

**Federal State Budgetary Educational Institution of Higher Education
The Russian Presidential Academy of National Economy and Public
Administration**

Manuscript copyright

MAYOROV SERGEI VASILIEVICH

**CLUSTER FORMATIONS IN INNOVATIVE
MODERNIZATION OF REGIONAL ECONOMIC SYSTEM (ON
THE EXAMPLE OF THE KAMA AGGLOMERATION)**

Speciality 08.00.05 Economics and management of the national economy (clause
2. Innovation management; clause 3. Regional economics)

ABSTRACT OF THESIS RESEARCH
for a
Candidate of Economic Sciences

Academic supervisor:
Doctor of Science, Economics
Professor
Protsenko O.D.

Moscow 2021

Urgency of a problem. In modern conditions dynamics of economic development of the Russian Federation in a significant degree is defined by a concept "Industry 4.0. Concept, defining prospects of the Russian national economy digitalization, characterizes strategy of transition to the new quality of social and economical development of the country. It provides development of information technologies of a digital format, qualitatively new ways of storing information and processing large amounts of data. Success of activity of both individual enterprises and complex structural formations in the digital economics is largely determined by intangible factors. Such elements as items of intellectual property, organizational and human capital, information and intellectual assets are key tools of efficiency.

New models of organization and management of economic activity are needed, capable of ensuring drastic increase in the competitiveness of all levels of the domestic national economy. One of such models, implemented at the macro- and meso-levels, is clustering, and formation of innovation-oriented cluster structures is becoming one of priorities of cluster policy of the country. Republic of Tatarstan (RT) is one of the regions of the Russian Federation where the clustering project is being successfully implemented. Currently, a number of world-class clusters was created in Tatarstan, in particular, machine-building cluster and the Kama Innovative Territorial Industrial Cluster (Innokam).

To solve strategic tasks, innovation-oriented clusters of the Kama agglomeration generate a set of initiatives that are combined into a single portfolio, and its implementation provides cluster structures with leadership in the global markets of high technologies and high technology products. Within the frames of the formed portfolio of strategic initiatives, these structures implement capital and science-driven innovative projects. In the clusters of the Kama agglomeration, such projects are associated with creation of engineering centres, formation of digital production facilities integrating flexible production links, new generation robotic complexes and intelligent information systems.

Therefore, there is a need to link individual tools ensuring effective activity of innovation-oriented clusters into a single system, necessity to develop a qualitatively new strategic line of behaviour focused on the digital environment forming in Russia.

Degree of scientific development of the problem. Modern theory of clustering is based on the concepts of A. Marshall, J. Schumpeter, M. Porter and a number of other scientists. Fundamental works of academicians V.L. Kvint and V.L. Makarov are devoted to the development of the theory of clusters in modern conditions. In literature sources, reflecting the activities of cluster structures, attention is often focused on the activation of innovative factors, digitalization and integration into macro- and meso-economic systems of innovation-oriented clusters.

From the standpoint of a systemic and process approach to management, construction of innovative systems is considered, usage of CALS-technologies, mechanisms of sustainable development of science-driven production facilities in the innovative environment is analysed. Usage of foresight tools at macro-, meso- and micro levels of the economic system is explored, issues of development and implementation of foresight projects in the territorial context and in the context of predicting the development tendencies of new technologies is considered. Mechanisms of state and regional cluster policy, tools that ensure the formation of conditions for the effective development of clusters, as well as main directions of state assistance to the development of clusters are studied. Much attention is paid to the issues of formation of clustering infrastructure, including public-private partnership.

However, insufficient attention is paid to the issues of management of investment activities in the conditions of changes in the external and internal environment of innovation-oriented clusters, formation of the digital environment. Theoretical and methodological aspects of digitalization are poorly developed,

including formation of information support systems for the support of development of clusters in the digital environment.

Analysis of theoretical researches and practical developments showed that the peculiarities of management of the investment activities of innovation-oriented clusters in the conditions of transition to the digital format were not fully investigated. There are no information and communication models that reflect management processes. That is why the topic of the thesis research is urgent.

The goal of research is the development of a methodology of innovative modernization of the regional economic system based on the digital transformation of industrial clusters.

To implement the goal in view, the following tasks were solved:

1. Analysis of the state cluster policy, including study of the prerequisites for the formation of innovation-oriented clusters, mechanisms of usage of public-private partnership tools.

2. Research of the processes of state regulation of the sphere of formation and functioning of innovation-oriented clusters in the context of digitalization of the Russian economics.

3. Development of digitalization strategy for innovation-oriented industrial clusters. Approbation of strategy in the clusters of the Kama agglomeration, and assessment of possibility of using the key provisions of this strategy by the structures of innovative type.

4. Creation of information and communication models for management of investment activities of the innovative-oriented industrial cluster structure.

5. Formation of structure of the digital environment, ensuring effective activity of innovation-oriented clusters.

6. Development of information support system of the development strategy of cluster structure in the digital environment.

7. Creation of a package of guidance notes, usage of which will improve the efficiency of activities of the cluster. Approbation of recommendations in the structures of clusters of the Kama agglomeration.

The *object of research* is innovation-oriented industrial clusters, whose activities are aimed at development and implementation of innovative projects.

The *subject of research* is the processes of formation and implementation of the strategy of activities of the innovation-oriented industrial cluster in relation to the conditions of the digital economics.

Theoretical and methodological basis of the thesis research is the works of Russian and foreign specialists on the issues of formation of cluster structures. Information and regulatory basis of the research is theoretical and methodological developments on the problems considered in the thesis research, including materials of a number of state programs, decrees, laws and regulations of the legislative and executive authorities of the Russian Federation, regulatory documents and actual data related to the activities of cluster structures of the Kama agglomeration.

The research is based on the main provisions of the systems theory, strategic management, decision-making, investment analysis and concept of the life cycle of an investment project.

To solve the set tasks, analytical, cognitive and synergetic approaches, methods of scientific research, including methods of diagnostics and monitoring, re-engineering of business processes, mathematical modelling of scenario planning, system, process and investment analysis and a number of other methods were used.

Scientific novelty of the work, reflecting the specificity of activity and prospects of the development of innovation-oriented clusters, is presented by the main results submitted for defence.

1. Expediency of using information elements of decision-making support in the strategy of project management in the digital transformation of enterprises was

substantiated. The performed research is the basis for the development of the digital environment in the cluster structures. This environment is also based on technologies of processing large data amounts (Big Data), integration into a single system of information flows with the aim of subsequent transition to a single information environment and robotic processes with usage of artificial intelligence.

2. Recommendations on usage of foresight methodology to increase the efficiency of strategic and tactical management of the development of the industrial cluster were developed and tested on the example of the machine-building cluster of the Republic of Tatarstan.

3. Information and communication models for management of investment activities were created. The models are focused on usage of life cycle contracts for created innovations and CALS-technologies. For the structures of the machine-building cluster of the Republic of Tatarstan, a tool kit for assessment of the effectiveness of models application in conditions of a high level of turbulence and uncertainty of the external environment of the cluster is proposed.

4. Methodology of formation of the digital environment structure was developed, providing conditions of effective activity of cluster structures. Based on the application of the cybernetic approach to the construction of management systems of complex socio-economic systems, a multi-level management system is proposed increasing the efficiency of functioning of cluster enterprises in the digital environment. Working efficiency of the proposed methodology was verified. This is confirmed by a certificate on the results of approbation in the structures of the machine-building cluster of the Republic of Tatarstan (Bars Technology LLC, RIAT PJSC, Management Company KOM LLC).

5. A multi-level system of information support of the development strategy of cluster in the digital economics was developed and tested on the example of the machine-building cluster of the Republic of Tatarstan, reflecting qualitatively new

connections in the management system of the innovative cluster structure, ensuring its digital transformation.

Formation of the digital environment of the innovation-oriented industrial cluster structure was carried out in relation to the activities of KAMAZ PTC enterprise, which is a representative of the machine-building clusters. Scientific results obtained by the author formed the basis for the proposals developed in pursuance of the instruction of the President of the Russian Federation (No. Pr-922 dated 22nd May 2019) by the Inter-Agency Working Group on the preparation of pilot cluster projects and the Roadmap "Provision of sustainable economic growth of the non-resource sector of the Russian economics".

Theoretical significance of the research lies in the development of a scientifically grounded choice of key directions for stimulating the economic growth of regional systems through the development of cluster structures - "points of innovative growth".

Practical value of the research lies in the development of a package of guideline notes to improve the efficiency of structures focused on innovative activities. Results of the thesis research are reflected in the practice of the work:

- structures of the real sector of economics: clusters of the Kama agglomeration (machine-building cluster and Innokam), Scientific Industrial Enterprise Zvezda named after Academician G.I. Severin JSC (Tomilino city); Tupolev PJSC (Moscow);
- educational institutions - training and research centre for the education of workers of fuel and energy complex of the Russian State University of Oil and Gas (National Research University) named after I.M. Gubkin, Department of Management of Naberezhnye Chelny branch of the Private Educational Institution of Higher Education "Kazan Innovative University named after V.G. Timiryasov (IEUP)".

Reliability of the obtained results is conditioned by the usage of complete and reliable initial data, usage of modern scientific theories and approaches, as

well as results of practical approbation of the theoretical provisions of the thesis research.

Content of the thesis research

In the introduction urgency of the research topic is substantiated, level of prior studies of the problem is analysed, goal and tasks of the research, subject and object of the research are enunciated, scientific novelty and practical significance of the results are reflected.

In the first chapter **“Analysis of cluster policy as the basis for formation of the innovative economics of Russia”**, prerequisites for the transition to innovation-oriented clusters are investigated, the essence, tasks and problems of such a transition are revealed, analysis of the state policy of regulation of the processes of formation and functioning of clusters is performed, prospects of usage of public-private partnership tools in the strategy of creation and development of innovation-oriented clusters are investigated.

In the second chapter **“Strategic development of innovation-oriented industrial cluster structures in the conditions of digitalization of economics”**, a foresight technology of formation of the strategy for the development of innovation-oriented clusters is proposed, information and communication models of management of investment activities of the innovation-oriented industrial cluster structure are developed, methodology of formation of the digital environment for the innovation-oriented industrial cluster structure is formulated and theoretical foundations for the formation of the information support system for the development strategy of the cluster structure in the digital economy is enunciated.

In the third chapter **“Development of the strategy of activities of the structures of the machine-building cluster of the Republic of Tatarstan in the conditions of digitalization”**, practical methods of increasing the efficiency of the cluster functioning, tested in the activities of the machine-building cluster, are proposed. The methods cover the mechanisms of integration of project

management into the strategy of the machine-building cluster, increase of activities efficiency of the cluster structures on the basis of re-engineering, as well as formation of a single information environment of the machine-building cluster and strategy of sustainable development of its enterprises by means of improvement of relationships with innovation consumers.

In the conclusion, main findings made in the process of accomplishment of the thesis research, are outlined. **Supplements** contain certificates and references on the implementation of results of the thesis research.

The thesis research consists of an introduction, three chapters, conclusion, bibliographical references including 156 names and supplements. The thesis research is presented on 185 pages of the main text and 7 pages of supplements, contains 4 figures, 12 tables and 7 supplements.

Mayorov S.V.

