Innovative industrial production environment and improving its economic efficiency

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Abstract — The theme of the article is of particular relevance, since innovative approaches and innovations in the industry are considered important and effective for all periods. In this study, the authors use comparative reconciliation and descriptive methods to analyze the modern industrial environment and make new proposals to improve its economic efficiency, which constitutes the scientific novelty of the research. The main purpose of the research is to identify and analyze new trends and innovative approaches to improving the economic efficiency of the industrial production environment. In conclusion, it is noted that the impact of factors that impede innovative development in the country's industry should be minimized, including the interest in innovation in enterprises, and their innovation potential. Such findings can be particularly important in the effective application of innovations in the industry.

Keywords — industry, innovations, economic efficiency, new trends in industry, innovation potential, product.

I. INTRODUCTION

Innovation environment means the innovation environment of the innovation process participant. Components of the environment are a system of elements that create environments in economic, social, organizational, legal, and political fields. In terms of the concept of innovation environment, researchers' positions are quite different. Thus, in the initial attempts to characterize that notion [1, p.9-9], they considered that the geographical area is characterized by the synergistic and collective nature of the learning process. In the following approaches, the processes of formation of the innovation environment were explored in accordance with the concept of agglomeration, and the relevant issues were clarified on the basis of A. Weber's theory of optimal placement of industrial production. Agglomeration reduces costs due to the compact location of the production, as well as the rapid spread of innovations. In short, spatial proximity increases innovation activity in the same group of businesses [2, p. 189].

In this case, the innovation environment should have the following properties: “Realized area of innovation; infrastructure base in support of science and innovation; material chain that unites the interests of all participants of the innovation process (education, science, business, government); venture financing of innovation business; technology transfer and concentration, combining elements of the innovation infrastructure involved in the solution of a specific problem; the center of generating new knowledge and so on” [3].

Evaluating the effectiveness of these or other innovations in the production process can be done in the light of the objective and resource ratio in the initial approach. Resource specifications should be in the limelight when determining priorities for industrial modernization. Thus, the real opportunities of realizing the economic potential of the industry are being evaluated, and the innovative development goals of the industry are defined.

With regard to the concept of innovation and innovative production, based on the provisions of the book Y.Schumpeter's “Theory of Innovative Economics” [4], we note that economic efficiency is at the base of the effectiveness of innovative manufacturing. In other words, it is possible to attribute the level of adherence to the realization of economic interests through the notion of economic feasibility. In our opinion, the following position is unambiguous.

Any significant innovation in production, including industrial production, should ultimately be reflected in the overall economic efficiency of those activities. In other words, there is a sufficiently strong correlation between growth rates, indicators of efficiency and novelty, in which all processes from raw materials to finished products are evaluated by the criterion of economic feasibility. These or other useful changes in the manufacturing process in the non-oil sectors of the industry are not only technological. As practice shows: raw materials and semi-finished products; raw material supply, in other words logistic system characteristics; the quality of the finished product, the main components that condition it; management of production processes, technological modes and closed technological lines; Changes in the nature of intra- and inter-sectoral relationships may also lead to significant updates.

As the economic benefits of innovation appear in the market, it is advisable to look at the innovative activity in the context of supply and demand ratios, especially in the following approach. “Innovation is defined as an economic necessity, which is realized through market demands. Here, we need to focus on the 'materialization' of innovation, invention and research, in the form of new, technically perfect industrial products, in the form of labor and tools, technology and organization of production and commercialization that turns them into a source of income” [5, p. 53].

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II. METHODS AND MATERIALS

A. Factors that create an innovative development environment

Competitiveness is an indicator of the effectiveness of innovative industrial production. The concept of competitiveness globally requires a broader approach. In this regard, technological innovation deserves special attention. The breakthrough in technological development has the potential to be more flexible in improving the indicators of socio-economic development at the country level. In other words, the state, which has the absolute advantage of technological progress, has the opportunity to benefit from its economic advantages. Suffice it to say that, "technological globalization results in the emergence of one or another local civilization at the various stages of development of the global technological quasi-world" [6, p. 176].

Among the factors contributing to the innovative development environment, the role of the legal and regulatory group is to direct all the opportunities created by the legislation to the creation of the innovation economy, to define the legal basis for development strategies, implementation of innovative development programs, support of patent and licensing activities, formation of legal and regulatory framework based on public-private partnership mechanism.

The application of legal norms to clean up economic relations is aimed at improving competitiveness, interference in the labor market, pricing processes and addressing a number of such issues. The formation and development of the regulatory framework for the innovation economy requires a number of provisions to be considered in a new approach. The point is that innovative activities - from the scientific idea to the organization of mass production of new products - takes creativity the forefront not only in technological, economic but also in legal approaches. It should be noted that the regulatory framework of the innovation economy is at the stage of development. This process depends on the stage in the development of civilized market relations, having quite different pace in different countries and in different areas of activity.

The directions for improving the regulatory framework for innovative activities in the development of innovation economy in Azerbaijan in general include: optimization of coverage of legal norms for the use of scientific and technical information systems; improvement of legal norms for the protection and use of results of intellectual activity; development of normative-legal acts on creation of innovation system at different levels of management; Improvement of regulatory and legal acts aimed at tax, customs and tariff incentives for commercialization and implementation of new technologies; expanding the scope of regulatory and legal acts that encourage private sector innovation activity; creation of favorable legal environment for venture capital in the implementation of innovative innovation projects; strengthening the legal support to promote public-private partnerships in the implementation of innovative projects.

Sensitivity to innovations in any human activity, especially production activity, requires reliable predictions of changes in working conditions. Experts' decision-making and implementation of innovative decisions are closely linked to education and income levels, as seen from the following source. "The level of people's decision-making and readiness to implement them (degree of innovation sensitivity) is largely conditioned by the following factors: the level of education of creators and users of innovation; the level of their income. At the same time, indicators of income differentiation, depending on the level of education, serve as an important indicator and a factor of sensitivity to innovation" [7, p.58].

It is possible to group in different aspects, using different signs to classify factors that enhance the effectiveness of innovative development. These aspects may include followings: “a combination of scientific, technological and educational factors; group of factors on the normative and legal aspect; factors grouped by the organizational aspect; factors grouped by the institutional aspect; factors grouped by production aspect; differentiated factors of cooperation and collaboration; differentiated factors on social (including personnel) aspect; distinctive factors on the market (marketing) aspect; distinguished factors in economic (and financial) aspect; differentiated factors by the information aspect”[8, p. 164].

Motivation and promotion of innovative development forms the environment of impact of differentiated factors on the market aspect. From this point of view, the following situation may be considered typical of the post-soviet countries, which involve the promotion of specific scientific centers and innovation projects.

Modern trends in the processes of globalization play a double role in the formation of post-Soviet society. From this point of view, the following position can be considered reasonably sufficient. “On the one hand, the modern model of globalization provides the basis for technological, information, and integration for the transition to a new stage of development of society - the post-civilization of the world. On the other hand, the economic, geopolitical and socio-cultural forms of globalization now exist as the last “fortress” of the late industrial civilization, its characterization and contradictions inherent in the last industrial phase” [6, p.18]. In other words, the globalization model that accompanies post-civilization has to take into account both new self-affirming tendencies and partially conservative elements.

The competitiveness of innovative products is largely due to the peculiarity of innovative activities. In addition, the competitiveness of this product has latency (delay), unlike ordinary (traditional) products. In other words, the emergence of innovation not immediately, but after a certain period of time, when the necessary conditions are created, is a distinctive feature of the innovative product's competitiveness. Studies evaluating the competitiveness of innovative development distinguish the latency of a new product in both strategic and tactical aspects.
III. RESULTS

A. Industrial science products market

One of the fastest growing segments of the global market is the industrial science products market. “Specific features of industrial enterprises (SFIE) include: rare (necessary to comment on product characteristics); technical complexity (production of products requires high-skilled scientific work). The important features of SFIE affecting the formation of market processes, as well as the following: the non-sustainability of demand; dynamics of competitiveness; sensitivity to scientific and technical progress; specificity of pricing formation; dependence on the consumer's innovation potential; existence of different levels of vegetation” [9, p. 21].

In terms of the number and composition of factors contributing to the activity in the innovation market, positions differ as expected. When we approach the classification of these factors in terms of their impact on the competitiveness of different levels of economic systems, we think that the following position is appropriate. “Innovation activity is a complex characteristic of three levels of economic systems as economic category: macro-level - innovation activity of the country in comparison with other countries in the world market; meso-level - region, area level; as well as micro-level – organization level” [10, p. 157]. From an analysis of post-Soviet experience, it is interesting to note that "the initiators of the development of the innovation market are the first people of the state, and the market institutions are very weak not only in this market, but in the economy as a whole. Therefore, the state is trying to fill the gap, taking on a proper governance” [11, p. 88]. Of course, this generalization can only be accepted under certain conditions. At the same time, we must note that if such a tendency exists, its continuous image will not have a positive impact on the internal motivation for innovative development.

The application of scientific achievements to production, the transformation of scientific and technical developments into an innovative product with the ability to reach the market, is the most difficult stage of economic and institutional integration of scientific achievements with its subjects. In post-Soviet countries, including Azerbaijan, the level of application of scientific research, or rather the ratio of applied results to the number of general research topics, are lower than in developed countries. This situation, on the one hand, reduces the efficiency of the use of public budget funds allocated for research and development. On the other hand, it reduces the contribution of research centers to the innovative development of the real economy. This is not uncommon for high school science in the countries we are talking about. From this point of view, we consider the following position, which realistically assesses the current situation in the countries mentioned. “A significant part of our research activities are not implemented in practice, and do not bring income to the economy and budget due to the lack of organizational and economic mechanisms that could lead to commercialization of projects and developments with the potential to be used in practice. This fact undoubtedly undermines the effectiveness of budget spending on research and significantly slows down the development of the innovation segment of the real economy of the area” [12, p. 220].

The place and role of the parties involved in the process of applying the results of research and interim and final results in the commercialization of scientific innovations depends to a large extent on their characteristics, including their composition. The composition, of course, is complex. However, we consider the following view on the composition of the commercialization of research results. “In general, there are two main groups involved in the commercialization process. They represent authors and investors of scientific and technical developments. The author's category is quite diverse: country and foreign grants, direct investment, etc. funded universities and institutes; scientific teams funded by lump sum small grants for not having potential investors; scholars and inventors who, for a variety of reasons, separated from scientific institutions and worked independently” [13, p.147].

The scope of innovative development and, ultimately, efficiency depend on the direction and nature of government assistance. Comparative analysis of public-private partnerships, in this regard, shows that systemic nature of public, financial, organizational and legal assistance to innovative development is a key factor in the creation, dissemination and mastering of scientific innovations. Although there are different forms of government involvement in innovative activities, there are certain approaches to assessing the extent to which they are sufficient.

Use of public-private partnerships in the commercialization of scientific innovation is a promising direction. In this regard, the quantitative and qualitative parameters of institutional support for the commercialization of scientific ideas and the results of scientific research play an important role. In the case of institutional support, the following refers to the relevant sources. “Institutional support refers to the process of strengthening social (political, social, economic, spiritual) relations in legal and moral norms (rules, sanctions, etc.)” [14, p. 297].

The effectiveness of innovative development should, in particular, be brought to the question of the effectiveness of the implementation of innovative activities in the non-oil sector of the industry on purpose-programs. The problem is that the state budget plays an important role in financing innovative activity, as seen from the experience of most developing countries. The attempts to obtain economic, social, environmental, technological efficiency indicators as indicators of efficiency, achieved through the implementation of one or another innovative non-oil sector development program, face serious methodological and informational challenges.

In order to assess the effectiveness of innovation projects in the industry, the cost of innovation, as well as the costs, should be calculated first. The following indicators should be calculated as income: profitability index; profits from the implementation of innovation; net present value; expected (future) value; profitability or profit rate. For assessing the effectiveness of innovation projects in the non-oil industry, indicators such as the normal and modified rate of return, self-
repayment period, and the self-sufficiency period should also be calculated.

Some of the features that characterize the economy of innovation are still ambiguous, and in other words, there is an undesirable approximation in the approach to the quantitative characteristics of the aspects we are talking about. Let's say that the economy of one or another country is considered innovative if the product produced here is at least half the innovative (new, radically or significantly improved product). It is advisable to classify resources that promote innovative development by the following characteristics: by developmental method: variable, evolving, adaptive; by the method of impact: direct, indirect; by types of economic resources: natural, labor, financial, business, knowledge; by the level of mobilization: high, medium, low; in relation to the business environment: public, production, social, communication, information; by measurement method: ambiguous, approximate; according to the method of formation: reproduction (renewable), non-renewable; by the degree of management: managed, difficult to manage, unmanaged.

The effectiveness of the innovative manufacturing industry regulation system depends on the perfection of the mechanism for stimulating innovation investment processes. As can be seen from the simplified scheme of stimulating investment processes of innovative industrial activity (Table 1), stimulation methods should be chosen not only for the purpose but also for the objects of innovation activity. Decisions on the selection of stimulus tools and mechanisms should be made by comparative analysis of options for their individual use and joint use.

At the enterprise level, it is necessary to consider the intensification of science and production relations as both a goal and a function when implementing measures to stimulate investment in innovative industrial activities. With regard to the objects of innovation activity, the leading role of the production and technological processes cannot be accepted without a doubt. Otherwise, the environmental and social requirements of commercial aspects of innovation can be difficult to properly consider. Therefore, in our case, in the system of economic and legal stimulation of innovation activity, it is necessary to provide the solution of social and environmental issues at a critical level.

Even in the uncertainties inherent in innovation, the current performance indicators in order to assess the effectiveness of financing innovation in the manufacturing industry do not allow the development prospects to be desired, even if they meet the objectivity and complexity requirements. In this respect, it is not possible to disagree with the following statements in the sources on the review of best foreign practices.

| The purpose of stimulating investment processes of innovative industrial production | Improving professional and educational level of the staff |
| Intensification of scientific and industrial relations | Increase of innovation activity |

TABLE 1. SIMPLIFIED SCHEME OF STIMULATING INVESTMENT PROCESSES OF INNOVATIVE INDUSTRIAL ACTIVITY

- Methods to stimulate investment in innovative industrial activities
  - Indirect
  - Direct

- Stimulation tools and mechanisms
  - Tax rebates, tax holidays
  - Investment tax credit
  - Administrative mechanism of stabilization
  - Financial mechanism of stimulation
  - Infrastructure mechanism of stabilization

- Objects of innovation activity
  - Economic-legal
  - Production—technological
  - Finance
  - Commercial

Creation of a system of adequate financing for innovative development in the industry, including in the non-oil sector, involves the satisfaction of investment needs and the provision of high efficiency in investment. The point is that, to a certain degree, this or that degree of materialized expression of innovation should be seen as the result of investment in the market. From this point of view, we can agree with the following.

The increasing role of innovation (private, state-owned and co-financed) funds in improving the financial regulation of innovation, first of all, reduces the level of innovation activity in the industry from the state budget and the institutional support available in the country. In this regard, there are other noteworthy advantages achieved by increasing the role of innovation funds, as well as a significant reduction in the duration of innovation projects: Due to increased transparency, innovation should also include cost reduction, including transaction costs.

From the point of view of following the process of developing the tax incentive system of innovation activity, it is
advisable to look at the way Japan has great experience in this area. He has experimented with six approaches to stimulating innovation and tax incentives in this country.

The synergistic effect of scientific and educational and industrial relations are observed in countries (UK, Norway), where more tax incentives are provided for joint research by research centers and universities. Strengthening commercial orientation of science will create more favorable conditions for the development of small-scale innovation enterprises. From this point of view, the following approach may be considered to be expedient.

“One of the incentives for the transfer of science to commercial rails is the provision of deductions to payroll funds in small applied establishments created at universities and research centers, and exempting VAT from research and development activities from such entities” [15, p.120]. It is not difficult to see that the use of tax credits for researchers, in other words, an approach that reduces their social deductions, can eventually play an important role in the chain of materialization and commercialization of scientific ideas.

B. Trends in improving the tax incentive system of innovation in the processing industry

Let us now comment on trends in improving the tax incentive system of innovation in the processing industry, relevant opportunities and tools. There are many different approaches in this literature, and this should be taken naturally. The problem is that the formation of the tax incentive system for innovative development, including the innovative activities of the processing industry, is influenced by a large number of different factors. As such factors, at the current stage of development of the processing industry, such factors as activity of special (free) zones, the level of establishment and development of industrial parks and neighborhoods should be considered. The following approach draws attention to the fact that innovations in the processing industry stimulate the innovation processes more efficiently by applying tax deductions directly from the profits of enterprises to the improvement of the tax incentive system. “It is advisable to apply direct tax deductions from the profit of organizations, to stimulate investment and innovation in the economy” [16, p. 85].

Recent research suggests that the following areas of tax mechanism improvement are more promising: “making changes to the legislation to give tax breaks to innovative areas; development and application of the mechanism of state support in the field of taxation for innovative activity of techno parks; individual approach to social taxes, given the high salary fund in innovative areas; exemption from value added tax on innovative equipment with high technological parameters imported into the country; application of special tax regimes to scientific and innovative organizations to enhance the stimulating role of taxes; Applying discounts for entrepreneurs engaged in innovation activities; introduction of a simplified taxation system for innovative areas” [17, p.125].

An effective tax incentive system for innovation in the manufacturing industry is that the financial benefits provided in the form of tax concessions are not paid in advance (unlike any other financial aid). This privilege is available to participants for innovative industrial production projects that are already in progress. The issue of tax exemptions to the participants of the innovation process is one of the issues that experts and researchers consider.

IV. CONCLUSION

Lastly, let's summarize what has been said about the opportunities and ways for their implementation to enhance the economic efficiency of innovative industrial production:

- the overall efficiency of technology transfer processes should be increased, which is an important condition for the efficiency of elite industry production. Appropriate measures should be focused on the development of proven business practice at all stages, from the design and accompanying of business plans to technological marketing, the selection of partners and the establishment of relationships;

- separate consideration of the processes of specialization and integration of activity in innovative and science-intensive industries is not considered promising at this time. For this and a number of other reasons, outsourcing development should be in the spotlight as a factor that increases the economic efficiency of elite industry production;

- to ensure the efficient use of renewable natural resources in order to increase the efficiency of the innovative and elite industry in the processing industry, the use of alternative energy sources, and the use of renewable resource technologies should be expanded.

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References

[12] Vladykin, A.A. Commercialization of scientific developments as a result of innovation and a way of additional financing of a higher educational institution // Theory and Practice of Social Development. 2013, №. 4, p.219-223.