

# New organizational mechanisms of infrastructure development of small agricultural businesses in Russia

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**Abstract.** The developed infrastructure of a small agricultural business (ISAB) ensures the innovative development of production of small enterprises of the agro-industrial complex (AIC), solves social problems of rural areas and provides employment for the rural population, performing a number of functions, including: property, financial, consulting, information, legal, innovative, social and export support for small agricultural businesses (SAB). The aim of the study is to identify the problems of the infrastructure development of the SAB and search for their solutions. The methods of generalization, economic and mathematical modeling, functional analysis were used, the data of the Ministry of Economic Development of Russia, the reporting of the Ministry of Agriculture of Russia, publications of foreign and domestic authors and other sources served as the material for the study. It was proposed to use the institution of "commercial procurement", to functionally expand the "financial" service, to organize a Single Industry Center for Infrastructure Development (Center), which will ensure effective interaction of all participants through the use of a digital platform based on a service-oriented architecture (SOA). The platform needs to be integrated with government information systems that support the infrastructure development of the SAB. The cluster organization of infrastructure facilities will increase efficiency, will contribute to the concentration of resources and their greater purposefulness. The main result of the implementation of new organizational mechanisms should be the effective development of the IMAB.

## 1 Introduction

By ISAB we mean a set of state, non-state, public, educational and commercial organizations of production (transport, power lines, water supply, etc.) and social (trade, housing and communal services, health care and education, consumer services, etc.) plans that provide a supportive environment for the operation of the SAB. In this context, the following infrastructure objects are significant: public organizations that unite SAB to solve

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specific problems; commercial and industrial facilities; educational organizations that provide personnel training and professional development; information, consulting organizations and mass media; funds to support SAB, microfinance organizations and other financial services for SAB, etc.

The development of ISAB has been actively studied in the Russian Federation for almost 30 years, due to the fact that it not only ensures the innovative development of production of small enterprises AIC, but also solves the social problems of rural areas and, first of all, the life support and employment of the rural population [1, 2]. From an economic point of view, the development of ISAB will accelerate the creation of a competitive environment in the food market and satisfy the needs of buyers with new products and goods [3]. With flexibility and mobility, ISAB is able to fill empty economic niches and provide efficient infrastructure services not only to small, but also to large businesses and the population.

The main problem in the development of ISAB is the lack of effective organizational mechanisms for its formation. This is due to the fact that the global crisis that occurs in the world every 3-4 years negatively affects the functioning of the SAB and does not allow it to form an effective infrastructure for its activities [4]. Internal problems arise due to the fact that the functions of infrastructural development are distributed among various ministries and departments that pursue their goals, lead to ineffective development mechanisms and require significant adjustments at different levels of government. This is confirmed by the goals of the national project "Small and Medium Enterprises and Support for Individual Entrepreneurial Initiatives" and its tasks related to the search and development of effective organizational mechanisms for the development of ISAB.

Despite numerous Russian and foreign studies of the issue [5-8], the national policy in this area is still ineffective and requires changes to the ISAB development paradigm, including clarification of the functional features of infrastructure development and the formation of new organizational mechanisms, taking into account modern trends of changes in institutional environment and national strategic policy in the field of support and development of small business [9].

## **2 Materials and methods**

The research methodology is based on a systematic approach and includes a set of methods, including: the method of generalization, economic and mathematical modeling, and statistical, functional analysis. The empirical basis of the analysis was the data of the Ministry of Economic Development of Russia, RosStat, reports of the Ministry of Agriculture of Russia, publications of domestic and foreign researchers.

## **3 Results**

In order to develop new mechanisms for the development of infrastructure, it is necessary to determine its essence. There are several concepts of the essence of infrastructure. In the traditional sense, the SAB infrastructure is a subsystem of agricultural facilities that provide services of a production and social nature. Infrastructure itself does not create added value, but provides the production processes where it is formed, develops favorable conditions for SAB workers and the entire rural community. Infrastructure provides various services to create favorable conditions for the operation and effective reproduction of SAB, including in terms of the implementation of the functions of property, financial, consulting, information, legal, innovation, social and export support, which are carried out at the request of enterprises within the authority of infrastructure facilities [10].

At present, as practice proves, it is advisable to supplement the list of forms of infrastructure services with the institution of "commercial procurement", to functionally expand the financial service to "financial guarantee", since for SAB, in the face of a shortage of its own funds, it becomes important to obtain guarantees for loans and borrowings. Cluster organization of infrastructure facilities increases the efficiency of infrastructure services, contributing to the concentration of resources and their focus on solving complex SAB problems [4, 8].

Expanding the number and improving the quality of infrastructure services (support) ensures the development of the SAB infrastructure, which has enormous potential and has good reason to play an important socio-economic role in the development of the agricultural sector and rural community. Despite the positive dynamics in the development of SAB over the past decade, there are still many problems with the development of infrastructure, limiting the rate of its growth [1, 3, 9, 11]. To identify these problems, a functional-integration approach was used, which allowed integrating ISAB functions into groups in order to concentrate resources on solving large tasks and effectively performing infrastructure services tasks. As for the tasks of infrastructural development, the formation and assembly of organizational mechanisms is carried out in the main categories: financial and economic, organizational and technical, regulatory and legal, information and consulting.

Today it is difficult to imagine a SAB organization without infrastructure support for its production activities, providing information to consumers without consulting services. The knowledge gained in the course of personnel training is converted into information resources, therefore it is recommended to include them in the functions of information and consulting support. Norms and laws define the limits of the duties, rights and responsibilities of the SAB, which are in fact so-called formal institutions. The economic process includes the financial aspects of infrastructure services, which are inseparable from each other. In this regard, the functional-integration approach forms the basis for the development of infrastructure, increasing the number and improving the quality of infrastructure services for SAB, expands the scope of this approach.

It should be noted that due to the fact that a comprehensive infrastructure development system has not been created in the agricultural sector, which should include a network of facilities necessary for SAB's activities, state programs for the development of agribusiness are not fully implemented and budget funds are not used effectively enough. Another problem of infrastructure development is associated with the fact that often infrastructure facilities are organized formally, this leads to fictitious provision of services, confusion of concepts and functions of various facilities.

Such disunity and imbalance in the formation of infrastructure, the ineffectiveness of the provision of infrastructure services is explained by the lack of a clear state policy for the development of ISAB, the absence of a single center for infrastructure development - a coordinator of formation and development, territorial heterogeneity of infrastructure services and a general lack of infrastructure facilities, especially in remote rural areas.

The solution to these problems is possible with the creation of a single Center, with subsidiaries at various levels of management of the agricultural industry, with the formation of a digital platform for the provision of SAB infrastructure services using SOA (service-oriented architecture) technologies.

## **4 Discussions**

Currently, AIC does not have a single body that carries out the coordinating functions of infrastructure development. Such functions are imputed to various ministries and departments, which hinders the coordination of their actions in terms of infrastructure

development. The problem is aggravated by different goals and objectives of these structures, which does not contribute to the unification of strategic and tactical goals for infrastructure development and the provision of ISAB services [12, 13]. It is possible to solve the above problems by creating a Center, the main purpose of which will be the coordination of infrastructure development, and its functions: analysis of the existing infrastructure and identification of problems in its development; identification of the optimal structure and composition of infrastructure facilities; development of strategic development plans and support for public-private partnerships in the construction of infrastructure facilities; updating of normative documents on infrastructure development; methodological support for the standardization of infrastructure services; information and consulting service of SAB on solving problems of infrastructure development.

The creation of such a Center is an important part of the organizational development mechanism of ISAB. The experience of small agricultural businesses in the USA, Japan, Great Britain, EU countries and other foreign countries proves that business structures managed to achieve great success in the development of infrastructure when creating special institutions for infrastructure development [14-18]. This is reflected in the developed roadmap "Sustainable growth of the non-resource sector of the Russian economy." To implement its functions, it is advisable for the Center to include structures in the main areas of infrastructure development and infrastructure support: a department for organizational and technical development, regulatory and financial and economic support, information and consulting support [8, 10, 15].

The Business Development Department will provide an analysis of the existing SAB infrastructure, based on which it determines the need for new infrastructure, interaction with the existing infrastructure and other stakeholders, including industry authorities and the public.

The Regulatory Support Department will analyze the existing regulatory framework for infrastructure development and will develop regulations, standards and rules for the provision of infrastructure services.

The Department of Financial and Economic Support will analyze the financial and economic activities of the infrastructure, the effectiveness of the provision of financial support, the assessment of investment projects, including in public-private partnerships, in the creation of new infrastructure facilities and reconstruction of existing ones, etc.

The department of information and consulting support will collect and statistically analyze information, transfer information reports to SAB structures, provide advisory support, as well as train and retrain specialists in infrastructure development. For the interaction of all structures of the Center and small businesses, it is advisable to form a single digital platform for the development of ISAB.

In the context of AIC's transition to the digital economy, the formation of the core and architecture of a digital infrastructure development platform is a prerequisite for the implementation of the infrastructure development concept. The core of the digital platform should be the main elements that ensure the operation of the platform, its functions and interface required for its development and creation of applications for various groups of participants [13].

The main purpose of a single digital platform is to provide services and technical support for existing information systems for the development of ISAB and the development of new services, including user authorization, centralized data entry, providing reference information, bringing data to the status of legal significance. Among the services, the following should be highlighted: interface platform, data storage, network verification and security systems, analytical support service. Such an arrangement of elements of a single digital platform will ensure the uniformity of data entry, increase the reliability of primary information, and optimize the cost structure.

A prerequisite for the creation of the Center is the implementation of primary operations, including: analysis of the legal basis for the interaction of all participants in the digital space and preparation of recommendations for their implementation; study of the functional features of potential participants in the digital space and digitization of their data; formation of information exchange and coordination of interaction between participants; development of technical agreements and standards for information exchange. The platform should provide the ability to use the user's work computer and the browser on the mobile device to work in the network. It is advisable to organize the operation of the platform using redundant communication channels and load balancers to support the operation of the accumulated software and hardware for protection against natural disasters. Technological modification of PaaS (Platform as a Service) is considered as a way of providing all platform participants with a ready-made software environment and tools for its customization. The elements of PaaS are hardware, operating systems, a database management system (DBMS), then testing and development tools, including digital services that ensure the implementation of all functions. PaaS technology is based on SOA, which is able to integrate various applications with maximum flexibility and allows you to build the IT infrastructure of a digital platform in such a way that loosely coupled components are linked into a single whole, equipped with interfaces for interaction using standard protocols. A software package developed in accordance with SOA, as a rule, is implemented as a set of web services interacting with well-known standard protocols (SOAP, WSDL, etc.), and each web service provides a business function. Thus, the proposed digital platform will ensure interoperability, including rational and open relationships for all participants in their activities and in the IT sphere.

The main functions of the digital platform include:

- creation and implementation of management decisions for the development of the SAB infrastructure through the formation of a new environment of trust;
- ensuring the coordinated actions of the platform participants in the implementation of investment projects for the development of infrastructure;
- increasing the effect of management decisions in the development of infrastructure as a result of reducing time and financial costs, providing equipment, testing and developing applications;
- implementation of the integration of the digital platform and information systems of the participants, providing communication at the level of all business processes, data structures and services;
- centralization of data entry, promotion of information from reference books and classifiers;
- identification of participants, authentication and authorization of their information systems;
- use of extended digital signatures to impart legal significance to information and ensure electronic document flow;
- expanding the capabilities of a single point of data entry for the digital platform and information systems of the participants;
- providing access to the existing state information resources and systems of scientific and technical information, including monitoring the development of the infrastructure of a small agricultural business;
- provision of disaster recovery and network security;
- provision of continuous professional training.

The ISAB digital development platform must be combined with the Unified Identification and Authentication System in the infrastructure that ensures the information and technological interaction of information systems used to provide state and municipal services in electronic form (ESIA), the Unified Interdepartmental Electronic Interaction

System, the National Data Management System (NDSM) and other information systems that support the infrastructure development of SAB in order to provide access to statistical data, information and analytical materials, ready-made business solutions and business plans.

It is advisable to develop and operate the ISAB digital development platform using the principles of openness and integrability, scalability and flexibility of settings, efficiency and modifiability, security of the entire system and durability. As the expected results from the use of a single digital platform, SAB will receive: effective interaction with all participants through a single access point, shorten the time for the provision of infrastructure services, reduce the cost of acquiring information technologies, increase cyber-security and the ability to expand and improve the quality of analytics data through big-data technologies.

The formation of the organizational mechanism should be carried out in several stages. The first stage includes the development of methodological support for the process of creating a Center at the federal and subsidiaries at the regional levels of AIC management, including methodological recommendations on the activities of all centers and regulations for the interaction of all participants. The second stage provides for consulting activities for the creation of subsidiary centers, based on the holding of educational and methodological meetings with stakeholders on their creation and functioning. At the third stage, subsidiary centers and digital platforms are created on their basis. At the fourth stage, the implementation of information systems, resources and platforms of all participants is carried out. The fifth stage provides for the large-scale deployment of the functions of all subsidiary centers of digital platforms.

New in the organizational mechanism is the interaction of all participants in the ISAB development process on the basis of a single Center, a digital platform and information technologies adapted to the specifics of SAB's infrastructural activities. It is also proposed to conduct the management of the Center and its regional network under the Ministry of Agriculture of Russia, which will allow specialists to more fully implement the tasks of the industry for the development of ISAB and develop rural areas. A positive result of the implementation of new organizational mechanisms for the development of ISAB should be such an infrastructure development that fully satisfies the needs of SAB, will contribute to improving the quality of infrastructure services, creating a single digital platform for organizations and developing infrastructure through the interaction of stakeholders in the process under the control of a single Center that implements complex tasks facing before AIC.

## **5 Conclusions**

The study of the organizational development mechanism of ISAB made it possible to identify the problems of infrastructure development and outline ways to solve them, taking into account the essence of infrastructure facilities and the characteristics of the services they provide. Based on the functional-integration approach, new organizational mechanisms for the development of the SAB infrastructure have been identified, including the creation of a new institution - a single body for infrastructure development in the agricultural industry (Center), where the effective interaction of all participants in the SAB infrastructure development process is provided by a digital platform based on SOA. Its organization will allow integrating various applications with maximum flexibility, using distributed, loosely coupled, replaceable components equipped with standardized interfaces for interaction of all participants in infrastructure development using standardized protocols. The main result of the implementation of new organizational mechanisms should be the effective development of ISAB, capable of providing favorable conditions for SAB employees and the entire rural community.

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