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CREATIVE AND DIGITAL ENVIRONMENT AS AN ACCELERATOR OF CREATOSPHERE DEVELOPMENT: EXPERIENCE OF THE SAKHA (YAKUTIA) REPUBLIC

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ABSTRACT

The rise of digital economy and digital environment in Russia affects the public processes and socio-economic development of the country. The study rests on the construction of a knowledge model, the method of deduction and analytical methods of cognition of socio-economic processes. The trends and development scenarios are simulated; the technologies of convergent monitoring and programming of the target indicators of regional development strategies and the state and municipal programs are reviewed. The society needs a non-standard approach and creative thinking to respond to the technological challenges of smart society and make the 'digital breakthrough'. The paper proposes a new paradigm of thinking—creatosphere—and formulates its definition, sources and resources. The place and role of the digital infrastructure is specified using the example of the Sakha (Yakutia) Republic, Russia. In the digital and creative economy, the creatosphere is the environment for expressing human potential. A new management paradigm, emerging in the republic, is based on the principles of visualization, synergy, complexity, time vector, creativity and trend modeling. The accelerator of the new management paradigm is digital environment.

INTRODUCTION

The modern world cannot do without information technology (IT) that changes industries, facilitates their development and discovered more innovative potential. The emergence of new digital infrastructure, the development of digital communication technologies, and research in computer engineering, in turn, enable new opportunities in the IT sphere and IT

integration into economic, social and political life, thus forming a new digital system of the world economy.

Today, digital environment manifests itself largely as the integration of economic, political and cultural activities of man where the main aspect of ensuring the quality development of economic and social spheres is the sustainable system of management as the key factor of industrial growth. This study seeks to analyze the interrelation between the digital economy and the formation of new sphere—creatosphere.

METHODS

The study rests upon Russian and international experience of the apprehension and evolution of the digital research infrastructure, which is based on understanding the systemic processes of knowledge management (the paradigm of thinking and relations), and also upon economic concepts of information and knowledge management.

The methods of analysis are comparative analysis, scientific method, content analysis, and deduction and simulation as the methods of obtaining knowledge on socio-economic processes.

The study focuses on the Sakha (Yakutia) Republic, Russia.

RESULTS AND DISCUSSION

The concept of ‘information economy’ was outlined by Marc Porat as his doctoral thesis at Stanford University, in 1976 год. Briefly, information economy is the contemporary stage of human civilization, marked by the leading role of creative labor and information product. The above notion can also mean the economic theory of informational society.

Following these criteria, the USA can be described as a society that has already reached the final stage of transformation to the information economy, while Russia may need another 30 years to get there.

There are three scenarios of development of the information economy and the digital environment in Russia; refer to Table 1.

Table 1 Three baseline scenarios of development of the information economy and the digital environment in Russia (“Three scenarios,” 2016).

Scenario	Description	Potential result for Russia by 2021
East Asian model	Digitalization as a development priority for the government and the business	Digital economy share is 5.6% of GDP
	Introduction of advanced technologies, such as the	Added value for the economy is 5–7 tln Rub per year

Scenario	Description	Potential result for Russia by 2021
	Internet of things, big data, online healthcare	
	Support to small and medium enterprise development	Gap with the leading countries is less than 5 years
	Examples: countries of the Asia-Pacific Region	
Middle Eastern model	Growing digitalization in the public and social sectors	Digital economy share is 3% of GDP
	Growing share of online consumption	Added value for the economy is 0.8–1.2 tln Rub per year
	Examples: the Middle East countries, the UAE, Saudi Arabia	Gap with the leading countries is 8–10 years
Venezuelan model	Stagnating digital economy	Digital economy share is 2.2% of GDP
	Growing gap with the leading countries	Added value for the economy is 0.1–0.2 tln Rub per year
	Examples: Venezuela	Gap with the leading countries is 15–20 years

Today the three above models—East Asian, Middle Eastern and Venezuelan—describe the baseline scenarios of the digital development of a society. Smirnova fairly suggests that “the most successful for Russia is the East Asian model since in this case the share of digital economy in DGP can be forecasted as high as 5.6%” [32, p. 73].

The accelerators of the economy digitalization can be the development of the creative sector, the improvement of digital competency and e-literacy, and the encouragement of creative thinking and perception. Otherwise stated, the country needs a new paradigm of management and thinking, or the paradigm of creatosphere.

Using the methods of knowledge management, the author agrees with Levitsky and Kostenko, who suggested that “the digital environments of knowledge form a sub-class of information systems, created for servicing the needs in domain-specific knowledge or professional knowledge. Their content includes the systems of objects, usually existing in the form of loosely structured electronic resources, that enable users to solve tasks of obtaining knowledge and professional tasks using formal procedures, which simulate gnoseological and ontological processes. The digital environment of knowledge is an open information resource that implements a full and

homogeneous structural-semantic representation of domain-specific knowledge along with the methods of processing such knowledge” [19, p. 440]. It would appear that in today’s context of smart society and smart environment the digital environment is an adaptation complex, which serves to manage the knowledge and form new knowledge, thus solving socio-economic tasks.

Pashkus and Bulina (2016), Mikhailova (2018), Buzgalin (2017), Barkhatov and Dyachenko (2013) identify the key aspects, indicating that the economy has become informational:

- socio-economic indicator (if at least half of the population is involved into the field of information services, it clearly indicates that such a society is informational),
- technical indicator (the period of informatization of the society should be less than sixty years).

The digital economy rests on the usage of digital platforms, development of electronic products and services by the business, and marketing such products through e-commerce. The digital economy is represented by three levels, which influence the life of society and individuals through close interaction:

- technologies and platforms,
- economic sectors and markets,
- Fundamental conditions (environment that creates conditions for formation of the technologies and platforms and productive interaction of market actors and economic sectors, encompassing normative regulation, information security, personnel, information infrastructure).

Abankina (2017), Alikperov (2017), Buzgalin (2017), Mikhailova and Vinokurova (2017) analyze the terms ‘digital’ and ‘creative’ in the informational and postindustrial society.

Lisovskaya believes that “the development of modern economics prompts us to seek ways to formulate the economic theory so that it covers new organizations and structures that would be created as and when the digitalization and globalization of the modern world continues” [20, p. 112].

Evtyanova gives a definition of the digital economy: “The digital economy is represented by automated regulation of economy on the basis of advanced information technology; new economic standard, which rests on efficient information management of production systems and which needs the modern world to be able to pursue successful economic growth. To implement a new paradigm, it is necessary to massively introduce digital management platforms that meet specific criteria and perform certain functions” [11, p. 54].

In our opinion, the digital economy is the field of activity, where the main production factor is information in digital form; and its processing and application in large volumes contributes to the improvement of quality, productivity and efficiency in various industrial sectors, and also in the sectors

of equipment and technologies in the process of consumption, shipment, sale, and storage of products and services.

Laws and economic relations pertain to the digital economy. The relations appear in the production, exchange, redistribution and consumption of scientific and technical data through digital information technologies; and the flow of such processes is subject to the laws of economics.

In Russia, the digital economy is one of the main directions of development until 2025, according to the strategy of formation of the informational society, adopted for 2017–2030. In the next ten years, each sector and field of activity shall be transformed, following the requirements of new digital economic models. As Kulik, Rozhanskaya, Koryakov summarize, “the growth of the digital economy affects not only the external and internal business environment, but also the political and governmental functions. For the benefit of business, the Internet helps any company to market its products around the world, often with insignificant investments; reduce costs; and significantly increase the productivity and effectiveness of operations.” [18, p. 64]

The adopted governmental program “Digital economy of the Russian Federation” is oriented towards ensuring the conditions, where the society of knowledge can be shaped; the quality of life and well-being of the citizens would improve due to refinement and availability of products and services created with the digital technologies in the digital economy; the rates of digital literacy and IT awareness would grow; and the public services, including security at home and abroad, would be available and competent.

Ashkhotov and Osmanova note that “the creative economy is formed on the basis of an industrial backbone, and the expanding effective layer of the postindustrial economic activity develops around it. In connection with this when determining the productivity of different variants of industrial growth, the increasing gross value added cannot a priority aspect. It is the provision of jobs and income of the population in a long reproductive chain that becomes the key criterion of the industrial productivity” [5, p. 90]. In other words, the creative economy pertains to the foundation that ensures the improvement of labor productivity, additional capital and hence the quality of existence for labor resources.

Frolova comes to the conclusion that “creative economy is a rather vague term. In different countries at different times it included different markets. However, they share one common characteristic. These activities are based on the application of human skills and knowledge. The commodities of creative economy are services and products, which are unable to occur without an actively involved developer” [37, p. 168].

For example, in the early 21st century most of the subjects of the Russian Federation have still give traditional industrial sectors the role of key of gross

product providers. Thus, for example, the Sakha (Yakutia) Republic is an important mineral mining and raw material region of Russia, a leader in the extraction of antimony, gold and diamonds. The region produces oil and gas on a large scale both for export and domestic consumption; platinum, natural gas, construction materials, rough semi-precious stones and other minerals are extracted for domestic needs. Yakutia claims the first place in the rating of Russian regions having ultimate mineral reserves. The specific quantity of Yakutia's mineral resources in the raw material potential of Russia reaches 82% for diamonds, 17% for gold, 61% for uranium, 82% for antimony, 6.2% for iron ore, 40% for coal, 28% for tin, and 8% for mercury [14]. There are substantial reserves of tungsten, lead, silver, and rare earth elements. The regional administration holds much significance; a direct relationship between the industrial growth and regional development can be observed. This is the foundation for development of the creative economy. Ashkhotov usefully underlines that "of importance to the modern industry are the segments of process manufacturing and the sectors that are involved into mineral resource development. However, the general increase of the industry's share in the domestic economy is accompanied by a decrease in the percentage of processing plants in the industrial segment of the economy. In the context of creative economy development, this trend requires enhanced interaction between regional and industrial growth" [4, p. 82].

The creatosphere is a special sector of economy, which is based on intellectual work. Its key characteristics are:

- an important role of new technology and discovery in various spheres of human activity,
- a high level of uncertainty,
- a large mass of pre-existing knowledge and an urgent need to generate new knowledge.

The creatosphere has three components:

First, it is the resource of creative labor—each phenomenon of culture, including any result of social, artistic, technical, educational, scientific labor that can be attributed to a new cultural value (given all the difficulties of determining novelty, this is a working formulation of creatology). The creatosphere embodies a world, which qualitatively differs from the matter, traditionally analyzed by economists, since resources of the matter are always limited from the 'technical' perspective.

Second, there occurs the action of creative labor. In the modern world, the actors of creative labor are represented not only by self-employed professionals, managers and the financial 'elite', but also by all the 'grassroots' creative employees, such as librarians, engineers, artists, doctors, teachers, environmental specialists, community workers, etc.

Third, the product of creative labor is as just unlimited from the 'technical' perspective as resource; from this standpoint, the creatosphere makes

‘everybody’s ownership of everything’ possible.

The term ‘creatosphere’ can be defined as a phenomenon that new intellectual values, innovations, humanitarian technologies, which are able to improve and transform the socio-economic reality in a given territory, are created with the help of knowledge.

In our opinion, the sources of the creatosphere in the conditions of social and technological changes are:

- (1) Internal potential of an individual, human ability to generate new knowledge, and professional self-realization.
- (2) The above three components related to creative labor—the resource, the action, and the product.
- (3) new knowledge, creativity, active cognition in the process of action, and ‘ecotecture’ based on belief in the good and creative initiative of the nature.
- (4) Artificial intelligence as the basis for digitalization of the social processes; in the creatosphere, the strength of artificial intelligence manifests itself in the change of natural landscape, the effects of climate change, the systemic transformation of the way of life, and the comprehension of the power of Nature and adaptation to it.
- (5) Divergent and convergent thinking in combination with digital tools of the digital environment allow building probabilistic models of life strategies and attitudes.

Social and technological trends shape new creative behavioral models. The core of these models is the sources of the creatosphere, integrated into the digital environment of the creative society with regard to social transformations.

Stepanov and Savina provided the terminology of creative economy. “The creative economy is a set of specific socio-economic relationships that arise from the issues of consumption, exchange, production, redistribution, based on non-traditional, non-standard, non-copied strategies, concepts, ideas, activities, which form an effective solution of socio-economic issues on the basis of new knowledge, the solutions of a fundamentally different quality” [33, p. 104]. This approach brings the notions of creativity, creative personality, innovation into use. However, it is important to note that the creative economy shapes the creative class as a category of the creatosphere. Pursuant to Stepanov and Savina, it can be concluded that “at the stage of formation of the innovation economy, there is an increasing need to create new methodological, theoretical and practical ways and approaches for activation, productive and rational application of the creative and intellectual potential of man as the main source, the strategic means of productive use of the main human producing strength in the post-industrial society” [33, p. 105].

Indeed, in the creative economy and the all-new informational society, human

potential is the basis of development. Zhuravlev notes that “the key factors in the creative economy development are human potential, investments, innovations, domestic demand; the ensuring criteria are productive, manufacturing, investment, creative, innovative and social management; an additional criterion being the external demand” [13, p. 52].

In addition, the creative economy can be characterized from the standpoint of creative approach, which is based on project thinking, creative imagination (i.e. modeling), and practical orientation.

Let us also agree with Richard Florida who proved that the post-industrial economy pertains to the foundations of the creative class, and posited the idea of a creative capital thesis. This should find application in the digital environment.

Guided by Frolova’s conclusion that “the ‘density’ of the cultural environment, the creative conditions and the atmosphere of tolerance are essential for them” [37, p. 165], it can be assumed that the existence of creative class is conditioned by increased mobility, focus on the realization of creative potential and search for a comfortable and favorable place to living. Abankina gathers that “the modern concept of cultural heritage protection is based on the idea of improving the quality of its application”, and that “the augmentation of creative potential together with the systematic support of the creative industry is a key task of strategic provision of municipalities and regions in the postindustrial period” [1, p. 100].

Having analyzed the level of development of American and Russian creative economies, Kamenskikh comes to conclusion that the financial sources within the creative economies differ. “In Russia, it is the country that invests in creativity, and the public share is only increasing. In America, companies invest into creativity, and their share is also increasing” [16, p. 18]. Consequently, the interaction of companies becomes the institutional model in the creative economy. Another model can be may a public-private partnership. The objective of such a partnership would be to bring investments into the infrastructure and involve private funds. The Federal Law of the Russian Federation No. 224-FZ "On public-private partnership and municipal-private partnership in the Russian Federation and amending certain legislative acts of the Russian Federation" entered into force on 1 January 2016.

Vinokurova and Mikhailova substantiated the concept of the Arctic creatosphere. “The cultural and natural source of the Arctic creatosphere was determined. Using an example of the largest region of the Russian Federation, we examined the sources of wealth development in the Sakha Republic in Yakutia. Currently, Yakutia is one of the major cultural regions in the north-eastern part of Russia. The unique and rich culture of Yakutia rightfully belongs to the national legacy. In this regard, the protection and subsequent development of the cultural and unique spiritual heritage of the indigenous

peoples of the North is a task of paramount importance. The folklife culture of the peoples of the Sakha Republic in Yakutia is marked by traditions that come from the depths of centuries. The people, who have chosen to inhabit the harsh yet beautiful Arctic nature, continue enriching the primordial country of Olonkho with new creations. The foundation of the creativity is human contribution and spatial support. The natural and cult places, the cultural heritage of the Arctic lands are the sources of self-realization, inspiration and creativity in the Arctic creatosphere” [39, p. 583].

Indeed, the creative potential, the creative industry and human resources serve as the foundation of the creatosphere. Alikperov outlined the requirements within the framework of creatosphere: “requirements to the productive forces, requirements to the users, requirements to the creative environment and requirements to the institutional infrastructure” [3, p. 17]. Barkhatov defined the boundaries of the creative class and the creative economy, which include “the core of the technological standard of the information economy, the industrial economy, the innovative and creative economy, and the economy of knowledge [6, p. 25]. This model brings attention to the main component—knowledge. However, any knowledge is inseparable from its carriers in the creative groups. The evolutionary development of a new class—the class of the creatosphere—takes place in the society.

Vasekina affirms that “the main value of the creative economy does not lie in physical (traditional) capital, but is expressed as an intellectual contribution” [8, p. 15]. Continuing Vasekina’s thought, one can observe the digital environment trends in certain regions. Pruss points to “the importance of creating conditions, which meet the requirements and challenges of the digital age, in the regions” [30, p. 113].

Buzgalin notes the formation of the creative class and the creative economy in the creatosphere and highlights “the outcome of ensuring public benefits in the creatosphere in the form of progress in individual human qualities” [7, p. 51]. This sector focuses on the formation of the institutional framework for personal development and on the preparation of the basis for socio-economic progress. Gromyko expresses an opposite opinion that “creative economy entails social segregation” [10, p. 30]. It is worth noting that this position is partly correct, because society is divided into the classes of traditional economic sectors and the classes of creative industries. At the same time, in the digital economy the components of the digital environment invalidate stratification and segregation, due to the fact that these components fully penetrate any social relations. This indicates the involvement of the public in the creatosphere. Kamanina confirms this opinion: “The foundations of innovation-oriented models are the practice of solidarity, information, communication, science, and education” [15, p. 171].

Smaglyukova believes that ‘the development and application of creative resources is the main task of each participant of the economic process. In the

new creative economy, the work of all actors relies primarily on the ability to think critically and to create new knowledge, which in turn is unacceptable without a creative resource, both within individual companies and in the economy as a whole. Financing of higher education helps to train highly qualified employees, whose highly qualified activity influences the dynamics of economic development” [31, p. 59]. It can be assumed that investment in education is the most important one of all the variety of investments in the public innovations. Special and general education improves the quality of knowledge, increases the fund and level of human knowledge and at the same time improves the quality and the volume of an individual's capital.

Abramov analyzed the period of transition from the service economy to the creative economy, based on the increase in gross product. It is concluded that “the formation of modern tools for data processing and communication makes it possible to bring the provision of services to a radically new level. First of all to the level where services can be separated from the providers and given for a long period. The main feature of such services, unlike the services inherent in the era of industrial economy, is the possibility of replicating it” [2, p.78]. Indeed, the results that users acquire in the creative economy are separated from the actors that provide such services, and the service is replicated on in scale, space and time.

Bulina and Pashkus proposed the analysis criterion in the creative economy; that is a brand. The researchers introduced “an integral analysis of brand power within the analysis of the ‘creative industry’, ‘creative cities’ and ‘creative classes’” [24, p. 41-42]. However, the qualitative indicator of the brand analysis can have a subjective nature and fail to reflect objective characteristics.

Petrova reported her assessment of the formation of intellectual capital in the creative industry to the conclusion that “the creative economy provides for new intraregional economic segments, new types of labor activity, thus developing an economic perspective for new public provisioning and growth” [25, p. 59]. Fedorova and Petrova defined “factors of the formation of creative industries in the conditions of the Northern regions” [26, p. 96]. Kornilova and Gromova suggested “the criteria of the creative economy and the connection of creative industries with creative classes” [38, p. 69].

Mikhaylova argues that “in the digital and creative economy, creative and digital technologies are used as a basis for developing a value chain” [21, p. 31], which increases the capitalization of the organization value and affects the increase of domestic gross products. There emerges a sustainable system of the creative and digital economy in Russia, consisting of market segments in which the added value is developed through intellectual cognitions and digital (information) technologies.

In the Sakha (Yakutia) Republic, priority is given to creating the conditions

for the development of digital environment.

The head of the republic Egor Borisov notes: “Everyone should catch the wave of the ‘digital revolution’. Digital transformations have already occurred in the sphere of financial services, in passenger transportation, in trade. The next in line are health care, education, the creation of ‘smart cities’ and industries, where the main factors for further growth will be the use of digital platforms, cloud computing and robotics. I instruct the government to develop a digitization program for the economy of the republic and to determine the relevant indicators in government programs in the first quarter of next year” [28].

The digital economy in the Sakha (Yakutia) Republic rests upon the development of digital infrastructure, the formation of digital society, the digital transformation of the main industries, and digital public services [23]. We analyzed the legal and regulatory mechanisms in Sakha (Yakutia) Republic, which affect the development of the digital economy, the digital environment. They are based on the principle of synergy and determine the basis for the creatosphere in the republic:

The strategy of the region

The Strategy of socio-economic development of the Sakha (Yakutia) Republic until 2030 with a target vision until 2050 was adopted in 2016 [34]. This document emphasizes the development of human capital and conditions for the creation of supporting clusters for the creative industries. The strategy priorities that should be highlighted are priority (1) “Human Capital Development” and priority (2) “Spatial organization of settlement and productive forces, ensuring cluster activation based on the full complex of industries, innovations and infrastructure.” Each priority has a set of goals and indicators developed.

The following target indicators determine the creatosphere potential in the region:

- (1) the index of intellectual potential of the society is expected to grow 4.4 times by 2030 as compared to 2016, i.e. from 0.3 in 2016 to 0.8 in 2030;
- (2) the share of educational institutions, which provide the training required by new economy such as IT, creative economy, high-tech industries, should reach 50% by 2030, while in 2016 Yakutia had none;
- (3) labor efficiency is expected to grow by 1.5 times by 2030 due to the effective use of the digital environment potential, i.e. from 101.6% in 2016 to 153.4% in 2030.

The achievement of target indicators largely depends on the cluster approach and the cluster specialization. The implementation of the road map actions should create a favorable environment for supporting the creative class of actors, raising the creativity index and forming the creatosphere.

The state program

The state program Economic Development and Innovative Economy of the Sakha (Yakutia) Republic for 2018-2022 was adopted in 2017 [9]. The key goal of the state program is “a new quality of governance, i.e. a balanced management system aimed at achieving strategic goals of social and economic development for the Sakha (Yakutia) Republic.” In other words, it stipulates the creation of conditions for cluster interaction and achievement of the target indicators, set forth in the local strategy.

Table 2 Target indicators Economic Development and Innovative Economy of the Sakha (Yakutia) Republic for 2018-2022 [9].

Target indicator	2018	2019	2020	2021	2022
Increase in the share of high-tech and knowledge-intensive industries in Gross Regional Product (%)	14.1	14.5	15.5	16.0	17.0
Increase of labor efficiency (%)	102.9	103,5	102.8	102.1	101.3
Maintenance of the percentage of students trained in each major discipline, provided that the quality of training content for each training program is improved (yes, maintained if 80-100%; no, failed to maintain if < 80%)	yes (80%)	yes (85%)	yes (90%)	yes (95%)	yes (100%)

The expected results of development of the digital environment in the Sakha (Yakutia) Republic are the following:

- growth of labor efficiency by 16.7% by 2022 as compared to 2016;
- the level of satisfaction with the quality of state and municipal services in multifunctional centers (up to 90%);
- maintenance of the percentage of students trained in each major discipline, provided that the quality of training content for each training program is improved, 100% educational by 2022;
- increase in the share of high-tech and knowledge-intensive industries in Gross Regional Product to 17% by 2022;
- increase in the total number of international projects and activities recognized as effective to 49 by 2022;
- Implementation of a pilot project aimed at the transfer of information

systems and information resources of the executive bodies of state authority to a single cloud platform in 2022.

It appears important to create normative, methodological, organizational and administrative mechanisms for creating clusters for the effective management model construction, resting on the digital infrastructure.

The municipal program

The city of Yakutsk is the capital of the Sakha (Yakutia) Republic. The municipal program Development of the informational society and formation of the digital economy in the urban district 'city of Yakutsk' for 2018-2022 offers the following main strategic objective: "improvement of the quality of life and work for the citizens, development of economic potential through the use of information and telecommunication technologies" [22]. The municipal program is based on the Strategy of socio-economic development of the urban district 'city of Yakutsk' until 2032 [35].

The municipal program for Yakutsk defines the legal framework, sets the parameters and directions for partnership interaction, and also identifies the target indicators:

- availability of the Internet to the population is expected to increase to 99.4 percent by 2020, while maintaining the level reached and increasing the quality of communication in the future;
- the percentage of municipal services provided in electronic format is expected to reach 100%;
- availability of the basic services in the field of information and telecommunication technologies for the population is expected to reach 100%;
- the percentage of socially significant facilities and organizations throughout the city, which have access to the high-speed telecommunications and the Internet connection, is expected to reach 100% by 2020.

To achieve these targets and to form the creatosphere, it is necessary to develop competences and transform the municipal education system in Yakutsk. At the very end, the priorities of the municipal education directly affect the conglomeration of creative and capable young professionals in the city and, therefore, the local IT companies with the appropriate infrastructure.

This shapes the factors for the formation of a competitive Internet environment, an IT microcluster for the development of software, graphics, portal projects, and interactive entertainment. The implementation of such projects is able to found the creatosphere in the city. In our opinion, the emphasis on IT should become one of the priority areas for diversification and innovative development of the city's economy. In 2017, Yakutsk launched such projects as the 7 Projects of the Future, aimed at developing the human resource potential of the municipal education system; the Junior Skills Competence Center, aimed at training competitive teammates the regional

teams and Russian national team that participate in academic competitions; and the Professional Identity of Yakutsk school leavers in the conditions of smart society and digital environment.

Results of monitoring the education system

We analyzed the results of education system monitoring in Yakutsk, initiated by the order of Russian Ministry of Education and Science in early 2014 [27]. The monitoring is aimed at forming the foundations the creatosphere in the region, since the conditions for the realization of creative potential are the availability of working conditions and the psycho-physiological and competence potential.

Table 3 Indicators of the education system monitoring in Yakutsk in 2014-2017 [27]

	Unit	2014-2015	2015-2016	2016-2017
Ratio of the average monthly salary of teaching employees of state and municipal general education organizations to the average monthly salary in the region:				
teaching employees,	per cent	126	118	117
Including teachers.	per cent	132	120	122
Human resourcing of general education organizations and other organizations engaged in educational activities in terms of implementing basic general education programs, as well as assessment of the salary level of teaching employees:				
Number of students in general education organizations per one teacher	people	13.2	13.7	13.9
Percentage of teachers under the age of 35 in the total number of teachers of general education organizations	per cent	31.1	31.7	31.4
Number of personal computers used for educational purposes, per 100 students of general education organizations:				
total	pcs.	4.0	4.0	4.0
connected to the Internet	pcs.	4.0	4.0	4.0
Examination results of the students trained according the programs of primary general education, basic general education and secondary general education:				
Ratio of the average score in the Unified State Examination (USE) (per one discipline) in 10% of general education organizations with	ratio	1.4 / 2.1	1.43 / 2.3	1.5 / 3

the best USE results to the average USE score (per one discipline) in 10% of general education organizations with the worst USE results				
Average value of the USE score, obtained by the graduates who mastered the secondary general education programs:				
in math	score	42.3	46.1	47.6
in Russian language	score	66.8	67.6	68.4
Average score for the state final certification (SFC) , obtained by the graduates who have mastered the secondary general education programs:				
in math	score	12.8 (3.6)	13.6 (3.4)	13.7 (3.4)
in Russian language	score	29.6 (4.1)	29.5 (4.1)	29.1 (4.0)
Percentage of graduates, who mastered the secondary general education programs and received the USE score below the minimum requirement, in the total number of graduates who mastered the secondary general education programs and took the USE test:				
in math	per cent	1.09	1.2	0.38
in Russian language	per cent	0.3	0	0
Percentage of graduates, who mastered the secondary basic education programs and received the SFC score below the minimum requirement, in the total number of graduates who mastered the basic general education programs and took the SFC test:				
in math	per cent	0.5	0.7	1.4
in Russian language	per cent	0.6	0.2	0.4
Opinion of the citizens on the educational system				
Index of satisfaction with the quality of education provided by educational organizations	per cent	96	96.49	96.6

To summarize this section, it can be highlighted that:

- (1) During the period of 2014-2017, conditions were created for the realization of the creative potential of teaching employees through the management of salaries. The salaries of teaching employees in the education system are higher than the average salary in the region;
- (2) The share of teaching employees under the age of 35 remains at 30-32%, which argues for the continuity in the educational system and the transfer of experience and pedagogical skills;
- (3) The active use of digital environment tools helped to improve the overall results of state exams USE and SFC;
- (4) Access to personal computers for educational purposes still needs to be proved, but this issue is addressed and partly solved by using private computers.

(5) The satisfaction with the quality of education is growing.

In the Sakha (Yakutia) Republic, the competence centers of the digital economy have been defined: the competence center for infrastructure, the competence center for professional training; the competence center for digital technologies in the sphere of housing services and utilities, the competence center for IT-solutions, and the competence center for electronic services. All the competence centers serve as the foundation of the creatosphere in the region.

Therefore, the analysis of monitoring data make it possible to conclude that the implementation of the cluster principle forms favorable conditions for the successful creation of a new phenomenon—creatosphere—in the city of Yakutsk, relying on technologies and tools of the digital environment. The study demonstrated that organizational, methodological and legal foundations in municipal administration are being created with the view to build the IT infrastructure and digital facilities for the implementation of the digital economy development program in Yakutsk. The level of competences and service capabilities of the digital environment determines the basis of cluster interaction.

CONCLUSION

Taken together, these findings suggest the relationship between the digital economy and the creativity:

- (1) The digital economy regulates and forms the basis of the relationship in the digital environment and the creative economy.
- (2) The development of professional and educational competences for the digital economy is crucial for the development of the creatosphere.
- (3) The digital and communication platforms are tools for processing, storage and exchange of data and also for cooperation and research.
- (4) The actors of the creative economy identify and express themselves in the digital environment.
- (5) Modern smart logistics technologies in the digital environment can enable the self-expression of the actors in the creatosphere.
- (6) The creative economy in the digital environment becomes the driver (accelerator) of development and the basis for the emergence of the new creative class.

The creative and digital economies are closely interrelated; they are not only the vectors of technological and socio-economic development of the regions in Russia, but also the foundations of the creatosphere. The digital environment is the accelerator of development and formation of the creatosphere. In the digital and creative economy, the creatosphere becomes the environment where the creative potential of man can be deployed. Today, a new management paradigm of the creatosphere emerges, based on the principles of visualization, synergy, complexity, time vector, creativity and trend modeling. By applying these principles, the administrative actors define the competence

centers of the digital space in the region. The competence centers set the vector of local development and growth of real economy.

Future work will concentrate on approbation of methods for studying the new paradigm of management thinking in the creatosphere.

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