Formation Of Innovation Clusters As A Basis For The Development Strategy Of Russia's Territories

Viktoriya Vladimirovna Kookueva, Juliya Sergeevna Tsertseil

Abstract — Currently, Russia is actively involved in carrying out integration and cooperation processes in the field of business. They are implemented within the framework of cluster policy in accordance with the development strategy of the Russian Federation until 2020. The relevance of this work is determined by the fact that the use of the cluster approach to justify the growth of the company's value in a competitive environment can be considered as a tool for the development of the regional economy. This article analyzes the use of cluster policy implementation tools in different regions, assesses the performance of the innovation cluster in Russia, as well as examines the financial and economic performance of the key enterprises participating in the innovation territorial cluster of the Republic of Tatarstan and the Nizhny Novgorod innovation cluster. The authors also consider the performance indicators of financial activities of the anchor enterprises participating in the clusters in the context of the value model.

Index Terms — innovation cluster, region, economic development.

1 INTRODUCTION

The relevance of the research topic is determined by the need to ensure a positive progressive dynamic of the activities of industrial entities, which will stimulate the efficiency of the related business structures that generally form an industrial innovation cluster, corresponding to the national strategic interests stated in Russia's development strategy until 2020 and the tasks of cluster policy development. The processes of integration and cooperation in the Russian Federation are currently taking place within the framework of cluster policy implementation. The relevance of the research topic is associated with the following circumstances. Firstly, in the scientific aspect, the theory of cluster development is of interest as a synthesis of the concepts of production location and competitive advantages of a company, which entails the emergence of cluster formations in various sectors of the region. Therefore, there is a need to build an appropriate corporate strategy for companies-cluster members, which will ensure the growth of the company's value in the post-industrial economy. Secondly, the practical use of the cluster approach to justify the growth of the company's value in a competitive environment can be used as a tool for the development of the regional economy (Martynova and Evarovich, 2018). The analysis of business value management is based on scientific works of the largest researchers in the theory of value such as A. Smith, D. Ricardo, K. Marx, A. Marshall, J. Mill, and J. Hicks. The study also uses scientific works, materials and publications of the leading foreign and domestic researchers, analysts and experts on the assessment and management of enterprise value as well as problems of the state and development of the Russian economy, such as I. Ansoff, G.D. Alexander, R. Braley, C. Griffith, A. Damodaran (2008), G. Desmond, R. Kelly, T. Koller, T. Copeland, S. Myers, M. Miller, F. Modigliani, D. Murrin, S. Pratt, R. Riis, D. Fishman, J. Friedman, D. Hay, R. Hampton, V.F. Sharp, F.M. Scherer, S.V. Valdaytsev, V.V. Grigoriev, A.G. Gryaznova, V.L. Inozemtsev, A.P. Kovalev, V.I. Koshkin, D.S. Lvov, B.Z. Milner, L.D. Revutsky, T.V. Tazikhina, M.A. Fedotova, N.M. Yakupova, T.V. Kramin, K.A. Tuchin, T.A. Korneev, A.S. Guzhin, V.P. Bagov, Yu.K. Akhriev, O.A. Zhdanova. The developed model for a regional cluster by branches of the economy was formed under the influence of cluster theory, whose development was largely contributed by E. Bergman (1999), H. Gassler, E. Dahmen (2011), D. Jereffi, E. Limer, A. Marshall, M. Porter (1990), S. Rammer, F. Feldman (1984; 2000), and M. Enright (2000). Consider some cluster policy implementation tools in Russia and abroad.

Table 1. Cluster policy implementation tools developed by the Organization for Economic Cooperation and Development

The process of implementing cluster policies involves the transformation of views on the content of the "industrial cluster" concept in the current market conditions, which is shown in Table 2.

Table 2. Approaches to the definition of the content of the "industrial cluster" concept presented in the TCI Report

The authors proposed the following definition of a cluster. It is regarded as a system of geographically neighboring interconnected companies and organizations that complement each other through the formation of a unified strategy of corporate management and cooperation, with regard to the internal and external institutional environment. Their interaction results in the enhancement of their competitive advantages, which is manifested in the creation of additional added value and leads to an increase in the value of companies and their investment attractiveness.

The Russian Cluster Observatory proposed the following definition of a territorial cluster. A territorial innovation

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cluster is an association of enterprises, suppliers of equipment, components, specialized production and maintenance services, research and educational organizations related by proximity and functional dependence in the sphere of production and sale of goods and services. At the same time, clusters can be located on the territory of one or several subjects of the Russian Federation (Vershinina et al., 2016).

State support for the implementation of cluster projects in the Russian Federation is based on the following resolutions, orders and recommendations:

- the Federal Law "On the Development of Small and Medium Businesses in the Russian Federation" No. 209-FZ dated July 24, 2007;
- the competitive provision of subsidies to the subjects of the Russian Federation as part of the implementation of measures for the state support of small businesses in accordance with the rules approved by the Resolution of the Government of the Russian Federation No. 249 dated April 22, 2005;
- the Federal Target Program (FTP) "Research and Development in Priority Areas of Development of the Russian Scientific and Technological Complex for 2014-2020", approved by the Resolution of the Government of the Russian Federation No. 426 dated May 21, 2006;
- the State Plan of Managerial Personnel Training for Organizations of the National Economy of the Russian Federation in 2007/08-2014/15 School Years, approved by the Resolution of the Government of the Russian Federation No. 177 dated September 26, 2011;
- the Regulation on the Investment Fund of the Russian Federation, approved by the Resolution of the Government of the Russian Federation No. 694 dated November 23, 2005;
- the Memorandum on the Financial Policy of the State Corporation "Bank for Development and Foreign Economic Affairs (Vnesheconombank)", approved by the Resolution of the Government of the Russian Federation No. 1007-r dated July 27, 2007;
- the Federal Target Program (FTP) "Dwelling" for 2002-2010, approved by the Resolution of the Government of the Russian Federation No. 675 dated September 17, 2001 (Vershinina et al., 2015).

Special economic zones of technology-innovative and industrial-production types act as a special tool for the development of the territorial industrial innovation cluster. According to the methodological recommendations on cluster policy implementation in the subjects of the Russian Federation, developed by the Ministry of Economic Development of the Russian Federation, in order to accelerate the development of clusters, there is a need to fully use the potential of special economic zones associated with financing infrastructure development, carried out from budget sources, as well as preferential tax treatment, and provided by the attraction of "anchor" residents - large companies that are competitive in the domestic and world markets, acting as the core of the developing clusters. The cluster approach to the formation of corporate strategies involves the implementation of the method to create and develop cluster entities in the region in order to increase the value of the participating companies (Tsertseil, Kookueva and Ordov, 2017; Martynova and Sazonova, 2018).

The performance of the innovation cluster can be of the following types:

1. Budget performance. It assumes an increase in revenues from the production of new types of products or services, and as a result, an increase in tax revenues to budgets of different levels. Tax revenues will also increase due to the maximum load of the existing material base, as well as the development of new industries and products.
2. Social performance. It means an increase in the number of people employed in the cluster and the level of their income, an improvement in their professional skills, as well as the creation of additional jobs at the cluster enterprises in related industries.
3. Information and emotional performance. It assumes an increase in the number of consumers of the product in the cluster and the number of new enterprises that would like to join the cluster.
4. Innovation and production performance. It assumes an increase in the volume of production of an innovative product in the total sales volume of enterprises participating in the cluster, providing profitability indicators above the industry average (Ketels and Protsiv, 2016).

The key characteristic of the innovation cluster is an increase in the competitiveness of its companies. It is classically considered that one of the sources of such an increase is the growth of the efficient use of production factors. In the postindustrial economy, however, accents are shifting from production and distribution factors to intangible, institutional factors (Tsertseil et al., 2017). Moreover, of particular significance in the cluster is the exchange and sharing of the key competencies of its participants. In this regard, there is a need to develop strategic tasks for the development of innovation clusters, which is shown in Table 3.

Table 3. The list of tasks for the development of pilot innovation territorial clusters and the priorities of their state support in Russia

The European Cluster Observatory conducted a study on the performance of companies participating in strong clusters and individual locations, which is shown in Table 4.

Table 4. Performance of companies participating in strong clusters and individual locations of the European Union in 2016

According to Table 4, the annual growth rates of key performance indicators of the cluster are higher than the growth rates in other locations.

In Russia a decision was made on the allocation and development of innovation territorial clusters in certain regions, which is reflected in Table 5.

Table 5. The list of pilot innovation territorial clusters by regions of the Russian Federation

Consider the following models of innovation industrial clusters operating in the Russian Federation, formed with the participation of public joint-stock companies (PJSC), acting as key cluster members and "driving economic forces that ensure growth". The models of petrochemical and automotive

clusters were used as an example.

2 Cluster 1. Innovation territorial cluster of the Republic of Tatarstan

Figure 1. Main participants of the territorial production cluster of the Republic of Tatarstan

Participant 1. The main production enterprises of the Republic of Tatarstan belonging to the petrochemical industry are:
1. PJSC "Nizhnekamskneftekhim";
2. PJSC "Nizhnekamskshina";
3. PJSC "Kazanorgsintez";
4. OAO "Nizhnekamsk Techcarbon Plant";
5. LLC "Nizhnekamsk Truck Tyre Factory";
6. LLC "Polimerholodtekhnika";
7. LLC "Trest TSNKhRS";
8. LLC "UOP 'Neftekhim'";
9. LLC "NKNKh-Servis";
10. LLC "Tsekh No. 4100-NKNKh";
11. JSC "SOV-NKNKh";
12. LLC "RMZ-NKNKh";
13. LLC "UAT-NKNKh";
14. LLC "KhK 'Neftekhimik'";
15. LLC "CHOP-NKNKh".

Participant 2. The executive authorities of the Republic of Tatarstan.
Participant 3. The special economic zone of industrial production type (SEZ IPT) "Alabuga", administrative resource.
3.1. The special economic zone of industrial production type (SEZ IPT) "Alabuga"
The special economic zone of industrial production type "Alabuga" was established in accordance with the Resolution of the Government of the Russian Federation No. 782 dated December 21, 2005 in the Elabuga district of the Republic of Tatarstan.
Priority development areas are as follows:
- automotive industry;
- automotive components;
- instrument making;
- petrochemistry;
- composite and building materials;
- construction materials;
- mass consumer goods.

Table 6. Industry affiliation of the companies participating in the SEZ IPT "Alabuga"

3.2. The special economic zone of technology innovative type (SEZ TIT) "Innopolis".
The special economic zone of technology innovative type "Innopolis" was created in accordance with the Resolution of the Government of the Russian Federation No. 781 dated November 01, 2012 in the territory of the Republic of Tatarstan.
Priority development areas are as follows:
- information and communication technologies;
- electronic technology;
- nanotechnology;
- biotechnology;
- medical technology.

Participant 4. The educational sector of the Republic of Tatarstan in the field of professional training and retraining includes:
- Kazan (Volga) Federal University;
- Kazan State Finance and Economics Institute;
- Kazan National Research Technological University;
- A.N. Tupolev Kazan National Research Technical University;
- Kazan State Power Engineering University;
- Almetyevsk State Oil Institute;
- Innopolis University.

3 Analysis of the financial and economic performance of the key enterprises participating in the innovation territorial cluster of the Republic of Tatarstan

Table 7. Key profitability performance indicators of PJSC "Nizhnekamskneftekhim" for the period 2015-2017, %

Table 8. Financial relative indicators of the financial activities of PJSC "Nizhnekamskneftekhim" for the period 2015-2017

Table 9. Relative indicators characterizing the capital structure of PJSC "Nizhnekamskneftekhim" for the period 2015-2017

Table 10. Relative indicators characterizing the operating activities of PJSC "Nizhnekamskneftekhim" for the period 2015-2017

4 Cluster 2. The Nizhny Novgorod territorial innovation cluster in the automotive industry

Figure 2. Main participants of the Nizhny Novgorod industrial innovation cluster

Participant 1. The main production enterprises of the Nizhny Novgorod region belonging to the automotive industry are:
- LLC "Avtotekhnika"
- LLC "PROMAVTO GROUP"
- LLC "Caprolactam TOSOL-SINTEZ"
- LLC "Sintez OKA"
- LLC "Tosol-Sintez-Invest"
- JSC "Khemkor"
- SC "Avtokomponent"
- OAO GAZ
- PAO ZMZ
- LLC "Tosol-Sintez-Trading"

Participant 2. The executive authorities of the Nizhny Novgorod region.
Participant 3. None.
Participant 4. The educational sector of the Nizhny Novgorod region in the field of professional training and retraining includes:
- PEI FPE Business Practice Center Leader;

- SBPEI Nizhny Novgorod Automotive Technical School;
- SBPEI B.I. Kornilov Oil Technical School of Kstovo;
- FSEI HPE R.E. Alekseev Nizhny Novgorod State Technical University.

Participant 5. The innovative sector of the economy, including business incubators, associations of producers, technoparks, technopolises, is presented by:

- LLC "AP-Project" (an engineering company);
- JSC "Industrial Park Oka-Polymer".

5 Analysis of the financial and economic performance of the key enterprises participating in the Nizhny Novgorod territorial innovation cluster

1. Anchor enterprise 1 - PJSC "Zavolzhsky Motor Plant"

Table 11. Key profitability performance indicators of PJSC "Zavolzhsky Motor Plant" for the period 2015-2017, %

Table 12. Financial relative indicators of the financial activities of PJSC "Zavolzhsky Motor Plant" for the period 2015-2017, %

Table 13. Relative indicators characterizing the capital structure of PJSC "Zavolzhsky Motor Plant" for the period 2015-2017, %

Table 14. Relative indicators characterizing the operating activities of PJSC "Zavolzhsky Motor Plant" for the period 2015-2017, %

2. Anchor enterprise 2 – PJSC "Nizhny Novgorod Machine-Building Plant".

Table 15. Key profitability performance indicators of PJSC "Nizhny Novgorod Machine-Building Plant"

Table 16. Financial relative indicators of the financial activities of PJSC "Nizhny Novgorod Machine-Building Plant"

Table 17. Relative indicators characterizing the capital structure of PJSC "Nizhny Novgorod Machine-Building Plant"

Table 18. Relative indicators characterizing the operating activities of PJSC "Nizhny Novgorod Machine-Building Plant"

6 Conclusions

This paper presented a model of an industrial innovation cluster formed with the participation of public joint-stock companies (PJSC) – anchor enterprises acting as the key cluster participants and "driving economic forces that ensure growth", by industry: petrochemical and automotive industries. The authors analyzed the financial and economic performance of the anchor enterprises participating in the cluster in the context of the value model: key profitability performance indicators, relative indicators of the company's financial activities, relative indicators characterizing the company's capital structure, and relative indicators characterizing the company's operating activities.

An increase in the performance of enterprises of the industrial complex and their financial sustainability implies an improvement in management processes within the framework of the cluster approach, which will make it possible to form a long-term competitive advantage of business entities, ensuring the viability of the enterprise in a strategic perspective. The development of enterprises of the industrial complex within the cluster should ensure an increase in the value of both the individual company and the entire integrated business structure (holding), primarily in key industries of the national economic system.

These circumstances confirm that the rational management of the development of innovation clusters in the manufacturing sector of the country's economy implies the formation of a scientifically based development strategy for Russia's territories. The implementation of such a strategy will ensure the effective development of enterprises participating in the innovation cluster, defined by strategic prospects, which is aimed at ensuring a positive progressive dynamic of the activities of economic entities in key industries of the national economy.

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Table 1. Cluster policy implementation tools developed by the Organization for Economic Cooperation and Development

Stage	Content	Specification
Stage 3. Interaction between research organizations and business structures	Development of programs for project financing	• elaboration of programs for state support and development of the R & D sector, including venture financing; • creation of conditions and support for the formation of private venture capital
	Commercialization of R & D results	• ensuring statutory regulation and compliance of intellectual property with current legislation; • overcoming barriers to public sector participation in R & D commercialization
	Development of interaction between research organizations and business structures for meeting needs	• support for joint projects involving business structures, universities and research institutes; • formation of cluster participating facilities to ensure cooperation, business incubators, and technology parks; • technical observatories
	Development and support of labor potential in strategic industries	• collection and dissemination of information about the labor market: • professional development and training programs; • support of interaction between groups of companies and educational structures; • educational resource for attracting promising graduates to the region
Stage 2. Business relations	Increase in additional areas of interaction (foreign direct investment and export)	• creation of trademarks (patent activity); • support for domestic investors in the cluster; • provision of market information for international cooperation; • support and development of chains shaping the supply of resources and final goods; • development of export business networks
	Enhancement of capacity, scope and skills of suppliers, mainly small businesses	• support and development of small business, business structures; • creation and development of services and platforms for strengthening interaction between producers and consumers; • creation and development of technical quality standards; • tracking and provision of general market information (monitoring)
Stage 1. Attraction of participants	Enterprise network/cluster support	• conducting awareness-raising activities (conferences, training programs); • financial incentives for corporate business networks; • sponsorship of business networks; • formation of intracluster relationships
	Cluster definition	• cartographic research (quantitative and qualitative); • use of specialized companies to identify companies for further cooperation and interaction

(Source: Report OECD. Innovation Policy Platform. - 2010. [Electronic resource]. Available at: http://www.oecd.org/innovation/policyplatform/48137710.pdf)

Table 2. Approaches to the definition of the content of the "industrial cluster" concept presented in the TCI Report

Characteristics	Content
Cluster development	the level of development of the competitive environment of cluster members has a huge impact on the development of the cluster; the main purpose of the cluster is to create added value and contribute to innovations; there is no unified approach with regards to regulatory measures for cluster development
Cluster management	actions regarding cluster management should cover all participants simultaneously; these actions are only organizational in nature; support from the public authority, including financial, should be limited to cluster members, but not to the management system itself; at the initial stages of cluster development, no state support is required for financing cluster members
Types of territories	steadily developing territories with highly developed infrastructure and supporting institutions; territories with highly developed infrastructure and supporting institutions that are in decline; steadily developing territories with underdeveloped infrastructure and supporting institutions; territories with underdeveloped infrastructure and supporting institutions that are in the "stagnation" stage
Interrelationship of clusters and territories	successful development of clusters as a whole influences the development of the country's national economy; sustainable development of the country's key industry may serve as a factor in the development of clusters in the future; clusters contribute to the development of territories, even if territories develop steadily, as they create additional competitive advantages

(Source: Report TCI (2016). Global changes: challenges for innovation clusters. 19th TCI Global Conference / Eindhoven, the Netherlands, 2016. Available at: http://www.tci2016.org/uploads/documents/20161220-TCI-rep-def.pdf)

Table 3. The list of tasks for the development of pilot innovation territorial clusters and the priorities of their state support in Russia

Tasks of cluster development	Priorities of state support
Clusters formed on the basis of "anchor" high-tech enterprises	
• development of innovative, industrial, transport and energy infrastructure; • search for new markets and areas of application of existing competencies, overcoming of the focus on traditional markets with low growth rates; • overcoming of the dependence on the receipt of state orders, technological backwardness, and implementation of the "open innovation" model.	• formation of an "innovation belt" around large enterprises consisting of small and medium-sized companies, universities and research organizations; • introduction of advanced production organization methods, and development of outsourcing, supplier systems; • improvement of the existing technological chains through support of an "optimization" nature.
Clusters formed on the basis of leading scientific and educational centers	
• formation of a "flow of projects" – high-tech start-ups created by graduates of higher education institutions involved in the cluster; • development of youth innovative entrepreneurship; • access to the world level of competitiveness in the field of education and science; • an increase in the share of breakthrough world-class research and development; • development of cooperation with industrial enterprises.	• attraction of large Russian and foreign companies to the organization of high-tech production on the basis of existing human resources and research infrastructure; • development of "mass" innovative entrepreneurship through commercialization of developed technologies; • personnel training, formation and development of new research areas; • launch of the latest high-tech industries.
Clusters formed on the basis of small and medium-sized innovative business	
• development of personnel potential, and involvement of highly qualified specialists; • development of entrepreneurship in the field of innovation (including in the early stages); • formation of consortia and joint projects to enter new markets, including in terms of access to procurements of large companies and government procurements.	• development of an "innovation ecosystem" and common service tools, including innovation infrastructure; • stimulation of the demand for innovative products of small and medium-sized businesses; • development of intracluster cooperation, including the involvement of scientific and educational organizations.

(Available at: https://cluster.hse.ru/innovative_clusters)

Table 4. Performance of companies participating in strong clusters and individual locations of the European Union in 2016

Cluster	Strong clusters			Other locations		
	Employment	Average wage	Average annual employment growth 2008-14, %	Employment	Average wage	Average annual employment growth 2008-14, %
Agricultural Inputs and Services	4 013	16 923	5,17	807	24 432	5,51
Automotive	20 811	32 640	7,03	4 521	39 389	1,02
Biopharmaceuticals	5 761	52 259	5,23	790	50 749	0,33
Coal Mining	5 023	19 220	15,26	78	60 778	1,72
Communications equipment and Services	8 744	45 687	5,55	997	44 194	3,32
Distributions and Electronic Commerce	77 406	26 688	5,73	41 035	37 622	0,51
Downstream Chemical Products	22 508	25 328	4,09	4 164	34 630	0,64
Education and Knowledge Creation	28 583	34 671	3,67	11 460	35 407	4,58
Information Technology and Analytical Instruments	13 419	44 193	3,05	3 053	47 110	0,97
Medical Devices	5 592	39 647	2,16	1 460	39 129	0,82
Oil and Gas Production and Transportation	5 040	68 521	5,24	543	53 359	0,98
Upstream Chemical Products	3 542	36 627	(2,37)	742	42 439	(0,10)

(Available at: https://www.iapmei.pt/getattachment/PRODUTOS-E-SERVICOS/Empreendedorismo-Inovacao/Eficiencia-Coletiva-e-Clusters/EuropeanClusterPanorama2016.pdf.aspx?lang=pt-PT)

Table 5. The list of pilot innovation territorial clusters by regions of the Russian Federation

Region	Cluster name
Altai Krai	Altai Biopharmaceutical Cluster
Arkhangelsk region	Shipbuilding Innovation Territorial Cluster
Kaluga region	Cluster for Pharmacy, Biotechnology and Biomedicine
Kemerovo region	Cluster for Integrated Processing of Coal and Industrial Waste
Krasnoyarsk region	ZATO Zheleznogorsk Innovation Technology Cluster
Leningrad region	Cluster of Medical, Pharmaceutical Industry and Radiation Technologies
Moscow	Zelenograd Cluster Cluster of New Materials, Laser and Radiation Technologies
Moscow region	Pushchino Biotechnological Innovation Territorial Cluster Cluster "Fiztech XX!" (Dolgoprudny city, Khimki city) Dubna Cluster for Nuclear Physics and Nano Technologies
Nizhny Novgorod region	Nizhniy Novgorod Industrial Innovation Cluster in the Automotive and Petrochemical Field
Novosibirsk region	Innovation Cluster of Information and Biopharmaceutical Technologies
Perm Krai	Rocket Engine Technology Territorial Innovation Cluster "Technopolis 'Novy Zvezdny'"

Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6
Production enterprises of the real sector of the economy (petrochemistry)	Executive authorities of the Republic of Tatarstan	Special economic zone of industrial production type (SEZ IPT) "Alabuga", administrative resource	Educational sector in the field of professional training and retraining	Innovative sector of the economy: business incubators, associations of producers, technoparks, technopolises	Consumer sector: small and medium-sized business

Figure 1. Main participants of the territorial production cluster of the Republic of Tatarstan

Table 6. Industry affiliation of the companies participating in the SEZ IPT "Alabuga"

Industry	Company-participant	Legal organizational form	Product group
Chemical industry	"Polymatiz"	CJSC	high-tech products from polymeric and natural materials
	"P-D Tatneft-Alabuga Fiberglass"	LLC	fiberglass and derived products
	"Rokvul - Volga"	LLC	incombustible insulation materials
	"Air Liquide Alabuga"	LLC	technical gases: liquid nitrogen and oxygen, gaseous oxygen
	"Alabuga-Fiber"	LLC	carbon fiber
Automotive industry	"Ford Sollers Elabuga"	LLC	motor vehicles
Food industry	"Belaya Dacha Alabuga"	LLC	salad and vegetable products
	"SARIA Bio-Industries Volga"	LLC	technical fat and feed flour
Pulp and paper industry	"Hyat Kimya"	LLC	sanitary paper products
Construction industry	"Kastamonu Integrated Wood Industry"	LLC	medium density fiber, wood chip and oriented strand boards
Instrument making and equipment	"Interskol"	JSC	professional power tools

Table 7. Key profitability performance indicators of PJSC "Nizhnekamskneftekhim" for the period 2015-2017, %

Indicators	Industry average	2015	2016	2017
Profitability of gross margin	29.3	28.9	33.8	25.9
Profitability of EBITDA	19.5	24.5	17.2	16.3
Profitability of EBIT	15.9	21.6	13.9	16.3
Profitability of EBT	17.1	23.0	14.2	16.6
Effective tax rate	16.1	20.9	24.0	20.4
Profitability of EAT	13.1	18.2	10.8	13.2

(Compiled by the authors based on the data presented on the Thomson Reuters website)

Table 8. Financial relative indicators of the financial activities of PJSC "Nizhnekamskneftekhim" for the period 2015-2017

Liquidity indicators	Industry average	2015	2016	2017
Quick liquidity	1.12	1.76	1.9	3.61
Current liquidity	1.71	2.95	2.93	5.55
Times interest earned	12.3	-	-	247.3
Cash cycle, days	70.3	55.8	72.5	84.9

(Compiled by the authors based on the data presented on the Thomson Reuters website)

Table 9. Relative indicators characterizing the capital structure of PJSC "Nizhnekamskneftekhim" for the period 2015-2017

Capital structure indicators	Industry average	2015	2016	2017
Asset/Equity	1.98	1.21	1.22	1.12
Debt/Equity	0.24	0.03	0.01	0.01
LT Debt to total capital, %	0.1	0.1	0.1	0.1
(Total debt – cash)/ EBITDA	2.43	-	-	-

Table 10. Relative indicators characterizing the operating activities of PJSC "Nizhnekamskneftekhim" for the period 2015-2017

Operating activity indicators	Industry average	2015	2016	2017
A/R Turnover	1.6	6.9	5.2	5.3
Average A/R Days	57.2	26.8	35.0	34.4
Inv. Turnover	1.4	3.6	2.8	2.8
Avg. Inventory Days	64.2	51.7	66.4	66.3
Avg. A/P Days	60.3	22.7	28.9	15.8
Fixed Asset Turnover	0.48	1.31	1.11	1.07
WC/Sales Growth, %	1.0		4.6	9.4
Bed debt allowance, %	3.4	3.7	-	-
ROIC, %	-	16.3	7.7	8.4

Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6
Production enterprises of the real sector of the economy (automotive industry and automotive parts manufacturing)	Executive authorities of the region	-	Educational sector of the Nizhny Novgorod region in the field of professional training and retraining	Innovative sector of the economy: business incubators, associations of producers, technoparks, technopolises	Consumer sector: small and medium-sized business

Figure 2. Main participants of the Nizhny Novgorod industrial innovation cluster

Table 11. Key profitability performance indicators of PJSC "Zavolzhsky Motor Plant" for the period 2015-2017, %

Indicators	Industry average	2015	2016	2017
Profitability of gross margin	33,2	15,1	30,0	28,8
Profitability of EBITDA	15,4	(0,5)	8,6	7,8
Profitability of EBIT	8,4	(5,2)	2,7	19,6
Profitability of EBT	7,8	(5,2)	2,7	19,6
Effective tax rate	30,8	-	95,9	37,4
Profitability of EAT	5,2	0,0	0,1	12,3

Table 12. Financial relative indicators of the financial activities of PJSC "Zavolzhsky Motor Plant" for the period 2015-2017, %

Liquidity indicators	Industry average	2015	2016	2017
Quick liquidity	1,23	5,6	7,09	3,68
Current liquidity	1,58	6,26	7,83	4,44
Times interest earned	15,8	-	-	-
Cash cycle, days	75,6	1,871	1,704	1,934

Table 13. Relative indicators characterizing the capital structure of PJSC "Zavolzhsky Motor Plant" for the period 2015-2017, %

Capital structure indicators	Industry average	2015	2016	2017
Asset/Equity	1,69	1,11	1,08	1,08
Debt/Equity	0,13	0,00	0,00	0,00
LT Debt to total capital, %	7,9	0,00	0,00	0,00
(Total debt – cash)/ EBITDA	0,25	-	-	-

Table 14. Relative indicators characterizing the operating activities of PJSC "Zavolzhsky Motor Plant" for the period 2015-2017, %

Operating activity indicators	Industry average	2015	2016	2017
A/R Turnover	5,2	0,2	0,2	0,2
Average A/R Days	70,3	1708,1	1596,8	1791,9
Inv. Turnover	4,6	1,5	1,4	0,9
Avg. Inventory Days	79,7	238,7	264,9	392,9
Avg. A/P Days	58,8	76,2	157,8	250,4
Fixed Asset Turnover	2,68	1,27	1,18	0,75
WC/Sales Growth, %	2,6	220,7	(45,1)	103,6
Bed debt allowance, %	0,6	0,0	1,3	0,1
ROIC, %	-	0,0	0,0	1,0

Table 15. Key profitability performance indicators of PJSC "Nizhny Novgorod Machine-Building Plant"

Indicators	2015	2016	2017
Profitability of gross margin	13,6	15,2	13,5
Profitability of EBITDA	(12,2)	9,7	6,4
Profitability of EBIT	(12,7)	5,4	0,3
Profitability of EBT	(12,7)	5,4	0,3
Effective tax rate	-	33,0	39,6
Profitability of EAT	(15,5)	3,6	0,2

Table 16. Financial relative indicators of the financial activities of PJSC "Nizhny Novgorod Machine-Building Plant"

Liquidity indicators	2015	2016	2017
Quick liquidity	0,6	0,48	0,62
Current liquidity	0,88	0,84	1,07
Times interest earned	(2,4)	1,8	0,9
Cash cycle, days	(110,5)	(192,0)	26,4

Table 17. Relative indicators characterizing the capital structure of PJSC "Nizhny Novgorod Machine-Building Plant"

Capital structure indicators	2015	2016	2017
Asset/Equity	-	-	-
Debt/Equity	-	-	-
LT Debt to total capital, %			79,2
(Total debt – cash)/ EBITDA		1,8	8,94

Table 18. Relative indicators characterizing the operating activities of PJSC "Nizhny Novgorod Machine-Building Plant"

Operating activity indicators	2015	2016	2017
A/R Turnover	0,8	0,8	0,9
Average A/R Days	443,3	464,3	421,6
Inv. Turnover	1,3	0,9	0,9
Avg. Inventory Days	279,5	395,3	401,9
Avg. A/P Days	833,3	1051,7	797,1
Fixed Asset Turnover	5,08	4,68	5,48
WC/Sales Growth, %	(44,7)	(44,2)	(27,4)
Bed debt allowance, %	-	-	-
ROIC, %	(50,1)	-	1,7