Mechanisms and instruments of mutual integration of municipalities in the field of municipal infrastructure

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Abstract. The problems of modernization of municipal infrastructure are among the widely discussed in the national economic literature. There are significant advances in this direction, although quite a few unresolved problems remain. Much less attention is paid to the study of the complexity of municipal integration tools for the development of municipal infrastructure in the territorial and spatial environment. This article discusses trends and approaches to ensure the sustainable development and functioning of municipal infrastructure through the formation of mechanisms and tools for inter-municipal integration. The issues of the practical implementation of inter-municipal interaction in digital technologies format are highlighted. The necessity of creating and using a regional digital platform, based on which a structural model of a digital platform of inter-municipal integration can be formed is justified. The effects of inter-municipal integration in general in the sphere of housing and communal services are determined.

Keywords: Mechanisms, tools, integration, communal infrastructure, spatial environment.

1 Introduction

Life quality improvement can be achieved by fully providing municipalities with the necessary resource base and all types of communal resources. One of the main target areas for the development of municipalities is to ensure mutual integration of resources, including regulatory and legal regulation of integration processes that has positive impact on the creation of a favorable investment climate, attracting strategic investors, the implementation of PPP projects, financing the implementation of major investment engineering projects, financial and credit, land relations and other areas of development of the territory.

It is necessary to clarify the concept of "integration processes" taking into account the development of housing and communal intermunicipal interaction process specifics and suggest the following reading: these are the processes of accelerating the modernization of...
communal infrastructure due to the concentration and unification of tangible and intangible resources, assets, potential and spatial environment of municipalities to achieve common goals of advanced development of production and non-production funds of life environment, reducing inefficient costs, increasing competitiveness, sustainable functioning and customer-oriented management in the activities of enterprises and organizations integrated into new mechanisms, tools and organizational structures [1].

Efficient planning in the housing and communal sphere is of particular importance. This is a way to predict and identify the potential which, in the framework of integration in certain areas, would help Municipal Structures (MS) eventually achieve more effective resource management, as well as the municipal services rendering.

It is unreasonable to have industrial repair services, large sports facilities, and innovation centers in every municipality. At the same time, integrated management, especially of small MS, makes it possible to achieve the housing and communal level of larger MS in case cooperation and concentration of resources is ensured.

A five-year or ten-year plan can show how an integrated MS will meet the needs of the population at a level that each municipality individually could never achieve on its own. It is also an important means of saving money from the budget of the MS by preventing duplication of functions by each municipality and by creating economies of scale, which can lead to a higher attractiveness of integrated MS for external investors.

The housing and communal services sector, as a component of the municipal economy, is one of the key activities of the administrations of the MS. Accordingly, it is among the most promising areas of the MS integration cooperation. In particular, this is an opportunity to solve infrastructure problems through the implementation of common projects for the creation and modernization of housing and communal services infrastructure facilities. At the same time, if urban agglomerations and suburbs can be integrated relatively simply, then the issues of housing and communal services infrastructure development are solved faster due to the compact location of the integrated MS and the availability of the main infrastructure base and other housing and communal services resources [2].

## 2 Methods

Methodological approaches to the development and implementation of the investment portfolio of integration intermunicipal development depend on a number of different options. Among them is the opportunity to invest using an integrated strategy adapted for different places. This means first to formulate a strategic vision with clear goals, define policies to support it, and then proceed with development planning that is intersectoral, "location-based", results-oriented, realistic, future-oriented, and consistent with national goals [3].

Implicitly, this requires the ability to unite and manage various sectors and interests of the MS economy to determine and implement development and investment priorities in a coordinated, appropriate sequence that optimizes resources [4].

Sharing administrative services can be a good example of economies of scale. Per capita spending on administrative tasks is usually very high in small municipalities, and administrative expenses make up a sizeable proportion of the budget. This has significant implications for countries with a large number of small municipalities [5].

The management of solid household waste and the maintenance of environmental indicators is a purely municipal function, which is influenced by the size of the municipality; often one municipality is not able to effectively cope with this task on its own. Research shows that a modern technological solution for proper waste management
requires a population of at least 70 thousand people. This is due to the high cost of investments necessary for the organization of a modern landfill, and technologies necessary for the processing and disposal of waste.

Modern waste management facilities are expensive. While it is difficult for even large MS to cover their expenses, small municipalities will find them unaffordable. The next problem is that facilities such as landfills and processing plants require suitable locations (they are almost impossible to find in densely populated areas), and the population categorically does not accept when they are built in their own MS on the territory adjacent to residential buildings.

Radical improvements in the field of environmental protection are possible only within the framework of the implementation of the MS integration interaction model and alongside with that attract public-private partnership financing. The use of a private contractor will improve management mechanisms and speed up decision-making processes. Currently, such companies operate the most modern facilities and have implemented a cost-effective waste segregation and recycling program [6].

Many infrastructure networks, such as water utilities, sewer systems, central heating systems, cable television, gas and electric networks, are built in more than one municipality. This may be related to the physical environment (for example, one line with several municipalities in a mountainous area). To carry out the work, it is necessary to ensure cooperation and integration ties of large, small, and medium-sized businesses.

Further research of the organizational and economic mechanism of MS integration interaction is associated with the justification of strategies for integrated growth of MS housing and communal potential, contractual relationships of integration processes participants, of added value growth for business enterprises and, in general, the achievement of sustainable development and competitiveness of housing and communal services [7, 8].

3 Results

The suggested methods of creating a program of intermunicipal integration interaction in the sphere of communal infrastructure include factor determination of the projection of intermunicipal integration processes on the selected subsystems, assessment of the MS potential for integration, a mechanism for synchronizing processes within territorial planning and urban zoning for the development of housing and communal integration, measures to optimize the MS integration program ensuring its implementation, which is presented on the fig.1. Projections of inter-municipal integration processes should be directed to the environmental, informational, organizational-economic, production, infrastructural, innovation-digital and social subsystems.

The assessment of integration opportunities is characterized by the ability of the MS potential to develop, the opportunities for the MS combined potential to develop and the economic activity of the integration process participants, the sufficiency of the population and business economic needs potential and development resources availability.

The processes synchronization mechanism within the framework of territorial planning and urban zoning for the development of housing and communal spheres MS integration includes the formation of priority projects and technological productions, programs for the construction of intermunicipal social facilities, development and renovation of, primarily, intermunicipal communal infrastructure, the development of intermunicipal waste management system, the formation of intermunicipal competence centers. The processes’ synchronization mechanism within the framework of territorial planning and urban zoning for the development of housing and communal spheres MS integration includes the
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Fig.1. Methodological approach to the formation of an inter-municipal integration program for sustainable housing and communal services development.
Steps to optimize the factors of intermunicipal integration of housing and communal services are aimed at:

- optimization of intermunicipal housing and communal services integration aims at:
  - the overall balance of the MS housing and communal services development,
  - creation of inter-municipal centers of investment attractiveness,
  - using the potential of resource-production integration,
  - acquisition of software for the use of digital technologies,
  - efficiency of administrative measures and organization of labor mobility.

The support measures system for the development program of intermunicipal integration of housing and communal services provides for resource provision, economic support tools (subsidies, PPP, borrowed funds, etc.), measures of state support through the Housing and Communal Services Fund, grants, master plans for the implementation of the program of intermunicipal integration in the housing and communal services sector.

It is important to ensure the conditions for the integration activity of enterprises; competitive selection of potential integration processes’ participants; the structures integration efficiency assessment and methodological approaches to transaction costs reduction, consistency with federal, sectoral and interregional programs.

The legislation on the general principles of the organization of local self-government in the Russian Federation regulates the possibility of creating such organizational structures as intermunicipal associations, business companies and other intermunicipal organizations. Representative bodies of municipalities for the joint resolution of issues of local importance can make decisions on the establishment of intermunicipal business companies in the form of joint-stock companies and limited liability companies, as well as the possibility of creating intermunicipal mass media [9].

Thus, the contractual form of intermunicipal integration in the housing and utilities sector can be carried out through the formation of two types of general (intermunicipal) organizations:

- commercial organizations as a tool of contractual economic cooperation;
- non-profit organizations (NPOs).

In this case, local self-government bodies act as legal entities - founders of these structures, to combine financial resources, material, and other resources to solve issues of local importance. Having the opportunity to combine financial resources, material, and other resources in the process of intermunicipal integration of several within the framework of the relevant economic societies and relying on their activities, local governments expand opportunities to meet certain needs of the population in services and goods [10].

As a result of the production activities of these companies, municipalities can receive additional funds for the needs of municipalities in the form of distributed profits. Housing and communal services, as well as other areas requiring reform, have significant professional and production limitations. In addition to the well-known professional limitations inherent in the industrial, financial and information sectors of the economy as a whole, in the housing and communal services, these shortcomings are exacerbated by the characteristics of employed specialists [11]. The quality of competencies for the development of IT technologies and their application in the daily turnover of providing quality services to the population can be improved in the implementation of the model of MS integration interaction in the housing and utilities sector. At the same time, the problem of uneven MS development in Russia does not make it possible to effectively use the
integration mechanism in the digitalization of housing and communal services in small settlements. There are also no coordinated and proven scientific, organizational and economic mechanisms for the incorporation of digital technologies into socially significant local functions of municipalities [12].

4 Discussion

Local governments, as participants in the process of digitalization of the economy, are keen to achieve the principles of organization and functioning of digital technologies based on digitalization of services to the local population, taking into account strategic economic goals (growth of business activity, creation of a favorable investment climate, etc. D.), the formation of management decisions to substantiate the trend of socio-economic development, taking into account the socio-economic and technical and organizational expediency of management decisions, the integrability of digitalization in management processes [13].

This view of the process of digitalization of the economy in socially significant areas does not fully correspond to the main parameters of the business model of the digital electronic economy: infrastructure, platform and cyber-physical [14].

The first model represents digitization as an infrastructure service, when the consumer uses the computing resources of the supplier. The most striking example of the implementation of this model is GIS-housing and communal services [15].

The second model is focused on providing economic entities with opportunities and means of using the internal service for coordinating processes and activities of market participants of goods, works and services of interest. The implementation of this model includes the development of a highly integrated IT infrastructure and IT opportunities for all participants without exception.

The third model assumes the formation and functioning of multifunctional complexes of shared computing resources and physical processes.

In general, it can be noted that the specifics of municipal management bring to the fore the MS integration cooperation in the field of digitalization of housing and communal services at the regional level. This is due to the fact that at the regional level, it is most effective to centralize the functions of forming and managing an integrated digital housing and communal services platform, taking into account the types of MS, in order to reduce the quality gap in the provision of housing and communal services to the population.

For housing and communal services, continuous digital development is an important prerequisite for economic efficiency. Therefore, the use of the latest technological achievements, subject to the availability of economies of scale in integrated management and the use of network digital solutions for the MS is appropriate and necessary.

In particular, if the task is to increase the efficiency of housing and communal services through integration cooperation in the direction of using digital platforms, then, first of all, we are talking about combining the entire communal infrastructure into a single information network, which is a natural continuation of the process of digitalization of housing and communal services. Such a network definitely makes sense only in large systems, which are combined agglomerations or MS network systems. [16,17] These two models correspond to two main types of localities: the agglomeration model takes place in the presence of a large center with suburbs gradually absorbed by it, or in the presence of a production and logistics cluster of several localities located compactly. The second model
takes place in remote areas where small settlements are located at a sufficient distance from each other, but can be combined informationally and economically on the basis of a single digital platform, since the presence of the Internet allows such interaction. Thus, agglomeration and network types of organizational and economic integration have similar opportunities in terms of digital platformization of the economy and housing and communal services.

In housing and communal services, all business processes are related to the management of infrastructure that combines production, distribution and control components. All these components are provided with certain equipment that can be controlled and monitored. Therefore, the use of the latest developments in the field of housing and communal services is not only possible, but also desirable.

5 Conclusions

For the economic justification of innovative mechanisms of integration interaction, an assessment of the potential for creating intermunicipal integration is carried out, providing conditions for additional effect from savings on transaction costs. The effects of inter-municipal integration interaction in the housing and communal services sector as a whole consist in: reducing unreasonable expenses in the implementation of administrative services that make up a sizeable share of local budgets in small municipalities, providing a significant number of municipalities with high-quality utilities, optimizing the resources of enterprises and organizations, implementing modern management in administration, switching to a break-even mode of operation, growth business value of enterprises and organizations, saving money from the MS budget by eliminating duplication of management functions by each municipality, sharing administrative services, building up the potential for advanced development and modernization of municipal infrastructure facilities. In the process of integration interaction, the creation and use of a regional digital platform is proposed at the first stage. A municipal digital platform is being created under the Association of Municipalities, on the basis of which a structural model of the digital platform of intermunicipal integration can be formed, including the housing and communal services block and the MS block included in the housing and communal services integration.
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Fig. 2. Organizational and economic model of the digital platform of intermunicipal integration development of housing and communal services. Compiled by the author.

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