

The Consequences of the Diversity of Innovation Development in Industry

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SUMMARY

It is well known that when high economic growth rates are not supported by the diversity of the economy and the faster development of human capital, then the economic growth efficiency will be understated [1].

Unfortunately, lately and nowadays only one direction of innovation activity prevails in Ukraine. This is the adoption of new technological means with the purpose to increase the range of goods. But the creation of new technologies within the enterprise is considered to be of secondary importance. This results in negative consequences, namely in a decrease in long-range innovation development, loss of quality and level of novelty, also a redistribution of proportions of the present scientific and technological potential in industry and an insufficient level of innovation in economic entities. This is significant when buying scientific and technical achievements, as Ukrainian commodity producers prefer licenses to use the objects of industrial property that are native elaborations on known technologies, which is explained by their lower price.

Thus, evidently the process of the diversification of industrial innovation development can be positive in direction but may vary according to the results of the influence of economy, nature and population.

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Often there are contradictions between the necessity for innovation development and its negative consequences for the economic system. Diversification is often the reason for changing the type of economic unbalance and as a result there is a breach in the present industrial system traditions and structure of contacts.

As researchers remark, considerable corrections to the processes of the diversity of innovation activity are brought by the globalization of the world economy. There is a certain "overlay" of processes and contradictions of diversity and globalization because of the increasing international competition [2]. Thus, nowadays it is necessary to search for new ways of development for Ukrainian industry that do not conflict with the economic and innovation processes taking place in the world economy.

The main problem of the Ukrainian industry is the persistence of its technological structure and weak diversity, which provide little opportunity to estimate the social-economic consequences of further development of the processes of innovation development diversity. The direction of further development in the innovation activities of industry should become progressive diversity based on the widening of branches and production with a large degree of added value to the price of goods which are produced, and with a large portion of innovative goods.

Such realization of the progressive diversity strategy supposes the creation of prerequisites for more dynamic growth of production and the export of advanced technology products, services, etc. This will have a positive consequence for the whole industrial system of the national economy, as it will give competitive positions to Ukraine in the international markets of high technology, balance the current orientation on raw materials export, and help to increase the number of further elaborations and introduction of innovations in the industry, as well as lead to an increase in the number of patents and inventions.

The diversity of innovation activity is one of the ways to reduce the innovation risk. It lies in the distribution of development contractor efforts and capital investments for realization of different innovation projects that are not connected with each other. If it turns out that one of the projects is unprofitable, others can still be successful and will make a profit. However, as practice shows, diversification can not only reduce but also increase the risks of the innovation activity in the case when an entrepreneur invests in a project that is directed to a sphere of activity where his knowledge and management skills are limited [3].

It is important that the diversity of innovation development in industry provides for the concentration of capital on the leading directions of the innovation activity. As a result of

such orientation towards long-range innovation in industry it is possible to expect a new progressive structure of the industry with predominance of new technological modes. The main means to achieve the object of diversity is versatile and multilevel development of the kinds of industrial activity and production, innovation reorganization of new spheres and scopes of activity, the modernization of the management structure and use of new technologies. A positive result is most likely to be obtained from diversification in the related kinds of activity that are able to use resources together with experience and technologies, which in aggregate provide a synergetic effect.

In our opinion, the process of the diversification of innovation development can have positive dynamics if:

- The priorities of the innovation activity of the industry are well-defined.
- Measures for organising the introduction of new technologies are taken that suppose the training of qualified personnel and provide support to the engineering of the introduced innovation processes.
- There is an organized system for marketing and management of innovations in the industry.
- There is an organized system for the monitoring of innovation process development in the industry.
- Access to informational resources about existing innovations and elaborations is provided.
- The specific forms of the innovation activity organization, which play the role of the pilot programs for the estimation of the introduced innovations efficiency, are made.
- There is appropriate registration and protection of intellectual property rights for further elaborations of existing ideas or products.

As Postaluk and Postaluk mention, during diversification in a social-economic system, multiple-valued system bifurcation consequences occur. In the process of the dynamic diversity the traditions, innovations and institutions simultaneously create and destroy the national economic system. On the one hand, under their influence, positive technical-technological, structural, managerial and other system improvements occur at all points, levels and in all spheres of business, authority and society. The positive component of these improvements consists in the consolidation of the national economic system, its traditional relations as the source of fundamental innovations, and the formation and development of the leading institutes of the postindustrial economy, under whose influence the innovations of different spheres of science are integrated into one productive strength [4].

On the other hand, the interaction of traditions and innovations destroys the fractal properties of the national economy. This is the reason for the change in the types of economic unbalance and as a result, a breach of the present system's traditions and of the structure of connections takes place. These disruptive actions of innovations are

accompanied by major system changes in the structure of business institutes, authority and society, which causes difficulties for the functioning of the national economic system, and sometimes leads to its destruction. Because of this, the scientists mention that there is a necessity to develop the mechanisms of changes of the institutions, providing for stimulation and protection of the creative process properties, especially of innovations, for prevention and minimization of their disruptive system effects [4].

According to Buhvalov and Katkalo, diversity is not profitable for some companies because of the additional costs connected with the management of different kinds of business [5]. The same can be said for the innovation directions of the industrial activity, where also the risks of the realization of the innovative projects of diversity are added. The negative consequences of the diversity of the industry innovation development can be unsuccessful diversification of the industrial company (for example, the Xerox company) [5].

Additional positive consequences of the diversity of innovation development for the economy are that the risks of innovation activity are reduced greatly because of the capital distribution between different kinds of innovation spheres. This provides an opportunity to concentrate on activity that is new, cutting edge and immensely long-range. In this way, new kinds of activity and new technologies appear, but not spontaneously and chaotically. One of the instruments for determining the long-range kinds of innovation diversity activity is Foresight – technological advance knowledge. It is known that demand for some kinds of industrial goods is cyclical. An example of this is the conjunctive instability in the raw materials market of the output. This is especially actively shown during the financial crisis because of the exchange fluctuations. The diversification of the innovation development of the industry will give an opportunity to compensate for competitive positions in some markets while losing them in other markets. Bounded diversity (that supposes the development of some innovative directions of the industrial activity, in other words, that uses the same or concurrent technologies, the markets of goods and services realization, etc.) have especially big potential for the positive consequences for the economy (or industry in particular).

Yurkova, who researched diversity in non-ferrous metallurgy, distinguishes two general directions of the diversity which are estimated as positive in the view of industry development. The first one is connected with the use during diversification of some advantages which a certain company achieved in the sphere that is traditional for it (in the same time the existent technologies, resources, productive capacities, distribution channels, marketing, and so on are used for the diversified activity). Such direction has got the name of synergetic diversity. The other direction is conglomerate diversity, which consists of a change in the operations of the company to new technologies and market needs [6]. The difference between

these two directions is, in our opinion, in the purpose of the diversity that the company makes for itself. For the purpose of development and improvement of the profiled industrial activity, synergetic diversity is used, but for getting more profit and for minimization of the entrepreneurial risks it is good to develop conglomerate diversity. Conglomerate diversity gives an opportunity to the company not only to manage new risks of the industrial goods sale due to new directions but also to activate the innovation process.

Thus, two motives for diversity are reflected in the scientific literature:

- protective (distribution of risks; decrease of the cyclic instability; change of the activity category, i.e., decrease in production; protection from competitors, etc.);
- offensive (aggressive growth; negotiation of the limits; new market penetration; achievement of synergetic effects; competitors' removal, etc.) [7].

For the economy the diversity of the innovation development of the industry gives the impulse for the development of new ways of production, activates innovation activity, raises the competitiveness, and minimizes the risks of the industrial activity, which in turn helps to create new workplaces and provides stability for the industry in crisis periods.

The positive aspect of the diversity of innovation development for social sphere is the diversity of scientific potential, which is reflected first of all in the prerequisite formation for further development and improvement in the quality of life for the population.

It is necessary to mention one more positive direction of industry diversity that supposes a change from the raw materials orientation of the native economy and from old technologies of the third technological mode to the development of a processing industry using new technologies, that in future will lead to the formation of knowledge as the basis of the economy, which, to our mind, is not too dematerialized.

Thus, there are positive changes in the social-economic system as the result of diversification: the number of new workplaces is increased, the competitiveness of the industry is raised (especially the export part), higher quality human capital is achieved, effective management is formed, and so on.

It is significant that we have researched the diversity of the innovation development of the industry. The factors and motives of the diversity, in addition to those described above, are innovations: strengthening and widening innovative kinds of activity in the industry. These processes are uninterrupted: the development of traditions and innovations constantly changes the orientations of the investment flows during diversification. The scientists have proved the existence of the threshold value for the degree, depth and width of the innovation diversity for every economic system and its structures, outside which the efficiency of innovative diversity descends [9].

Ignoring and missing of specified risks can lead the negative social-economic consequences. Apart from the positive effects of the diversity process it is necessary to mention some risks and possible disadvantages, threats to the social-economic system that diversity brings. The impartial fact is that diversity foresees the presence of certain resources, first of all, financial resources. It is known that deficient investment activity cannot create the opportunity to modernize and to diversify the economy.

The important moment in the realization of diversity is to train well-qualified personnel that are oriented towards innovation introduction and have a high level of training for getting new information or technologies for the purpose of providing structural diversity and innovation development.

At present some financial, institutional and infrastructural barriers largely prevent the modernization and diversity of the native industry based on innovations.

The financial aspect of diversity realization is very important. Under the high fund depreciation of the industry of Ukraine, diversification requires considerable financial costs. The withdrawal of such financial resources, in researchers' opinions, will lead to a huge strain on the whole economy in area and time [7]. Even if the costs for innovation activity are added to from the state budget if topping up is needed, if there are crisis manifestation in the industry development, the diversity of the innovation sphere is a very complicated topic. But the diversity of the innovation development of industry is the one way to increase competitiveness and to provide the stable development of the economy.

The negative consequence of the diversity can be the high risk of losing the invested resources in the innovation projects under their limiting conditions. In spite of this, only diversity is the one form to realize the innovations and investments. We consider that the one opportunity to avoid the negative consequences is the active practice of the technological foresight policy – Foresight. Together with this it is necessary to assist the formation of the national innovation system, economic and institutional mechanisms that stimulate knowledge creation, distribution and usage.

The crisis situation in Ukraine creates the prerequisites for long-range diversity, which should be put in place now. The crisis ought to be used as the certain jumping-off place for important structural changes in the industry of Ukraine towards the development of innovative ways of activity based on the use of nanotechnology, cell technology, and other such advanced technologies.

In addition, use of branch-wise diversity in the industry, even within limits, gives the opportunity to reduce greatly the level of economic risk. So the strategy of diversity within a certain group of branches of industry is efficient only under the favorable forecast of the conjuncture of certain goods markets. The least risky is, to the researchers' opinions, the diversity of the groups of branches that are not connected with each other, and this gives the opportunity to develop alternative kinds of activity.

Though the process of diversification has the positive consequences of reducing the risks of the innovation activity in the industry and increasing its stability, sometimes the exceeding of the limited value of the diversity characteristics leads to negative consequences.

Research of the native and foreign practice to realize the strategy of the diversity gives us the opportunity to methodize the main negative consequences for the social-economic system:

- steep expectations when choosing the ways of the diversity which entail big material losses;
- complication of the organizational-managerial structure in companies;
- distribution of the financial run-the-business resources between different directions of innovation activity in the industry;
- barriers to restructuring of the native industry;
- inconsistency between industrial and innovation policy;
- the possibility of industrial disasters, worsening of the ecologic situation;
- disappearance of unique technologies under the guise of “diversity” because of their insufficient protection by patents and licenses;
- lack of well-qualified personnel;
- the time needed for diversity realisation.

The main drawbacks in the realization of the diversity are:

- lack of necessary knowledge, experience and skills (technological skills) for new activity realisation;
- lack of attention paid to behavioural aspects of diversity that cause problems of a social character (inefficient management);
- the results from the diversity can be just in the long-term;
- necessity of considerable financial resources;
- displacement of the tendency of the diversity strategy realization;
- difficulties in the search for appropriate direction for the diversity.

The negative consequences for the social-economic system listed here are not the full list. But we have concentrated our attention on the general negative moments in the development of the native industry under economic ambiguity.

Thus, the success of diversification in many cases depends on making a innovation-industrial policy, with the state support of the system for ground-breaking projects, especially within the state-private partnership. With the purpose of providing the positive consequences of the innovation development diversity it is necessary to create the institutional forms of innovation activity support (innovation clusters that are necessary to realize the priority directions of the innovation activity, they can take the original form of the diversity realization in the industry of the region). Approval of the national development strategy including diversification as a strategic task of

industry will help to realize efficient diversity. Unfortunately, the current strategy for the innovation development of Ukraine has no positions about diversity in general and the diversity of the innovation development of the Ukrainian industry in particular.

Also a system approach to the creation of mechanisms for attracting youth to the sphere of science, and measures which propose a system of state grant support for young scientists are two ways to help develop innovation and industrial diversity. This will diminish the outflow of the clever people abroad and will provide for the uninterrupted development of the innovation economy.

Formation of a system for annual monitoring of diversity results will make it impossible to get negative consequences from the diversity of the innovation development in the industry, will help to provide flexibility to industrial companies, and will give the opportunity to trace the international trends in the development of science and technologies.

The specification of diversity priorities is possible on the basis of making a forecast of the technological development – Foresight. Formation of the priorities is necessary to connect with the real competitive advantages of the native industry and demands for providing national safety.

The concentration of the financial resources on directions of breakthroughs will help to make diversity in the long-range for the native industry spheres. Besides, it is important to use venture capital more actively for diversity realization, as it can minimize the risks under unsuccessful forms of the industrial diversity. The insurance of innovation risks has also great potential for the elimination of negative sides of the diversity.

The important condition for the efficient diversification of industry innovation development is entrepreneurial activity. So the main task for diversity realization is the clearance of obstacles to the entrepreneurial activity: simplification of the managerial permissions for starting up a new business; transparency of the procedures for state monitoring of the entrepreneurial activity; an efficient production infrastructure that supposes the system of planning of land use, transport, etc.

The entrepreneurial activity in small-scale businesses is an important factor in the diversification of the economy, because the small-scale enterprises work in general in the industries that are not based on raw materials but that use technologies of an innovative kind and are flexible in times of economic ambiguity.

So the simultaneous development of all kinds of industry needs the concentration of huge resources: financial and intellectual capital, which is a problem for the enterprises of the native industry. This is why the most expedient way to renew the industry based on innovation development diversity is the connected diversity of the production, that is, the development of the kinds of industry that are connected with each other and goods and services diversification within one enterprise.

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