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# INFRASTRUCTURE ACTIVATION OF INNOVATIVE DEVELOPMENT OF UKRAINIAN AGRARIAN SECTOR

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**Abstract.** The *purpose* of the paper is a justification of roles and identifying areas of improving the functioning of innovation infrastructure that will boost innovation in the agricultural sector of Ukraine. *Methodology.* The methodical basis of the study consists of general scientific cognition methods of economic phenomena and processes. Realization of the work tasks required such methods: theoretical generalization method – during study of scientific papers, legislative and regulatory acts; abstract logical method – to summarize theoretical and methodological provisions, as well as define the research goal; system approach method – identifying areas for improving the functioning of the innovation infrastructure of Ukrainian agrarian sector. *Results.* Found that in modern development conditions, a network of innovative structures that would provide infrastructure support for innovation development in the agricultural sector should be represented by such institutions as: agricultural innovation clusters, science parks, business incubators, venture funds, advisory services. Taking into account the international experience of the main institutions of infrastructural maintenance of innovative development, suggested areas of improvement and optimization of their formation and functioning to ensure innovation in the agricultural sector of Ukraine. Proved that the formation of agricultural innovation regional clusters should be represented by the following stages: a preliminary analysis and identifying promising areas and productions; selection of the cluster members; the strategic planning stage; setting goals and objectives; work scheduling of the cluster members in order to implement strategies; control over the execution of the approved programs and projects. Taking into account the global model of organization of advisory services, determined that the development of agricultural advisory system should be implemented through extension services, organized at the agricultural universities that provide links with rural youth, agricultural enterprises, and scientific organizations. Proved, that two groups of methods – direct and indirect – should represent the most important directions of the state policy on the development of venture investments of innovative development of the agricultural sector. *Value/originality.* The formation and functioning of the optimal system of institutes of innovation infrastructure with the help of appropriate tools and methods will promote the active introduction of innovations in the agrarian sector of the economy and bring it to a qualitatively new level of development.

**Key words:** innovative development, infrastructure, agrarian sector, science park, business incubator, innovation cluster.

**JEL Classification:** O31, O18, O13, Q16

## 1. Introduction

Crisis tendencies, which define the Ukrainian economy of last years, determine the need for further development of mechanisms to strengthen the competitive position of agricultural enterprises. Permanent growth, renewal, and development of domestic agricultural enterprises can be achieved when using modern tools of implementing the strategy of innovative development. Innovations allow the company to achieve its goals – namely to reduce

production costs, increase profits, and eventually expand its operations and gain a foothold in the market. Improving efficiency of the agricultural sector and accelerating its innovation development is possible, first of all, if the appropriate infrastructure. Works of many prominent scientists and economists (Datsiy, 2004), (Zubets, 2010), (Kyrylov, 2015), (Makarenko, 2008), (Russell, 2003), (Shebanin, 2014) and others were dedicated to research problems of the innovation development of agricultural enterprises. Despite the

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depth of the conducted research, some issues related to ensuring the promotion of the innovative development of agricultural enterprises require further study. In particular, there remain relevant issues of formation and functioning of innovative infrastructure as one of the most important mechanisms for the involvement of agricultural enterprises in the process of innovation.

On the basis of a systematic approach, the role and importance of innovative infrastructure development in stimulating the innovative development of the agrarian sector of the Ukrainian economy are substantiated. With the help of abstract-logical method and structural-logical analysis, features, modern problems, and obstacles to its formation and functioning are determined, as well as the main directions of development are defined.

## 2. The formation of agricultural innovation clusters

According to the Law of Ukraine “On Innovation Activity”, innovation infrastructure – a combination of businesses, organizations, institutions, their unions, associations of any form of ownership, providing services to support innovation. It ensures the functioning of the reproductive process, based on innovation, making it a key factor in the implementation process of modernization and innovative development.

Considering this, it becomes necessary to modernize existing infrastructure and the additional establishment of new institutions of infrastructure to support an

innovative business that would have a systematic relationship and do stimulating and providing functions (Goncharenko, 2014). In modern development conditions, a network of innovative structures, which would provide infrastructure support for innovation development in the agricultural sector, should be represented by such institutions as: agricultural innovation clusters, science parks, business incubators, venture funds, advisory services.

Thus, agrarian innovative territorial clusters are one of the most effective forms of integration that could result in a maximum synergy for the sustainable development of the agricultural sector of Ukraine. However, as noted by scientists, the development of agricultural clusters in Ukraine hamper the following factors: imperfect legal framework for the operation of clusters and the consequent lack of support for agricultural enterprises cluster initiatives on the part of the state; weakness of existing agricultural clusters because of the low level of competition in the internal market; lack of trust between public authorities and business, as well as between individual companies; danger of losing the right to receive benefits agricultural enterprises and grants for any organizational changes or production; “isolation” of science and education from agricultural production (Sobkevych, Rusan, Yurchenko, 2013).

As a result, Ukraine has a very low level of development and operation of regional innovation clusters in the agricultural sector. Their creation and operation are

Table 1

### Key elements of public policy to support the development of agricultural clusters in Ukraine

Elements	Characteristic
Formation of the legal field of cluster organization of the rural development	<ul style="list-style-type: none"> <li>- Consolidation, especially on the level of economic legislation, the legal regime of functioning clusters in Ukraine, in particular, through the introduction of the legal category of “cluster”;</li> <li>- Paragraph 2 of Article 7 “Measures of state stimulation of depressed areas development” of the Law of Ukraine “On Stimulating Regional Development” shall be amended to read: “providing state support to small enterprises, including financial, promotion of infrastructure objects of the development of the entrepreneurship”</li> </ul>
Improved cooperation in the “region – science – production”	<ul style="list-style-type: none"> <li>- Regional centres of the agricultural production scientific providing should advertise and demonstrate the advanced research and development products that will promote such developments in industrial activities of enterprises cluster associations;</li> <li>- Regional and district state administrations on the basis of orders of the agricultural cluster members should form an order for higher education and vocational training of specialists in Ukraine and specialists of the required profile along with their future employment in the cluster structure</li> </ul>
Providing support for the development of agricultural clusters at the regional level	<p>Regional and district state administrations should:</p> <ul style="list-style-type: none"> <li>- Carry out organizational and economic support to initiatives of the enterprises and organizations of cluster association through the development of social and industrial infrastructure of the region;</li> <li>- Develop websites and a single database with information on existing regional clusters, inform entrepreneurs about the benefits of cluster model of production during the events of enterprise development, create electronic forms of application for businesses that wish to become members of clusters, thereby eliminating information vacuum for potential investors, as well as will attract domestic and foreign capital to clusters;</li> <li>- Implement at the local level a procedure for issuing permits following the principle of “single window”, which will speed up licensing procedures (especially in construction and land acquisition); partially financing of the social, industrial, and home infrastructure through public-private partnerships within the agreed project</li> </ul>

Source: (Sobkevych, Rusan, Yurchenko, 2013)

mainly the initiatives of the producers themselves. Therefore, experts identified a number of key elements of government policy to support the development of agricultural clusters (Table 1).

Also, in our opinion, the application of the cluster approach to innovation development of the agricultural sector should be based on the positive experience of foreign countries.

Also noteworthy is the experience of Norway, where the agro-industrial clusters occupy a leading position. Formation of agro-industrial clusters in Norway largely was the result of the abolition of state support and billing the agricultural sector. Conducted employment policy in this area was based on the use of cluster benefits and attraction of skilled professionals. Because of the development of special education system, its average level within the cluster has recently increased significantly. Thus, in the mid-80s of the XX century, unskilled workers' share was more than 75%, by the end of the 90s – less than 50%, and today – about 36%. Using

the innovative technologies in agro-industrial clusters in Norway is aimed at improving product quality, as well as production costs reducing and development of new markets (Krasnokutsky, 2010).

Thus, given the international experience, the formation of regional clusters of agricultural innovation should be made in the following order (Figure 1).

### 3. Directions of development of business incubators

In the international practice among the major institutions of innovative development of infrastructure, business incubators are the most common. Today, there are more than 4,000 business-incubators worldwide, among them from 850 to 1100 are officially registered in the US, about 800 – in Western Europe, and more than 20 – in Ukraine.

The main functions of a business incubator include (Nemchenko, 2010): providing entrepreneurs

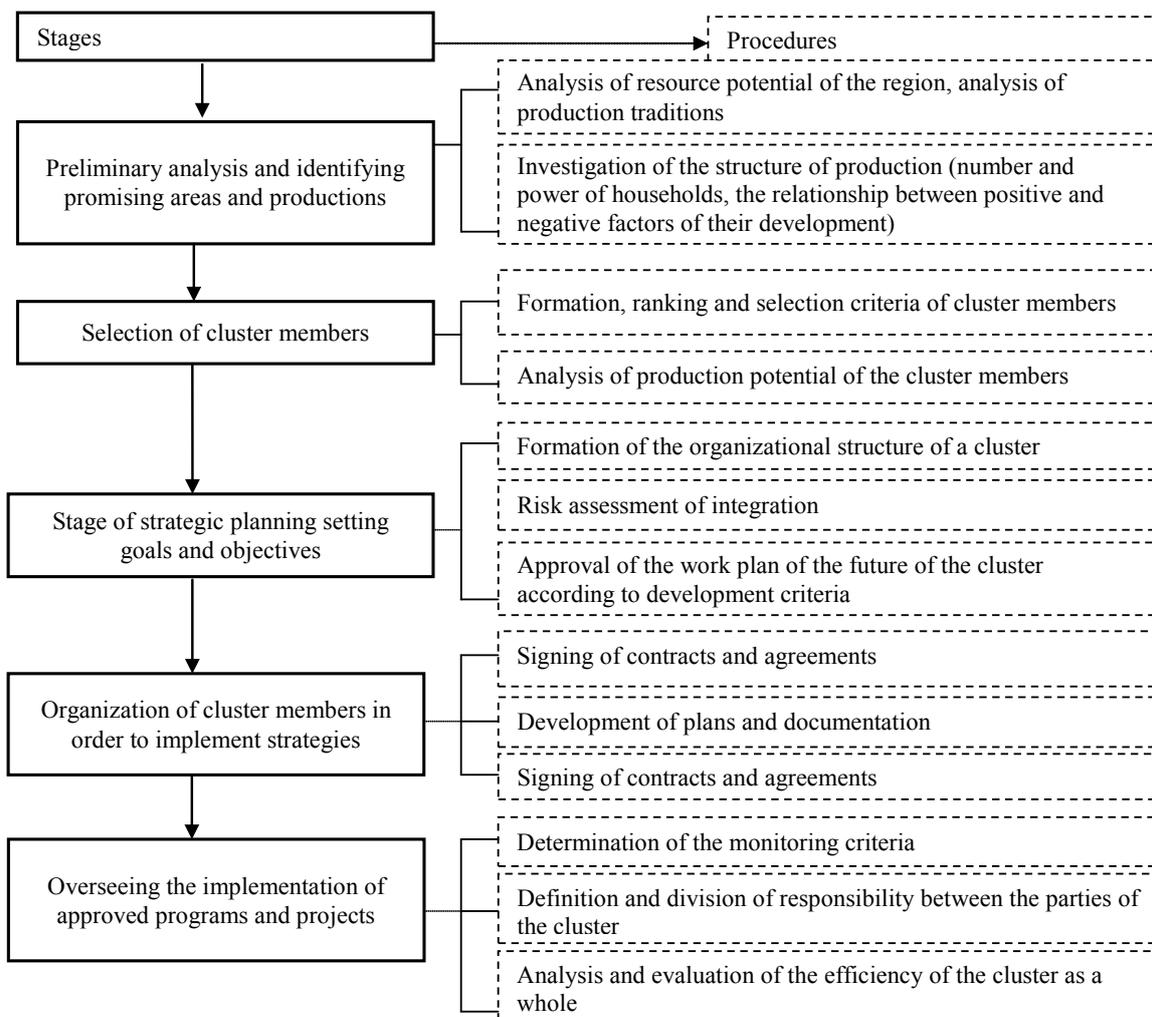


Fig. 1. The procedure of formation of regional agricultural innovation cluster

Source: (Golovnyia, 2013, Golubev, Voronov, Dorokhova, Dugin, 2013)

supporting and production facilities, leased on favourable terms; consulting services; assistance in conducting market research; search for potential investors; information and resource support of existing and newly created small businesses; educational activities.

The main components of the functioning of business incubators in the agricultural sector should be Management Centre, Logistics Centre, Information Technology Centre, Innovative Technology Centre, Market Research Centre, Consulting Centre, Investment Loan Centre and the Centre of Training Programs and Technologies (Figure 2).

However, it should be noted that the operation of innovative business incubators in the agricultural sector is accompanied by a number of obstacles, including: lack of legislative and regulatory and methodological framework of business incubators; shortage of own financial resources, business incubators; poorly developed venture capital. Thus, the main directions of development of business incubators in the agricultural sector are the development of appropriate legal and regulatory provision that would clearly regulate activities of business incubators; use of foreign experience of its creation; provide adequate financial support from the state and private investors.

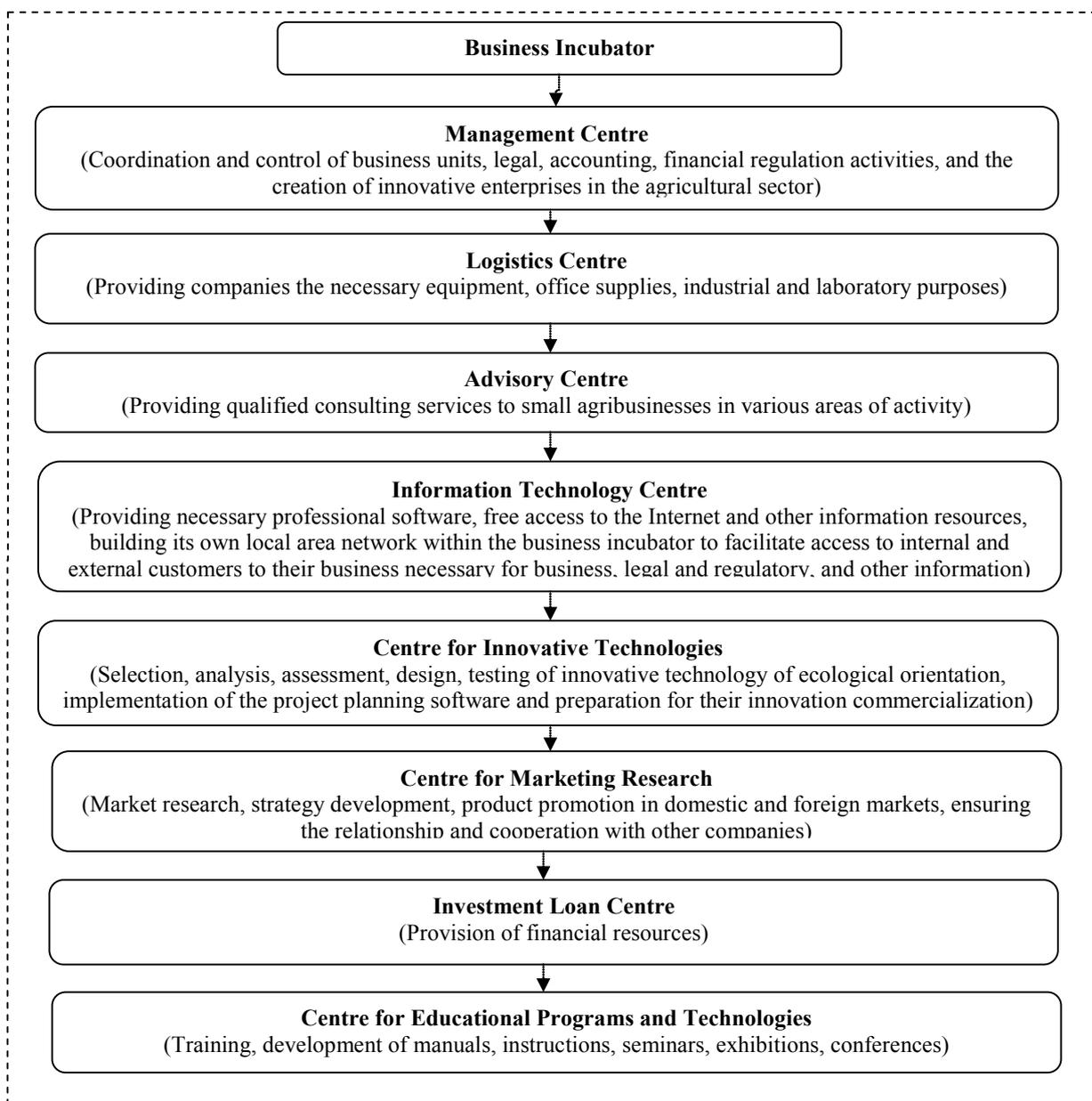


Fig. 2. Model of a business incubator in the agricultural sector

Source: (Fedorenko, 2010)

#### 4. Transfer of innovations based on agricultural consulting

The network of advisory services is a major communicative chain of the regional markets and the most efficient mechanism for providing innovations to the agricultural sector. Within the consulting services should be developed and recommended projects that are fully equipped with personnel, machines, and finances, which will be possible only in the interaction of sellers of appliances and technologies, financial institutions and agricultural universities. This relationship will be also provided with advisory services. Also making its activities within the process of transfer of innovation and diffusion of innovations in agricultural production, advisory services thus stimulate scientific progress, increase in jobs and investment in the production expansion.

Taking into account the international experience, today it is possible to use these models of organization of advisory services:

- 1) Services created as structural branches of government units – ministries, regional departments of the agricultural development etc.;
- 2) Services organized on the basis of large multi-regional or sectorial universities, agricultural colleges, and specialized schools;
- 3) Farmers' organizations or associations to provide consulting services;
- 4) Consulting services as departments of commercial firms;
- 5) Private consulting services.

Depending on the activity of the interaction between extension services and agricultural enterprises, such possible models of the transfer of innovation in the agricultural sector through agricultural advisory services can be distinguished (Table 2).

These models of transfer of innovations in agriculture based on agricultural consulting can be effectively used,

depending on the level of innovation environment, and the willingness and ability of agricultural producers to accept and implement innovations. In our opinion, developing of the agricultural consulting system should be done primarily through advisory services, organized at the higher agrarian educational institutions, which retain links with rural youth, agricultural enterprises, and scientific organizations. Therefore, first of all, we should promote the training of expert advisors.

#### 5. Venture financing of innovative development

The most effective and common form of intensification of innovation in a market economy conditions is venture financing of innovative projects related to high risk. But now venture financing in the agricultural sector of Ukraine is underdeveloped. The problem lies in the imperfections of the legal, technical and organizational provision of various aspects of investment support of innovation. In our country, only some elements of emerging complex infrastructure of support of venture capital (venture capital funds, expertise and consulting services management company venture enterprises and projects, specialized information services, etc.) can be found. In addition, many developers of new products and services do not have knowledge about the process of venture financing innovation from initial stages to the commercialization of the results of a market economy. Weak innovation activity of most agricultural enterprises is due to the lack of sufficient economic incentive among producers, largely due to low consumer demand in the domestic market. To promote the development of venture financing, Ukraine has established Association of Private Investors. But unfortunately, the sectors of agriculture presented to the Association only three projects, which is extremely less in comparison to other sectors. Therefore, one of the most important tasks to ensure the further innovative development of the agricultural sector of

Table 2

#### Models of transfer of innovation in the agricultural sector based on agricultural consulting

Types of models	Specifics
Model 1	Informing all concerned about the emergence of new techniques or technologies and other innovations by publishing bulletins, information through the website and more. In this model, the interaction between extension services and agricultural enterprises is minimal
Model 2	The consultant is an active mediator between the carrier of innovative knowledge and agricultural enterprises. In such circumstances, the main task of the consultant is bringing information about the proposed innovation and efficiency on the results of testing of carrier (developer) innovations
Model 3	Interactive informing of all interested parties of the emergence of new techniques or technologies and other innovations through periodic seminars, training courses, workshops, and so on
Model 4	Consultant demonstrates the innovative technology at its research site (for example, plants a new variety or working on innovative technology from the previously known varieties). A potential client can see the difference in yield and laboriousness reduction in the experimental area compared with its own (control) plots
Model 5	Consultant demonstrates the innovative technology in practice in the real terms. For example, he sows popular culture, using innovative technology on the land that provided by the potential client. After harvesting potential customer will be able to visually verify the effectiveness of the proposed innovative technology, comparing the yield at the experimental area and other areas

Source: (Glebova, 2012)

Table 3

**The main directions for the state support of venture financing of the innovative development of agricultural enterprises**

Directions	Aim
Direct methods	
Government direct investment	Direct investments in venture capital funds that stimulate the development of innovative agricultural enterprises
Government loans	Long-term loans at low-interest rates and (or) non-refundable credits venture funds
Indirect methods	
Regulatory support	Development of the legal framework, which regulates legal relations in the field of venture capital investment; development and legislative consolidation of new forms of venture capital investment to finance innovative projects; legislative regulation of the right to higher education institutions on a share in the capital of innovative enterprises
Tax incentives	Creating a favourable tax treatment of income from securities transactions; eliminating double taxation of investors involved in the formation of venture capital funds that finance agricultural enterprises
Information support	Development of an informational environment that allows inventors, innovative agricultural businesses and investors to find each other and promotes the development of cooperative ties between them; training and consulting of agricultural producers, including dissemination of information on promising innovative projects and potential investors
Guaranteeing investments in capital stock	Ensuring the return of the losses from venture capital investments in the agricultural sector, which is characterized by a high level of risk

Source: made by the author

the economy is an enabling environment for increasing investment activity in the field of venture capital financing innovation of agricultural enterprises.

The most important directions of the state policy on the development of venture investments of innovative development of the agricultural sector should be represented by two main groups of methods – direct and indirect (Table 3).

Direct methods of venture capital support should include specific mechanisms of state support aimed at increasing the supply of venture capital. These programs primarily should be implemented in the form of financial incentives – namely, direct public investment and government loans. Indirect methods of venture capital support should include a favourable legal framework for the regulation of relations in the field of venture capital investment, promoting new forms of venture capital investments, tax incentives, guaranteeing investments in capital stock. Thus, the implementation methods of government support and stimulate venture investment will positively affect the innovative development of the agricultural sector as it ensures increasing their attractiveness to potential investors.

## 6. Conclusions

Thus, in the formation of an effective infrastructure of innovative development of the agricultural sector must take into account the positive experience

of international practice and domestic business conditions, territorial and sectorial features that will combine the best global models with national realities innovation. The formation of agricultural innovation regional clusters should be represented by the following stages: a preliminary analysis and identifying promising areas and productions; selection of the cluster members; the strategic planning stage; setting goals and objectives; work scheduling of the cluster members in order to implement strategies; control over the execution of the approved programs and projects. The main components of the functioning of business incubators in the agricultural sector should be Management Centre, Logistics Centre, Information Technology Centre, Innovative Technology Centre, Market Research Centre, Consulting Centre, Investment Loan Centre, and the Centre of Training Programs and Technologies. The development of agricultural advisory system should be implemented through extension services, organized at the agricultural universities that provide links with rural youth, agricultural enterprises, and scientific organizations. The formation and functioning of the optimal system of institutions of the innovation infrastructure by means of appropriate tools and methods will contribute to the active implementation of innovations in the agrarian sector of the economy and taking it to a qualitatively new level of development.

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