

# FORMATION OF AGRO-INDUSTRIAL CLUSTER ON THE PRIORITY SOCIAL AND ECONOMIC DEVELOPMENT AREA OF THE MONO-INDUSTRY TOWN

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**Abstract:** Issues on the development of mono-industry towns in Russia through diversification of economics thereof may be addressed by formation of the priority social and economic development area (PSEDA). By the results of analysis of conditions to create intraregional (municipal) industrial clusters within the PSEDA mono-industry towns, the feasibility of such clusters is justified to turn into the priority residents of PSEDA, but also to obtain the synergistic effect of taking PSEDA advantages and the cluster approach in diversifying the economies of mono-industry towns. In contrast to previous definitions, the authors consider the intraregional (municipal) industrial cluster as the concept created with favorable involvement of regional and municipal authorities to develop the cluster strategy and use favorable conditions to expand private enterprises, association of entities to implement projects on diversification of mono-industry town economies and investment projects that meet the PSEDA requirements. The principles of PSEDA-based cluster formation in mono-industry towns are formulated. The most significant factors of sustainable development of clusters are highlighted to address mono-town problems. The stage-by-stage creation of municipal clusters proposed by authors is based on their ability to emerge during the extensive market mechanism performance and includes stages to assess the potential to form and develop cluster formations, but also the stages to identify the needs of participating entities in the course of particular interaction, creation and development of entity networks. The analysis of existing agglomerations, systematization of SWOT analysis findings, assessment of factors contributing to cluster formation offered the chance to determine the perspective for the agro-industrial cluster development in Yurga in the Kemerovo Region. The study results represent the particular contribution to the cluster theory, regional economy in terms of development of tools to form municipal industrial clusters within the PSEDA for the purpose to diversify economies of mono-industry towns. The practical significance of the research is the possibility to apply the study results in the activity of regional and municipal authorities when identifying intraregional agglomerations, creating cluster formations as PSEDA mono-town residents.

**Keywords:** Mono-town, cluster, development, the priority social and economic development area, diversification

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## INTRODUCTION

The socio-economic development of mono-industry towns directly depends on functioning of the city-forming enterprise (or a group of related enterprises). For the period from 2008 to 2015, as per various estimates, 200 to 500 settlements belong to RF mono-towns. With the reduction of mono-industry towns of the list approved by the government, the actual number of mono-industry towns and, in particular, the problems they accumulate, is not reduced from 335 in 2009 to 319 in 2015. Options for mono-industry town development: inertial development causing the liquidation of the city-forming entity and population

resettlement, upgrading of the city-forming entity with retention of its city-forming purpose, diversification of the mono-industry town economy. Pursuant to the Federal Law No. 473-FZ dd. March 30, 2014 On Priority Social and Economic Development Area in the Russian Federation" [1] and THE Government Decree No. 614 dd. June 22, 2015 On peculiarities to create priority social and economic development areas in the territories of mono-profile municipal entities of the Russian Federation (mono-industry towns)" [2] the tool to address social and economic problems of mono-industry towns is the creation of priority social and economic development areas (PSEDA) based in mono-

towns with the most tough social and economic situation. Despite the PSEDA, along with clusters and special economic zones, are considered as mechanisms to stimulate industrial and innovative development, the authors assume that creation of intraregional (municipal) industrial clusters in the territory of mono-towns as priority ("anchor") residents can afford the synergistic effect by benefiting from PSEDA and cluster approach. The economic meaning of clusterizing is to take advantage of the synergy that arise during interacting between related industry entities concentrated in one territory, and public and private sector organizations. The constructive partnership of all stakeholders in the development of local economy is the defining feature of the cluster. The clusters formation, even during the crisis, boosts the economic growth in territories, contributes to overcome technological backwardness. There is an opinion that cluster formation, involving entities from more than one municipal formation, can strengthen the mono-profile of towns [3]. However, there are examples of effective practice of forming intra-regional clusters. For example, the auto-industry cluster in the Kaluga region (developing based on the governmental support, in particular, tax incentives, access to infrastructure, investor support by administration), "Integrated development of the Lower Angara region" cluster (financed from the federal and regional budgets, banks and enterprises). In this regard, it seems that it makes sense to identify and develop associations of enterprises with the potential to transform into intra-regional clusters as part of PSEDA.

Despite the experience of cluster creation in the Russian Federation, there is a lack in practical formation as part of programs to create PSEDA in mono-industry towns. In addition, the term of cluster is not defined when applied to forms of organization for the purpose of PSEDA creation and development. The practice of cluster formation was reviewed to evidence that they may be formed, firstly, by natural means, as a consequence of gradual development of the certain area of concentration based in the specific territory, and secondly, as a result of purposeful implementation of cluster-forming events. Dirigiste and liberal models of clusters are specified as per these criteria: The dirigiste model is known to assume cluster formation through governmental support. Within the liberal model, the cluster emerges as a result of market rules, and the function of federal authorities is reduced to limiting barriers to its natural development [4]. Both models do not associate the cluster with special economic zones. However, it should be assumed that creation of special conditions favorable for the business development aimed, in particular, to addressing social and economic issues of mono-industry towns, for example, priority social and economic development areas, is the factor initiating the successful emergence and further development of clusters as elements (residents) of such territories. This is how the relevance and practical significance of this study is specified.

## OBJECTS AND METHODS OF STUDY

The research object is cluster projects, economic relations of agrobusiness entities of the mono-town, experience of cluster formation in industry.

Studies of national and foreign scientists primarily focus on the rationale to identify cluster groups, however, the potential of entities, in particular mono-towns, to become the cluster member is not studied, the methods of cluster formation are associated with methods of their identification only [5, 6].

Theoretical and methodological provisions of the cluster theory, official statistic publications, expert opinions form the information base of the research. The calculation-analytical method, system analysis, and method of expert appraisal are used.

When developing the principles of methodological approach to PSEDA-based cluster formation in mono-industry towns, the following provisions of theoretical concepts and studies were taken into account: the opportunity of more effective internal control based on internal information, regulation and coordination of business activities of merging enterprises as a result of intracorporate financial market formation (concept based on the intra-company capital market); efficient creation of networks of suppliers, producers, consumer networks and networks of technological cooperation (D. Ernst); advantages to form industrial chains, commodity chain, supply chains and the creation of value chains (E. Yordon, M. Christopher, T.J. Gallin and M. Handon, M. Garrett and P. Ducuge).

In the methodology for cluster formation analysis, methods for their detection and identification, methods for evaluation thereof and methodological approaches to assess their effectiveness are distinguished. The totality of methods to detect and identify cluster formations in the territory includes the expert assessments, calculation of localization coefficients, factor analysis, statistical cluster and discriminant analysis, use of production inter-branch balances, etc. To determine economic agglomerations capable of cluster forming, tradable or export-oriented industries are determined [7], the coefficient of sectoral employment localization is calculated as the ratio of share of this industry in production structure to the specific share of the same in the country. Similarly, the production localization factor, ratio of sectoral localization by labor productivity, investment and other indicators can be determined [8]. The clusters may be assessed based on SWOT analysis, analysis of industrial potential, methods to evaluate the effectiveness of investment projects, and others. As part of this study, expert assessments, SWOT analysis, assessment of potential of mono-industry sectors, and evaluation of investment project effectiveness were used to locate and identify, as well as to assess cluster structures.

## RESULTS AND DISCUSSION

As the economic term, the cluster is a totality of enterprises concentrated on the specific territory, interrelated, but performing in different sectors. And the core of cluster is that its members complement each

other and strengthen their competitive advantages and those of cluster as a whole.

In the concept of M. Porter [9] the interaction between cluster members is distinguished (main manufacturing companies, auxiliary (associated) industries, universities, research organizations and government agencies). The cluster is a more complex formation as compared to a simple association of entities for joint activities, since it involves cooperation through participation in value creation systems, as well as competition.

R. Bro defines the cluster as “the intersectoral concentration of entities that create jobs, export goods and services, have common basic economic needs and unite the public sector of economic development, legislature of different levels, universities, colleges, educational community, funds and all other stakeholders” [10].

The cluster is the form of network intercompany interaction, and unlike entrepreneurial networks, it unites a wider range of members, including support institutions, production and commercial structures (among them manufacturers, suppliers, as well as higher education institutions and scientific organizations). Within the cluster, members may be associated both by sectors and regions (interindustry).

The cluster member may be a focal enterprise (the core firm), key players, small and medium-sized businesses, supplier agencies, sales intermediaries, trading companies, representatives of workers (trade unions), investment companies, investors, capital investors, financial institutions, local administrations, supporting enterprises, universities, research organizations and think tanks being the part of the cluster companies. It should be noted that the ideas on focal networks with the involvement of a key player are well understood in Russia, but the capacity of small and medium-sized business is underestimated.

The intraregional (municipal) industrial cluster created based on PSEDA mono-town is proposed to be considered as: tool to structure the industry and its network organization; association of organizations, formed to implement projects to diversify the mono-town economy and investment projects meeting PSEDA requirements; network association of industry-related enterprises and organizations in the territory of a mono-industry town; a type of territorial cluster, regional industrial cluster, industrial district.

Its features are as follow:

- combination of competition and cooperation, market and organization;
- extensional and local economic structure, where socio-cultural and production and engineering factors interrelate to ensure competitiveness and activity;
- the form of industrial entity is characterized by the focus of economic and entrepreneurial activity and limited by geography (municipal district, urban district);
- participants are the mono-industry town enterprises with the area of concentration in production of competitive products, suppliers of raw materials,

services, cluster infrastructure creating in aggregate the final product and added value;

– availability of internal competition, that distinguishes the cluster against integrated entities.

The most successful and dynamically developing clusters formed based on special economic zones, technology parks and business incubators include clusters in mono-industry towns: cluster of automotive industry - Tolyatti and Naberezhnye Chelny, creation of “titanium valley” in the Upper Ufaley in the Sverdlovsk region, a chemical cluster in Nizhny Tagil, a wood processing cluster using the latest technologies in the city of Sokol, Vologda region and others.

Having analyzed the structure of clusters of mono-profile towns in the Sverdlovsk region, the specialists of the Ural State University compiled a list of most promising new industries for each single-industry town. So, the following industries were named for Nizhny Tagil: manufacture of electrical appliances, pharmaceutical industry, business services, jewelry industry.

The most significant factors for the successful development of clusters are: quality management [11]; mechanisms and organizational forms for knowledge accumulation and dissemination and social capital accumulation [12]; presence of at least 30–50 profile companies in the cluster to realize the potential of innovation diffusion [13].

To describe the communities of technologically related sectors in France, the term “dies” was widely used [14] as the form of interaction of innovative cluster features. The term “clusters of innovation” has gained a wide popularity among public and private sector leaders after formation of the US cluster named “Clusters of Innovation” [15]. It well reflects the fact that all the world companies have to compete not only in and not so much in terms of productivity as in terms of the ability to innovate.

The methodology and implementation of cluster policy in Russia correspond to conceptual basis of similar European programs on whole, especially of French and German origin [13]. Since 2012, the Ministry of Economic Development of the Russian Federation has competitively selected projects for cluster development in the Russian regions. Around 100 cluster initiatives took part in the competition, 25 of them were selected for pilot support. In 2013–2014, the amount of 3.8 billion rubles was allocated from the federal budget for cluster development on co-financing terms from regional budgets. So, the innovative territorial cluster in the sphere of information and telecommunication technologies of the Novosibirsk region received 269 million rubles, and the information technology cluster in St. Petersburg – 1.3 million rubles. The average size of subsidy for clusters was about 100 million rubles [16].

An analysis of study results of Russian pilot innovation clusters [17] held in 2015 using the European Cluster Improvement Initiative showed the following:

- clusters are mainly located in Russian regions with a high level of innovative development (out of 21 test

clusters, 13 (62%) are based in "strong innovator" regions, 5 (24%) – in "medium-strong innovator" regions, 1 cluster is in the region of "medium innovator" and 2 (9.5%) – in "medium-scale innovator" regions) [18];

– in 13 clusters out of 21 the number of participants was less than 50, and less than 30 in 6 clusters;

– 11 new clusters are specialized in new industries (information technologies, bio-pharmaceuticals and new technologies), while 12 clusters can be referred to traditional high-tech industries founded in the Soviet time (production of aircraft and space vehicles, shipbuilding, nuclear and radiation technology, chemistry and petrochemistry).

Since a large share of Russian clusters is created based on former Soviet enterprises in conventional high-tech industries (aerospace complex, nuclear technologies, etc.), one of their features is a small number of small and medium-sized businesses that act as an active part of foreign clusters created. However, there is diversity among a small number of innovative clusters selected by the Ministry of Economic Development of Russia for subsidization as follow:

– clusters formed of members around large companies (aerospace cluster in Samara);

– networks joining small and medium-sized enterprises (information and pharmaceutical clusters in St. Petersburg and Novosibirsk);

– association of enterprises around the research institute ("Biotechnological Innovative Territorial Cluster "Pushchino") or leading universities (Cluster "Fiztekhn XXI" in Dolgoprudny);

– formed in Closed Administrative Territorial Units (Sarov, Zheleznogorsk);

– created based on large agglomerations.

By the extent of impact on the regional and national economics, on whole, the multi-profile Kamsky Innovative Cluster in Tatarstan, clusters of information and communication technologies in St. Petersburg and the Novosibirsk region, as well as the Samara aerospace and Bashkir petrochemical innovation territorial cluster (ITC) are ranked first as per the study results. The nuclear-innovative cluster in Dimitrovgrad in the Ulyanovsk region, the multiprofile cluster of the Tomsk region, the Zelenograd cluster of microelectronics (Moscow) and the engineering lighting cluster in Mordovia are distinguished by the interaction intensity within the cluster, namely, as per the share of participants in joint projects, number of joint innovation projects and business projects. By the professionalism criteria of the managing company, the multisectoral cluster in Tomsk, the cluster of pharmaceuticals, biotechnology and biomedicine in Kaluga, the nuclear-innovation cluster in Dimitrovgrad, ICT cluster in Novosibirsk and cluster of rocket engine building in Perm are ranked first.

The following dependencies are revealed: there is a correlation between the volume of cluster financing through the Ministry of Economic Development of Russia with the level of integration of its participants and the extent of cluster impact on regional development; there is no significant correlation

between the support volume and the quality of cluster management [17].

Apart from cluster success, it is necessary to highlight the problems of their development in Russia. So, the cluster development is limited with the lack of knowledge and inability to apply best world practices locally, rapid result orientation, difficulties with investment raising, obsolete and worn-out fixed assets, human resource problems, and poor work-out of the strategy in terms of development priorities choice. Almost all sectors running in the territory are chosen as key areas of growth to result in dispersion of forces, lack of resources to implement all projects.

A particularly significant problem is the weak innovativeness of formed clusters, since the national economy remains weak-responsive to innovations. Among the important reasons the quality of the institutional environment and the specifics of internal industry markets should be accentuated. As a rule, companies are willing to invest in innovations only if the term for innovation and new product marketing is feasible within a year. This is not enough for breakthrough innovations. Even innovative entities are poorly cooperated in terms of creation of new knowledge, technology transfer and interaction with scientific organizations. In addition, the importance of existing barriers between the science, innovation, education and real economic sector should not be excluded, the growing differentiation between sectors in terms of their technological development, regional polarization by innovative performance.

In addition to problems and limitations in cluster development in the Russian Federation, the risks existing in the sphere of cluster formation and cluster policy should be systematized. For example, the global experience shows that when the cluster formation initiated exclusively by the government faces one of major risks, that is the failure to consider business development trends, as well as its economic interests. The "large-scale construction in the open field occurs initiated by officials oriented toward trendy issues" [19]. This results in the artificially created cluster that exists until the state support is granted. Due to certain artificially created cluster initiatives considered by regional authorities as a tool to ensure state support, horizontal links are poorly formed in Russian clusters, the member cooperation is not developed.

The Russian risks of cluster approach execution match those risks highlighted by foreign experts. In particular, Man-Wen T. and Vojer R. [20] focus on the most significant risks faced by foreign governments when forming and promoting cluster development: change of macroeconomic conditions, weak cluster innovation due to the lack of production mechanisms and adaptation of new knowledge, insufficient development of external and internal scientific and technological links that weakens the synergistic effect of clustering and use of inefficient management techniques.

In addition, risks of opportunistic behavior of cluster members, personnel risks (shortage of specialists of the required qualifications to support the cluster entity activities), logistical and marketing risks

should be highlighted. There are also risk groups produced by governmental authorities. For example, infrastructure risks manifested in case of insufficient provision of cluster members with transport, energy, communal and other infrastructure for cluster members, institutional risks that are due to inconsistency of measures of scientific and technical, industrial, regional, socio-demographic, educational policies, resource risks associated with inadequate or inefficient use of budgetary funds.

PSEDA creation in mono-towns is aimed at creating conditions to attract investments avoiding mono-dependence. By implementing projects with multiplier effect, it will be possible to improve the life quality of population by creating the new social infrastructure, work places and by increasing the tax base. The creation of the sustainable system of investment attraction and investment projects implementation will ensure solution of tasks of sustainable social and economic development for the long term. In addition, the PSEDA creation allows solving problems as follow: attracting high-tech enterprises of processing industries with high added value, the growth of competitiveness of the territory by creating conditions to attract investors to the region, including foreign ones and creation of new, up-to-date, export-oriented production, reduction of unemployment through redistribution of labor resources available, growth of tax and non-tax revenues (for example, return of old and emergence of new taxpayers).

PSEDA are created in mono-industry town territory with the most difficult social and economic situation. So, for example, the Yurga municipal district of the Kemerovo region (hereinafter referred to as the "mono-town Yurga") is listed among single-profile municipal entities of the Russian Federation (mono-industry towns) and depending on the risk of their socio-economic deterioration, refers to Category 1 - mono-profile municipal formations of the Russian Federation (mono-industry towns) with the most difficult social and economic situation (including in interrelation with problems of the city-forming entity functioning). The unemployment rate increased from 1.6% to 2.1% between 2000 and 2008 in the mono-town Yurga in the Kemerovo region, By 2009, the level was 3.6%, and by 2016, the figure almost doubled and amounted to 6.4%. In 2016, the staff double reduction is planned and dismissal of more than 1750 peoples at the town-forming entity, that is, the Yurginsky machine-building plant. The Yurginsky Machine-Building Plant LLC faces significant difficulties to obtain orders and, as a result, production volumes have significantly decreased. The city does not dispose of sufficient internal sources for budgeting. In April 2015, the Agreement was signed between the Mono-Town Development Fund and Administration of the Kemerovo Region. To annul infrastructure constraints and develop investment projects, Yurga was allocated assets in the amount of 373.5 mln rubles, and 139.5 million rubles for the construction of a sewage collector.

Formation of the program for PSEDA creation and development in the mono-town requires justification of the list of economic activities that may be internal triggering points. The cluster approach may be used for justification. The cluster approach is one of ways to increase the competitiveness and economic development of territories. In addition, in the paradigm of cluster ideology, the priority today is given to restructuring of the area economy, in particular, to supporting diversification.

It is obvious that single-industry clusters around one or a group of entities may be formed in single-industry towns. Moreover, due to internal structuring, they may be more resistant to the impact of risks associated with external environment of cluster performance. However, failures in cluster functioning may result in the destruction due to weak diversification of the economy of the territory.

When using the cluster approach to form the PSEDA-based mono-town program, one should consider the foreign practice of cluster management of the European Cluster Excellence Initiative [21], the research results of industrial cluster state management, formation of business clusters and high-tech clusters [22, 23, 24, 25, 26, 27], and factors of their sustainable development revealed during the study of national practice of clusters functioning [17].

Prerequisites to create intraregional (municipal) industrial clusters within the PSEDA mono-towns: lack of own opportunities with entities to arrange the effective production activities based on introduction of innovations; the need for economic diversification; the demand for production upgrading; import substitution and the possibility to use favorable conditions for the private entrepreneurship development.

The scenario approach to create municipal clusters based on PSEDA assumes the priority of the top-down movement with the initial development of the cluster strategy and its support under the PSEDA conditions. For example, M. Wickham [28] considers the role of the state when creating clusters as the most important and identifies in the totality of factors for the successful role of the government to create conditions favorable for cluster formation, provision of the necessary infrastructure for cluster development and formation of new leading companies. In addition, it was noted [29] that governments (32%), businesses (27%) and jointly by business and government (35%) are the initiators of cluster formation, cluster is financed by the government (54%), business (18%), jointly by business and government (25%).

An important tool for cluster formation based on PSEDA is the financial and economic mechanism that includes an investment mechanism, and, most importantly, a tax mechanism (creating conditions to foster business development).

As a result of research, analysis and systematization of cluster theory, foreign cluster management practice, methodology and practice of cluster policy implementation in Russia and abroad, Russian pilot innovation clusters, problems, constraints and risks of clusters development, main principles to form intra-

regional (municipal) industrial clusters under PSEDA are in single-industry towns are defined:

- when choosing clusters that can develop within the PSEDA mono-town, the concentration of enterprises carrying out profile, related and supporting lines of activity should be assessed, since high value of activity promotes the spread of innovations. This is also important to stimulate domestic competition, especially in the field of innovation that promotes selection of most effective players and re-flow of labor and investment. When choosing the mono-town to support the mono-industry based on PSEDA are the clusters running in industries with economic indicators that are much higher than the average level in the country;
- use of the network strategy to obtain advantages from the ability to coordinate network structures, adapt to changing conditions, quick response to changes in market conditions, specialization, cost reduction;
- creation of attractive conditions for urban environment for the skilled personnel and innovative entrepreneurship to avoid the domination of the city-forming enterprise and to ensure diversification of the urban economy;
- arrangement of specialized managing companies that implement functions of cluster management, including the coordination of the strategies of participants, interaction with governmental authorities to build effective communications within and between the cluster, as well as to improve skills, training, identify areas of cooperation among participants, intensify cross-sectoral interaction;
- use of outsourcing, that is, clustering through cooperation, involvement of multiple independent companies and competition between them around core enterprises, including, for example, city-forming enterprises and large plants. To form clusters - networks of competing suppliers and contractors, research institutes at certain territories, certain conditions are required, and therefore, the practice of transferring individual business processes for outsourcing is important, since it forms the market for many potential cluster members, the existing organizations and start-ups;
- development of internal competitive environment (in this case, we consider the competition not as an antagonistic struggle between the cluster members and the parallel, simultaneous maintenance (and, therefore, duplication) of same functions). Relying on the functional approach to define the competition (that describes the role of competition in the economy), as per J. Schumpeter who describes under his theory of competition economic development as a rivalry between the old and the new, we consider competition as a mechanism that expels entities that operate inefficiently using obsolete technologies. In justifying the need for internal competition, we rely on perception of the competition not as the conflict between the cluster participants, not as the antagonistic form of competition between enterprises and organizations. The competition is deemed as a form of competitiveness between subjects as an element of market mechanism introduced into the system of functioning and cluster development. In this case, we

consider the competition as a driving force to increase the efficiency of activities, including innovation, such as the interaction between cluster members, their coexistence, cooperation, and interconnection to increase the competitiveness of the cluster as a whole. Competition in this case is a selective and flexible mechanism. The first is manifested in the fact that enterprises performing ineffectively can be "absorbed" more efficiently. The flexibility of the mechanism of internal competition is shown in its rapid reaction to any changes in the situation. When changes emerge, the entities emerge in the best position capable to quickly adapt to changes. Thus, the competition is the most important mechanism to ensure the cluster effectiveness.

The prospective development of PSEDA-based clusters determines adoption of the strategy by enterprises based on "open innovation" model [21], the application of incoming and outgoing knowledge flows to strengthen innovative processes within companies. It is important to attract third-party solutions as a result of outsourcing, networking, involvement of customers, and also to involve employees in the innovation creation.

The gradual formation of the intra-regional industrial cluster under PSEDA is defined by the sequence of "formation of certain conditions in the mono-town - key enterprises - related organizations". This chain of events in process of cluster formation considers the operation of market mechanisms and stimulates emergence of key firms capable to form the core of the cluster. The most important elements for the effective cluster functioning are the business climate, infrastructure, access to resources, capital markets, taxation system, administrative barriers, transport infrastructure. In this sense, the conditions formed under PSEDA are favorable to identify and form intra-regional (municipal) industrial clusters in single-industry towns. However, when identifying clusters, their ability should be considered to emerge in the course of extensive manifestation of the market mechanism when enterprises seek concentration due to obvious advantages of the geographic location. For example, Porter and Enright believe that clusters should not be formed from scratch, but rather to develop those agglomerated.

Let's consider the gradual cluster formation.

Stage I. Analysis of social and economic state of single-industry town, identification of promising economic agglomerations, identification of cluster formations, assessment of their formation and development potential, selection of projects to create and develop intra-regional (municipal) industrial clusters.

Stage II. In process of organizational design of clusters, it is required to first consider the needs of participating entities in certain types of targeted interaction that specify the motivation for association: integration of supply, sales, marketing; use of common economically viable suppliers; integration of the unified scientific and technical policy; exchange of work experience and innovations; coordinated actions to retain and expand positions in the market. The

choice of particular spheres of activity is expedient to justify based on analysis of the marketing research results and perspectives for the sales market development.

The Stage III provides: choice of major cluster activities in the strategic perspective; inclusion of structures actively playing at the market, first of all marketing, supply-marketing, design, etc. (allocation of the group of specialized suppliers and service enterprises); development of future common intra-cluster solutions and approaches; development of principles for the management of the enterprise network.

The formation and development of networks (industrial and business) is based on the combination of key competence of the large enterprise, totality of medium-sized enterprises, a number of small firms (auxiliary, service, service enterprises). The autonomy of unincorporated entities to match with clear rules of inter-organizational interaction, initiates the emergence of sustainable synergies in networks.

Features of network structures: stable nature of cooperation, the need for which is specified by the complexity of final product, its growing science-intensive and long-term research and production cycle. The inter-sectoral principle of cooperation is associated with the involvement in technological process of not only production but also marketing (justification of feasibility to create new products and markets for sale thereof), scientific and technical, sales and service (dealers, leasing companies, maintenance centers, recycling, etc.), financial organizations.

The main feature of the network is that technologies, know-how and other intangible assets are produced and sold created by the request of the managing company of this chain. This requires the use of special network forms of organization of the scientific and production cycle. The networks are distinguished by cooperation (joint creation of value, but not just the market exchange) and the special role of internal infrastructure, interpersonal links, and knowledge transfer.

The cluster that includes a managing company and a network of entities as a core, has a number of advantages to structures that act under strict legal frameworks: freedom to "enter" and "exit" from the network and cooperation ties; the most effective cooperative relations are developed and strengthened, the less effective ones easily die off (with no legal problems); unlimited number of participants, arbitrarily "long" chains of interrelations (technological, economic, financial); ability to integrate resources of different number of participants to the structure to invest in projects aimed at creating new and improving production and cooperation; reduction of transaction costs.

The proposed step-by-step mechanism for cluster formation supposes its gradual increase in its boundaries due to inclusion of participants in the production and business networks. Such a mechanism has advantages as follow: first, it avoids

miscalculations and mistakes in determining the structure and types of activities within an intraregional (municipal) cluster; second, the functioning in the network will identify problems of interaction, points of contact, promising areas of joint activities, adjustment of characteristics of joint entities, elaboration of interaction principles.

The effectiveness of cluster project implementation is defined by appearance of the cluster features: synergetic effects, stability of intra-cluster material and information flows, system-forming factors, ability to self-organization and self-development, and continuity of functioning. The cluster should be formed with minimal expenditure of resources, but no compromising of the process effectiveness. The voluntary association of members should be encouraged.

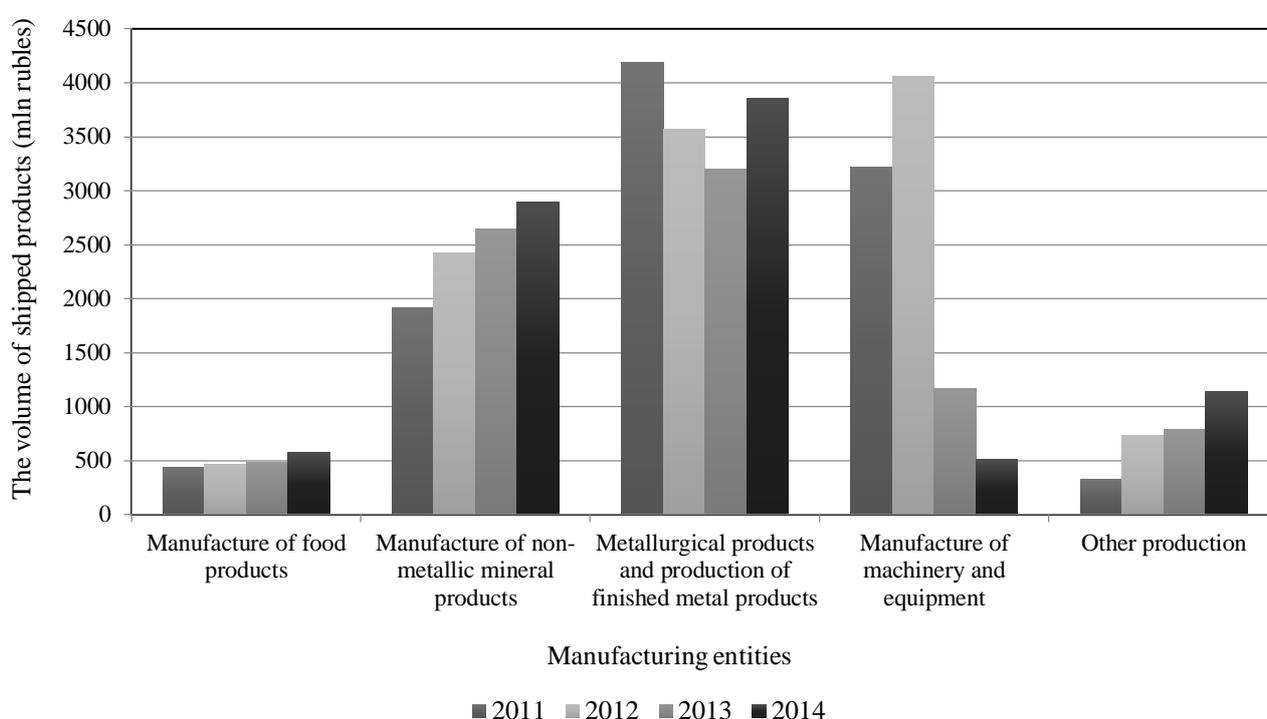
Data analysis of social and economic development of the town as shown on the official website of the Yurga Town Administration makes for the conclusion as follows [30].

First, there is an increase in economic performance figures of the mono-industry town in 2011–2012 followed by the abrupt negative trend in 2013 with some recovery in 2014. Against the overall favorable macroeconomic situation in 2011, there was the upward trend in the economic development. The physical index of industrial production was 122% (12.1 bln rubles), the volume of commodity turnover was 7 bln rubles. The physical index of industrial production in 2012 amounted to 103.2% (13.6 bln rubles). The sales volume reached 7.7 bln rubles (physical volume index is 100.4%). However, yet in 2013, the economic development figures grew to have the negative trend. The index of industrial production in 2013 reduced to 75.6%, and the sales volume – to 75.2%. By the end of 2014, this figure reached 96.6% (see table 1). The transition of the positive trend to negative is reported in the volume of industrial production in the town, especially for manufacturing entities (Table 1) [30], whereas this figure slightly changes for the production and distribution of electricity for the studied period.

Second, the structure of industrial output changed by types of economic activity within 2011–2014. The share of manufacturing entity slightly reduced as follows: from 87.85% in 2011 to 84.24% in 2014. Whereby, the reduction in the volume of shipped products was reported for metallurgical products (by 14% in 2011-2014 from 4186 to 3681.9 mln rubles) and machinery and equipment production (26% growth in 2012 against the previous year and the overall reduction by 84% in 2011 to 2014 from 3,218 to 510.1 mln rubles), while the production of non-metallic mineral products showed an increase by 51% in 2011-2014 (from 1912 to 2893.9 mln rubles) (See Figure 1) [30]. The latter occurs during the construction material industry development in Yurga. The change in the investment pattern to fixed assets of the town also results in the change in the structure of industrial output volume.

**Table 1.** Changes in industrial output of municipal formation “Yurginsky Municipal District”

| No | Types of economic activity  | 2011  | 2012  | By 2011, in % | 2013  | By 2012, in % | 2014  | By 2013, in % |
|----|---|-------|-------|---------------|-------|---------------|-------|---------------|
| 1  | Volume of industrial output of the town, mln rubles including for large and medium-sized enterprises          | 12401 | 13593 | 110.2         | 10662 | 78.4          | 11331 | 107           |
|    |   | 1717  | 12907 | 109.6         | 9924  | 76.9          | 10657 | 107           |
| 2  | Manufacturing entities, mln rubles including large and medium-sized enterprises                               | 10751 | 11944 | 111           | 9018  | 75.5          | 9632  | 108           |
|    |   | 10071 | 11263 | 111.8         | 8281  | 73.5          | 8977  | 109           |
| 3  | Production and distribution of energy, gas and water, mln rubles including large and medium-sized enterprises | 1650  | 1649  | 99.9          | 1643  | 99.7          | 1696  | 102           |
|    |   | 1646  | 1644  | 99.9          | 1643  | 99.9          | 1680  | 102           |

**Fig. 1.** Changes in the volume of shipped products to manufacturing entities for 2011–2014 (mln rubles).

Third, the structure of real investments has changed: investments in buildings and structures in 2011–2014 significantly increased. The implementation of the Integrated Investment Plan for Upgrading reasonably involves a change in the structure of investments. During the period from 2011 to 2014, the ratio of investments in buildings and structures radically changed (share in 2014 was over 60% against slightly over 30% in 2011) and in machinery, equipment, vehicles and tools (reduction in share from 64% to 35.1% over the same period) (Fig. 2) [30].

Fourth, the structure of investments changed by the types of economic activity towards the reduction in metallurgical products and growth in wholesale and retail trade, repair of vehicles and motorcycles, production of household goods and personal

consumables in 2011–2014. [30]. Exemplary is the change in the structure of investment by the types of economic activity. If in 2011 the equity contribution to the capital stock of metallurgical production and production of finished metal products amounted to 62.7% of total investments, by 2014 it declined to 11.02%. Whereas, the equity contribution to capital stock in wholesale and retail trade and repair of motor vehicles and motorcycles, household products and personal consumables increased from 2.4% in 2011 to 47.3% in 2014, the latter figure is the resultant of obvious trends to diversify the economy of the town. These changes cause alterations in the structure of industrial production, reducing the share of city-forming enterprises of a mono-industry town (Fig. 3) [30].

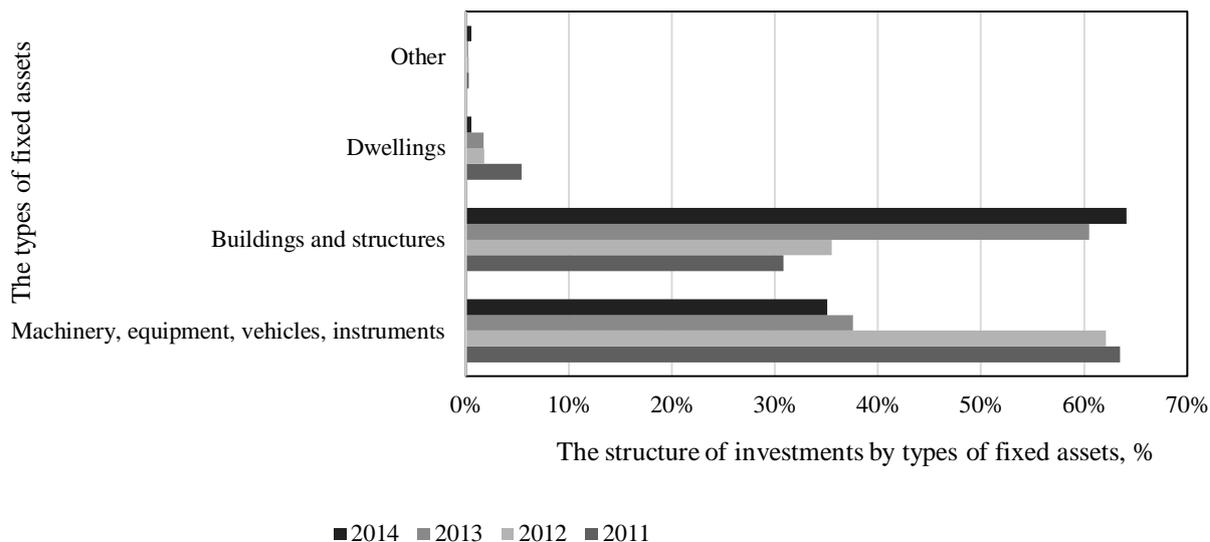


Fig. 2. Trends in changes in the structure of investments by types of fixed assets in 2011–2014.

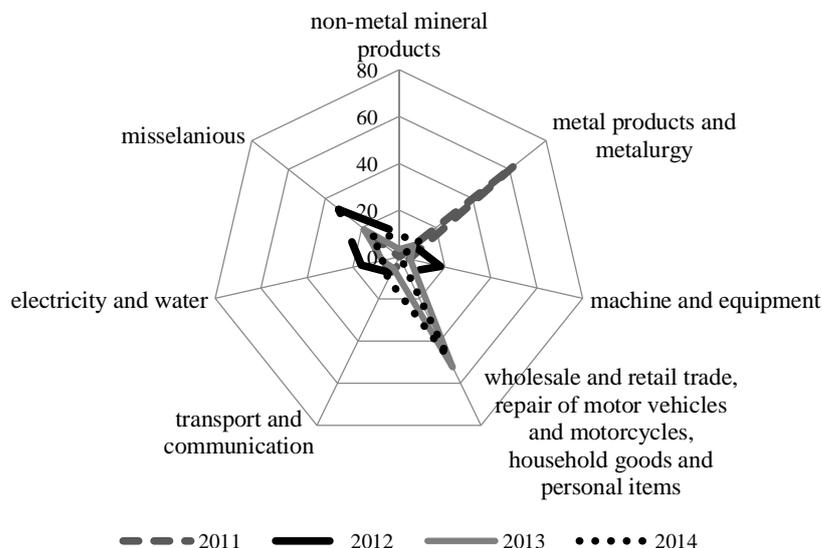


Fig. 3. Change in the structure of investments in the capital stock by types of economic activity in 2011–2014.

The share of town-forming entities is reduced in the total volume of shipped products from 51.2% in 2011 to 12.3% in 2014. Thus, the industrial production index in 2013 was 75.6%, increasing to 96, 6% by 2014. Moreover, the cumulative problems of city-forming entities affected the share reduction therein resulting in the natural decrease in the volume of shipped products and industrial production index of the mono-industry from 90.9% in 2011 to 38.2% in 2014.

In 2011, 9 projects were among projects to create and invest to small enterprises (4 of them were suspended) raising investments from extra-budgetary sources in the amount of 171 mln rubles that made it possible to create 248 new jobs. By 2012, the small business investment projects amounted to 6 with 271.94 million rubles raised and 93 jobs created. However, in 2013 the number of small business projects decreased to 4, and in 2014 – to 3. The joint

investments to implementation of these projects in 2013 amounted to 264 mln rubles, in 2014 – only 24 mln rubles, while 218 and 42 work places were created, respectively. At the same time, the volume of extra-budgetary funds to finance projects significantly reduced in 2014 against the figure in previous years.

It should be noted that the share reduction of the Limited Liability Company "Yurginsky Machine Building Plant" in the municipal industrial output does not result in the decrease in the company impact on the mono-town standing to diversify its economy. So, if in 2011–2012 the company succeeded to implemented a range of measures to upgrade, reconstruct and retrofit the entity, introduce up-to-date technologies and equipment at the expense of 350 million rubles allocated, in 2013 the position of the largest system-forming enterprise impeded. That was resulting from macroeconomic deterioration, decrease in consumption

level and coal prices that caused a reduction in investment projects of coal mining companies to acquire the equipment. In this connection, the volume of commodity output of the plant reduced by 50%, and the average monthly salary – by 25%. During 2013–2014, the number of employees decreased by more than 1,700 persons (up to 3959 persons). The resulting state gave rise to the introduction of extreme situation at the Yurginskaya CHPP on the balance of Yurginsky Machine Building Plant LLC. These circumstances make for the conclusion to reduce the share of the enterprise in the volume of municipal commodity output, number of labor force employed in the core enterprise under conditions where the performance of the enterprise highly impacted the social and economic state of the town. The latter circumstance evidence on negligible changes in the dependence on the enterprise activity and mono-profile capacity in case of formal reduction in the mono-town criteria parameters. This conclusion is proposed based on the need to consider both the official level of the mono-town criteria to assess its economy diversification and the reduction in the influence of the city-forming (backbone) enterprise to the municipal economy [30].

Although the economy of the monogorod Yurga over the period 2011-2014 has changed towards a greater variety of economic activities, this was not only due to implementation of modernization program for the mono-industry town, but largely due to a sharp decline in the share of the city-forming enterprise in the mono-industry economy. Such reduction is associated with scheduled measures to restructure the municipal economy as a whole as per the comprehensive plan and with consequences of negative macroeconomic factors.

The existing agglomerations were reviewed to identify cluster entities in Yurga: machine-building, agro-industrial and complex production of building materials. Let's consider the factor assessment in detail that contribute to the creation of agro-industrial cluster.

Apart from Kuznetskie Ferrosplavy JSC, Yurginskiy Ferrosplavny Zavod stand-alone business unit, ZavodTekhnoNikol-Sibir LLC, Komus-upakovka Siberian Plant, among the largest industrial enterprises of the town there Kuzbasskhele LLC, bakery plant No. 3 in Yurga, "Yurginskiy Gormolzavod" JSC. About 500 small businesses are registered to run in Yurga, 75 of them are engaged in manufacturing industries. In recent years, the distinctive feature in development trends of small business in the town is its production trend.

The SWOT analysis of social and economic conditions in Yurga afford focusing on the following competitive advantages. In terms of geographical location and climatic conditions, these include the density of town location, the proximity to the regional center and major cities of the Siberian region, namely Novosibirsk and Tomsk (intersection of three highways), transport communication support (road, water, railway), location of the West Siberian landfill near the town, the consumer of goods and services of Yurga manufacturers, the supplier of labor force to the

town (officers' wives, persons demobilized in reserves from military forces), the factor contributing to social stability in Yurga, strengthening links with federal and regional authorities. In view of demographic potential, the standard of population living and the labor market, it includes an increase in the birth rate since 1997, the reduction in infant mortality rate, in general mortality rate and availability of free man power. As for engineering infrastructure and accommodation, the population in the town is provided with utility services, engineering and transport infrastructure, the housing construction rate doubled since 2000. As for the environmental situation, it covers free and vast lands for the development of agroindustrial cluster and assumes low susceptibility to natural disasters. Along with machine industry and production of building materials, food industry is noted among main industries. Besides, the territorial proximity of the town and the region favorable for agriculture and livestock production allowing supply of agricultural products to the town both for population needs and to food production plants. Among competitive advantages are the following: availability of vocational schools, technical schools, university branches that ensure the adequate number of qualified personnel, the infrastructure for entrepreneurship support available, availability of four manufacturing sites suitable for the construction of various facilities. The city has the advanced infrastructure available in the dense location of the town with the adequate land plots, buildings, facilities available for investment purposes. Geographic and transport availability favorable for investors should be highlighted. There are sufficient land resources for agricultural, industrial and other purposes within the agro-industrial cluster to study.

The known favorable factors include the convenient geographical location of the town (mid location between the regional centers of the Siberian Federal District, namely Kemerovo, Tomsk and Novosibirsk cities, availability of railway communication, good proximity of underground oil and gas mains, high-voltage transmission lines, arrangement of the town on the bank of the Tom River which is the main waterway for the Kemerovo region). The competitive advantages of the town include: the developed system of professional education (Yurga Institute of Technology of the National Research Tomsk Polytechnic University, three colleges (The Yurga Technical College of Machine Industry and Information Technologies, the Yurga Technical School of Agrotechnology and Service, the Yurga College of Technology)), high rate of population with higher and secondary technical education, availability of qualified specialist engineers from the city-forming enterprise (machine-building plant), free investment sites of 549.4 hectares in area and the engineering infrastructure.

As of January 1, 2016, the share of permanent residents in the town amounts to 80484 people, 43214 people are employable population in productive age, 760 people are engaged in the production of food products, including drinks and tobacco goods. In 2014

and 2015, the agricultural output is rated in the amount of over 230 thousand rubles, in 2014 the volume of own-produced goods shipped, delivery of works and services on their own (with no small business involvement) amounted to 12,490.00 thousand rubles, and in 2015 - 514,683.7 thousand rubles.

The agro-industrial cluster will consolidate the greenhousing, the dairy plant, the industrial company for production of beverages and mineral waters "YUSIL", the bakery complex, the greenhouse plant of 5 hectares in area. By 2020, the following is scheduled: implementation of projects to establish a plant for the rainbow trout production of more than a thousand tons per year in volume and fish production recycling (Sibirskaya ryba LLC), expansion of the greenhouse complex (Zeleniy proekt LLC) up to the area of 20 hectares. The cost of projects totals 2165 million rubles. 710 new jobs will be created. In particular, the establishment of the fish-breeding complex for commodity cultivation of rainbow trout will make it possible to saturate the market of the Kemerovo region and other regions with refrigerated and fresh fish products, since production of more than 1,000 tons per year is expected. Peculiarities of cluster strategy implementation and the possibility to create the agricultural complex in Yurga as the standard mono-town of the Kemerovo region is not only PSEDA-based benefits (tax privileges and preferences), food import embargo to Russia from a range of countries (so, for example, in 2014, the volume of Russian trout imports decreased by 50%), but is also based on the identified competitiveness of products bred directly in the region, due to proximity to the consumer, among other things. Public catering establishments and retail chains of Siberian regions compose the target group of consumers. In addition, the higher competitiveness, for example, of trout, will be supported by processing options (smoking, canning, etc.), free delivery management of large batches within Kemerovo, Tomsk, Novosibirsk cities (convenient geography point usage), commercials (brand development and

promotion). The consumer similarity is rated as the competitive benefit.

Analysis of figures to identify the agro-industrial cluster, physical output indicators of agricultural and food products, volume of investment in the development of agro-industrial enterprises, as well as opportunities and competitive advantages that ensure investment attraction, the growth of business concern in arrangement of entities and production facilities in the PSEDA of Yurga prove on the high potential to create and develop the agro-industrial cluster in the mono-town.

The following is deemed as positive results of cluster formation in Yurga (predicted by municipal authorities of Yurga): increase in the number of taxpayers and taxable base; emergence of the convenient tool for interaction between large businesses and small and medium-sized businesses; the municipal budget revenue increase; diversification of the economy, use of excess capacity and the territory of the former city-forming enterprise (Table 2).

Among the deterrent factors in Yurga the following may be distinguished: poor quality of business environment (prior to PSEDA), poor development of business associations (chambers of commerce, industry associations) that often fail to achieve the productivity goals and promotion of priorities and interests of the regional business.

As per estimation, the use of cluster approach to form the PSEDA program in Yurga the best effective clusters are identified for the territory. However, it is important to identify the best effective clusters for single-industry towns and establish a specialized entity in a mono-town that executes the cluster management.

PSEDA-based cluster formation contributes to occurrence of synergistic effects, in particular, technological effects due to the spread of technological innovations, resources and infrastructure based on joint use of key resources and PSEDA infrastructure on preferred terms.

**Table 2.** Estimated figures of cluster formation under PSEDA in the mono-industry town of Yurga, Kemerovo region

| Figure   | Without PSEDA | With PSEDA<br>(in the first five years) | If there are clusters |
|--|---------------|---|-----------------------|
| Number of enterprises, units                       | 2839          | 2889                                    | Over 3000             |
| Labor force, pcs                                   | 35 600        | 38 100                                  | 40 000                |
| PIT allocations to the municipal budget, rubles    | 574 609 000   | 945 208 000                             | 1 172 057920          |
| Insurance contributions from the wage fund, rubles | 1 334 860 907 | 567 124 799                             | 431 014 847           |
| Budget revenues, rubles                            | 912 464 200   | 1 465 377 000                           | 1 817 067480          |
| Debts of municipal budget, rubles                  | 183 122 000   | 0                                       | 0                     |

## CONCLUSION

The PSEDA-based intraregional (municipal) industrial cluster in the mono-town is proposed to consider as the tool to deploy the industry and its network, association of entities to implement projects to diversify the mono-town economy and investment projects meeting the PSEDA requirements. It is indicated, either, that the intraregional (municipal) industrial cluster is the special type (category) of the territorial cluster, regional industrial cluster and the industrial district. In addition, the features distinguishing the intraregional (municipal) industrial cluster from other types are systematized. It is validated that the scenario approach is required to creation of PSEDA municipal clusters based on the priority of from top downward movement with the initial development of the cluster strategy and its support under PSEDA conditions. Basic principles are specified to form the intraregional (municipal) industrial clusters when creating PSEDA in mono-towns that differ from those combination in practice: priority evaluation criteria when choosing clusters with the capacity to develop under the mono-industry town PSEDA; phased networking; use of PSEDA options to create the favorable urban environment; harmonization of participants' strategies; use of outsourcing; development of internal competitive environment as a form of competitiveness of subjects and the market mechanism element integrated into the system of cluster functioning and development. The stages of cluster formation are proposed assuming

identification of perspective economic agglomerations, identification and assessment of the cluster formation potential; arrangement of cluster design in view of needs of participants in certain targeted interaction; the choice of basic fields of concern of the cluster in strategic outlook. The staged mechanism for cluster formation assumes a gradual expansion of its boundaries by including participants of manufacturing and business networks. The advantages of the staged mechanism are distinguished to form the cluster. This makes to minimize mistakes when determining the composition and kinds of activities within an intraregional (municipal) cluster, coping with interaction problem. The results of this method evaluation are reviewed with specific reference of cluster formation for PSEDA-based mono-town Yurga. In particular, by the results of analysis of figures obtained for agro-industrial cluster identification and opportunities and competitive benefits of the territory, the high potential is concluded to create and develop the agro-industrial cluster in the mono-town.

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