

Optimization of Innovation Activity – Implementation Method of the Digital Economy

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Abstract— The article reveals innovative activity as a way to shape the most important digital economy in Russia, as an incentive to ensure the shift towards the sixth technological mode, and to advance the improvement of human capital development process. Innovative activity is interpreted as purposeful, dynamically realizable, achievement-oriented and breakthrough scientific and technological activity of entities aimed at promoting and turning into reality the of ideas of creation of product, technological and organizational and managerial innovations; as a specific coefficient of strengthening the resource capacity, as a special method for specifying instruments for ensuring economic security. Analyzing the forms in which the of innovation activity is carried out, the authors consider it as a specificity of the firm in the context of the digital economy formation; they also highlight its specific features and content elements, provide the calculations of indicators for the innovation activity level of enterprises reflecting the degree of their participation in the innovation activity. The innovation activity of a firm is defined as a complex characteristics of its research and development activity, as a structural element of the innovation mechanism, realized as a temporary, technological, methodological, mobilization factor, as a special way of generating new effects associated with the transformation of economic relations.

Keywords— *innovation activity, competitive advantage, competitive environment, digital economy, technological paradigm.*

1. INTRODUCTION

The need to optimize innovation activity is largely determined by the solution to the problems of bringing the economy to a new technological stage of enhancing the potential capabilities of the economic system - the stage of shaping a digital economy that ensures the implementation of the country's national interests in the development of its social and economic system. This is reflected in creating and introducing technological and managerial innovations. In providing the interdependence and consistency of the processes of transition to a new technological mode and the emergence of fundamentally new properties that mark the promotion of the role of digital production, management, organization and optimization of economic decisions, the most essential is the behavior of innovation entities and their innovative activity. A new emerging type of economic

management - digital economy - is characterized by the prevalence of certain empirical data and methods of its governance as a key resource in production, distribution, exchange and consumption. In this context, it becomes important for the economic agent not so much to possess a resource, but to get access to specific information about this resource and use it for the purpose of planning and effectively implementing agent's activities.

The study of innovative activity as one of the ways to shape digital economy is based on recognizing digital technologies as an essential capacity of accelerating innovation processes. This involves identifying opportunities to stimulate the transition of the reproductive process onto a new technological base capable to give the economy innovative and competitive advantages, identifying ways and methods of integrating domestic companies into new production chains and markets, into the world economic and technological space, which makes a greater value-added.

2. LITERATURE AND DISCUSSIONS REVIEW

In the world economic literature, the discussion on innovation and innovation activity have their long history. For the first time the concept of "innovation" is used in the works by G. Tarde (2011), J. Schumpeter (2008) and P. Drucker (2007), where it is considered as a factor in the society development. The formation and development of innovative systems in different countries are detailed in the works by C. Freeman (1987), R. Nelson (1993), B. Lundvall (1992, 2007, 2011), R. Chesbrough (2003), N.I. Ivanova (2001, 2005), A.A. Oreshenkov (2005).

D.V. Gayazova (2014) in her study defined that "innovation activity is the interaction of the system elements between themselves and the external environment." V.I. Gunin (2000) considers innovation activity as a competitive advantage of an enterprise. R.A. Fatkhutdinov (2014) describes the firm's innovative activity as a feature, "which should demonstrate the link between the targeted content of the activity and its results. This link is due to the company's behavior in the implementation of planned activities." Ansoff compares the innovative activity of the firm with its market

aggressiveness, and considers the level of firm's aggressive strategy as the level of its activity (2005).

A number of researchers, for example, Surin A.V. and Molchanova O.P.(2009) believe that the incomplete formation of the national innovation system is the reason for "low innovation activity of a significant part of enterprises in the real economy." According to N. Beketov (2009) the innovation activity of enterprises has little to do with active R&D. The researchers suggest searching for incentives not only and not so much among market regulators, the use of which clearly became insufficient for a company to develop its successful strategy. Instead of focusing on a customer-consumer, American scholars proposed the "Customer Focused" concept, according to which firms should concentrate their attention on the clients' resources, and their potential capabilities. This concept has found support among Russian researchers who consider it expedient to direct the attention of innovative products manufacturers to potential, resource-rich clients "to studying their individual key competencies that can change into competitive advantages ... focusing is an active choice of their well-understood concrete effective or would-be customer, on which the attention and efforts of the company concentrates", which for the manufacturer excludes the risk of getting dependent on the client, reduces the risk of "surprises" in the new technology market, initiates the innovation activity of these technologies users.

However, in our country the innovation activity of enterprises does not so far contribute to the economic growth. In Russia, in the course of market reforms, the organizational structure of the economy was destroyed. V. Daskovsky and V. Kiselev (2016) believe that "the transformation of the currently fragmented and separated private-capitalist production into powerful inter-industry associations, which, as practice shows, without any watchwords and calls for action based on creative principles inherent in them can pull out the stalled Russian economy onto the path of effective development ". The same was written by O. Sukharev (2016) "only developing high-tech complexes, due to development requirements, will initiate an innovative process - with the preliminary removal of systemic restrictions for the sake of creating appropriate opportunities and conditions."

3. METHODOLOGICAL FRAMEWORKS OF RESEARCH

Innovation activity (IA) – is one is the main categories in the innovation theory. The content, place and role of this category in economic science have become the methodological basis of the research and serve as a tool of forming and implementing the digital economy. Innovation activity is interpreted as a purposeful, dynamically implemented, competitively advancing scientific and technological activity of entities aimed at putting forward ideas of innovative product, their manufacturing and implementing prototypes in the serial production, and then promoting product, technological, organizational and managerial innovations to the market. The category of

"innovation activity", as such, takes its place in the structure of macro- and micro-economic categories, in the theory of management and theoretical rationale for business practice.

The methodological foundation of the research was the dialectical method. Relying on the components of this method, the research of innovation activity was built in the framework of systematic approach, which made it possible to identify the main trends in the development of the digital economy, and to establish the causes and conditions of the new structure formation.

Table 1 - Interpretation of the category "innovation activity"

<i>Theories</i>	<i>The interpretation of the content and conditionality of "innovation activity" category</i>
Macroeconomic theory	IA is defined by economic and scientific-and-technological capability of the country, spiritual state of the society, its ability to formulate both national innovation doctrine and scientific-and-technological progress strategy, identify the spheres and forms of innovation policy, concentrate its resources on its implementation.
Microeconomic theory	IA is based on the choice of a strategy for managing innovation activities, the flexibility of manufacturing systems, mobility in the use of resources, the ability to form tools to ensure economic security.
Theory of management	IA in the framework of strategic approach is characterized by a number of particular indicators, among we can name: the quality of the organization's innovation strategy; the level of mobilization or use of innovation capacity; the amount of capital attracted - investments; the quality of methods used in carrying out innovative changes; relevance of the regulated level of innovation activity
Theory of enterprise	IA is characterized by two specific indicators: The relevance of the firm's response to the type of competitive strategic situation; the rate (pace) of actions and strategic innovation changes.

Source: compiled by the authors

4. RESEARCH FINDINGS

The economic strategy, being formed under the influence of the strengthened innovation activity, both at the national and at the of individual enterprises level, gathers a corresponding pace of implementation, gets focused on the eventual outcome and the stability of the secure advancement of the economy to a new technological mode. IA level affects the quality and rate of capacities mobilization. By dint of modern methods of public governance and regulation (for example, running in parallel project design operations, focusing clients, or putting into execution inexpensive but technologically sound and profitable projects), it is possible to mobilize hidden reserves and obtain additional internal competitive advantages over the key competitor. As a matter of fact, IA transforms potential opportunities into a real competitive force (the opportunity to raise its new products prices). The ultimate success depends on the quality of this transformation. In this case, IA acts as a certain coefficient increasing / decreasing the initial (planned) innovation

capacities. Therefore, IA can be conditionally considered a "coefficient of capacity-building". As such, it takes some specific forms (fig.1).

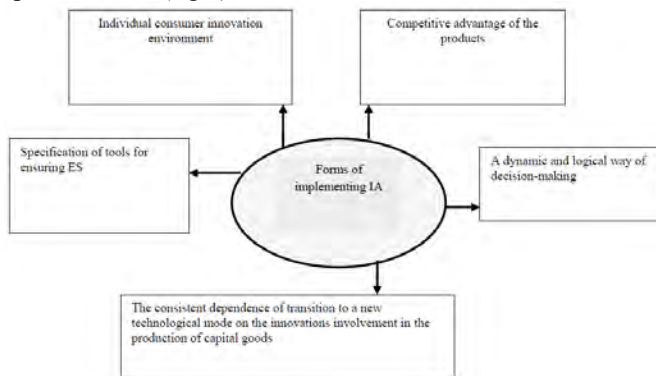


Fig. 1 - Forms of carrying out innovation activities Source: compiled by the authors

Realized in these or some other forms, the IA fulfills its mission, namely, it imparts to innovations rationality, timeliness of decision-making, definiteness in the pace of the necessary actions, the dynamism required in a particular situation, sufficient logic and the sequence of the changes that are made. Innovation activity of economic entities appears as a very productive way of forming fundamentally new technical, technological and managerial processes that are the symbols of basic signs of a new type of society caused by informatization. The use of computer technology, telecommunication devices, and microchips in production becomes an important factor in the development of capital goods and ensure the transition to a new technological paradigm. The factors such as availability of raw materials, financial resources or favorable terms for business partners become more effective in the emerging single digital space. It is the digital capacity of a company that determines the level of its profitability, transaction costs, managerial efficiency and market prospects. The use of digital technologies that have a significant potential for accelerating innovation processes makes innovation activity a driver of increasing the pace of development in the national economy as a whole and improving the competitiveness of individual industries and enterprises. In this context, we can trace the interdependence between the appearance of new, more productive capital goods and new ways of their use. Innovation activity of business entities gives this dependence a recurring character and the status of a stable trend, changes the behavior of both the entities themselves, and the requirements for their qualitative characteristics, makes it urgent to advance the process of improving the human capital in the digital sector.

The innovation activity in the sphere of management is of a particular importance, becoming a certain instrument for implementing the innovation policy in the economy and the enterprise. Optimized in the course of its implementation, IA creates new incentives for organizing and stimulating economic growth, developing scientific and technological progress, improving human capital, raising the level and quality of people's life. At the same time, innovation activity

actualizes the process of ensuring economic security. Active and purposeful promotion of innovations in the real economy provides the high rates of productive forces transformation, makes the economy less vulnerable and more protected.

In its turn, the strength and degree of an individual economic entities' innovation activity are mediated by their real competitive advantages, realized in the form of accumulated potential scientific and technological opportunities, determined by the status of the firm, and affect the activities results. In this case, the innovation activity of the firm should be recognized as its specific feature in the digital economy development, which should manifest itself in all main areas of its activity: in attracting investments; in developing strategy; in searching for resources and mobilizing them; in shaping productive activity independent of external influence factors. Innovation activity as a special attribute of the enterprise is reflected in the emerging specific features of its activities:

first, the innovation activity of the company acquires a strategic character. This implies that, in the changing external environment it takes focused targeting character, improved qualitative characteristics, and real-time manageability;

second, the innovation activity of the enterprise becomes more rational in the current time both in terms of the sequence of actions and timeliness. This ensures the dynamism required for the business processes, sufficient pace of necessary operations and changes in order to use more effectively the time and resources reserves.

Innovation activity of an enterprise as its specific feature in the context of transition to digital technologies, comprises the following elements:

- regularly conducted innovation activity at a particular level, relevant to external environment and the state of this enterprise;
- A new type of resource - data has become a present-day factor for successful innovation activity;
- innovation strategy of a firm's competition, which has advantages in respect to a number of indicators: a) the updatability of products; b) the updatability of technology and manufacturing equipment; c) the updatability of personnel knowledge; d) the updatability of organizational structures;
- human capital with its sufficient level of mobilization is capable to demonstrate the highest competence in the development and implementation of plans on attracting investments of required volume and sources;
- methods, culture, and guidance used in carrying out innovative changes aimed at obtaining real competitive advantages.

One of the important forms of implementing company's innovation activity is the competitive advantage of its products with their distinctive characteristics that create "value for the customers" due to: either reducing its costs, increasing its efficiency, or fitting the fashion of the day and prospects in the proposal. One should not ignore the fact that this form of the firm's innovation activity is based on its advantage in establishing an appropriate management of various processes:

reducing production and consumption costs; improving the quality of service for consumers.

Achieving an appropriate level of IA requires the internal and external competitive advantage of the enterprise. Being a special component of the good production and management policy, the IA of the enterprise ensures the possibility of implementing its own innovation policy, and therefore, achieving economic security. So, if the product of the firm is delivered to consumers before the product of its competitor, then it gives the first firm a market independence, market power - i.e. the possibility of pricing to its advantage.

Relying on their own capabilities, enterprises can actively carry out their IA, market their innovations in the most effective way and create a consumer innovative environment, i.e. prepare consumers who are focused on the novelties of a particular enterprise. Thus, the enterprise creates opportunities to succeed due to a good knowledge of the customer's needs and preferences, and the right combination of resources. Only properly detected demand makes production expedient. Some groups of customers are ready to incur increased expenses. In fact, the informed choice of customers is an IA driver and particular method of specifying instruments to ensure economic security. At the same time, the competitive advantages created and enhanced through the increased rate of innovation activity are transformed into a firm's competitiveness in the innovation market and can contribute to the achievement of the innovation goal and reduce innovation risks, influence all stages of the innovation life cycle, affect the firm's functions, determine all stages of taking and implementing strategic decisions.

Innovation activity is conditioned by the stages of innovation cycles. It is known that innovation rise (innovation wave) reaches its peak in the phase of economic recovery. But during the crisis and the depression, innovation activity falls sharply, the level of economic security of both the individual organization and the economy as a whole decreases. A large innovative wave (innovation rise) takes place when a new technological structure is created, especially in moving to a new technological paradigm of production, which is the material and technical base of the next generation.

Innovation cycles are naturally linked with scientific and economic cycles. In the phases of economic growth and stabilization, priority is given to improving innovations associated with insignificant capital investments and with due regard to little risks. This period witnesses a reduction in state support for innovation; the problems with the implementation of innovation policies arise.

Russian statistics shows that the development of scientific and innovative activities at the turn of the millennium was characterized by negative trends: a deterioration in the scientific human capital and degradation of the scientific infrastructure. At present, Russian share in the world high-tech market is, according to some estimates, about 0.3%, and in terms of the absolute volume of high-tech products it falls behind not only the developed countries of the world, but also, for example, Hungary and China. So, its revenue from exporting licenses is 6 times less than in Italy and 418 times

less than in the US. In 2017 Russia was not among the top ten countries in the world innovation index¹ (Table 2)

Table 2 - Countries Ranking in the Global Innovation Index, 2017

Ranking	Country	Index
1	Switzerland	67.69
2	Sweden	63.82
3	Netherlands	63.36
4	The United States of America	61.40
5	Great Britain:	60.89
6	Denmark	58.70
7	Singapore	58.69
8	Finland	58.49
9	Germany	58.39
10	Ireland	58.13
11	South Korea	57.70
14	Japan	54.72
15	France	54.18
22	China	52.54
29	Italy	46.96
38	Poland	41.99
39	Hungary	41.74
43	Turkey	38.90
44	Greece	38.85
45	Russia	38.76
127	Yemen	15.64

¹ The Global Innovation Index is a global study and the accompanying rating of the countries in the world in terms of the innovation development level. Calculated by the method of the International Business School INSEAD, France. The research has been conducted since 2007 within the framework of the joint project of the International Business School INSEAD, Cornell University and the World Intellectual Property Organization (WIPO), and currently is the most comprehensive set of innovation development indicators in various countries of the world. The global innovation index is made up of 82 different variables that characterize in detail the innovative development of the countries in the world that are at different levels of economic development. The authors of the study believe that the success of the economy is linked both with the availability of innovation capacities and the conditions for its implementation. Therefore, the Index is calculated as a weighted sum of estimates of two groups of indicators:

1. Available resources and conditions for innovation implementation (Innovation Input): institutes; human capital and research; infrastructure; development of the domestic market; business development.
2. The achieved practical results of innovation (Innovation Output): The development of technology and knowledge economy; results of creativity.

Thus, the final index is a cost-effects ratio, which allows an objective assessment of the efforts effectiveness in developing innovations in a particular country.

Source: Global Innovation Index. Humanitarian Encyclopedia [Electronic resource] // Center for Humanitarian Technologies, 2006-2018 (last revised: 5/12/2018 URL: <http://gtmarket.ru/ratings/global-innovation-index/info> (Date of address 20.05.2018)

In Russia, about a third of all enterprises are loss-making, which reduces the opportunities not only for innovation, but also the competitiveness of its economy. For example, in 2017, the Russian Federation ranked only 38th in the Global Competitiveness Index, comprising 137 economies of the world, which also takes into account such indicators as the level of technological development, competitiveness of companies, innovation capacities (Table 3)

Table 3 - Global Competitiveness Index

Ranking	Country	Index
1	Switzerland	5.9
2	USA	5.9
3	Singapore	5.7
4	Netherlands	5.7
5	Germany	5.7
6	Hong Kong	5.5
7	Sweden	5.5
8	Great Britain	5.5
9	Japan	5.5
10	Finland	5.5
22	France	5.2
26	South Korea	5.1
27	China	5.0
34	Spain	4.7
35	Azerbaijan	4.7
38	Russia	4.6
137	Yemen	2.9

Source: Global Competitiveness Index. Humanitarian Encyclopedia [Electronic resource] // Center for Humanitarian Technologies, 2006-2018 (last revised: 5/12/2018 URL: <http://gtmarket.ru/ratings/global-competitiveness-index/info> (Date of address 20.05.2018)

Russia started shifting from knowledge-based types of activities. And even now, after taking decisive measures, the number of innovation-active enterprises remains small, and the number of small innovative enterprises is constantly decreasing (in the "research and scientific services" sector the reduction was up to 23% and more).

The classification of enterprises as innovation-active is based on a wide range of features, including: the introduction of new or improved products, services and methods of their manufacturing, acquisition of patent and non-patent licenses; pilot production and testing; personnel education and training; acquisition of fixed-capital assets (machinery, equipment, plants and installations) and capital expenditures associated with the introduction of innovations. It serves the basis for

calculating the indicators of the enterprises' innovative activity describing the degree of their involvement in the innovation activity (tab. 4).

Table 4 - Innovation activity indicators for enterprises of manufacturing and service industry (%)

Year	The rate of the enterprise's innovation activity			
	The share of institutions that carried out innovation activities in the total number of institutions surveyed	The share of institutions that carried out technological innovation in the total number of institutions surveyed	The share of institutions that carried out marketing innovations in the total number of institutions surveyed	The share of institutions that carried out organizational innovations in the total number of institutions surveyed
2005	9.7	9.7	-	-
2009	9.3	7.7	2.1	3.2
2010	9.5	7.9	2.2	3.2
2011	10.4	8.9	2.3	3.3
2012	10.3	9.1	1.9	3.0
2013	10.1	8.9	1.9	2.9
2014	9.9	8.8	1.7	2.8
2015	9.3	8.3	1.8	2.7

Source: Innovation activity of the Russian Federation. Inf.-stat. mat. – M.: SRI FRCEC, 2016 [Electronic resource], access mode: http://www.csr.ru/archive/stat_2016_inno/innovation_2016.pdf

The practice demonstrates that the increase in innovation activity of enterprises will ensure the growth of gross profit of the economy, resulting in the higher gross capital formation. In this case, the domestic demand remains the basis for the production development, while a new industrialization, which ensures the increase in labor capacity, reduced costs and increased productive capital, is the source of efficiency growth. For that end an indisputable and generally accepted position should be: it is more profitable to manufacture products and make profit on the basis of commissioning and use of new capacities. However, this should be accompanied by: a) an increase in the savings rate due to a increased taxation for highly profitable enterprises; b) the greater role of depreciation as a source of investment funds.

In Russia, a number of barriers have been formed that significantly inhibit the innovation activity of economic entities:

- the lack of strategic motivation for most actors of the domestic economy;
- the emergence of significant resource constraints for the economy;
- the reduction of creative component in human activities, caused by a change in values;
- flat income tax scale (13%);
- the use of depreciation benefits.

Overcoming existing barriers will require the economic authorities to take urgent measures to change the economic and financial climate in the country. First of all, there is a

topical issue connected with the change in the organizational structure of the economy. Proposed by S.S. Gubanov [4], and widely supported by many experts, the idea of vertical integration and the law of the same name, substantiated by him, contain the main conclusion according to which powerful interindustry associations - vertically integrated corporations - should become the potential for accelerated development of the Russian economy. We believe that such corporations will not only provide for the rehabilitation of unprofitable and enterprises on the verge of bankruptcy, but also initiate the process of innovative production with a full technological cycle of final products manufacturing, with a qualitatively new management system and self-sufficient national structures. The combined resources will enable them to activate innovation activities and successfully enter the innovative products markets. The faster transition of the Russian economy to a new type of management can be achieved through the large companies of the digital sector that provide services in the field of digital technologies, the use of digital means of production, storage, data management, increasing the competitiveness of the electronic industry and IT technologies. These companies become pivotal in the economic growth providing the economy with digital resources.

The function of innovative incentives is particularly significant for maintaining the IA rate in the transition to a digital economy, as this function is important for the whole life cycle of innovation. The primary task of this function is to stimulate the transition of the reproduction process onto a new technological platform capable of ensuring a shift to a new type of economy and its competitive advantages. In this case, innovation activity can consist in using the modern theory of relative advantages competition. According to this theory "customer is key to everything" in the market. However, in the context of intense competition, focus only on the market has not been enough to develop a successful company's innovation strategy. The fact is that the market has increasingly become a buyer's market. And market orientation has become an element of market culture for all competitors, which, however, does not give competitive advantages to a particular firm and does not generate new effects of transformation of economic relations.

Therefore, now there are recommendations about the need to focus on the individual resource capabilities of the individual manufacturer and on the individual key competencies of a particular effective or would-be consumer, on which the focus and efforts of the firm should be concentrated. At the same time, in order for such orientation to become an effective tool for intensifying IA, it is necessary to take appropriate measures (Table 5):

Innovation activity, being a way of implementing innovation policy of economic entities - clients of the market, affects the state of innovation environment, innovation climate in the country. It defines the strategy of innovative development, the state of innovation capacity, determines the structure and content of the innovative mechanism - the mechanism of forming the innovation-oriented economy.

Table 5 - Measures to initiate customers' innovation activity

	<i>Not advisable</i>	<i>Advisable</i>	<i>In prospect</i>
1.	to ignore the necessity of the firm's timely response and innovation proposals, the duration of the ILC and the stages of the cycle, the timing of the demand meeting;	to adhere to the strategy of using its strengths, backed by resources not only to achieve competitive advantages, but also to prevent risks and ensure their own economic security	to take into account individual consumers needs and individual offers made by manufacturers and their services, based on the availability of specific resources, competencies and advantages
2.	to become dependent on the customer-consumer	to increase the ability to mobilize the required resources, to seek and attract hidden capabilities	to keep constant monitoring of actual and potential demand
3.		to get concerned about lower risk of "surprises" in the new technologies market	to conduct a comparative analysis of the competencies of their own enterprise and competitors, to assess in advance the technological designs of competitors
4.	to overlook the results of the innovator-company activity	to identify future customer needs and translate them into competitive products	to activate secondary IA

Source: compiled by the authors

CONCLUSION

Optimization of the IA as the way to implement the digital economy presupposes the promotion of the participants' activity in the innovation process. To do this, it is necessary: to ensure a high level of their organization and coordination of work, broad opportunities to attract science and technology achievements to the reproduction, to organize the transfer of new innovative products, to increase the number of employees of telecommunications companies and analysts whose main task is data processing. Ultimately, in order to support the participants in building the digital economy, we need a well-thought-out innovation policy and a clear mechanism for its implementation through the formation of innovative needs and demand, on the one hand, and innovative proposals, on the other. This is accomplished through stimulating the supply of innovations, increasing the demand for the results of innovation, through influencing the conditions that stimulate innovations meeting the needs and values of the society. The growth of economic value in creating, transferring, processing, storing a huge array of data actualizes the problem of their processing. Increasing the data flow, improving the quality of data itself, expanding and qualitatively transforming the data

communication network, modern methods for their analysis and making management decisions based on them are accompanied with a profound transformation of the ways of social interaction, economic relations, institutions, become the most significant in the formation of the digital economy. Access to massive databases through modern devices and the ability to obtain data directly from economic agents allow the creation of digital models of technical and technological processes, which leads to optimization of the use of all types of resources, not through painful reforms, but through the activation of innovative transformations, to improve the socio-economic system.

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