

SCIENTIFIC ASPECTS OF AGRICULTURE INNOVATIVE DEVELOPMENT IN MODERN RUSSIA

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Abstract

The aspects of agriculture innovative development are considered and the importance of the problem of effective agricultural development organization which is based on one's own innovation is shown in this article. On the system approach base, the authors reveal the essential functioning principles of creators, distributions and users of innovations in their interrelation in different conditions: creating and using their own innovations and using external innovations, especially foreign innovations. The proposals for modernizing institutional environment for the agricultural development which based on domestic innovations are made.

Keywords: *innovation, agriculture, institutional environment*

JEL Classification: *O3, Q16*

1 Introduction

In the economic theory most aspects of economy innovative development was discussed in detail. Josef Schumpeter in his fundamental research, “The Theory of Economic Development” (1912) for the first time touched upon new combinations and changes in the development of industries. He introduced the term “innovation” only in 1930 [1].

At the moment, the essence of innovation is well studied and its importance for economic development is revealed. Innovations have become a determining factor in the current stage of the world economy development. The importance

of the innovation primary implementation and consequences for other market participants at various delays in its implementation is well described.

Also it became clear that Schumpeter, when he considered creative destruction, meant the transition to innovations that change the technological mode. He showed that it is impossible to formation the new if the release from obstructive factors of the previous basis didn't happen. Often it happens through significant destruction of the previous action technologies. Although any innovation represents a new combination of the old with the creation of something new. A lot of improving innovations continue to develop the existing basis. And its implementation is not associated with a creative destruction. So, using of improving innovations for actors is much easier than to make the transition to the next new basis. It is necessary to change not only technology, to implement a new mode. It is often necessary to change the behavior of people in order to fully implement the basic innovation.

It is believed, that the origin of innovations is not so important as the ratio of benefits from their using compared to the costs of their creation or acquisition. We can see that companies in most industries producing goods and services not only carry out its own research and implement its results. They buy a lot of innovations with different rights of use them. The practice of buying innovative startups is expanding.

2 The situation in the Russian agriculture and research methods

Agricultural production is characterized by a very large number of businesses with different capacities, which are located in zones with different production conditions. Therefore, the methods of promoting and using innovations in these businesses differ from the methods of using innovations in industry. They differ even depending on the level of intellectual and material capacities of different representatives of agrarian businesses [2].

In innovation activity of small number of specialized companies, even if they are global level companies and have significant volumes of production, there are design-engineering units. They carry out the adjustment to the production conditions not only of their developments, but also of the external innovation. We can see different situation in agriculture, there in one region can operate tens and hundreds of businesses that don't have the capacity of technological adaption most innovations to their specific conditions.

Therefore, if the industrial firm can be considered as a socio-economic system, which is creating and acquiring innovations, then in the agricultural sector

individual farmers and even a small number of larger agrarian businesses cannot be considered as isolated systems of innovative development. Although large poultry farms and other similar agrarian businesses may have characteristic similar to industrial firms. It is clear that seed farms, other breeding and similar agricultural firms carry out their own scientific research and bring them to implementation as innovative products or innovative technologies, attract external innovation. In fact, farmers and other agribusinesses are only purchasers of these most important components of agricultural production. Therefore, in the matter of attracting and adapting innovations in agriculture, an important role is played by special extension service systems designed to carry out technological adjustment of innovations to the level of its practical implementation. Actually extension service should provide necessary technological instructions for concrete agricultural businesses. Today such instruction is provided by the producers of seeds, biological and chemical substances, and other components of agricultural production and technology.

In the developed world, the use of various know-how has been transformed into a well-organized and skillfully managed business a long time ago. We can say that such activity becoming the front line of competitive struggle. The agrarian business of Russia widely uses foreign innovations.

Thus, we find ourselves in a situation where our numerous agricultural businesses are beginning to enter into a single socio-economic innovative system, the core of which becomes foreign source of innovative development, foreign representatives that carry out adjustment and transfer of innovations. The cost of such an intellectual product increases from year to year. Therefore, the purchase of foreign innovative tools and subjects of labor actually means financing foreign science, foreign accelerated innovative development. Access to these sources can be blocked at any time. This situation puts our producers in completely dependent unfavorable conditions.

In this regard the importance of those who creates and implements innovations is very significant in Russia. It allows noticing all the weaknesses in time and take action to eliminate shortcomings. Domestic managers and experts delve into the smallest details of the creation and implementation of their own innovations. Also improving the skills of adaptation involved external innovation. It often happens in unexpected way that cannot be offered by foreign suppliers of innovative products. For example, Uglich poultry farm reassignment - a typical soviet enterprise - is interesting. Today it is a modern production of eggs and quail meat [3]. Every updated workshop of this factory is qualitatively different from the previous one - the identified shortcomings in previous workshops are taken into account during its reconstruction. Improvement at the Uglich poultry

farm goes in all areas of activity: technology, poultry breeding, management, marketing, organization, wage system and others. Such development is due to the systematic creation and involvement of not only technological innovations. The organizational and marketing innovations are also widely used. A production of innovation for the Russian economic conditions is going constant. Such enterprises represent a great value also because they ensure food security of the country [4].

Development of production when used its own or borrowed innovation is fundamentally different for several reasons. First of all, opportunities to self-improvement and duration of innovation cycle process are differ. Of course, organization of production based on its own innovations has a longer innovations life-cycle, greater costs for creating innovation. The payback of such innovations is longer. However, full ownership of the innovation allows us to timely carry out many of its improvements, to increase the life cycle of the modified innovation. In general, it allows benefit more from it than from a foreign “turnkey” innovation.

It can be said that in case of using its own innovation there is a constant circulation, like well-known formula Karl Marx “commodity - money - commodity”. This circulation can be represented by an expanding spiral movement: carrying out of marketing and scientific substantiations – origin of innovation - its design - adaption - large-scale using - getting effect - numerous improvements of innovation based on company own experience - getting additional benefit. That is, we can say about constant expanded reproduction on an innovative basis, each turn of which brings its delta - an additional effect, materializing in added value. When companies use borrowed technology that is not the expanding spiral, it is a significant leapfrogging moving from one “walking in a circle” to another. The movement to a higher level of development, with increasing value and preserving shaky competitiveness. Even in the domestic business environment it will not be possible to get ahead: the same innovations are sold by foreign partners to all who are able to buy them. The most advanced innovations are not offered to us for many reasons, that it is no point in discussing.

When company use borrowed innovation, the economic cycle includes: innovation (I), purchased from outside; organization of production on its basis (P); the produced goods (G); money proceeds (M). Typically, each such cycle has linear character I-P-G-M. These cycles are repeated on different scales, bringing more or less constant revenue proportional to the scale of using innovation. In order to improve production, additional costs are required to purchasing improving innovations and its adjustment for production.

The development of production on the basis of company’s own innovations can be interpreted in the form of expending spiral. Thus development is seen

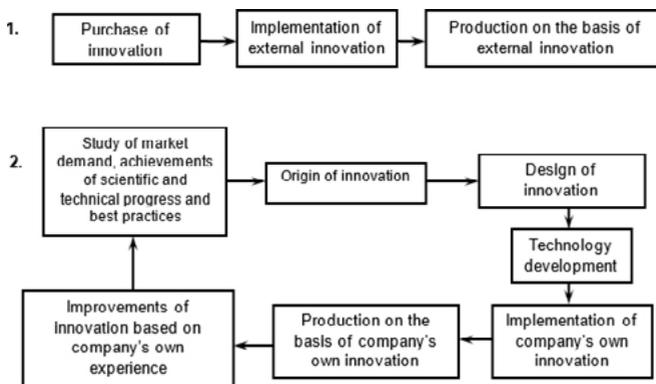
almost without leaps with timely addition of new economic cycles on the basis of an improving or even basic innovation. Therefore, it is proposed to talk about innovative additions ΔI . Consequently, they lead to additions in production (ΔP) and to increasing output volume of goods or to improvement in its quality (ΔG) on this basis. This causes additional money proceeds (ΔM) in another chain:

$$I - P - G - M - \Delta I - \Delta P - G - \Delta G - M - \Delta M.$$

As a result of this turnover, revenue covers the costs of creating and implementation innovations and allows starting profit from the use of innovation faster than competitors. Often that level of higher profit is reached earlier than the market will be saturated. More frequently, the amount of profit is slightly higher than competitors' one, because there is no delay in innovation implementation. The higher profit level is a more significant source of financing for the creation of new innovations in all areas of the enterprise.

Thus, the considered variants of innovative development can be represented in the schemes shown in the Figure 1.

Figure 1 **Production development based on external (1) and own (2) innovations**



3 Results and Discussion

The development and systematic modernization of production on the basis of company's own innovations determines the creative nature of employees' work. There is an accumulation and deepening of the intellectual potential of developers and the whole team, which drawn into the orbit of technology improvement. The intellectual growth of such work communities ensures the development not only

of their enterprises. Also it ensures the stability of the state economy. Because, it is the inventions create the industrial revolutions that underlie economic growth.

However, let us return to the socio-economic innovation system. Today in the domestic crop production the role of foreign beet and corn seeds and some other plant species is very important. In animal husbandry it is foreign breeding eggs and breeding animals. The role of many foreign means of production is very significant also. It turns out that the spiral development described for a specific case of the quail farm is impossible in these systems. Development in such systems is only a leapfrogging movement, due to the purchasing and using of the one more foreign innovation. Moreover, even maintaining rotation in, so to speak, a closed circle at the same level is often link to the need for almost an annual acquisition of seeds from foreign seed farms. Such agrarian businesses are turning into primitive production and technological applications of the powerfully developing innovative foreign agricultural systems. In general, as stated above, domestic agribusinesses are becoming industrial applications to foreign innovation systems. These companies lose the ability to self-development, as its human capacity focused mainly on the adaption and using of external innovations. It negatively affects the development of Russian agrarian science and education. The longer-term adverse effects of this situation are becoming apparent.

Therefore, production development based on domestic innovations is very important for the food security and the accelerated development of competitive production. Russia has the necessary resources for this:

1. There a little less than half of world's black earth (chernozem) is located in the territory of our country.
2. More than a quarter of the 40 million hectares still unused land can be involved in production processes.
3. In many cases, low levels of pesticide usage in Russian fields have saved large land areas where it is possible to organize production of environmentally-friendly products. This technological gap now can be turned into a competitive advantage, because the low intensive use of agricultural land that was the reason of the little harvests, has significantly contributed to the preservation of Russian agriculture relic shades, which makes it possible to produce natural products on a biological basis.
4. There are large fresh water reserves (about 20% of the world's reserves) in the country, which can be used for land-reclamation purposes, for expanding the area of irrigated agriculture.
5. There are huge water areas, which allow a sharp increasing of commercial fish catching and expand its breeding in numerous and diverse water bodies.

6. The observed trends in climate change, which are associated with the increasing of air temperature and the increasing the amount of precipitation in our territory, open up new prospects for the development of agriculture in the Russian Federation.
7. There is a noticeable pool of Russian innovators who systematically generated and actively used innovations in their agricultural business.
8. An extensive network of agricultural scientific and educational institutions, which covers the main agricultural regions of the country.

The recent history shows the possibility of agriculture accelerated development in Russia, in the near future. Not long ago, our country was overwhelmed with a lot of foreign chicken products. Then it was the bulk of the meat in Russian stores. The situation has changed dramatically in a few years. Domestic production of these products has increased almost threefold over the past decade. The situation is similar in the development of the domestic pig farming (production growth over the decade was about 100%), which collapse was heralded, when Russia joined the WTO. Now the country is almost completely self-sufficient in meat, sugar, vegetable oil, vegetables. Even in the production of beef and milk progress is visible: in 2013 the country imported 40% beef and 30% of the milk, and in 2017 this figure fell to 25% and 10%, respectively. Also the growth of meat production (excluding poultry) was 24%, semi-finished meat products - 22%, poultry meat - 19%, butter - 9%. The production of greenhouse vegetables is growing. New gardens are laying and vineyards are establishing. In spite of a long payback period of these industries. It gives confidence that, in general, the goals for import substitution in agriculture will be achieved by 2020.

Active State support contributed to this. In 2017, State support amounted to 242 billion rubles, of which 35% was aimed at stimulating investment. Also should take into account the funds for the preferential purchase of agricultural machinery. In general, the investment part of the total State support is 42%.

At the same time, it became clear that the mechanisms of State support for agriculture is needed a significant modernization. It is necessary to change the vector of Agricultural policy in the direction of creating an enabling environment for innovative development. It is necessary to increase the role of domestic science. It is necessary to create the systems of a large-scale transfer of innovations among numerous agrarian businesses practically anew [5]. At present, not numerous domestic information and advisory service organizations in the Russian Federation regions almost do not engage in such activity. At best, most of them distribute only information about innovations to agrarians. It is necessary to significantly expand the scale of financing agricultural science using grants. At the

same time, it seems necessary to provide grants to scientists not only for scientific developments. It is necessary to provide second grant to them on the results of the successfully developed innovation. As well as providing grants for the primary implementation of innovations among the region agricultural businesses jointly with the agricultural information and advisory service organizations (extension service system). For that to happen, in each agrarian region should be: a fund for agricultural innovative development; agricultural advisory organizations that can carry out pilot demonstration activities. Also it should be understood that such advisory organization can become the integrator of regional agricultural innovation development system with numerous agrarian business, if it carry out the engineering design work as for domestic and for various foreign innovations. That is, it develops technological instructions for implementation innovations in typical conditions of different agrarian businesses.

4 Conclusion

It is necessary not only to allocate financial means of state support and identify the necessary measures in the program documents. It is necessary to prepare and adopt legislative and other normative legal acts to create an enabling institutional environment for innovative development of agriculture. Because we cannot do without a common understanding the essence of actors' new behavior in ensuring the innovative development of all agriculture branches. It will be very difficult to move on to new mechanisms of agriculture innovative development and to the corresponding behavior of existing actors without making a habit of new behavior under the influence of laws. The importance of this fact is noted by modern foreign and domestic institutional economy researchers [6,7].

It is necessary to develop and adopt the Law "About innovative agriculture development", which should clearly define the role of science and agricultural advisory service (extension service), the basis for the federal and regional agricultural development funds work with the active participation of agrarian business professional associations. The sources of federal and regional funding, the main financing mechanisms for science and for the primary innovation implementation by the agricultural advisory system on the basis of grants should be identified.

It is also necessary to envisage the development and implementation of advisory services standards in each regional agricultural advisory organization, primarily in the area of adapting innovations and transferring it to agrarian businesses.

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