Kanban, 5S, poka yoke and other methods, it is intended to create more favorable working conditions and minimize production losses in industrial enterprises. Thus, with kanban signal cards, information about products and spare parts is transferred between processes. With the full-time production method, the necessary measures are taken immediately, taking into account the amount and time of demand. Here, excess production and warehouse stocks are treated as waste, and full-time production methods eliminate

warehouse space limitations, unplanned raw material supply, and production bottlenecks. With kaizen methods, wasteful activities are removed over time with continuous improvement measures in industrial enterprises, and functionality is increased with poka yoke, labeling, and visual control measures. The tagging method, in its simplest form, provides workers with faster access to the necessary tools and helps reduce time wastage. These types of measures make a positive contribution to the health and safety of workers in industrial enterprises.

As these methods aim at the economical use of raw materials and other resources, they contribute to the prevention of pollution by reducing emissions and have a positive impact on the environment. Therefore, we can note that there is a positive correlation between lean production and green production.

Although the modern industry uses artificial intelligence, data analysis, robotics, cloud technologies, etc. equipped with, digitized and automated, there is still a need for human intervention in certain parts. In such cases, cost-effective production methods come to the fore and become an integral part of the modern digitized industry. However, in the hybrid model we offer, taking into account the new trends in the industry and the factor of digitization, certain innovations and changes in cost-effective production methods have also been taken into account. So, instead of traditional kanban cards, it is recommended to use kanban cards in electronic form, and the value flow map method performed on paper to be organized in electronic form, and other such changes are recommended. Figuratively speaking, lean production methods create synergy with modern digitized industry. A digitized supply chain integrates lean production methods with just-in-time manufacturing and helps manage raw materials, supplies, and warehouse inventory with accurate, timely information. The method of universal maintenance of equipment, which is another cost-effective production method, is directly related to the concepts of virtual reality and artificial intelligence of modern industry. Thus, it is possible to successfully apply the universal maintenance

method by using the possibilities of virtual reality (direction of instructions to the monitor helmet, statistical analysis of equipment stops, etc.). Another cost-effective manufacturing method, value stream mapping, is related to the Internet of Things. Thus, the method of value stream mapping, based on the identification and elimination of waste in production processes, works even more effectively with the help of Internet of Things technology to obtain accurate information in real-time flow. Our proposed hybrid model includes principles such as reducing waste in production, better visual organization, and reducing the duration and number of downtimes. At the same time, the use of large databases is based on the integration of systems such as cloud technologies and virtual reality. Thus, digitization will help industrialists achieve more perfect results by using cost-effective production methods. In the hybrid model, lean production methods are applied in different forms at different times, with workers focusing on value-adding operations and eliminating waste. These coordinated systems analyze data to predict outages and adapt to changes. Continuous application of lean manufacturing methods leads to continuous improvement, high quality and customer satisfaction.

CONCLUSION

In the course of the research, the following conclusions and suggestions on the current situation were obtained on the basis of analysis and assessments:

The increase of innovation-based activities enables the formation of industries based on high technologies. Although the systematic and continuous support of the state in the Azerbaijani industry has a positive effect on innovative activity, the desired results have not yet been achieved.

Taking all this into account, the following important results were obtained:

1) On the basis of international experience, the experience of the United States, Great Britain, Japan, South Korea and other developed countries in the innovative management of the industry, the level of development of technological parks has been assessed and the cases

that can be applied to our country include the strengthening of the promotion of foreign investments, the involvement of state aid and tax incentives. has been done.

2) It was concluded that the preparation of the innovation strategy aimed at technological development is of great importance in the formation of the innovative management model in the industry of our country.

3) Based on the statistics collected by the State Statistics Committee of the Republic of Azerbaijan from 2013 to 2021, rating evaluations were carried out for the city of Baku and other economic regions and it was determined that Baku, Absheron-Khizi, Ganja-Dashkasan and Nakhchivan regions have the highest industrial potential. It is selected from other economic regions of Azerbaijan. Later, "Localization coefficient" was calculated for Baku city and other economic regions. As a result, it was determined that Baku, Ganja-Dashkasan, Absheron-Khizi and Nakhchivan economic regions are ahead of other economic regions in terms of industrial development. According to the localization coefficient, the economic regions with the lowest potential were calculated as Lankaran-Astara and Mountainous -Shirvan. Thus, the economic regions with high potential for investments in the future are the regions selected with high coefficient values. Because the economic regions with high potential will create conditions for the return of the investments made in a shorter time and high income.

4) A comparative analysis of industrial enterprises in our country according to the type of activity and ownership, their number, the value of the manufactured product, the number of salaried employees and the nominal salary was carried out. Taking these into account, it was recommended that in order to achieve high results in a shorter period of time across the country, importance should be given to the development of non-state enterprises operating in the processing industry in particular, and the factors that hinder innovation should be eliminated. After the statistical analyzes in the analysis of the economic regions of Azerbaijan according to their industrial potential and the analysis of the activity of the industry in Azerbaijan, in order

to ensure innovative development, it was recommended to ensure the exchange of information about qualified personnel and modern technologies, to allocate a significant amount of funding from the state, and to expand the opportunities for joint activities with scientific organizations. , priority should be given to the preparation of legislative and normative-legal documents regulating and encouraging innovation activity and the formation of innovation infrastructure.

5) Factors such as lack of own funds, lack of sufficient financial assistance from the state, high economic risk, low innovation potential of the enterprise, and high cost of innovations have been proved to be decisive and important factors that hinder the innovative development of industrial enterprises. Therefore, in order to ensure innovative development of industrial enterprises, it is recommended to pay more attention to these factors first and to eliminate these difficulties.

6) Statistical calculations of technological innovation expenditures for the years 2005-2021 for all industries and manufacturing industries were carried out, and it was determined that there is a positive correlation, that the independent variable explains a large part of the dependent variable. Statistical calculations and hypothesis analysis conducted on process innovations for all industries and processing industries did not prove correlation. Therefore, it is concluded that product innovation should be given more attention than process innovation in order to achieve high results in the manufacturing industry and industry as a whole.

7) The following ways are indicated for the development of manufacturing enterprises in Azerbaijan and for increasing the export of industrial products:

- Encouraging private entrepreneurship and start-ups for the development of competitive industrial production based on innovation and high technologies in our republic, attracting foreign investments, establishing joint ventures with transnational ICT companies, eliminating bureaucratic obstacles in the import and export processes of high-tech products, customs concessions, establishment of favorable conditions with a number of measures such as the application of international experience in our country

- Providing state support to the activities of independent entrepreneurs in this field with business training, infrastructure opportunities, concessional loans, business incubators
- Achieving sustainable development using the experience of developed countries and modern trends in the non-oil sector of industry
- Increasing employment in the processing sector of the industry and combating unemployment

8) For the Azerbaijani industry, depending on the field of activity and structure of enterprises, a hybrid based on continuous contact with customers, flexible response to changes, quick adaptation to a changing environment, cost-effective methods, elimination of unprofitable activities, stress reduction in the work environment, stimulation of creativity and continuous use of cost-effective production methods link to the model is marked.

9) In order to ensure the intensification of innovative processes in the industry, the need for direct state intervention and the application of the experience of developed countries was stated.

The main content of the dissertation is reflected in the following published works.

1. Süleymanlı, O.Z. Azərbaycan sənaye parklarının innovativ idarə edilməsinin iqtisadi hüquqi mexanizmləri // - Bakı: Azərbaycan Universitetinin Elmi Jurnalı İpək Yolu, - 2021, - ISSN 1810-911X, - No. 2, - s. 97-103

2. Süleymanlı, O.Z. Azərbaycanın işğaldan azad olunmuş ərazilərində sənayenin innovativ inkişafı perspektivləri. // Beynəlxalq İpək Yolu və Naxçıvan. Beynəlxalq elmi konfrans, - Naxçıvan: Naxçıvan Universiteti, 22-23 Noyabr, 2022

3. Süleymanlı, O.Z. Sənaye parklarının inkişafının dünya təcrübəsi // - Bakı: Azərbaycan Universitetinin Elmi Jurnalı İpək Yolu, - 2020, - ISSN 1810-911X, - No. 3, - s. 114-118

4. Süleymanlı, O.Z. Sənayenin innovativ inkişafında qənaətli istehsal metodlarının tətbiqi // – Naxçıvan: Naxçıvan Universitetinin

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