

National Research University Higher School of Economics

As a manuscript

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**DEVELOPMENT AND JUSTIFICATION OF A COMPREHENSIVE
EVALUATION OF THE CLUSTER POLICY EFFECTIVENESS**

Ph.D. Dissertation Summary

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Statement of a scientific problem and substantiation of its relevance. The clusters' formation and functioning is a tool that promotes economic growth and increases the competitiveness of the region's economies and the country as a whole. The cluster approach to economic development promotes effective cooperation between business, science and the government. Innovative activities are intensified in clusters, the potential of special economic zones, science cities, scientific and production associations (hereinafter referred to as NPOs), and technology parks is realized.

In the legal field, clustering of the regions' economies and the country as a whole intensified in 2008 with the adoption of the Concept of long-term socio-economic development of the Russian Federation for the period until 2020 [1], which set the task of forming a network of clusters, the main purpose of which is the modernization of the economic system countries. Over the past period, the above concept, as well as the Strategy for Innovative Development of the Russian Federation for the period until 2020 [2], has been implemented, in terms of creating a network of territorial-production clusters and innovative clusters. A new impetus for development was given by the President of the Russian Federation as part of his speech at the St. Petersburg Economic Forum (July 2022). In the Concept of Technological Development for the period up to 2030 [3] the regions were assigned the function of forming research and production clusters around leading engineering higher education institutions.

At the federal level, the conductors of cluster policy are the Ministry of Industry and Trade of the Russian Federation (hereinafter referred to as the Ministry of Industry and Trade of the Russian Federation), the Ministry of Economic Development of the Russian Federation (hereinafter referred to as the Ministry of

¹Order of the Government of the Russian Federation dated November 17, 2008 No. 1662-r "On the Concept of long-term socio-economic development of the Russian Federation for the period until 2020" (together with the "Concept of long-term socio-economic development of the Russian Federation for the period until 2020").

²Order of the Government of the Russian Federation dated December 8, 2011 No. 2227-r "On approval of the Strategy for Innovative Development of the Russian Federation for the period until 2020."

³Order of the Government of the Russian Federation of May 20, 2023 No. 1315-r "On approval of the Concept of technological development for the period until 2030."

Economic Development of the Russian Federation), and the Federal Agency for Tourism. These authorized bodies ensure interaction with regional authorities in terms of coordinating actions for the clusters development, ensure the implementation of government programs, and draw up annual reports and reports on the results of work on economic clustering.

At the regional level, the directions of cluster policy are reflected in regional strategic planning documents, in laws on industrial, innovation policies of constituent entities of the Russian Federation and / or in individual legal acts. The regions were provided with methodological recommendations for the implementation of cluster policy in the constituent entities of the Russian Federation [4] and methodological materials for the development of a detailed action plan ("road map") for the development of a cluster – a participant in the priority project of the Ministry of Economic Development of the Russian Federation “Development of Innovative Clusters – Leaders of World-class Investment Appeal” [5]. The documents are advisory in nature and do not regulate the procedure for implementing the region’s cluster policy.

Information about the clusters is posted on the Russian Cluster Map; on the portal “Geographic information system. Industrial parks. Technoparks. Clusters” (hereinafter referred to as GISIP); on the portal of the Association of Clusters and Technoparks of Russia; on the websites of cluster development centers and clusters. However, summary data on Russian clusters has not been generated.

Support for the development of clusters is carried out as part of the implementation of government programs and projects. Subsidies and grants are allocated from the federal and regional budgets for the development of clusters, and

⁴Methodological recommendations for the implementation of cluster policy in the constituent entities of the Russian Federation (approved by the Ministry of Economic Development of the Russian Federation on December 26, 2008 N 20615-ak/d19).

⁵Pilot innovative territorial clusters in the Russian Federation: directions for implementing development programs / ed. L.M. Gokhberg, A.E. Shadrina. M.: National Research University Higher School of Economics, 2015. Methodological materials were prepared in accordance with the order of the Ministry of Economic Development of Russia dated June 27, 2016 No. 400 “On the priority project of the Ministry of Economic Development of Russia “Development of innovation clusters - leaders of world-class investment attractiveness” (clause 12 of Appendix 3 of the order)

the activities of development institutions are financed. Federal and regional executive authorities, executors of government programs, post on their websites information about measures of government support for the development of clusters, while monitoring the implementation of cluster policy is not within their powers.

The execution of strategic planning documents and the expenditure of budget funds, by force of law, is subject to state control, which, in turn, is an integral part of the cluster management process, which predetermines the need for state control external to the executive branch over the implementation of cluster policy. However, the results of such control in official sources of information and in scientific publications are covered in fragments, mainly in relation to technology parks.

The current state and problems associated with the implementation of cluster policy in the regions are presented in Table 1.

Table 1 – Current state and problems of implementing the region’s cluster policy.

Current state	Causes	Problems
Information about the clusters is posted on the Russian Cluster Map; on the portal “Geographic information system. Industrial parks. Technoparks. Clusters”; on the portal of the Association of Clusters and Technoparks of Russia; on the official websites of cluster development centers; on the websites of the clusters themselves	Accounting for clusters is of a declarative nature. Databases on regional cluster policies and their implementation have not been created	Databases on Russian clusters are not integrated on a single IT-platform that would allow obtaining information, including on the results of implementing the regional CP and assessing its effectiveness
The directions of the regional CP are reflected in the strategies of socio-economic development of the regions, in the laws on industrial, innovation policies of the regions and/or in individual legal acts. Information about documents containing the directions of the region's cluster policy, about cluster development centers, and about the procedure for implementing the region's cluster policy in the context of constituent entities of the Russian Federation is grouped in tables	Among the legal acts of 82 constituent entities of the Russian Federation in the ConsultantPlus Region database, there are no documents containing a mechanism for implementing the region’s cluster policy, defining the procedure, timing for the implementation of cluster policy and responsible persons. Cluster development centers have been created in 52 (out of 82) regions	Regional authorities (according to available data) do not develop road maps for the implementation of the region’s cluster policy, in which activities are interconnected in terms of goals, financial resources, deadlines, and performers. Reporting on the implementation of such a document can serve as an information base for monitoring

Current state	Causes	Problems
Regional authorities do not pay due attention to the implementation of the region's cluster policy. As a result of sampling in the legal database of ConsulnantPlus of the region, 50 control and accounting bodies, using the keywords “cluster policy”, “cluster”, methodological documents are not presented on the portals	Methodological developments for conducting an audit of the effectiveness of the implementation of the region’s cluster policy are not publicly available	The methodological basis for monitoring the implementation of the region’s cluster policy is not fully provided
Regional control and accounting bodies do not pay due attention to carrying out control activities on the implementation of the region's cluster policy. As a result of sampling on the portal of state and municipal financial audit – portal.audit.gov.ru – using the keywords “cluster policy”, “cluster”, information on the implementation of control measures in 50 regions on the implementation of the region’s cluster policy is not posted	Control measures on target issues of cluster implementation in the constituent entities of the Russian Federation are not carried out properly	Assessing the effectiveness of regional cluster policies is currently difficult

Source: Compiled by the author.

The solution to the identified problems and issues of comprehensive assessment of the effectiveness⁶ of cluster policy is timely and relevant.

The degree of scientific development of the dissertation topic.

Issues of the functioning and development of clusters have been in the sphere of scientific interests of researchers in the field of public administration from around the world for more than two decades. The theoretical basis of the study is the works of domestic and foreign authors in the field of cluster theory. The issues of forming the state's cluster policy, the differences and relationships between cluster and

⁶According to ISO 9000:2015 “Quality management systems – Fundamentals and vocabulary”, effectiveness means the degree to which planned activities are implemented and planned results are achieved, efficiency means the relationship between the results achieved and the resources used. Effectiveness is interconnected with efficiency, which is defined as the ratio of results achieved and resources used, and at what cost these results were obtained. ISO 9000:2015 is identical to the current GOST R ISO 9000-2015. National standard of the Russian Federation. Quality management systems (approved and put into effect by the Order of the Federal Agency for Technical Regulation and Metrology dated September 28, 2015).

industrial policies, the place and role of the state in the process of activation and development of clusters, development mechanisms and cluster management tools are actively discussed by scientists. Foreign scientists made a significant contribution to the formation of the foundations and study of the functioning of clusters: O. Solwell, G. Lindqvist [7]; M. Porter [8]; K. Ketels [9]; E. Bergman, E. Feser [10]; M. Enright [11]; M. Delgado [12]; R. Hassink, H. Gong [13]; D. Forey [14]; T. Anderson [15]; A. Maffioli [16]; J. Pellegrin, M. Spinoglio, R. Wientjes, P. Hausemer, C. Amicetti [17]; K. Izak, G.M. zu Coker, T. Lammer-Gump [18]; Graf H., Brockel T. [19]; E. Uyarra, R. Ramlogan [20]; J.R. Wilson [21]. And also Russian scientists:

⁷Ketels C., Lindqvist G., Sölvell Ö. The Cluster Initiative Greenbook 2.0. – Ivory Tower Publishers, Stockholm, 2013. – 92 p.

⁸Porter M. The Competitive Advantage of Nations. Harvard Business Review, 1990 [Electronic resource]. – Access mode: <https://hbr.org/1990/03/the-competitive-advantage-of-nations> (date of access: 02/15/2021).

⁹Ketels C. Recent Research on Competitiveness and Clusters: What Are the Implications for Regional Policy? // Cambridge Journal of Regions, Economy and Society. – 2013. – No. 2. – P. 269-284.

¹⁰Bergman EM, Feser EJ Industrial and Regional Clusters: Concepts and Comparative Applications. Regional Research Institute, WVU, 1999 [Electronic resource]. – Access mode: <http://www.rrri.wvu.edu/WebBook/Bergman-Feser/contents.htm> (date of access: 09/02/2021).

¹¹Enright M. Why local clusters are the way to win the game // World Link. – 1992. – Vol. 5. – No. 4. P. 24-25.

Enright MJ The globalization of competition and the localization of competitive advantage: Policies towards regional clustering. In: Hood N. Young S (eds) The Globalization of Multinational Enterprise Activity and Economic Development. – Macmillan, London, 2000. – P. 303-331.

Enright MJ Regional Clusters: What we know and what we should know // Paper prepared for the Kiel Institute International Workshop on Innovation Clusters and Interregional Competition. – 2002. – P. 18.

¹²Delgado M., Porter M., Stern S. Defining Clusters of Related Industries // NBER Working Paper No. 20375, National Bureau of Economic Research. – 2014. – P. 1-48.

¹³Hassink R, Gong H. Six critical questions about smart specialization // European Planning Studies. – 2019. – Vol. 27. – No. 10. – P. 2049-2065.

¹⁴Foray D. In response to 'Six critical questions about smart specialization // European Planning Studies. – 2019. – Vol. 27. – No. 10. – P. 2066-2078.

¹⁵Andersson T., Schwaag-Serger S., Sorvik J, Hansson EW The Cluster Policies Whitebook. – IKED, 2004. – 266 r.

¹⁶Maffioli A., et al. The impact evaluation of cluster development programs: methods and practices. Inter-American Development Bank, Felipe Herrera Library, 2016. – 203 p.

¹⁷Pellegrin J., Spinoglio M., Wintjes R., Hausemer P., Amicetti C. Smart guide to cluster policy monitoring and evaluation. – Luxembourg: Publication Office of the European Union, 2020. – 59 p.

¹⁸Izak K., Ketels C., zu Köcker GM, Lämmer-Gump T. Smart Guide to Cluster Policy – How to make better use of clusters for promoting regional industrial modernization, supporting the growth of SMEs and encouraging smart specialization. – Belgium: Publication Office of the European Union, 2016. – 56 p.

¹⁹Graf H., Broekel T. A shot in the dark? Policy influence on cluster networks // Research Policy. – 2020. – Vol. 49. – No. 3. – 30 rub.

²⁰Uyarra E., Ramlogan R. The effects of cluster policy on innovation, in J. Edler et al. (eds.) // Handbook of Innovation Policy Impact. – Cheltenham: Edward Elgar Publishing, 2016. – Chapter 7. – P. 196-238.

²¹Wilson JR Cluster policy resilience: New challenges for a mature policy // International Journal of Business Environment. – 2019. – No. 10(4). – S. 371-382.

L.M. Gokhberg; S.V. Golovanova, S.B. Avdasheva; E.S. Kutsenko; L.S. Markov; P.A. Minakir; M.Yu. Sheresheva; T.V. Qihan; D.D. Katukov, V.E. Malygin, N.V. Smorodinskaya ; M.A. Yagolnitser [22] . Issues of forming cluster policy and determining the role of the state in the process of cluster development are studied in the works of V.L. Abashkina, S.V. Artemova, E.A. Islankina, L.S. Markova, A.A. Pankratova, E.E. Kolchinskaya, E.S. Khatsenko [23]. Issues of monitoring and

²²Methodological materials for the development and implementation of programs for the development of innovative territorial clusters and regional cluster policy / V.L. Abashkin, E.S. Kutsenko, P.B. Rudnik and others; scientific ed. L.M. Gokhberg, A.N. Klepach, P.B. Rudnik and others; Ministry of Economic Development of Russia, National research University "Higher School of Economics". – M.: National Research University Higher School of Economics, 2016. – 208 p.

Golovanova S.V., Avdasheva S.B., Kadochnikov S.M. Interfirm cooperation: analysis of the development of clusters in Russia // *Russian Journal of Management*. – 2010. – T. 8. – No. 1. – P. 41-66.

Kutsenko E. Pilot innovative territorial clusters of Russia: a model of sustainable development // *Foresight*. – 2015. – T. 9. – No. 1. – P. 32-55.

Markov L.S. Economic clusters as a form of functioning and development of regional industry: the example of high technology clusters in Novosibirsk. – IEOPP SB RAS, 2006. – 186 p.

Minakir P.A. Russian economic space: strategic dead ends // *Economics of the region*. – 2019. – T. 15. – No. 4. – P. 967-980.

Golovanova S.V., Avdasheva S.B., Kadochnikov S.M. Interfirm cooperation: analysis of the development of clusters in Russia // *Russian Journal of Management*. – 2010. – T. 8. – No. 1. – P. 41-66.

Sheresheva M.Yu. Clusters // *Collection of scientific articles Network business and cluster technologies*. Scientific ed. V.P. Tretyak, M.Yu. Sheresheva. – Statute Moscow, 2008. – 335 p.

Tsihan T.V. Cluster theory of economic development // *Theory and practice of management*. – 2003. – No. 5. – P. 43-51.

Katukov D.D. Malygin V.E., Smorodinskaya N.V. Institutional environment of a globalized economy: the development of network interactions / *Scientific report ed. N.V. Smorodinskaya*. – M.: Institute of Economics of the Russian Academy of Sciences, 2012. – 45 p.

Yagolnitser M.A., Kolobova E.A. Measuring the influence of institutional conditions on the formation of innovation clusters in Russian regions // *Issues of innovative economics*. – 2018. – T. 8. – No. 4. – P. 661-678.

Markov L.S., Yagolnitser M.A., Teplova I.G. Functioning and mechanisms for the development of a production cluster / L.S. Markov, M.A. Yagolnitser, I.G. Teplova // *Region: economics and sociology*. – 2010. – No. 1. – P. 287-305.

²³ Cluster policy: achieving global competitiveness / V.L. Abashkin, S.V. Artemov, E.A. Islankina and others; Ministry of Economic Development of Russia, RVC JSC, National research University "Higher School of Economics". – M.: National Research University Higher School of Economics, 2017. – 324 p.

Markov L.S. Economic clusters as a form of functioning and development of regional industry: the example of high technology clusters in Novosibirsk. – IEOPP SB RAS, 2006. – 186 p.

Musaev R.A., Pankratov A.A. Approaches to the formation of an effective system for implementing cluster policy in the field of information technology. *Problems of management theory and practice*. – 2021. – No. 5. – P.60-77.

Pankratov A.A., Musaev R.A. Problems of implementing federal cluster policy in the Russian Federation. *Regional economics: theory and practice*. – 2020. – T. 18. – No. 2 (473). – P.265-283.

Kolchinskaya E.E., Limonov L.E., Yakovleva P.E. The feasibility of cluster policy in the pharmaceutical industry in Russia: exploratory research // *Bulletin of St. Petersburg University. Episode 8. Management*. – 2019. – T. 18. – No. 3. – P. 375-399.

Khatsenko E.S. The influence of public-private partnerships on the formation of innovative business structures in the implementation of cluster regional policy. *Issues of regional economics*. – 2022. – No. 1 (50). – P.133-137.

evaluating the activities of clusters, providing government support measures are discussed in the works of V.L. Abashkina, A.D. Boyarova, E.S. Kutsenko, E.E. Kolchinskaya, E.S. Khatsenko [²⁴].

Issues of assessing cluster policy are considered in a number of foreign scientific publications and reflect different approaches to the solution. The paper “Evaluating the Impact of Cluster Development Programs: Methods and Practices” [²⁵] notes the critical importance of policy evaluation when it comes to cluster development programs to ensure the best use of public resources, accountability of beneficiaries and, above all, to provide the necessary data to improve the design and implementation of government policy. E. Uyarra and R. Ramlogan analyzed the results of the implementation of 17 cluster policy programs and found that there is no evidence that cluster policy can sustainably ensure innovative development, increase the level of entrepreneurial activity, employment growth or increase the productivity of companies [²⁶]. According to H. Graf and T. Brockel, the assessment of cluster policy has gone beyond the description of the various types of effects from its implementation. At the same time, scientific works do not describe a mechanism that allows researchers working on the assessment of cluster policy to form an information base for its study and comparative analysis [²⁷].

In 2020, the European Commission published the Smart Guide to Cluster Policy Monitoring and Evaluation [²⁸], aimed at policymakers and cluster managers

²⁴Abashkin V.L., Boyarov A.D., Kutsenko E.S. Cluster policy in Russia: from theory to practice // *Foresight*. – 2012. – T.6. – No. 3. – P. 16-27.

Stepanova E.S., Kolchinskaya E.E., Limonov L.E. Are clusters effective for the development of industrial enterprises in countries with former planned economies? // *Spatial economics*. – 2019. – No. 4. – P. 126-148.

Khatsenko E.S. Analysis of the most effective cluster strategies implemented in circumpolar regions. *Issues of regional economics*. – 2021. – No. 4 (49). – P.129-134.

Yagolnitsers M.A., Kolobova E.A., Buruk A.F. Assessing the impact of cluster development on the regional economy. – DOI: 10.15372/REG20200309 // *Region: economics and sociology*. – 2020. – No. 3. – P. 218-241.

²⁵Maffioli A., et al. The impact evaluation of cluster development programs: methods and practices. Inter-American Development Bank, Felipe Herrera Library, 2016. – 203 p.

²⁶Uyarra E., Ramlogan R. The effects of cluster policy on innovation, in J. Edler et al. (eds.) // *Handbook of Innovation Policy Impact*. – Cheltenham: Edward Elgar Publishing, 2016. – Chapter 7. – P. 196-238.

²⁷Graf H., Broekel T. A shot in the dark? Policy influence on cluster networks // *Research Policy*. – 2020. – Vol. 49. – No. 3. – 30 rub.

²⁸Pellegrin J., Spinoglio M., Wintjes R., Hausemer P., Amichetti C. Smart guide to cluster policy monitoring and evaluation. – Luxembourg: Publication Office of the European Union, 2020. – 59 p.

who are involved in cluster policy making and are interested in monitoring and evaluating the impact of their policies. This guide complements the “Smart Guide to Cluster Policy” [29], in which, in 2016 g., the importance of monitoring and evaluation as a strategic tool for the implementation of cluster policies and programs has already been noted. At the same time, Russian authors note the lack of methods for assessing the implementation of cluster policy and offer their scientific ideas for solving the problem. In the work of E.A. Petrova, A.E. Kalinina, M.S. Lapina [30] proposes assessing the effectiveness of cluster policy in two stages (at the first stage – an analysis of the cluster potential of the territory; at the second – an assessment of the effectiveness of the implementation of specific measures to support the development of cluster initiatives of the territories). O.D. Gaisha [31] studies the mechanism of financial control of industrial clusters. G.V. Surovitskaya, D.I. Semin, I.I. Frolov [32] consider assessing the effectiveness of the region’s cluster policy from the standpoint of assessing the economic activities of enterprises participating in the cluster and intra-cluster interaction. It is noted that the authors did not rely on state performance audit standards developed by the Accounts Chamber of the Russian Federation and regional control and accounting bodies, which determine the practical significance of the above scientific works.

The effectiveness audit is interconnected with the assessment of the effectiveness of cluster policy. The most succinct and precise relationship between efficiency and effectiveness is formulated in the Moscow City Law “On the Moscow Chamber of Control and Accounts” [33]. It is indicated that the efficiency audit is carried out in order to determine the effectiveness of the use of budget funds.

²⁹Izsak K., Ketels C., zu Köcker GM, Lämmer-Gamp T. Smart Guide to Cluster Policy – How to make better use of clusters for promoting regional industrial modernization, supporting the growth of SMEs and encouraging smart specialization. – Belgium: Publication Office of the European Union, 2016. – 56 p.

³⁰Petrova E.A., Kalinina A.E., Lapina M.S. Methodological approaches to assessing the effectiveness of the implementation of cluster policy in the regions of the Russian Federation // Regional Economics and Management: electronic scientific journal. – 2019. – No. 2(58). – Article number: 5814.

³¹Gaisha O.D. Mechanisms of financial control of industrial clusters in Russia. Collection of materials of the XXVI International Scientific and Practical Conference. ICNS "Science and Education". – 2020. – pp. 116-118.

³²Surovitskaya G.V., Semin D.I., Frolov I.I. Assessing the effectiveness of the implementation of cluster policy in the region // Innovations. – 2015. – No. 3 (197). – P. 58-60.

³³Moscow City Law of June 30, 2010 No. 30 “On the Moscow Chamber of Control and Accounts.”

Methodological and practical aspects of performance auditing are actively discussed in the works of D.E. Koshelya [34], A.N. Saunina [35], S.V. Stepashina [36], N.S. Stolyarova [37], S.O. Shokhina [38], A.A. Yalbuganov [39]. And the standards and methodological developments of the Accounts Chamber of the Russian Federation, the control and accounting bodies of the constituent entities of the Russian Federation, the practices of their application, the best practices of the UK, the USA and Canada are examined. It also examines international experience in implementing state financial control, the main directions of its development [40], and the procedure for assessing the effectiveness of budget expenditures [41].

The works of Russian scientists in the field of cluster policy and economics of innovation highlight unsolved problems [42; 43], who found a solution in this study. Scientists share the opinion that the conceptual apparatus of cluster policy is not defined in federal regulatory legal acts [44], as well as the need for a systematic critical review of the activities of innovative, scientific and technological, scientific, educational and research centers, clusters, and other forms of cooperation [45].

In the process of work, the fundamental works of Russian and foreign scientists

³⁴Koshel D.E. The concept of financial control and issues of systematization of legislation // Bulletin of Omsk University. Series "Law". – 2019. – T.16. – No. 1. – pp. 51-56.

³⁵Saunin A.N. On the problem of standardization of state audit in Russia // Bulletin of Moscow University. Episode 26: State audit. – 2018. – No. 3. – P. 6-18.

³⁶Stepashin S.V. Timeliness of audit // Bulletin of AKSOR. – 2013. – No. 1(25). – P. 3-6.

³⁷Stolyarov N.S., Semenova A.A. The role and place of strategic audit in corporate and public management // Current problems of socio-economic development of Russia. –2018. – No. 4. – P. 11-27.

³⁸Shokhin S.O. Control, supervision and audit in the financial sector // Financial law. – 2018. – No. 12. – P. 7-8.

³⁹Yalbuganov A.A. New categorical apparatus of state financial control // Financial law. – 2014. – No. 8. – pp. 10-16.

⁴⁰Matveeva N.S. International experience in implementing state financial control // Financial Journal. – 2020. – T.12. – No. 2. – P. 69-95.

⁴¹Astapov K.L., Musaev R.A., Malakhov A.A. Assessing the effectiveness of budgetary expenditure policies // Financial Journal. – 2020. – T. 12. – No. 6. – S. _ 9-24.

⁴²Zemtsov S., Barinova V., Pankratov A., Kutsenko E. Potential High-Tech Clusters in Russian Regions: From Current Policy to New Growth Areas // Foresight and STI Governance. – 2016. – Vol. 10. – No. 3. – R. _ 34-52. DOI: 10.17323/1995-459 X .2016.3.34.52.

⁴³Gokhberg L.M. Why it is necessary to change policies to stimulate innovation in the regions [Electronic resource]. – Access mode: <https://rg.ru/2020/03/23/pochemu-neobhodimo-meniati-politiku-postimulirovaniu-innovacij-v-regionah.html> (access date: 08/21/2021).

⁴⁴Musaev R.A., Pankratov A.A. Problems of implementing federal cluster policy in the Russian Federation // Regional Economics: Theory and Practice. – 2020. – T.18. – No. 2. – P. 265-283.

⁴⁵Seminar “Global and Russian trends in the development of clusters” at the National Research University “Higher School of Economics”.

were studied on the following issues: the role of clusters in the economy; participation of government bodies in cluster management; cluster policy and the role of road mapping in public administration; efficiency audit as a type of government control.

The degree of development of a scientific problem is schematically visualized in Figure 1.

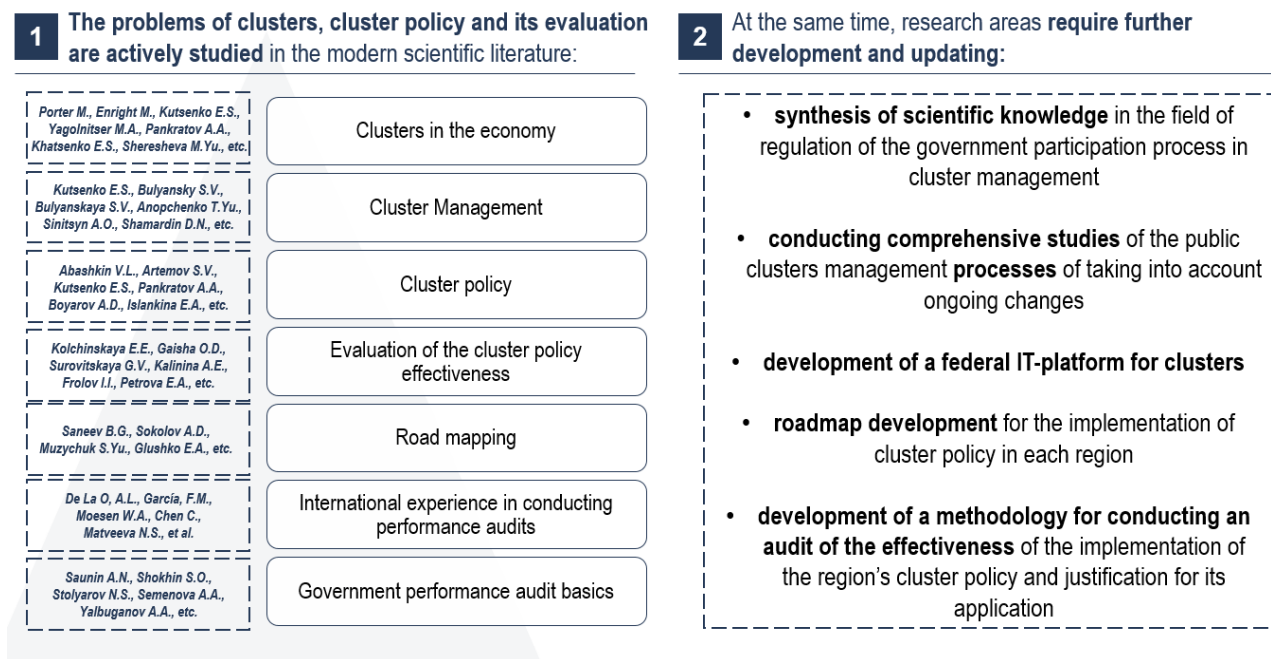


Figure 1 – Degree of development of a scientific problem.

Source: Compiled by the author.

Analysis of scientific and methodological developments made it possible to identify promising scientific directions for the dissertation research, each of which is interconnected with the assigned tasks.

Cluster policy is interconnected with the industrial and innovation policies of the state and in a number of regions is reflected in them in separate sections. Industrial policy is considered as “a set of legal, economic, organizational and other measures aimed at developing the industrial potential of the Russian Federation and ensuring the production of competitive industrial products” [46]. State innovation policy is considered as “an integral part of socio-economic policy, which expresses the state’s attitude to innovation, determines the goals, directions, forms of activity of

⁴⁶ Federal Law of December 31, 2014 No. 488-FZ “On Industrial Policy in the Russian Federation”.

public authorities in the field of science, technology and the implementation of scientific and technological achievements” [47]. The directions of cluster policy are reflected in most strategies for the socio-economic development of regions. In a number of regions, cluster policy has been approved in the form of a separate document.

The system of state participation in the management and development of clusters is based on a federal structure. Interaction between the Ministry of Economic Development of the Russian Federation, the Ministry of Industry and Trade of the Russian Federation, the Federal Agency for Tourism of the Russian Federation and regional authorities to support clusters is carried out within the framework of federal state programs, as well as regional programs and projects adopted in accordance with them in the territories of the constituent entities of the Russian Federation.

Considering that measures to support clusters are implemented in the regions, the subject of the study is fixed at the regional level. The place of regional authorities in the implementation of the region’s cluster policy is visualized in Figure 2.

Federal level

The functioning of industrial clusters is regulated by the Federal Law “On Industrial Clusters”. Responsible for the development of clusters is the **Ministry of Industry and Trade of the Russian Federation**.

The Ministry of Economic Development of Russia is responsible for coordinating activities on the development and implementation of cluster policy, the cluster development centers within the framework of the state program of the Russian Federation “Economic Development and Innovative Economy”. Previously, the Russian Ministry of Economic Development was responsible for implementing measures to support pilot innovative territorial clusters.

The distribution of subsidies to regional budgets for the creation of engineering and transport infrastructure for the development of tourism clusters is regulated by the Federal Law “On the Federal Budget” and the Decree of the Government of the Russian Federation “On the creation of special economic zones and a tourism cluster in the North Caucasus Federal District.” Strategies for the development of tourism in the Russian Federation for the period until 2035. Responsible for the development of clusters is the **Federal Tourism Agency of the Russian Federation**.

Regional level

Strategies for the socio-economic development of regions have been developed, including directions for the development of clusters. In a number of regions, the directions of cluster policy are included in separate sections in the law on industrial policy of a constituent entity of the Russian Federation.

State programs provide for measures to support clusters, coordinated with federal state programs. Cluster Development Centers and Guarantee Funds have been created.

Figure 2 – Place of authorities in the implementation of the region’s cluster policy.

Source: Compiled by the author.

⁴⁷ Agarkov S.A., Kuznetsova E.S., Gryaznova M.O. Innovation management and state innovation policy. – Publisher: Academy of Natural Sciences, 2011. ISBN: 978-5-91327-137-2.

Reporting on the implementation of state program activities, information on state support for clusters is published on the websites of federal and regional ministries (departments, offices) within the assigned powers, which does not include the generation of reporting on the implementation of cluster policy. Considering that in most regions the mechanism for implementing cluster policy is not fixed in a document requiring execution, a comprehensive assessment of the effectiveness of the region's cluster policy is not currently being carried out⁴⁸.

The identified problems predetermined the purpose and objectives of the study.

The purpose and objectives of dissertation research.

The purpose of the dissertation research is to develop and substantiate a comprehensive assessment of the effectiveness of cluster policy at the regional level to ensure the system of public management of clusters in theoretical and applied aspects.

The stated purpose of the dissertation research predetermined the solution of the following tasks:

1. Systematize the results of research in the field of cluster policy, forms of government participation in the development of clusters, methods of cluster management, government audit and its role in public administration at the regional level.

2. Systematize the legal aspects of the region's cluster policy and clarify the conceptual apparatus used in solving the assigned scientific problems and recommended by the authorized regional executive authority for use in the development of regional legal acts regulating the processes of clustering of the region's economy .

3. Explore cluster management processes taking into account ongoing changes in the economy. Develop recommendations for the creation of a Federal IT-platform for clusters of Russia, on which databases of cluster sites, participants in cluster

⁴⁸The conclusions were made based on an analysis of the current regulatory legal acts of the constituent entities of the Russian Federation, posted in the legal database ConsultantPlus Region, as well as an analysis of reports posted on the portal of the State and municipal financial audit (the justifications are given in the text of the work).

formations, executive agencies, cluster development centers, development institutions will be integrated, in order to ensure intercluster relationships; relationships between clusters and government bodies and development institutions; receiving government support; formation of summary information on the implementation of regional cluster policy.

4. To develop methodological approaches and develop a standard road map for the implementation of the region's cluster policy, which will serve, among other things, as an information base for assessing the effectiveness of the region's cluster policy.

5. To study control as a function of public administration and to develop a methodology for auditing the effectiveness of the implementation of the region's cluster policy, the use of which will make it possible to obtain information for a comprehensive assessment of the effectiveness of the region's cluster policy.

The object of the dissertation research is the functions of government authorities in developing, implementing and assessing the effectiveness of the region's cluster policy⁴⁹.

The subject of the dissertation research was the management processes that arise during the development, implementation and control of the region's cluster policy, as well as methods of control activities.

The study used the following information database:

- information about 119 clusters posted on the Russian Cluster Map (<https://map.cluster.hse.ru/>), created by the Russian Cluster Observatory of the National Research University Higher School of Economics (hereinafter referred to as HSE);

- data on 87 industrial clusters posted on the portal GISIP (<https://gisp.gov.ru/gisip/>) and the Association of Clusters and Technoparks of Russia (<https://akitrf.ru/>);

- information about clusters posted on 20 official websites of Russian clusters

⁴⁹Passport of the field of science "State and municipal management", approved. Academic Council of the National Research University Higher School of Economics dated June 24, 2022, protocol No. 07.

and cluster development centers;

- economic development strategies for 82 constituent entities of the Russian Federation;

- more than 240 literature sources were analyzed for further development of the theory and practice of implementing cluster policy in the region; developing a standard roadmap for its implementation; development of the author's methodology for auditing the effectiveness of the implementation of the region's cluster policy; assessing its effectiveness;

- more than 50 reports on the results of control and expert analytical activities carried out in 2018-2022. the Accounts Chamber of the Russian Federation and the control and accounting bodies of the regions posted on the portal of the State and municipal financial audit [⁵⁰];

- Rosstat reports 2018-2022. “Institutional transformations in the economy”, “Efficiency of the Russian economy”, “Science, innovation and technology” [⁵¹], Collection “Indicators of the digital economy” (Higher School of Economics in partnership with the Ministry of Digital Development of Russia and Rosstat) [⁵²], “Indicators determined by the May “decrees of the President of the Russian Federation, and indicators of national projects”;

- speeches, reports, reviews on the implementation of cluster development activities, posted on the official websites of the Department of Strategic Development and Innovation of the Ministry of Economic Development of the Russian Federation; Department of Regional Industrial Policy and Project Management of the Ministry of Industry and Trade of the Russian Federation (hereinafter referred to as the Ministry of Industry and Trade of the Russian Federation); Department of State Scientific, Scientific, Technical and Innovation Policy of the Ministry of Education and Science of the Russian Federation; Federal Tourism Agency of the Russian Federation;

⁵⁰Portal of the Accounts Chamber of the Russian Federation and control and accounting bodies of the Russian Federation: <https://portalkso.ru/kso/gis-esgfk/>.

⁵¹Federal State Statistics Service. Official statistics [Electronic resource]. – Access mode: <https://rosstat.gov.ru/folder/10705> (date of access: 04/08/2022).

⁵²Indicators of the digital economy: 2022 [Electronic resource]. – Access mode: <https://issek.hse.ru/news/780811313.html> (access date: 04/08/2022).

- final documents “European Spatial Development Perspective (ESDP)” [53], “European Charter for Regional / Spatial Planning” [54], reports on the implementation of spatial development strategies in Europe, the USA, Canada, data on the clusters of the USA [55] and Europe [56] ;
- conference proceedings of the Regional Studies Association [57];
- regulatory legal acts regulating the system of strategic planning, innovation, industrial policies, the functioning of clusters, state control⁵⁸;
- empirical surveys conducted using the methodology developed by the author.

Research methodology. In the modern understanding, research methodology: determines the ways of obtaining scientific knowledge to achieve the research goal; ensures comprehensiveness of obtaining information about the process being studied; helps introduce new information into the fund of the theory of scientific knowledge; provides clarification, enrichment, systematization of terms and concepts in science; creates a system of scientific information based on objective facts and a logical-analytical tool of scientific knowledge [59]. The methodology of this study ensures close interaction between scientific theory and the practice of its application. The logical diagram of the methodology of this study includes: justification of the relevance of the topic; setting the purpose and objectives of the study; determination of the object, subject, information base of the study; selection of research methods; description of the results, including the degree of scientific development of the

⁵³ESDP – European Spatial Development Perspective. Towards Balanced and Sustainable Development of the Territory of the European Union. – Luxembourg: Office for Official Publications of the European Communities, 1999. – 87 p. ISBN 92-828-7658-6.

⁵⁴Translation of: European Charter for Regional/Spatial Planning (adopted at the VI Conference of Ministers of Spatial Planning (CEMAT) in Torremolinos (Spain) on May 20, 1983).

⁵⁵US Cluster Mapping. US Clusters Portal [Electronic resource]. – Access mode: <https://clustermapping.us/cluster> (access date: 07/04/2022).

⁵⁶European Cluster Collaboration Platform. Portal of European clusters [Electronic resource]. – Access mode: <https://www.clustercollaboration.eu/cluster-mapping> (access date: 07/04/2022).

⁵⁷Portal of the Association for Regional Studies. Publications [Electronic resource]. – Access mode: <https://www.regionalstudies.org/publications/> (access date: 05/05/2022).

⁵⁸Documents posted in the legal information systems ConsultantPlus and ConsultantPlus Region were analyzed.

⁵⁹Methodology of scientific research: textbook. N.V. Lipchiiu, K.I. Lipchiiu. – Krasnodar: KubGAU, 2013. – 290 p.

research topic; formulation and discussion of research results, as well as their practical application.

The theoretical stage of the study included the study of scientific theories of cluster development, cluster policy, forms of state support for clusters, cluster management methods, government audit and its role in public administration. Based on the results of studying scientific works, the need for the development of clusters, cluster infrastructure⁶⁰ and the development of cluster policy is noted, as well as the insufficient development of the mechanism for implementing cluster policy. In a number of studies, Russian authors pointed out the lack of methods for assessing the effectiveness of cluster policy and proposed solutions to the identified problem. At the same time, in their research, the authors did not rely on state performance audit standards and, thus, significantly limited the possibility of practical implementation of the developed methods and, thereby, significantly limited the possibility of practical implementation of the developed methods⁶¹.

A critical analysis of scientific knowledge made it possible to: develop the principles of the phenomena being studied (management, control, clusters and cluster policy); to form a conceptual apparatus for more accurately reflecting the author's ideas in the work and using them in the development of regional normative legal acts ; develop a standard road map for the implementation of the region's cluster policy; develop an original methodology for auditing the effectiveness of the implementation of the region's cluster policy and the basis for its practical application . In the process of work, general scientific theoretical and empirical research methods were used: analysis, synthesis, observation, comparison, juxtaposition, forecasting, simulation, road mapping.

The empirical stage of the study was associated with the receipt and initial processing of scientific facts, statistical data, reports and conclusions on the following

⁶⁰ Cluster infrastructure is understood as a set of cluster participants, a specialized cluster organization, a cluster development center, a cluster IT platform, communication and control systems that ensure the functioning of the cluster.

⁶¹ Descriptions and links to sources are given in the sections "Statement of the scientific problem and justification of its relevance", "The degree of scientific development of the dissertation topic", "Basic scientific provisions submitted for defense" and in the text of the dissertation.

aspects:

- reflection of cluster development directions in territorial planning documents;
- creation and development of territorial clusters;
- identifying problems in the development and implementation of cluster policy in the region;
- reflection of the directions of cluster development in the activities of government programs;
- systematization of the results of external (in relation to the executive branch) control of the implementation of the region's cluster policy and assessment of its effectiveness.

The empirical (qualitative) study included: the process of obtaining information (sources of information are given in the corresponding section); comprehension and scientific description of facts; classification of facts and identification of relationships between them; critical assessment and verification of each fact; proof. Evidence was obtained in a practical way, through logical argumentation of scientific conclusions and proposals (qualitative approach), as well as the use of a quantitative approach: modeling (imitation) of the process of practical actions of potential users of scientific developments. The main research methods were methods of grouping and comparative analysis of statistical data; database analysis (verification); imitation, forecasting, questioning, survey.

Scientific novelty of the dissertation research consists of theoretical and methodological justification for a comprehensive assessment of the effectiveness of the region's cluster policy, determining the tools and information base for conducting the assessment.

In the process of carrying out the research, a number of provisions and conclusions of scientific novelty were formulated:

- the conceptual apparatus has been clarified (“state management of regional clusters”; “cluster policy of the region”, “assessment of the effectiveness of the region's cluster policy”) to more accurately reflect the author's ideas in the work and

possible use in relevant regional regulatory legal acts;

- recommendations have been developed for the creation of a Federal IT-platform for clusters of Russia and the concept of technical specifications for software product developers using the state information system and the technical capabilities of the Unified Digital Platform "GosTech". A distinctive feature in comparison with other IT platforms is the author's development of the functioning scheme of the Federal IT-platform of Russian clusters, the menu (main sections) of the portal and its content, as well as a set of data for layer-by-layer filling of the interactive map of Russian clusters. It is proposed to integrate databases of clusters, participants in cluster formations, executive agencies, cluster development centers, development institutions into the Federal IT-platform of clusters. This will allow building intercluster relationships; the relationship of clusters with regional executive authorities and development institutions to obtain financial and non-financial support; generate information on the implementation of regional cluster policy;

- Using the road mapping method, forecasting technology, and simulation modeling, the author has developed a standard road map for the implementation of the region's cluster policy, the basis for its practical application and a list of target indicators for the results of its implementation. Unlike existing road mapping documents, the standard road map provides for the preparation of a passport containing a description of the areas of development of the cluster economy and the expected results of its implementation; establishment of program activities, volumes of financial resources for their implementation, deadlines and responsible executors; development of a list of target indicators for the results of the implementation of the region's cluster policy, broken down by year for the period of implementation of the cluster policy and milestones for their achievement. Reporting on the implementation of the road map will serve as an information base for conducting a comprehensive assessment of the effectiveness of the region's cluster policy;

- a methodology has been developed for auditing the effectiveness of the implementation of the region's cluster policy and the basis for its practical application in the work of regional control and accounting bodies, within the framework of which

the effectiveness of the region's cluster policy is assessed. Distinctive features of the author's methodology in comparison with other existing methods: the subject area is defined (cluster policy); goals and verification questions were formulated, worksheet layouts were developed, and a list of target indicators was determined; control procedures for examining the subject of control are described; the procedure for drawing conclusions and recommendations for updating the region's cluster policy has been determined; a formula for calculating the performance index of cluster policy measures was proposed, and a ranking of indicators was carried out. The methodology is standard and can be adapted (modified, supplemented) by control and accounting bodies and used, among other things, to assess the effectiveness of the region's cluster policy.

The theoretical significance of the dissertation research lies in: expanding the methodological base of research in the field of public management of clusters; in clarifying the conceptual apparatus for a more accurate reflection of the author's ideas in the work and possible use in relevant regional regulatory legal acts; in the development of a standard road map for the implementation of the region's cluster policy; in developing a methodology for auditing the effectiveness of the implementation of the region's cluster policy and the basis for its practical application; in the possibility of using the main provisions of the work in the process of teaching the disciplines "Economics of Development", "Innovation Management", "Regional Economics", "State Audit", special courses "Clusters in the Russian Economy", "Cluster Policy".

The practical results of the dissertation research are addressed to the executive agencies – developers of the region's cluster policy and other strategic planning documents, specialists of cluster development centers, as well as regional (municipal) control and accounting bodies.

Scientific developments will be able to find practical application in the creation of the Federal IT-platform for clusters of Russia; in the development of regulatory legal acts regulating the process of clustering of the regional economy; when developing a mechanism for implementing the region's cluster policy and forming an

information base; when developing a verification program (performance audit) for the implementation of the region's cluster policy.

Approbation of work. The main provisions and conclusions of the dissertation research were reported and discussed at scientific conferences:

- report "Systematization of approaches to assessing cluster policy" at the International Scientific Conference "Socio-economic and Humanities". St. Petersburg, August 28, 2020;

- report "Management of innovation clusters in the conditions of digitalization" at the All-Russian scientific and practical conference "New paradigm for the development of economic systems in the conditions of digitalization: theory, methodology, management." Krasnodar, February 13-14, 2020;

- report "Audit of the effectiveness of state support for territorial clusters – drivers of economic growth" at the International Scientific Conference on Innovation in the Digital Economy: SPBPU IDE -2019. St. Petersburg, October 24-25, 2019;

- report "Cluster approach to the development of the regional economy" at the V International School of Young Scientists in the Field of Economics in the South of Russia. Sochi, October 04-06, 2018;

- report "Methodological aspects of developing a model for the formation of the architecture of an innovative agro-industrial cluster" at the competition of the Ministry of Economy of the Krasnodar Territory "My future is the Krasnodar Territory!" within the framework of the Strategy for Social and Economic Development of the Krasnodar Territory until 2030. Krasnodar, September 29, 2017.

Recommendations for the creation of a Federal IT-platform for clusters using the state information system and the technical capabilities of the Unified Digital Platform "GosTech", the Cluster Maps of Russia database were reported to the management of the Russian Cluster Observatory.

A typical road map for the implementation of the region's cluster policy and recommendations for its development were tested during a survey of potential users regarding the applicability of the developments. A report on the implementation of the road map of the Yaroslavl region for 2009-2022 was also modeled (simulated).

(in conditions of limited sources of information, including financial data).

For testing purposes, the author's methodology for auditing the effectiveness of the region's cluster policy, including a list of target indicators for the results of the implementation of cluster policy, a list of goals and results of auditing the effectiveness of the implementation of the region's cluster policy, layouts of worksheet, were reviewed at the board of the Control and Accounts Chamber of the municipal formation of the city of Krasnodar. It was decided to use the methodology when conducting an audit of the efficiency of using budget funds for the implementation of a project to create a medical cluster (within the framework of the cluster policy of the Krasnodar Territory).

Also, for testing purposes, based on open data on the results of the implementation of the cluster policy of the Yaroslavl region (under conditions of limited access to information), an audit of the effectiveness of the cluster policy of the Yaroslavl region was modeled (simulated). The objectives of the performance audit, verification issues, basic methods, information base are determined, approximate conclusions and recommendations are formulated.

The author's personal contribution is decisive and consists of direct participation at all stages of the research, from setting tasks and writing methodological recommendations to discussing the results in scientific publications, reports, as well as implementation in practical work.

Logic and structure of the dissertation. The dissertation for the academic degree of Candidate of Sciences in the direction of "State and Municipal Administration" is presented on 213 pages of printed text, includes 16 tables, 12 figures, 4 appendices. The list of sources includes 273 items, including 61 legal acts and 25 Russian and foreign information portals. The logic and structure of the work are determined by the purpose and objectives of the study.

The dissertation research was carried out in accordance with the passport of the field of science "Public and Municipal Administration" of the National Research University "Higher School of Economics" , approved by the Academic Council of the National Research University Higher School of Economics,

06/24/2022, protocol No. 7 regarding section 3 . “Planning, decision-making and results-based management” – clause 3.5. “Efficiency and effectiveness indicators in the program and project management system, their use in assessment, budgeting and incentive systems in public administration”; section 7. “Development and implementation of sectoral policies, management of public sector organizations” – clause 7.1. Theories and practice of development, implementation and evaluation of the execution of programs and policies in the field of state and municipal management; section 8. “Spatial development, regional and municipal governance” – clause 8.1. Management of socio-economic and spatial development of cities, agglomerations and regions.

BASIC SCIENTIFIC PROVISIONS FOR DEFENSE⁶²:

1. The works of Russian and foreign scientists devoted to the research topic have been systematized, the conceptual apparatus has been clarified (“state management of regional clusters”; “cluster policy of the region”, “assessment of the effectiveness of the region’s cluster policy”) for a more accurate reflection of the author’s ideas in the work and possible use in relevant regional regulatory legal acts, the main stages of implementation of the region's cluster policy are defined.

The study examines theoretical and empirical concepts of cluster formation, the historical background of their development in Russia, the main classification characteristics and role in the economy. It is noted that the formation and functioning of clusters is a process that promotes economic growth and increases the competitiveness of the economies of the regions and the country as a whole. Interest in clusters on the part of scientists and practitioners is due to the development of network connections, growth of innovation, labor productivity, production volumes and other factors. The advantages of clusters lie in the ability to shape a business environment, share innovations, regroup production, labor and investment resources for new projects, and quickly meet the needs of production processes in case of

⁶² The dissertation contains fragments of the author's research published in scientific articles.

resource shortages. Such interactions are most in demand under conditions of economic sanctions.

A comparative analysis of theories of management and the influence of the state on the processes of development of clusters, systematization of scientific concepts of “public administration” made it possible to formulate the author’s definition of the concept of “public administration of regional clusters”. State management of regional clusters means the purposeful, organizing and regulatory influence of government and management bodies on the activities of cluster participants in order to implement the region’s cluster policy, equitable distribution and efficient use of public resources, as well as ensuring the growth of an innovative economy and gross regional product.

Distinctive features of the author’s definition of the term “public administration”: firstly, the regional aspect is highlighted management; secondly, regulatory influence is carried out in order to implement the region’s cluster policy; thirdly, regulatory influence is carried out for the purpose of fair distribution and efficient use of public resources (subsidies, grants, other support measures).

The region's cluster policy, as a strategic planning document, is an object of management. In order to ensure author management, the main functions and methods of cluster management have been clarified. The content of functions and methods of cluster management were clarified taking into account the functional responsibilities of employees of regional ministries and cluster development centers.

Regions are assigned a special role in the implementation of government support measures for the development of clusters, including the development of cluster infrastructure, which includes specialized cluster organizations and cluster development centers. Based on the basic functions and management methods, a comparative analysis of the characteristic features of external and internal cluster management was carried out (Table 2).

Table 2 – Comparison of goals, methods and objects of influence of external and internal cluster management.

External cluster management	Internal cluster management
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External cluster management	Internal cluster management
Management functions are performed by specialists from the cluster development center, which includes representatives of state authorities of the region	Management functions are performed by cluster managers as part of a specialized cluster organization
Aimed at developing the region's economic growth, growth and ensuring public social needs	Aimed at ensuring interaction between participants in cluster education in order to develop and implement a cluster development strategy
Provides redistribution of regional budget funds as part of the implementation of program activities to support clusters	Provides an influx of private investment and growth in sales of goods (works, services)
Legal relationships are regulated by the norms of public law (administrative, tax, budgetary, regulatory legal acts of the constituent entity of the Russian Federation)	Legal relationships are regulated primarily by the norms of civil, commercial, and labor law
Methods of legal influence on participants in intercluster relations are used (imperative methods of legal regulation)	Methods are used to regulate relations between cluster participants who are equal parties (dispositive methods of legal regulation)
The activities of representatives of regional executive authorities are subject to control by socio-political institutions (public chambers, public organizations, regulatory bodies)	The activities of cluster managers are not subject to control by socio-political institutions (only social responsibility remains)
The objects of control influence are the participants in the implementation of the region's cluster policy	The objects of control influence are the participants in the implementation of the cluster development strategy, which is agreed upon with the region's CP

Source: Compiled by the author.

At the regional level, external cluster management is carried out by specialists from the cluster development center and is aimed at ensuring intercluster interaction and ensuring the implementation of government support measures. The functions of monitoring the implementation of cluster policy can be assigned to specialists from the regional center for cluster development. Its structure includes: strategic planning department; consulting department; Department of Foreign Economic Relations; prototyping department and others. The objects of control influence are the participants in the implementation of cluster policy.

Internal cluster management is aimed at organizing and ensuring effective management of production processes and production. In the process of internal cluster management, the implementation of the cluster development strategy and joint projects can be monitored, problems in attracting investments can be identified and

ways to solve them can be developed, as well as other issues. The objects of management influence are the participants in the implementation of the cluster development strategy.

To achieve effective results of regional development, interaction between external and internal cluster management is necessary.

There are quite a lot of definitions of the concept “cluster policy” in the scientific literature. A single definition of the concept of “cluster policy” has not been fixed, but there are no disputes over existing interpretations. The differences lie in the emphasis placed, the personal understanding of the authors or the features of the translation.

The author's definition of the concept “cluster policy of the region” is formulated on the basis of scientific interpretations of the concept “cluster policy” and means a set of measures of state support for the development of clusters and cluster infrastructure facilities, aimed at increasing the competitiveness of the region's economy, the growth of the gross regional product, subject to monitoring and control.

The common core of all scientific interpretations is the presence of government support measures. The distinctive features of the author's definition of the concept from others are the identification of the regional aspect and main goals, as well as the clarification that measures of state support for clusters have an implementation mechanism that is subject to monitoring and control. This approach allows us to determine the directions of cluster policy, for which implementation deadlines, target indicators, responsible executors, and sources of financing will be established.

The main function of public administration and one of the stages of management activity designed to identify bottlenecks in the process of implementing cluster policy is state control. A special type of external (in relation to the executive branch) control, which allows one to form an opinion based on the results of analysis, verification of financial and statistical information, and expert assessments, is an efficiency audit. Efficiency audits are carried out: at the federal level by the Accounts Chamber of the Russian Federation, at the regional level by the control and

accounting chambers of the constituent entities of the Russian Federation, at the municipal level by local control and accounting bodies.

As part of the study, based on a comparative analysis of the concepts of “performance audit”, the terms “effectiveness” and “efficiency”, and practical aspects of control activities, the relationship between performance audit and assessment of the effectiveness of the region’s cluster policy is substantiated. An efficiency audit is carried out, among other things, to determine the effectiveness of the use of resources [63]. The author’s definition of the concept “assessment of the effectiveness of a region’s cluster policy” has been formulated, which means a set of control measures carried out as part of an efficiency audit to study the results of achieving the stated goals and objectives of the region’s cluster policy to ensure the cost-effective use of public resources and make management decisions on updating cluster policy region.

The common core of the above terms is the relationship between effectiveness and efficiency. A distinctive feature of the author’s formulation of the concept is: firstly, in assessing the effectiveness of cluster policy (carried out as part of an effectiveness audit); secondly, in defining the subject area of the performance audit (“cluster policy of the region”); thirdly, the assessment results make it possible to make management decisions on updating the region’s cluster policy and implement the function of public administration.

The Russian economy, being part of the global economic space, is changing course in choosing economic partners. At the same time, it continues to remain open to foreign partners and building economic relations. In the conditions of a new multipolar world, it is advisable to use “best practices” and, on their basis, develop methods for road mapping and assessing the effectiveness of the implementation of the region’s cluster policy.

When developing recommendations for creating a unified IT-platform for clusters and developing a mechanism for implementing and assessing the effectiveness of the region’s cluster policy, the experience of the following foreign

⁶³Moscow City Law of June 30, 2010 No. 30 “On the Moscow Chamber of Control and Accounts.”

organizations was taken into account: the European Cluster Observatory; European cluster collaboration platform; European Network of Spatial Planning Observatories; experience in mapping clusters in the USA and Europe; publication “Smart Guide to Monitoring and Evaluation of Cluster Policy”.

The introduction of foreign experience into Russia is possible taking into account national interests, historical and political characteristics. This will reduce risks and errors, develop new approaches to the formation of international intercluster formations and cluster mapping.

2. The results of the functioning of clusters and the provision of government support measures were analyzed, problems of implementing cluster policy were identified and scientific approaches to their solution were identified.

The system of state participation in the development of clusters is based on a federal structure. The main directions of cluster policy are developed at the federal level and implemented in the regions within the framework of federal and regional programs and projects. The main stages of cluster policy implementation are visualized in Figure 3.

When developing and implementing cluster policy, regional authorities were guided by Methodological recommendations for the implementation of cluster policy in the constituent entities of the Russian Federation [⁶⁴] and methodological materials on the development of a detailed action plan ("road map") for the development of a cluster – a participant in the priority project of the Ministry of Economic Development of the Russian Federation " Development of Innovative Clusters – Leaders of World-class Investment Appeal"⁶⁵.

⁶⁴Methodological recommendations for the implementation of cluster policy in the constituent entities of the Russian Federation (approved by the Ministry of Economic Development of the Russian Federation on December 26, 2008 No. 20615-ak/d19).

⁶⁵Pilot innovative territorial clusters in the Russian Federation: directions for implementing development programs / ed. L.M. Gokhberg, A.E. Shadrina. M.: National Research University Higher School of Economics, 2015. Methodological materials were prepared in accordance with the order of the Ministry of Economic Development of the Russian Federation dated June 27, 2016 No. 400 “On the priority project of the Ministry of Economic Development of the Russian Federation “Development of innovation clusters - leaders of world-class investment attractiveness” (clause 12 of Appendix 3 of the order)

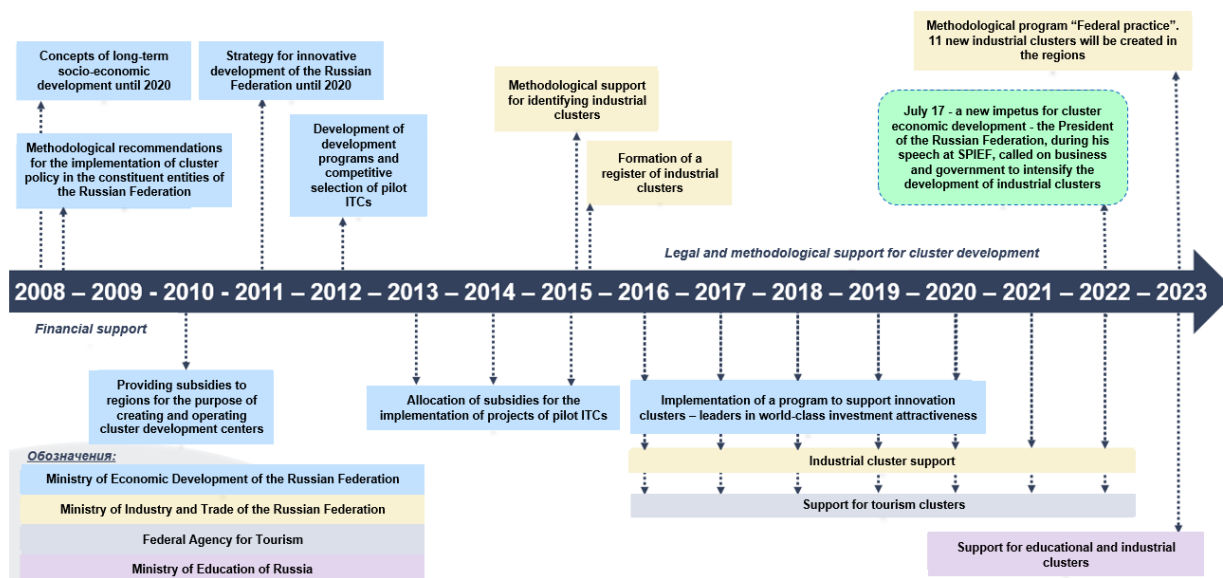


Figure 3 – Main stages of cluster policy implementation.

Source: Compiled by the author.

Subjects of the Russian Federation received subsidies from the federal budget for the implementation of state support measures for regional clusters within the framework of various regional programs [66] and projects [67]. Subsidies and grants were provided within the framework of the National Project “Small and Medium Enterprises and Support for Individual Entrepreneurial Initiatives”, state programs

⁶⁶Federal Law “On Strategic Planning in the Russian Federation” dated June 28, 2014 No. 172-FZ.

⁶⁷Decree of the Government of the Russian Federation of October 31, 2018 No. 1288 “On the organization of project activities in the Government of the Russian Federation” (“Regulations on the organization of project activities in the Government of the Russian Federation”).

“regional project” is a project that ensures the achievement of the goals, indicators and results of a federal project, the activities of which relate to the legislatively established powers of a constituent entity of the Russian Federation, as well as to issues of local importance of municipalities located on the territory of the specified constituent entity of the Russian Federation;

“federal project” is a project that ensures the achievement of goals, target and additional indicators, the fulfillment of the tasks of the national project and (or) the achievement of other goals and indicators, the implementation of other tasks on behalf and (or) instructions of the President of the Russian Federation, instructions of the Chairman of the Government of the Russian Federation, the Government of the Russian Federation, decision of the Council, the Presidium of the Council, instructions from the curator of the relevant national project;

“national project” is a project that ensures the achievement of goals and targets, the implementation of tasks defined by Decree of the President of the Russian Federation of May 7, 2018 No. 204 “On national goals and strategic objectives of the development of the Russian Federation for the period until 2024.” Also, if necessary, achieving additional indicators and performing additional tasks on behalf and (or) instructions of the President of the Russian Federation, instructions of the Chairman of the Government of the Russian Federation, the Government of the Russian Federation, a decision of the Council under the President of the Russian Federation for Strategic Development and National Projects, the Presidium of the Council and to be developed in accordance with the Decree ;

“Economic Development and Innovative Economy” [68], “Development of Industry and Increasing Its Competitiveness” [69].

The study analyzed information about the place of regional cluster policy in the strategic planning documents of 82 regions and information about the creation of cluster development centers in the context of constituent entities of the Russian Federation as of 07/01/2023. The analytical base was formed on the basis of data from the websites of the administrations of the constituent entities of the Russian Federation, the legal portal ConsultantPlus and ConsultantPlus region; state information systems, Russian Cluster Observatory. The following conclusions are drawn.

The directions of cluster policy are defined in all strategies for the socio-economic development of regions (with the exception of the strategies for the socio-economic development of the Republic of Adygea, the Republic of Ingushetia, the Republic of Kalmykia and the Smolensk region). The Concept of cluster policy of the Yaroslavl [70] and Novosibirsk [71] regions was approved by regulatory legal acts. At the legislative level, the directions of cluster policy are enshrined in Moscow (Moscow City Law “On the Innovation Cluster” [72]), Kemerovo, Kirov, Kursk regions, and the Republic of Bashkortostan. Cluster policy is reflected in a separate section in the industrial policies of most constituent entities of the Russian Federation. Sections or directions of cluster policy are provided for in the innovation policies of the Voronezh, Kaliningrad, Moscow, Novosibirsk regions, the Komi Republic and the Republic of Sakha (Yakutia).

The mechanism for implementing the region's cluster policy, a road map or

⁶⁸Decree of the Government of the Russian Federation of April 15, 2014 No. 316 “On approval of the state program of the Russian Federation “Economic development and innovative economy”.

⁶⁹Decree of the Government of the Russian Federation of April 15, 2014 No. 328 (as amended on June 2, 2022) “On approval of the state program of the Russian Federation “Development of industry and increasing its competitiveness.”

⁷⁰Decree of the Government of the Novosibirsk Region dated April 16, 2012 No. 187-p “On approval of the Concept of Cluster Policy of the Novosibirsk Region.”

⁷¹Decree of the Government of the Yaroslavl Region of June 30, 2009 No. 650-p “On approval of the Concept of cluster policy of the Regional Government.”

⁷²Law of Moscow dated February 20, 2019 No. 5 “On the innovation cluster of the city of Moscow” [Electronic resource]. – Access mode: [https://www.mos.ru/upload/documents/docs/Zakon5\(22\).pdf](https://www.mos.ru/upload/documents/docs/Zakon5(22).pdf) (access date 12/24/2021).

other document defining the procedure, timing for the implementation of the region's cluster policy, assigning responsible executors, has not been approved by regional legal acts. Based on the results of the analysis of legal documents that determine the direction of the regions' cluster policy, their individuality and the lack of development of the mechanism for implementing the region's cluster policy are noted.

The Ministry of Economic Development of the Russian Federation is the authorized body for interaction with regional authorities in terms of coordinating actions for the development of territorial and innovation clusters. As the developer and implementer of the state program "Economic Development and Innovative Economy," the ministry allocated subsidies for the development of pilot innovation clusters. Since 2010, regions have received subsidies for the creation and operation of cluster development centers [73], with the aim of the participation of state authorities in cluster management [74]. In addition, cluster development centers assisted clusters: in obtaining consulting, organizational and marketing services; in conducting training seminars, exhibition events; in relations with the media; in the development of strategies, programs, projects; in launching pilot projects [75]. As of July 1, 2023, cluster development centers have been created in 52 regions.

The Russian Ministry of Industry and Trade is responsible for the development and implementation of measures to support industrial clusters. Financing of activities included in the register of the Ministry of Industry and Trade of Russia is carried out within the framework of the State program "Development of Industry and Increasing its Competitiveness". Clusters included in the register of industrial clusters and

⁷³Decree of the Government of the Russian Federation of February 27, 2009 No. 178 "On the distribution and provision of subsidies from the federal budget to the budgets of constituent entities of the Russian Federation for state support of small and medium-sized businesses, including peasant (farm) enterprises."

⁷⁴Skvortsov E.N., Guskova N.D. Analysis of organizational structures of management systems for innovative industrial clusters in Russia // Scientific and Technical Journal of the St. Petersburg State Polytechnic University. Economic Sciences. – 2016. – No. 1. – pp. 86-99.

⁷⁵Order of the Ministry of Economic Development of the Russian Federation dated March 25, 2015 No. 167 "On approval of the conditions for the competitive selection of constituent entities of the Russian Federation, the budgets of which are provided with subsidies from the federal budget for state support of small and medium-sized businesses, including peasant (farm) enterprises, and requirements for organizations that form the infrastructure for supporting small entities and medium-sized businesses."

meeting established requirements receive government support [⁷⁶].

The Ministry of Education and Science of the Russian Federation participates in the implementation of measures for the development of clusters in the process of implementing state programs “Economic development and innovative economy” and “Industrial development and increasing its competitiveness.” In 2020, the Ministry of Education and Science of the Russian Federation approved the creation of a technology cluster on the basis of the Far Eastern Branch of the Russian Academy of Sciences. Scientific organizations and higher education institutions are not only included in the cluster participants, but also form separate clusters.

Federal Tourism Agency of the Russian Federation carries out the development and implementation of measures to support the development of tourism clusters within the framework of the Strategy for the Development of Tourism in the Russian Federation until 2035 [⁷⁷], and other legal documents. Activities for the development of tourism clusters were financed from the federal and regional budgets, as well as extra-budgetary sources.

The study grouped data on the volume of subsidies from the federal budget to the budgets of constituent entities of the Russian Federation and/or directly to cluster formations for the period 2013-2021. Analysis of the data obtained allows us to conclude that the regions received subsidies from the federal budget subject to established criteria for selecting clusters that met certain classification requirements. Budget funds for the creation and development of clusters are dispersed across various government programs. Their expenditure in some cases is not linked to the implementation of cluster policy. For activities to support clusters, implementation deadlines and criteria for assessing effectiveness are generally not established.

Reporting on the results of development and activities of clusters is formed at

⁷⁶Decree of the Government of the Russian Federation dated July 31, 2015 No. 779 “On industrial clusters and specialized organizations of industrial clusters.”

⁷⁷Order of the Government of the Russian Federation of September 20, 2019 No. 2129-r “On approval of the Strategy for the development of tourism in the Russian Federation for the period until 2035.”

Previously - Order of the Government of the Russian Federation dated May 31, 2014 No. 941-r (as amended on March 21, 2019) “On approval of the Strategy for the Development of Tourism in the Russian Federation for the period until 2020.”

the level of line ministries. An analysis of the information posted on the official websites of federal executive authorities allows us to conclude that a comprehensive report on the results of the use by industry departments of public funds allocated for the development of clusters is largely not presented in official sources. Also, the results of a comprehensive assessment of the effectiveness of cluster policy, necessary to provide feedback between developers and implementers of cluster policy, are not presented.

The findings are supported by an analysis of the results of implementing the cluster policy in the Yaroslavl region. The choice of the region is explained by the fact that the Concept of cluster policy in the Yaroslavl region [⁷⁸] was one of the first adopted (2009).

As part of the study, a comparison was made of the planned values and results of the implementation of the cluster policy of the Yaroslavl region for the period 2009-2022. Over the past 13 years, a cluster infrastructure has been created in the region (a specialized cluster organization, a cluster development center) and development institutions (Guarantee Agency; Business Incubator; Investment and Cluster Development Agency; working group for interaction with investors; Advisory and Coordination Councils for PPP; Commission to support investment activities, etc.). As a result of the implementation of the Cluster Policy Concept in the region, the Cheese Making and Dairy Processing Cluster and the Pharmaceutical Cluster were created. The Tourism Cluster is in the process of being created. Financing of measures to support the development of clusters was carried out within the framework of the target program “Stimulating investment activity in the Yaroslavl region”, currently – the state programs “Economic development and innovative economy in the Yaroslavl region” and “Development of industry in the Yaroslavl region and increasing its competitiveness”.

At the same time, it is premature to talk about the successful implementation of cluster policy. Only two out of 11 projects to create clusters have been implemented.

⁷⁸Resolution of the Government of the Yaroslavl Region No. 650-p dated June 30, 2009 “On approval of the Concept of cluster policy of the Regional Government.”

Target indicators for achieving a number of stated goals have not been established. Namely: to develop mutually beneficial cooperation between government, business, educational institutions, scientific organizations, and the public; ensure the training of targeted specialists in higher educational institutions and institutions of secondary vocational education; expand access of economic entities – cluster participants to investments, innovations and new technologies; increase the level of competitiveness of the region's goods and services on the Russian and international markets.

In the absence of target indicators, assessing the achievement of goals is difficult, if not impossible. According to the established target indicators for the implementation of the region's cluster policy, data on their achievement are not provided in official sources.

In order to determine the impact of clusters on the regional economy, the activities of five Russian member companies of the Pharmaceutical Cluster of the Yaroslavl Region for the period 2018-2022 were analyzed (data on the activities of the Japanese corporation Takeda, the Swiss company Nycomed, and the Israeli company Teva are not provided in official sources).

Based on the results of data analysis in SPARK-Interfax, it is noted that in the analyzed period, enterprises participating in the Pharmaceutical Cluster modernized their equipment. Despite the decrease in the total volumes of net profit of the group of companies, the total volume of assets of participants in the Pharmaceutical Cluster of the Yaroslavl Region for the period 2018-2022. increased by 2.9 times (from RUB 8,563.1 million in 2018 to RUB 24,631.5 million in 2022, excluding the deflator index). The production of medicines and materials used for medical purposes in the Yaroslavl region increased 2.6 times (from 8,482.7 million rubles in 2018 to 22,189.0 million rubles in 2022, excluding the deflator index).

Based on the data presented, it was concluded that the creation of the Pharmaceutical Cluster had a positive effect on the increase in the volume of medicines. The GRP of the Yaroslavl region increased by 18%, from 583.6 billion rubles in 2018 to 690.3 billion rubles in 2022 (excluding the deflator index), which is higher than the average annual growth rate of Russia's GDP (2%). The

unemployment rate of the economically active population decreased from 5.5% in 2018 to 4.5% in 2022. At the same time, a direct relationship between the development of the cluster and the growth of GRP is not traceable, since the share of pharmaceutical production volumes in the turnover of organizations by type of economic activity in the analyzed period ranged from 0.7% in 2018 to 1.3% in 2022.

Analysis of the results of the implementation of the cluster policy of the Yaroslavl region made it possible to identify shortcomings in the operation of internal and external cluster management systems, as well as the lack of an effective mechanism for implementing the region's cluster policy. The solution to the problems is seen in strengthening intra-cluster relationships, intensifying the work of internal and external cluster management, and integrating the Pharmaceutical Cluster website into a single IT-platform of Russian clusters.

A study of the practical aspects of the implementation of regional cluster policy in general allows us to conclude that in the information space there is no information about the development of mechanisms for the implementation of regional cluster policy and the generation of reporting on the implementation of the corresponding road map, which can be used to assess the effectiveness of the regional cluster policy. The lack of official information on the results of assessing the effectiveness of cluster policy makes it difficult to make management decisions on its adjustment.

3. The need has been substantiated and recommendations have been developed for the creation of a Federal IT-platform for clusters of Russia using the state information system and the technical capabilities of the Unified Digital Platform “GosTech” in order to ensure the analysis of intercluster relationships; interrelations of clusters with regional executive agencies and development institutions; receiving financial and non-financial support; formation of summary information on the implementation of regional cluster policy.

Based on the analysis of data on clusters posted on the portal “State Information System of Industry” (<https://gisp.gov.ru/gisplk>) and the portal “Map of Clusters of Russia” (<https://map.cluster.hse.ru/>) It is noted that as of the beginning of October 2023, the GISIP portal contains information about 87 clusters, of which

eight are interregional, and the map of Russian clusters contains information about 119 clusters, of which four are interregional. Information about clusters was submitted by application. Clusters in most cases generated applications for government support funds and were recipients if the applications were approved. In addition, information about clusters is posted on the websites of the Association of Clusters and Technoparks of Russia (<https://akitrf.ru/>), websites of clusters and cluster development centers. It is concluded that a unified database on Russian clusters has not currently been formed, and Rosstat reports do not contain information about the role of clusters in the development of the economies of the regions and the country as a whole.

In order to comprehensively solve the research problem, it is proposed to create a Federal IT-platform for clusters of Russia, which includes an interactive map of clusters in Russia. The recommendations are based on the results of an analysis of the structure and content of portals (sites) of organizations providing digital services (Table 3).

Table 3 – Analysis of the structure of portals (sites) of non-profit organizations providing digital services, including for clusters and/or participants in cluster formations.

Internet resources	Portal (site) structure							
	About us (team)	Documents (legal, methodological, informational)	Information	Map	Modules	Help (feedback)	Technical support	Contacts
1	2	3	4	5	6	7	8	9
Portal "State Information System of Industry" (https://gisp.gov.ru/gisplk)	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Map of Russian clusters (https://map.cluster.hse.ru/)	Yes	Yes	Yes	Yes	Yes			Yes
Portal "Information and analytical system that provides access to information necessary for territorial planning" (https://fgistp.economy.gov.ru/)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Website of the Association of Clusters and Technoparks of Russia (https://akitrf.ru/)	Yes		Yes		Yes			Yes
Websites of cluster development centers	Yes		Yes					Yes
SME Corporation website (https://corpmsp.ru/old/)	Yes	Yes	Yes		Yes	Yes		Yes
Unified digital platform "GosTech"		Yes	Yes		Yes	Yes		Yes

Internet resources	Portal (site) structure							
	About us (team)	Documents (legal, methodological, informational)	Information	Map	Modules	Help (feedback)	Technical support	Contacts
(https://platform.gov.ru/) ⁷⁹								

Source: Compiled by the author.

Financing of such an event can be carried out as part of the implementation of the National Project “Digital Economy”.

Recommendations for creating a Federal IT-platform for clusters in Russia.

The creation of such an open platform will serve as a communication tool for registered users and an information resource, including for conducting a comprehensive assessment of the effectiveness of the region’s cluster policy.

A distinctive feature of the Federal IT-platform for clusters of Russia from other IT platforms is the author’s development of a scheme for the functioning of the Federal IT-platform for clusters of Russia; in developing the menu (main sections) of the portal and its content; in determining the data set for layer-by-layer filling of the interactive map of clusters of Russia.

As part of the study, an analysis of the interfaces and menus of the following portals was carried out: GISIP; “Map of clusters of Russia”; “Federal State Information System for Territorial Planning” (<https://fgistp.economy.gov.ru/>); Association of Clusters and Technoparks of Russia (<https://akitrf.ru/>); cluster development centers; SME Corporation (<https://corpmsp.ru/old/>); Unified digital platform “GosTech” (<https://platform.gov.ru/>); platform “Federal State Information System for Territorial Planning” (“FSIS TP”); IT platforms of Moscow clusters. Based on the results of the analysis, a scheme for the functioning of the Federal IT-platform for clusters of Russia has been developed (Figure 4) and a number of recommendations for software product developers. The role of users and suppliers of information is played by cluster participants, cluster development centers, other participants in the cluster infrastructure, executive agencies, and development

⁷⁹The unified digital platform “GosTech” is a cloud platform solution for federal and regional authorities, with which you can quickly and efficiently create government information systems and digital services.”

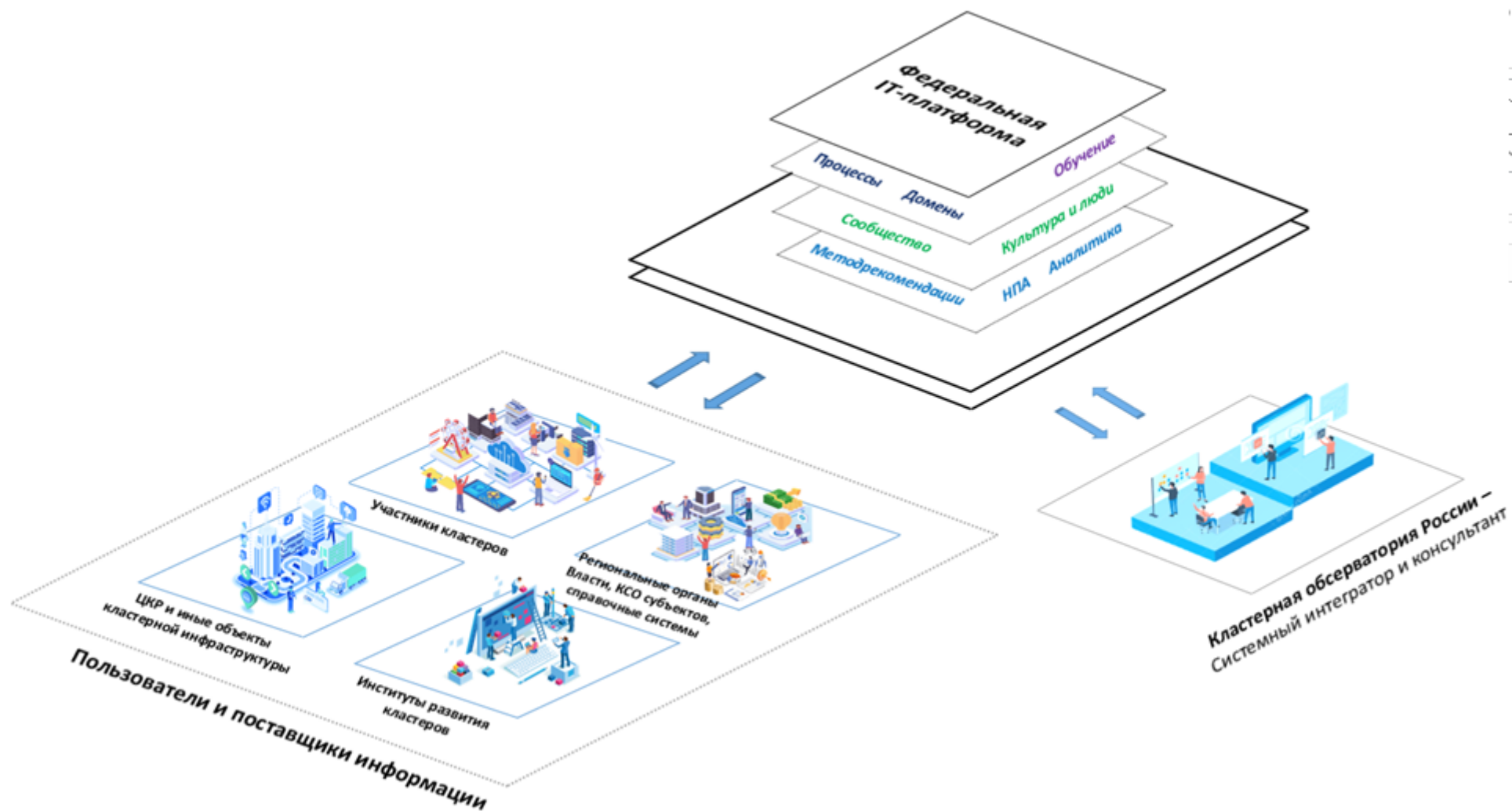


Figure 4 – Scheme of functioning of the Federal IT-platform for clusters of Russia.

Source: Compiled by the author.

institutions. The Russian Cluster Observatory of ISSEK NRU HSE acts as a system integrator and consultant. The cloud-based Federal IT-platform for Russian clusters is maintained by a software product developer.

As a technical assignment for programmers, the author has defined the following main sections (menus) of the Federal IT-platform for clusters of Russia:

- the “Team” section contains information about the employees who ensure the functioning of the platform and provide consulting services;

- The “Documents” section contains regulatory legal acts, methodological recommendations regarding the development of clusters, developed by federal and regional authorities. Tabs have been added that contain links to federal (regional) state programs (projects), within the framework of which cluster policy measures are implemented;

- in the “Information (modules)” section, information is placed that must be grouped according to the following criteria: clusters within the boundaries of the region, recorded in the database of regional authorities; clusters by groups of specializations; clusters interacting with the cluster development center ; clusters registered in the database of the Ministry of Industry and Trade of the Russian Federation of the Ministry of Economic Development of the Russian Federation; clusters included in the database of the Federal Tourism Agency of the Russian Federation and other ministries; cluster sites;

- section “Interactive map of Russian clusters” (contents are described separately);

- the “Help” (feedback) and “Technical Support” sections are serviced by a chatbot, online support and video communication are provided;

- The “Contacts” section contains information about all Team members.

For the developers of an interactive map of Russian clusters, the author has defined the main provisions of the concept of technical specifications:

- the development of an interactive map of Russian clusters is carried out on the basis of a geographic information system and a map of Russian clusters (<https://map.cluster.hse.ru/>);

- an interactive map of Russian clusters is integrated into the Federal IT-platform for clusters;

- filling the interactive map of Russian clusters is carried out layer by layer and includes : the borders of the constituent entities of the Russian Federation; participants of each cluster; cluster development centers; development institutions of each region; higher educational (scientific) organizations within the boundaries of regions; transport and engineering infrastructure; large logistics centers.

The interactive map of Russian clusters is designed to create and visualize various types of data (cluster location, planning/reporting data), form and group information databases for analysis, forecasting, and solving cluster development problems.

In order to test the tools of the interactive map of clusters in Russia, a diagram of the interconnection of clusters of related industries was simulated. It is assumed that the interactive map of Russian clusters contains a set of services that help enterprises participating in clusters solve assigned tasks, build intercluster relationships for joint implementation of projects, and attract investors.

Registered users of the Federal IT Cluster Platform, using tools and technical capabilities, will be able to:

- create a database of clusters;
- build interregional, international intercluster chains and form new clusters;
- build relationships among clusters of related industries, which, in turn, will allow interested parties to expand markets for products, find economic partners, attract labor resources, investors, and build logistics;
- participate in the creation of promising commercial technologies and new products (services);
- attract investment for research and development with the participation of business, science, government, and civil society;
- post information about measures of state financial support for Russian clusters, including the possibility of concluding agreements with regional authorities on receiving subsidies and grants;

- post reports on planned and actual volumes of funds from budgets of all levels allocated to support clusters:

- provide the executive agencies with the information necessary for the development, implementation and adjustment of the region's cluster policy.

The information posted on the Federal IT-platform for clusters of Russia is intended: for authorities – for the purpose of monitoring, control and audit of the implementation of cluster policy; for regional chambers of control and accounts – as part of assessing the effectiveness of the implementation of cluster policy in a particular region; for scientists and specialists – in order to conduct a comprehensive analysis of clustering of the economy of the region and the country as a whole; for businesses to see potential partners, learn about their products, equipment, simplify business processes and receive government support.

Further development of the research is seen in the development of regulations for posting information on the results of monitoring the implementation of the cluster development strategy on the Federal IT-platform of clusters.

4. Using the road mapping method, forecasting technology, and simulation modeling, the author has developed a standard road map for the implementation of the region's cluster policy, a list of target indicators for the results of its implementation, and the basis for the use of documents that have elements of scientific novelty. In the standard roadmap for the implementation of the region's cluster policy, in contrast to the current policy road mapping documents, the activities of the region's state programs to support clusters, financial resources, implementation deadlines and responsible executors are defined. The preparation of a roadmap passport containing a description of the areas of development of the cluster economy and the expected results is justified. Reporting on the implementation of the roadmap will serve as an information base for conducting a comprehensive assessment of the effectiveness of the region's cluster policy.

The study identifies the need to synthesize scientific knowledge in the field of regulating the participation of regional authorities in managing the process of

clustering of the regional economy.

An analysis of the application of methodological recommendations for the implementation of cluster policy in the constituent entities of the Russian Federation, as well as methodological materials for the development of a detailed action plan ("road map") for the development of a cluster – a participant in the priority project of the Ministry of Economic Development of the Russian Federation “Development of Innovative Clusters – Leaders of World-class Investment Appeal” allowed us to draw the following conclusions. These methodological documents are advisory in nature and do not limit regional authorities in the right to develop a road map for the implementation of the region's cluster policy.

In the course of the study, a complete selection of three dozen road maps was carried out in the information and legal database of ConsultantPlus and ConsultantPlus Region. It is noted that among them there are no road maps for the implementation of regional cluster policy. The structures of seven existing road maps compiled by federal and regional authorities are compared in tabular form, and their general characteristics are highlighted. An analysis of the current strategic planning documents of the Republic of Tatarstan, the Krasnodar Territory, and the Yaroslavl Region was also carried out, according to which the regions received subsidies from the federal budget for activities to support clusters.

Based on the findings obtained using the road mapping method, forecasting technology, and simulation modeling, the author developed a standard road map for the implementation of the region's cluster policy and justified its practical application (Table 4).

Unlike existing road mapping documents, the standard road map provides for: drawing up a passport containing a description of the areas of development of the cluster economy of the region; establishment of activities, financial resources, responsible executors, deadlines for the implementation of cluster policy measures in the region.

Table 4 – Typical road map for the implementation of the region’s cluster policy for the period 2024-2035.

Event name	Responsible executor	Implementation period	Financing	Expected results of the event
1. Formation of a regulatory legal framework for the implementation of CP in a constituent entity of the Russian Federation and informing the public				
Development of the region’s CP in conjunction with the strategy for the socio-economic development of the region, state (regional) programs “Economic development and innovative economy”, “Development of industry and increasing its competitiveness”	Ministry (department) of economics of a constituent entity of the Russian Federation, in cooperation with sectoral authorities	2024	X	Development and adoption of documents, media coverage, Internet, and television information about the direction of the region’s cluster policy and the role of clusters in the development of the region’s economy
Creation of new clusters in accordance with the strategy of socio-economic development of the region, the territorial planning scheme of the region, the strategy of spatial development of Russia (if information is available about the growth points of the regional economy)	Ministry (department) of economics of a constituent entity of the Russian Federation; Ministry of Industry of a constituent entity of the Russian Federation; Ministry of Investment and Support of SMEs of a constituent entity of the Russian Federation in cooperation with industry departments	2024-2030 upon creation	X	Creation of new clusters, media coverage, Internet, television information about the creation of clusters and their role in the development of the regional economy
Updating the CP of a constituent entity of the Russian Federation based on a comprehensive assessment of the effectiveness of the CP of the region, carried out by the Chamber of Control and Accounts of a constituent entity of the Russian Federation	Ministry (department) of economics of a constituent entity of the Russian Federation; Ministry of Industry of a constituent entity of the Russian Federation in cooperation with industry departments	2024-2035 based on the results of control activities	X	Adoption of a legal document on the introduction of changes and additions to the regional code, to state (regional) programs containing activities for the development of clusters in the region
Informing representatives of business communities, potential cluster participants, and the population about the results of implementation and achievement of target indicators of the regional KP	Cluster Development Center in cooperation with Ministry (department) of economics of a constituent entity of the Russian Federation; Ministry of Industry of a constituent entity of the Russian Federation; Ministry of Investments and Support for SMEs of a constituent entity of the Russian Federation	Annually, April 2024-2035	Budget funds	Placement in the media, Internet, and television of information about the achievement of target indicators and the results of implementation of the region’s CP

Event name	Responsible executor	Implementation period	Financing	Expected results of the event
Adjustment of the regional territorial planning scheme in terms of placement of clusters and engineering infrastructure	Department of Construction and Architecture of a Subject of the Russian Federation	2024-2035 as needed	X	Adoption of a normative legal act on amendments and additions to the regional territorial planning scheme
2. Creation of development institutions and cluster infrastructure				
Ensuring the functioning of existing and creating new development institutions in the region: – Chamber of Commerce and Industry; – business incubators, technology parks, industrial parks, – venture funds, – technology transfer centers, – energy saving centers, – subcontracting (subcontracting) support centers; – entrepreneurship development agency, – entrepreneurship support fund, – leasing fund; – agencies to support the export of goods; – joint-stock investment funds, – Unions, associations of industries, agriculture	Ministry of Economy of a constituent entity of the Russian Federation, Ministry of Industry of a constituent entity of the Russian Federation; Ministry of Investment and Support of SMEs of a constituent entity of the Russian Federation in cooperation with line ministries	2024	X	Adoption of regulatory legal acts on amendments and additions to state programs regarding measures to create development institutions in the region. Coverage in the media, Internet, and television of information about the creation and activities of development institutions in the region
Adjustment of the region's long-term budget forecast in terms of clarifying the volume of budget financing of measures to create development institutions and cluster infrastructure facilities	Ministry of Finance of a constituent entity of the Russian Federation	2024-2035 as needed	Budget funds	Adoption of a regulatory legal act on amendments and additions to the region's long-term budget forecast
Creation of a tab on the Federal IT-platform for clusters about the "Procedure for obtaining measures of state support for clusters" in a specific region	Ministry of Economy of a constituent entity of the Russian Federation	2025	Budget funds	Participants of regional clusters received access to online registration on the Federal IT-platform of clusters of agreements with regional authorities to receive subsidies and grants
Conducting an information campaign aimed at highlighting the activities of clusters and the cluster development center in order to expand the network of cluster participants	Department of Media and Press of a constituent entity of the Russian Federation	quarterly	Budget funds	Placed in the media, the Internet, and on television at least 20 publications per year about the activities of clusters and the cluster development center
3. Information content of the Federal IT-platform of clusters				

Event name	Responsible executor	Implementation period	Financing	Expected results of the event
Placing the following information on the Federal IT-platform of clusters:				
– about existing clusters in the context of industry specifications and their participants (large parent company, research institutes and higher education institutions, SMEs, other participants)	Cluster Development Center	annually	X	Cluster creation agreement; Regulations on the work of the cluster development center; Typical registers of information about cluster members
– production strategy for the development of the cluster (clusters)	Cluster Development Center	annually	X	Declaration of the cluster participants and agreed upon by the Minister of Economy of the region regarding financial support
– cluster marketing strategy	Cluster Development Center	annually	X	Declaration of cluster participants
– about the cluster's needs for raw materials, labor resources, sales markets, investment needs	Cluster Development Center	annually	X	Forecast calculations and justifications
– on the implementation of international investment projects (for placement on foreign IT platforms)	Cluster Development Center	annually	X	Passport of an international investment project
– on the conditions and procedure for receiving grants and subsidies from the budget to support clusters	Ministry of Industry of a constituent entity of the Russian Federation; Ministry of Investments and Support for SMEs of a Subject of the Russian Federation	five working days from the date of receipt of information	X	Information and provision for participants of the electronic collection cluster from applications and documents for receiving budget subsidies and grants
– on providing benefits and preferences to cluster participants	Ministry of Industry of a constituent entity of the Russian Federation; Ministry of Investment and Support of SMEs of a constituent entity of the Russian Federation Ministry of Finance of a constituent entity of the Russian Federation	five working days from the date of receipt of information	X	Information and provision for cluster participants of electronic collection of applications and documents for benefits and preferences
– on educational programs for training scientific and professional personnel for enterprises participating in the cluster	Universities, institutes, colleges, vocational schools located on the territory of a constituent entity of the Russian Federation	five working days from the date of receipt of information	X	Curricula and work programs of disciplines

Event name	Responsible executor	Implementation period	Financing	Expected results of the event
– about scientific projects that can be implemented by cluster participants	Branches of the Russian Academy of Sciences, research institutes, universities located on the territory of a constituent entity of the RF	five working days from the date of receipt of information	X	Passports of scientific projects and developments
Ensuring effective interaction between cluster participants, including expanding access to innovation, technology, know-how, specialized services and highly qualified personnel, as well as creating prerequisites for the implementation of joint cooperation projects and the production of competitive products	Center for Cluster Development in interaction with cluster participants, regional branch of the Agency for Strategic Initiatives	annually	X	List of main activities for the development of the cluster. Establishing effective information interaction between cluster participants
4. Development of human resources of a constituent entity of the Russian Federation				
Formation of a system of professional training for industry that meets modern international standards	Ministry of Education of a constituent entity of the Russian Federation, Universities, institutes, colleges, vocational schools on the territory of a constituent entity of the Russian Federation	annually before July 1	Budget funds	The system operates in general for SMEs
Creating conditions for the formation of human resources on the basis of institutions of higher and secondary technical education	Ministry of Education of a constituent entity of the Russian Federation	annually before July 1	Budget funds	The system operates in general for SMEs
Development of a system of professional training (retraining) of personnel for cluster participants that meets modern international standards	Ministry of Education of a constituent entity of the RF, Universities, institutes, colleges, vocational schools located on the territory of RF constituent entity	annually before July 1	Budget funds	State assignments have been brought to institutions of secondary, vocational, and higher education
Creating conditions for attracting professional personnel to the region	Department of Labor and Employment of a constituent entity of the Russian Federation	annually before July 1	Budget funds	Implementation of the state program to assist the voluntary resettlement of compatriots living abroad to the region
5. Implementation of government support measures for clusters by providing targeted subsidies (grants) within the framework of government programs				
Implementation of a project to create high-performance jobs.	Ministry of Finance of a constituent entity of the Russian Federation	within the project deadlines	Budget funds	Providing targeted subsidies
Implementation of a project to increase production volumes of innovative products	Ministry of Economy of a constituent entity of the RF			Providing grants

Source: Compiled by the author.

The document lays out the implementation of five areas of cluster policy: the formation of a regulatory legal framework for its implementation and informing the public; creation and development of cluster infrastructure; information content of the Federal IT-platform for clusters; development of human resources potential of a constituent entity of the Russian Federation; implementation of state support measures – targeted subsidies (grants) to cluster formations.

The scientific novelty lies in the methodological substantiation and development of a standard road map for the implementation of the region’s cluster policy and target indicators for the results of its implementation. And also in the use of data on the implementation of target indicators for the implementation of the document when conducting a comprehensive assessment of the effectiveness of the region’s cluster policy.

In order to ensure the implementation of the cluster policy, an indicative list of target indicators for the results of the implementation of the regional cluster policy has been modeled for the developers of the roadmap (as an example). The sources of information were target indicators enshrined in regulatory legal acts (Table 5).

Table 5 – Target indicators set out in regulatory legal acts.

No. p/p	Details of the normative legal act	Target	Total value, %
1	2	3	4
1	Passport of the national project (program) “Labor Productivity and Employment Support”, approved. Presidium of the Council under the President of the Russian Federation for Strategic Development and National Projects, protocol dated December 24, 2018 No. 16.	Increased labor productivity at enterprises	104.0
2	Passport of the national project (program) "International cooperation and export", approved. Presidium of the Council under the President of the Russian Federation for Strategic Development and National Projects, protocol dated December 24, 2018 No. 16	Share of innovative goods in the total volume of shipped goods, %	50.0
3	By Order of the Government of the Russian Federation dated October 6, 2021 N 2816-r, the List of initiatives for the socio-economic development of the Russian Federation until 2030 was approved (the Forecast of long-term socio-economic development of the Russian Federation for the period until 2030 was developed by the Ministry of Economic Development of the Russian Federation).	Investments in % of the previous year (with deflator index)	101.0
4		Index of physical volume of investments in fixed assets, in% by 2020 (at least 70% by 2020)	170.0
5		Growth rate of gross value added, % compared to the previous year	104.0

Source: Compiled by the author.

Methodological developments of a standard road map for the implementation of the regional cluster policy and an indicative list of target indicators for the results of the implementation of the cluster policy are addressed to the developers of strategic planning documents, specialists of cluster development centers and control and accounts chambers of regions (municipalities).

For testing purposes, the results of the study were presented at scientific conferences. As part of the All-Russian scientific and practical conference “New paradigm for the development of economic systems in the context of digitalization: theory, methodology, management,” 20 round table participants, which included representatives of regional authorities, cluster managers and employees of cluster development centers, got acquainted with the standard implementation roadmap cluster policy of the region and filled out a questionnaire.

The results of processing the questionnaires confirmed the advisability of using methodological recommendations when developing a road map for the implementation of the region’s cluster policy. The authorized representatives of the regional executive authority were asked to adapt the standard road map in accordance with the current strategic planning documents of the region.

In order to further test the standard road map for the implementation of the region's cluster policy (under the conditions of restrictions on obtaining financial statements), a report on the implementation of the road map of the Yaroslavl region for 2009-2022 was simulated. The report is compiled in the form of a standard road map. The information base was the data posted on the websites of the administration of the Yaroslavl region, the pharmaceutical cluster of the Yaroslavl region; Investment and Cluster Development Agency of the Yaroslavl Region, on the legal portal ConsultantPlus Region and in other open sources. Data analysis clearly identified the problems of implementing the cluster region, including the lack of a legal document establishing the mechanism for implementing the region’s cluster policy. The directions of cluster policy were not reflected in specific activities of state programs of the Yaroslavl region, agreed upon in terms of implementation deadlines and responsible executors. As a result, certain areas of the region’s cluster policy

remained the declared intentions of the authorities.

5. A methodology has been developed for auditing the effectiveness of the implementation of the region's cluster policy and the basis for its practical application, which can be used in control work, within the framework of which the effectiveness of the region's cluster policy is assessed. The basis is based on management influence methods, as well as state performance audit standards developed by the Accounts Chamber of the Russian Federation and regional control and accounting bodies.

The implementation of cluster policy is ensured through the targeted, organizing, regulatory influence of state (federal, regional) bodies on participants in the process. External control at the federal level is carried out by the Accounts Chamber of the Russian Federation, at the regional level – by the control and audit chambers of the regions. Control as a management function is intended to provide feedback between developers and implementers of cluster policy, identify bottlenecks, and adjust and update the region's cluster policy.

Based on the results of a sample of about 50 methodological documents posted on the portal of the Accounts Chamber of the Russian Federation and control and accounting bodies [⁸⁰], a lack of methods for auditing the effectiveness of the implementation of the region's cluster policy was noted.

Based on the results of a sample of reports on the results of control activities carried out by 50 control and accounting bodies of the constituent entities of the Russian Federation, posted on the portal of the State and Municipal Financial Audit , the lack of systemic⁸¹ information on the implementation of control activities in the regions on the implementation of cluster policy was noted .

Methodological developments are based on the provisions of the State Audit Standard “Performance Audit” (the unifying core of all methods), take into account the best practices in conducting control activities, law enforcement practice, legal

⁸⁰Portal of the Accounts Chamber of the Russian Federation and control and accounting bodies of the Russian Federation: <https://portalkso.ru/kso/gis-esgfk/>.

⁸¹Portal of State and municipal financial audit <https://portal.audit.gov.ru/kb/faq/>.

norms and restrictions.

The author's methodology for auditing the effectiveness of the region's cluster policy implementation has elements of scientific novelty and has the following distinctive features compared to other existing methods: the subject area (cluster policy) is defined; goals and verification questions were formulated, worksheet layouts were developed, and a list of target indicators was formulated; control procedures for examining the subject of control are described; the procedure for drawing conclusions and recommendations for updating the region's cluster policy has been determined.

As an example for potential users of the methodology, a list of goals for auditing the effectiveness of the implementation of the region's cluster policy and criteria for their achievement have been modeled (Table 6).

As part of the performance audit, employees of the regional control and accounting bodies were asked to use reports on the implementation of the road map for implementing the region's cluster policy, reporting and statistical information provided by the executive authority based on requests as sources of information. Based on the analysis of this information, the goals, objectives (questions) of the control measure are formulated, and the objects and methods of control are determined. Each performance audit issue must be interconnected with the criteria for achieving the goal, methods and results of control, conclusions and proposals. Subsequently, goals, target indicators, and control measures are subject to approval in the work program.

The process of conducting a performance audit involves the compilation of worksheets that allow you to group, systematize, analyze data, and determine the relationships between goals, objectives, evaluation criteria and results. The results of the performance audit make it possible to reveal problems (shortcomings) in the use of public resources as part of the implementation of cluster policy and the reasons for their occurrence. After completing the control activity, the group leader writes a report on its results. The report in the operative part must contain a motivated evaluative opinion (positive or negative): statement of purpose (fulfilled / not fulfilled

Table 6 – List of objectives for auditing the effectiveness of the implementation of the region’s cluster policy and criteria for their achievement

Questions	Criteria achieving the goal	Methods	results	conclusions	Recommendations	Comments, possible risks
Goal 1 – Assessing the effectiveness of regional cluster policy						
Analysis of the results of socio-economic development of the region based on the results of the implementation of cluster policy	<ul style="list-style-type: none"> – the directions of cluster policy are reflected in the socio-economic development strategy and regional programs; – target indicators of cluster policy have been met; – rates of economic growth and diversification of the economy have been achieved by increasing the competitiveness of enterprises; – directions of cluster policy are implemented through the activities of regional programs, responsible executors, deadlines, financial resources, target indicators are established 	<p>Comparison; comparison; grouping; balance method; graphic method; factor analysis</p>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>
Analysis of the results of the functioning of the region’s cluster infrastructure, interaction with cluster participants	<ul style="list-style-type: none"> – a regulatory legal framework has been formed and is being implemented to regulate the process of creation and operation of territorial clusters and cluster infrastructure; – The Center for Cluster Development monitors the results of the work of cluster infrastructure facilities to support cluster participants; – all instruments of financial support for cluster formations are used 	<p>Comparison; comparison; grouping; balance method; graphic method; factor analysis</p>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>
Analysis of the results of the creation (development) of clusters in the region over a certain period	<ul style="list-style-type: none"> – the formation of new clusters, the development of existing clusters, the construction and creation of cluster infrastructure facilities are carried out in accordance with spatial development plans and territorial development schemes; – the development of clusters ensures an increase in productivity and innovative 	<p>Comparison; comparison; grouping; balance method; graphic method; factor analysis</p>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>

Questions	Criteria achieving the goal	Methods	results	conclusions	Recommendations	Comments, possible risks
	<p>activity of enterprises included in the cluster, an increase in direct investment and an increase in economic growth;</p> <ul style="list-style-type: none"> – a cluster development strategy has been developed and is being implemented, aimed at increasing the competitiveness of manufactured products within the value-added production chain; – a specialized cluster development organization was created; – information interaction and cooperation between cluster participants is ensured; – target indicators of the results of implementing the cluster policy have been fulfilled; target indicators are logical, have quantitative and/or cost estimates; – the planned values for increasing the volume of private investments attracted to clusters have been achieved; – the number of new jobs created corresponds to the declared values 					
Goal 2 – Assessing the effectiveness of government support measures for clusters and their impact on the growth of the regional economy						
Verification of compliance with the principles of sufficiency, efficiency, and effectiveness when spending public resources on the creation and operation of clusters and cluster infrastructure	– program activities for the creation and development of territorial clusters are provided with the necessary budget funding, budget funds are used in full within the established time frame	Comparison; comparison; grouping; balance method; graphic method; factor analysis	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>
Checking the implementation of measures to implement the cluster policy of a	– the Federal IT-platform for clusters contains information provided for in the relevant agreement within the framework of the Measures for the implementation of the	Comparison; comparison; grouping; balance method;	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>

Questions	Criteria achieving the goal	Methods	results	conclusions	Recommendations	Comments, possible risks
constituent entity of the Russian Federation until 2035 in terms of openness and accessibility of information about clusters and their development	cluster policy of a constituent entity of the Russian Federation until 2035; – information on planned and actual expenditures of the regional budget for the support and development of clusters, as well as the procedure for providing state assistance, is publicly available. For example, about the expenditures of the regional budget on professional training (retraining) of personnel for cluster participants; on grants for the creation of innovative products; on subsidies to support small businesses; about tax and property benefits, etc.	graphic method; factor analysis				
Analysis of the results of the departmental control system on the use of subsidies and grants provided to specialized cluster organizations	– departmental control over the expenditure of state resources was carried out, measures were taken to eliminate identified violations	Comparison; comparison; grouping; balance method	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>
Comparison of the volumes of government resources aimed at the development of clusters with the results of financial and economic activities of cluster participants	– a positive result was obtained with the ratio of the total amount of budget expenditures to the results of regional economic development. For example, an increase in tax revenues to the budget; increase in the volume of added value in the production of innovative products; increase in wages, increase in investment volumes, etc.	Comparison; comparison; grouping; balance method	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>	<i>To be completed based on the results of the performance audit</i>

Source: Compiled by the author based on: SGA 104. Standard for external government audit (control). Efficiency Audit” and the “Efficiency Audit” Standard, approved by order of the Moscow Chamber of Control and Accounts. The criteria for achieving the goal are simulated taking into account documents strategic planning of the Republic of Tatarstan, Krasnodar Territory, Yaroslavl Region, including strategies for the socio-economic development of regions, regional programs containing activities to support clusters, developed in accordance with the state programs “Economic Development and Innovative Economy”; “Development of industry and increasing its competitiveness”; “Development of tourism in the region”; “Development of agriculture and regulation of agricultural and food markets.”

/ partially fulfilled); management decisions made in the process of implementing cluster policy (effective / not effective); budget funds for the implementation of program activities have been spent (effectively / ineffectively); the cluster policy is interconnected in terms of goals, deadlines, financial support, or the document requires adjustment. The report may also contain specific recommendations for eliminating identified problems and updating (adjusting) the region's cluster policy. The report is sent to the authorities and published on the official website of the regulatory authority on the Internet. The results of the performance audit serve as the basis for a comprehensive assessment of the effectiveness of the region's cluster policy, and are also one of the stages of management activities. An efficiency audit is carried out to identify bottlenecks in the process of implementing measures and mechanisms for supporting clusters, and is also a necessary condition for building a full-fledged management system that allows minimizing risks arising in the process of implementing cluster policy.

The author's methodology for conducting an audit of the effectiveness of the region's cluster policy was reviewed at the board of the PSC of the municipal formation of the city of Krasnodar. As a result, a decision was made to apply the methodology in the process of conducting an audit of the efficiency of using budget funds for the implementation of a project to create a medical cluster (within the framework of the cluster policy of the Krasnodar Territory).

Additionally, for testing purposes (based on open data on the results of the implementation of the cluster policy of the Yaroslavl region), an audit of the effectiveness of the implementation of the region's cluster policy was conducted using simulation modeling (Table 7).

Table 7 – Main provisions of the audit of the effectiveness of the implementation of the cluster policy of the Yaroslavl region (compiled using the simulation method).

Name	Description
Subject (who checks)	Chamber of Control and Accounts of the Yaroslavl Region
Item (what they check)	Results of the use of government and other resources allocated for the development of clusters and cluster infrastructure within the framework of

Name	Description
	the implementation of government programs and projects, achievement of goals and target indicators
Objects (who is being checked)	Developers and implementers of cluster policy, cluster participants who received government support
Financial period audited	2019-2022 (non-financial data for the period 2009-2022 are used for analysis, financial data – 2019-2022)
Information sources	<p>Reports on the implementation of state support measures aimed at developing cluster infrastructure and regional development institutions within the framework of the implementation of regional state programs: the Department of Investment Policy and Foreign Economic Activity (state programs: “Economic development and innovative economy in the Yaroslavl region”; “Industrial development in the Yaroslavl region” and increasing its competitiveness”); Department of Tourism of the Yaroslavl Region (State Program “Development of Tourism and Recreation in the Yaroslavl Region”); Department of Health and Physical Education (State Program “Health Development in the Yaroslavl Region”).</p> <p>Guarantee Agency reports; Business incubator; Investment and Cluster Development Agency on the use of subsidies and grants to support business entities – cluster participants.</p> <p>Report of the Investor Relations Working Group;</p> <p>Report of the Advisory and Coordination Councils on PPP;</p> <p>Report of the Commission for Support of Investment Activities.</p> <p>Information from the GAS “Management” website, section “Strategic Planning System” (https://gasu.gov.ru/stratdocuments/);</p> <p>Information from the portal of the State and municipal financial audit;</p> <p>Information from the GISIP portal;</p> <p>Information "SPARK-Interfax" (https://spark-interfax.ru/);</p> <p>other information</p>
Target	Justify the assessment of the effectiveness of the cluster policy of the Yaroslavl region
Tasks aimed at achieving the goal (questions)	<p>Determine and establish the results of the creation (development) of clusters in the region over a certain period.</p> <p>Determine the results of the functioning of the cluster infrastructure and interaction with cluster participants.</p> <p>To determine the results of economic development of the Yaroslavl region based on the results of the implementation of the region’s cluster policy</p>
Methods	Analysis, observation, measurement, comparison; comparison; grouping; simulation modeling; graphic method
Target indicators (criteria for achieving the goal)	<p>There are 13 clusters operating in the Yaroslavl region;</p> <p>The directions of cluster policy are implemented through 10 activities in 2 state programs of the Yaroslavl region, responsible executors, deadlines, financial resources, target indicators have been established;</p> <p>For the period 2020-2022. 150 new jobs were created in clusters;</p> <p>Creation and operation of the Agency for Investment and Cluster Development of the Yaroslavl Region – 1 unit;</p> <p>Creation of 13 specialized organization clusters;</p> <p>Operation of 13 IT platforms (sites) of clusters in the Yaroslavl region, providing intra-cluster communications and a management system</p>
Order of conduct	Issuing an order to conduct a performance audit; approval of the program and work plan; collecting and analyzing information, filling out worksheets,

Name	Description
	using control methods and techniques, conducting an audit, writing conclusions and proposals

Source: Compiled by the author.

Goals and target indicators are defined, verification questions are formulated, basic control methods, information base are formulated, approximate conclusions and recommendations are formulated. As part of the audit of the effectiveness of the implementation of cluster policy, a performance index is calculated cluster policy activities (Table 8).

Table 8 – Calculation of the performance index of non-financial target indicators of the cluster policy of the Yaroslavl region.

Performance audit issues	Target indicators (non-financial), plan	Results, fact	Fact / plan (gr.3/gr.2)	Indicator _	Performance Index (gr.4 x gr.5) x 100
1	2	3	4	5	6
Analysis of the socio-economic development of the Yaroslavl region as a result of the implementation of cluster policy	There are 13 clusters operating in the Yaroslavl region	2 clusters created	2/13	1/6	2.57
	The directions of cluster policy are implemented through 10 activities in two state programs of the Yaroslavl region, responsible executors, deadlines, financial resources, target indicators have been established	2 events implemented	2/10	1/6	3.33
	For the period 2020-2022. 150 new jobs were created in clusters	100 jobs created	100/150	1/6	11.11
Analysis of the results of the functioning of the region's cluster infrastructure, interaction with cluster participants	Creation and operation of the Agency for Investment and Cluster Development of the Yaroslavl Region – 1	Created by AIiKR	1/1	1/6	16.67
	Creation of 13 specialized cluster organizations	There is 1 specialized organization	1/13	1/6	1.28
	Organize the functioning of 13 IT platforms (sites) of clusters in the Yaroslavl region, providing intra-cluster communications and a management system	1 cluster site is operational	1/13	1/6	1.28
Total	X	X	X	1	36.24

Source: Compiled by the author.

For the calculation, data from the report on the implementation of the roadmap for implementing the cluster policy of the Yaroslavl region, the websites of the administration of the Yaroslavl region, the pharmaceutical cluster of the Yaroslavl region, the Investment and Cluster Development Agency of the Yaroslavl region, and data from open sources were used. According to the calculation results, the performance index of non-financial activities of the region's cluster policy amounted to 36 points. The result obtained is assessed as low-impact (performance rank from 30 to 70 points).

Based on the results of an audit of the effectiveness of the implementation of the region's cluster policy, a number of proposals (recommendations) were formulated for executive authorities:

- update the Concept of cluster policy in the Yaroslavl region and the regional territorial planning scheme in terms of the placement of clusters and engineering infrastructure;

- in the state program "Information Society in the Yaroslavl Region", provide subsidies for the creation of an IT-platform for clusters in the Yaroslavl region. Such a resource will allow for inter-cluster interaction; intra-cluster interaction between cluster infrastructure objects; interaction between clusters, regional executive authorities, development institutions; simplify the process of forming new clusters and intensify the process of including SMEs in the composition of cluster participants; simplify access for cluster participants to information about the forms and types of receiving government support and concluding agreements to receive subsidies (grants) for government support;

- place the cluster development strategy on the IT-platform of clusters; information about the needs of clusters for raw materials, labor resources, and investments; on the conditions and procedure for receiving grants and subsidies from the regional budget to support clusters; on providing cluster participants with benefits and preferences; on educational programs for training scientific and professional personnel for enterprises participating in the cluster; about scientific projects that can be implemented by cluster participants;

- The Agency for Investment and Cluster Development of the Yaroslavl Region, within the framework of an agreement with cluster participants, ensures the collection of information to calculate the share of added value created by the clusters of the Yaroslavl Region;

- in the road map for the implementation of the cluster policy of the Yaroslavl region, set target indicators and deadlines for their achievement;

- specialized cluster organizations to develop action plans for the implementation of materials (identified deficiencies) of the audit of the effectiveness of the implementation of the cluster policy of the Yaroslavl region, indicating the deadlines and responsible executors.

Methodological developments are addressed to specialists of regional (municipal) chambers of control and accounts, developers of cluster policy. Goals, verification questions, worksheet layouts, and a list of target indicators can be adapted (modified) by the control and accounting body and used when conducting an audit of the effectiveness of the implementation of the region's cluster policy.

Directions for further research. Further development of the study is seen in the refinement of the author's methodology for conducting an audit of the effectiveness of the implementation of the region's cluster policy, taking into account the results of its application.

The main author's publications on the topic of the dissertation research. The main results of the dissertation research are reflected in 4 papers and published in journals recommended by the NRU HSE, with a total volume of 4.8 p.s., of which the author's personal contribution is 3.45 p.s. In addition, 5 papers were published in other publications, with a total volume of 3.0 p.s., of which the personal contribution of the author is 2.45 p.s., one of the collections of conference materials is placed in the Scopus database.

Publications in journals recommended by NRU HSE:

1. Bergal O.E. Audit of effectiveness of cluster policy implementation in the region // Pskov Journal of Regional Studies. – 2022. – Vol. 18. – № 2. – P. 154-167. – 1.2 printed sheets.

2. Bergal O.E. Road mapping method in implementation of regional cluster policy // Pskov Journal of Regional Studies. – 2021. – Vol. 17. – № 4. – P. 111-122. – 0.9 printed sheets.

3. Fonotov A.G., Bergal O.E. Territorial clusters in the system of spatial development: foreign experience // Spatial Economics. – 2020. – Vol. 16. – №4. – P. 113-135 (In Russian). – 1.4 printed sheets (author's contribution – 0.7 printed sheets).

4. Fonotov A.G., Bergal O.E. Territorial clusters as a mechanism for the spatial development of the Russian economy // Journal of Economic Theory. – 2019. – Vol. 16. – №4. – P. 673-687 (In Russian). – 1.3 printed sheets (author's contribution – 0.65 printed sheets).

Other publications on the topic of the dissertation research:

5. Bergal O. Innovative Energy Clusters' Infrastructure // International Journal of Economics and Business Administration. – 2020. – Vol. VIII. – S1. – P. 361-376. – 1.1 printed sheets.

6. Bergal O.E. Management of innovation clusters in the context of digitalization // Collection of materials of the All-Russian scientific and practical conference "A new paradigm for the development of economic systems in the context of digitalization: theory, methodology, management", Kuban State Technological University, Institute of Economics, Management and Business, Krasnodar. – 2020. – P. 59-64 (In Russian). – 0.3 printed sheets.

7. Bergal O.E. Systematization of approaches to the cluster policy evaluation // Collection of materials of the international scientific conference "Socio-economic sciences and humanities", St. Petersburg. – 2020. – P. 52-55 (In Russian). – 0.2 printed sheets.

8. Fonotov A.G., Bergal O.E. Audit of effectiveness of the government support of territorial clusters – drivers of economic growth // ACM International Conference Proceedings Series (ICPS). – 2019. – Article №10. – P. 1-7. – 1.1 printed sheets (author's contribution – 0.55 printed sheets).

9. Bergal O.E. Cluster approach to the regional economy development //

Collection of articles of the XXXIII International scientific and practical conference "Actual aspects of the implementation of the strategy of modernization of Russia: the search for a model of effective economic development" edited by G.B. Kleiner, V.V. Sorokozherdeva, Z.M. Khasheva. – 2018. – P. 50-53 (In Russian). – 0.3 printed sheets.