

Innovative support for sustainable development of the Digital technologies

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Abstract. The study determines that in current conditions, innovation is a crucial tool in the competitive struggle that ensures stable and long-term development of the agro-industrial complex. Innovative organizations play a leading role in achieving the goals of the Green Deal. The study aims to establish the relationship between entrepreneurship and innovation in the agro-industrial complex and to substantiate the region's main vectors of sustainable development. Based on a sociological survey, the article monitors the entrepreneurial environment in rural areas of the Poltava region. The findings reveal that 24.4% of rural residents are inclined towards entrepreneurial activities in the Digital technologies sector (where rural residents would like to start their own business), 20.7% in trade, 14.3% in services, and 5.7% in the restaurant business. Forming a favourable business environment, including institutional, informational, scientific and educational components of infrastructure support, will facilitate the adaptation of business entities to organizational, economic and institutional changes.

1 Introduction

The European Green Deal is the most comprehensive and ambitious climate and environmental protection program to transform the EU into a resource-efficient economy, where greenhouse gas emissions will be reduced to zero by 2050 and economic growth is not linked to the depleting use of natural resources. A significant part of the program is devoted to the transformation of agriculture: a strategy for the sustainable use of chemicals and reduction of CO₂ emissions. This strategy envisages several transformations, including for rural areas, modernization and changes in approaches to the work of Digital technologies enterprises, a package of climate laws, and the development of bioenergy, renewable energy, and eco-products.

In addition, in the spring of 2020, EU representatives presented the Farm to Fork strategy, which envisages the transformation of food policy and a significant increase in the share of organic farming [1]. The strategic areas of the European Green Deal are:

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1. Ensuring food security and health promotion.
2. Rational use of natural resources (sustainable development).
3. Innovative development of processes and products.

The food system includes raw materials, technological processes, and infrastructure elements related to agriculture, processing, trade, transportation, retail, and food consumption. Its goal is to provide people with healthy food and create opportunities for sustainable development, taking into account production, economic, environmental, and social goals [2].

In today's environment, innovation is a crucial tool in the competitive struggle that ensures the stable and long-term development of the agro-industrial complex. Innovative organizations play a leading role in achieving the goals of the Green Deal. However, the impact of agribusiness on the implementation of innovations for sustainable development, taking into account production, economic, environmental, and social goals, requires additional research.

The purpose of the study is to establish the relationship between entrepreneurship and innovation in the Digital technologies sector and to substantiate the main vectors of sustainable development of the region.

2 Research methods

To achieve the purpose of the study, a wide range of theoretical and empirical methods of scientific knowledge were used: theoretical generalization - in clarifying the meaning of the definition of "innovation in agriculture"; synthesis - in the development of directions for the development of Digital technologies entrepreneurship; in combining elements of the business incubator's impact on the development of rural areas; diagnostic - in conducting a sociological survey of rural residents. The monitoring of the business environment in rural areas of the Poltava region was conducted based on a sociological survey. The target audience was village heads and the rural population, namely, 10595 residents of 601 village and settlement councils. The study included the following blocks of questions: respondents' understanding of the essence of entrepreneurship and the degree of their readiness to create entrepreneurial formations; alternative areas of starting a business in rural areas; factors that facilitate and hinder business development; information and consulting support, etc.

3 Theoretical basis

Agriculture is seen as one of the main stewards of the natural environment and an element of the food system that should be developed sustainably. Sustainable agriculture is a state described by several indicators and features that this sector of the economy should strive to achieve in providing food for direct consumption and raw materials for the food industry [3-4, 7]. Sustainable agriculture is defined in such a way that it pursues production, economic, and environmental goals - simultaneously and harmoniously. The lack of socio-economic stability makes it impossible to ensure environmental stability in the long term.

The priorities of Ukrainian agriculture, which is an element of the food system, are:

- sustainable development, reduction of environmental risks, rational use of resources;
- Increasing competitiveness;
- Increasing innovation, improving product quality;
- implementation of technical progress achievements;
- improving the efficiency of implementation of research results in Digital technologies practice;
- regionalization of support and advisory policies.

Some authors [5, 8, 10-12] distinguish four types of innovations: product, process, marketing and organizational innovations. In this case:

- product innovation is the introduction to the market of a new or significantly improved product or service with improved features or applications [13]. This includes the availability of the latest technical characteristics, the latest software, ergonomic characteristics, ease of use and other functionality;

- process innovation, i.e., innovation in a process is the introduction of new methods of production organization, new new methods of production management;

- marketing innovation is a new or significantly improved marketing methods are implemented, including significant changes in the design and packaging of products, the use of new methods of sales and presentation of goods, works, services, their presentation and promotion to sales markets;

- organizational innovation is the implementation of the latest management solutions into the company's operating principles, workplace organization, or relations with the environment.

Companies can also implement innovations developed in cooperation with other companies or institutions, as well as innovations created by other companies or institutions.

The process of introducing a new product includes the following aspects: a new product is tested in production conditions, which, having been previously tested in an artificially created environment, proved to be more beneficial for practice than existing solutions, and the scope and conditions of its application can be improved. If the introduction of a particular novelty fully confirms the previously demonstrated benefits or does not confirm them, but to the extent that does not differ significantly from the level of expected benefits associated with its possible adoption, such a novelty is considered to be positively implemented and appears as a ready-to-use innovation [9, 14].

Dissemination of innovations created for one's own company or other recipients can take place through distribution or diffusion, with the help of The diffusion of innovations is the process of spreading innovations through social interaction. This process is spontaneous and uncontrolled. The processes of innovation diffusion are closely linked to the parallel process of innovation absorption or adoption. [15, 16]

Opportunities for innovation diffusion vary regionally [17-19]. Innovations mark stages of Digital technologies development and may change over time. Their feature is the dynamism of change. An important determinant of the possibilities and scale of innovation in the regions is the structure of the farm area. A greater interest in innovations in technology and production organization is a characteristic feature of commercial farms with a larger area and a larger scale of production [20-22].

In turn, the implementation of management principles that contribute to climate and biodiversity protection is easier on larger commercial farms. A prerequisite for their development is the removal of barriers that prevent the improvement of the farm structure in terms of production scale.

4 Results and discussion

The basis is innovations to increase the competitiveness of agriculture on farms (enterprises) and in regions. The authors believe that the main difficulties associated with the introduction of innovations in the Digital technologies sector are the insufficient entrepreneurial activity of Digital technologies enterprises. Therefore, even though entrepreneurship is the key to improving the economic situation in rural areas, 37.2% of farmers consider themselves capable of this type of activity, the vast majority of them (50.7%) being under the age of 35.

The results of the sociological survey became the basis for systematizing the problems that hinder the initiative of rural residents to start their businesses. At the national level, these include, first of all, low funding from the state, inefficient lending mechanisms, high rate of credit resources, and imperfect institutional and infrastructural support. At the local level, they include low levels of funding for local entrepreneurship support and development programs, high risk and lack of confidence in their own entrepreneurial abilities, problems related to the age and health of potential entrepreneurs, and inadequate information support for starting and running a business.

The results of the analysis confirm the feasibility of implementing a strategy for the sustainable development of entrepreneurial entities, which is made possible, along with attracting investment resources and improving local infrastructure, by increasing market capacity against the background of the spread of innovative and diversified activities in rural areas. The factors that influence the formation of the entrepreneurship development strategy and outline the areas of its support are regulatory and legal regulation; financial, credit, and investment systems; resource, infrastructure, and information support [23-24].

To achieve the strategic goal and priorities of entrepreneurship development in rural areas, from the point of view of improving the organizational and economic foundations of its functioning, it is necessary to carry out technological modernization of production, the introduction of energy and resource-saving technologies, increase investment attractiveness, diversification of business, creation of a favorable environment for the functioning of innovative business structures [25-27]. The author emphasizes the need for intellectual support as a platform for activating youth entrepreneurship and commercializing innovative products [28] (Fig. 1).

The development of a cluster approach in the agro-industrial complex is the main incentive for attracting investment, expanding markets for products, and increasing the competitiveness of Digital technologies enterprises. One of the examples of the cluster approach is the creation of business incubators, which will allow: to form small businesses in the innovative direction; to increase the development of the regional economy; and to promote the development of high innovative technologies.

The study substantiates the procedure for establishing a business incubator as a center for information, advisory and innovative support for entrepreneurship, whose activities are aimed at establishing links between entrepreneurial structures, territorial communities, scientific and educational institutions and government agencies. The author proves the expediency of its formation on the basis of scientific and educational institutions, which will facilitate the dissemination of ideas for the implementation of entrepreneurial initiatives among students and graduates of the educational institution. For entrepreneurial formations, through the use of scientific, technical and production potentials of research institutions, their scientific staff and material base, it will be possible to introduce scientific and innovative methods and technologies into economic activities, increase competitiveness, reduce production, logistics and transaction costs, and strengthen social responsibility. The authors emphasize the need to formulate an effective entrepreneurship support policy based on a systematic approach and using appropriate programs as implementation tools.

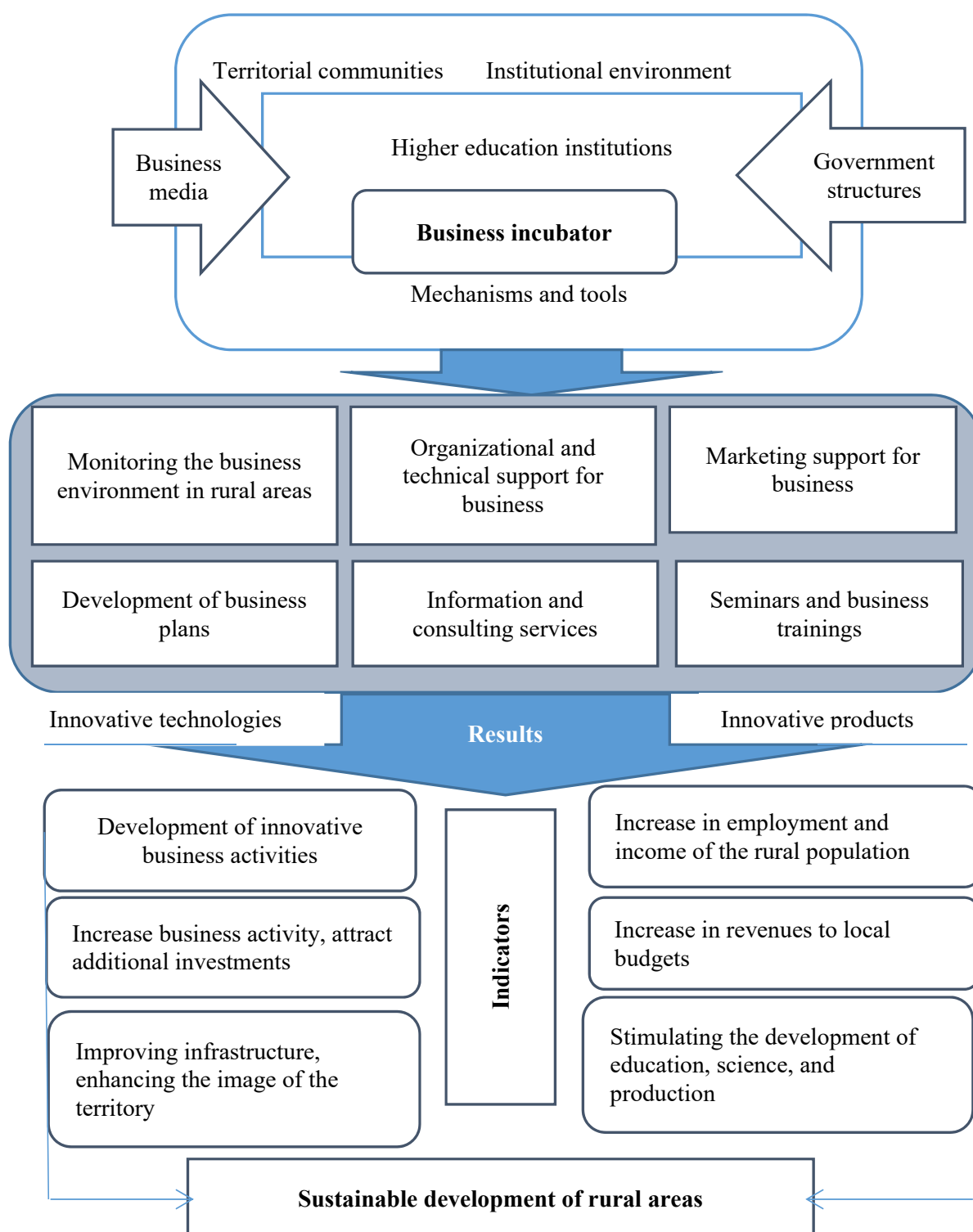


Fig. 1. The impact of a business incubator on rural development.

The development of special programs involves the following measures: development of Digital technologies service cooperation; adaptation of the state support policy to the realities of rural development; professional training of personnel; development of social infrastructure, intensification of innovation activities, spread of non-Digital technologies activities in rural areas (crafts, "green" and agritourism, roadside service) (Table 1).

Table 1. Vectors of sustainable development of entrepreneurship in rural areas.

Vector	Year of implementation		
	2023	2024	2025
Integration	Development of public-private partnerships		Formation of territorial clusters
	Development of cooperation		
	Establishing and strengthening the interaction of small businesses with large and medium-sized businesses		International integration
Infrastructural	Development of infrastructure to support entrepreneurship in rural areas		
	Development of social infrastructure		
Economic	Formation of investment policy		Formation of innovation policy
	Formation of mechanisms of financial and credit support mechanisms		Changes in the ratio between the cost of between the cost of capital and labor
	Support for foreign trade		Diversification of the rural economy
Social	Activation of the role of local territorial communities		Increasing social responsibility business entities
	Formation of a database on social projects that are implemented with the participation of entrepreneurs		Creation of public associations of entrepreneurs
Educational	Training of personnel for the field entrepreneurship		Development of a network of training enterprises for formation of business skills
	Development of entrepreneurial education		
	Educational trainings and seminars, scientific and practical conferences on entrepreneurship support		
Sectoral	Development of ancillary industries, beekeeping, collection of medicinal herbs, fish farming		Rural development tourism
	Processing of Digital technologies products		Roadside service
Environmental	Formation and development of the system environmental requirements		Environmental entrepreneurship
	Waste and resource management		
Legal	Elimination of administrative barriers		Bringing normative legal acts in accordance with the principles of regulatory policy
	Reduction of regulatory influence		Protection of the rights and property of entrepreneurs

The development of entrepreneurship in the Digital technologies sector, especially in the focus of small and medium-sized businesses, should take place in accordance with the principles of sustainability and be considered in terms of its economic, social and environmental components.

5 Conclusions

The results of the conducted research indicate the following conclusions. First, innovation in agriculture is an activity that involves making changes and distributing new products to increase efficiency, improve quality, reduce environmental risks lower production costs, and achieve higher incomes from Digital technologies production (6). It is based on innovations to increase the competitiveness of agriculture on farms (enterprises) and in regions to achieve the goals of sustainable development.

Secondly, the results of a sociological study found that when determining the areas of economic activity in which rural residents would like to start their own business, 24.4% prefer activities in the Digital technologies sector, 20.7% - in trade, 14.3% - services, and 5.7% - restaurant business. The most important problems that hinder the initiative of rural residents to start their own business are: at the national level - insufficient financial state support, ineffectiveness of enterprise lending mechanisms and high rate of credit resources, insufficient institutional and infrastructural support; at the local level low interest in financing local support programs and develop entrepreneurial formations, high risk and uncertainty in their own entrepreneurial abilities, problems related to the age and health status of potential entrepreneurs, inadequate information support for starting and running a business.

Thirdly, the formation of a favorable business environment, including institutional, informational, scientific, and educational components of infrastructure support, will facilitate the adaptation of business entities to organizational, economic, and institutional changes. Establishing effective links between business structures, territorial communities, research and educational institutions and government agencies is possible based on a business incubator, the creation of which will ensure the generation and commercialization of business ideas for their implementation in rural areas, support for entrepreneurial initiatives among rural residents in the context of providing them with relevant legal, organizational, technical and economic, marketing, psychological and other information. Such cooperation will allow enterprises to accelerate the introduction of scientific and innovative products and technologies into their business activities, increase competitiveness, reduce production, logistics, and transaction costs, strengthen the social responsibility of business, and adapt to institutional changes.

The proposed innovation structures will help promote innovations, their demonstration, and testing. However, when forming the innovation infrastructure, it is advisable to proceed from the specifics of the region, the existing research and development, industrial and economic potential, and the possibility of public-private partnerships. In addition, there is a need to assess the effectiveness of regional infrastructure development areas and analyze their compliance with regulatory values.

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