

Diffusion of Innovation in the Digital Economy*

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Abstract. This article discusses the diffusion of innovation in the digital economy. The purpose and basic directions of the program "Digital economy of the Russian Federation" and "Digital Crimea" are allocated. Approaches to modeling the spread of innovations in the digital economy are characterized. The digital economy of Russia, including the Crimea, is considered, examples of use are given. The models of various options of "digitalization" in other countries, as well as the main tasks of information exchange are analyzed.

Keywords: diffusion of innovations, digital economy, models, innovations, distribution of innovations, program.

1 Introduction

Recently there has appeared a large number of researches dedicated to innovation processes and the digital economy. The scope of investigated theoretical and practical questions is rather wide. The main problem that arises in such studies is how to define the patterns or objective laws of development of such phenomena.

Diffusion of innovations or their distribution stays behind the spread or deployment and corresponds to the phase when innovations developed by one or several pioneer enterprises are adopted and come into use within other companies.

2 Related Works

There are several definitions of the concept of "digital economy" which may lead to misinterpretation and vague understanding of its core idea.

According to E.M. Rodger's definition [1]: «Diffusion process is the spreading or deployment of a new idea from the initial source (developer) to the end-user or adopter».

Ivanov V.V. – Dr.sc.oec, a member of the junior grade of the Russian Academy of Sciences gives the following definition «Digital economy is a virtual environment complementary to our real world» [8]. All our behaviors and doings within the virtual environment can be assigned to the production, distribution or consumption systems.

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The other representative of RAS considers a dual approach to the concept of the digital economy: the first – classical one - according to which “digital economy” is defined as “economy based on digital technologies that cover mostly the sector of e-services and e-goods”. The second - more enhanced approach - interprets digital economy as “production process based on the use of digital technologies”. [9].

The diffusion of innovations in the digital economy thus is described as a process by which the innovation is spread via communication channels between the members of the social system in a given period of time. The examples here are telemedicine, remote e-learning programs, on-line sales of games, videos, mobile applications, films, taxi aggregator programs, food delivery via electronic applications, mobile bank services, booking services etc. All the abovementioned services become widely spread and used in everyday life.

In other words, the diffusion of the digital economy is the spreading and development of once used innovation to other spheres of life. This is the process of innovation adaptation and applicability to end-users and its further deployment to the market. Balanced management of group communication channels is a significant factor in the commercial success of the innovation.

The term “digital economy” was officially recognized only in 2016, thus the “diffusion of innovations” concept in Russia remains on the initial stage now.

3 Results

We will begin the study with the analysis of digitalization spread in the economy of the Russian Federation.

Digital economy can be described as economic activity based on digital technologies and divided into auxiliary infrastructure, online services and electronic commerce (e-business). The development of a digitalized environment requires the maintenance of existing digital platforms and the creation of new know-how technologies and software.

In 2017 the President of the Russian Federation signed a new National Program “Development of the digital economy in the Russian Federation 2024”. The main goal of this program is the systematic development and introduction of digital technologies in all spheres of life: industry, business, government, social life and urban economy, which aims to increase the competitiveness and overall national security. The period for program realization is set to 2024. Apart from those abovementioned, the program includes statutory regulation of digital technology incorporation into educational programs thus aiming to increase the level of modern educational standards as well as into health care projects and “smart city” concepts.

To manage the program and its results five basic scopes were defined [5]:

1. Statutory regulation, which aims to eliminate and reduce the legal and policy barriers preventing digitalization deployment.
2. Human resources and education. For this sphere, the program targets the drastic enhancement of the educational system in Russia, including overall e-literacy. Successful deployment of a digital economy is possible when people have enough knowledge and experience to use their products.

3. The creation of research competence pool and technical capacities. The allocation of the support environment for national businesses that specialize in digital and other cross-industry technologies. In this sense, technical capacities are the communities or enterprises that create and apply cross-industry technologies.
4. IT infrastructure. The development of basic infrastructure, communication lines, processing data centers covering all territory of the Russian Federation.
5. IT-security (cybersecurity). Detection of problem zones, verifying threat models and finding solutions to eliminate them.

Below we will investigate the models for diffusion of innovations in the digital economy (fig. 1) [4].

Epidemic approach. At first, the diffusion was compared to epidemic disease when the adoption of new technology imposes the necessity to be in contact with adopters. The reason for adoption, in this case, is stipulated by the influence of the external environment.

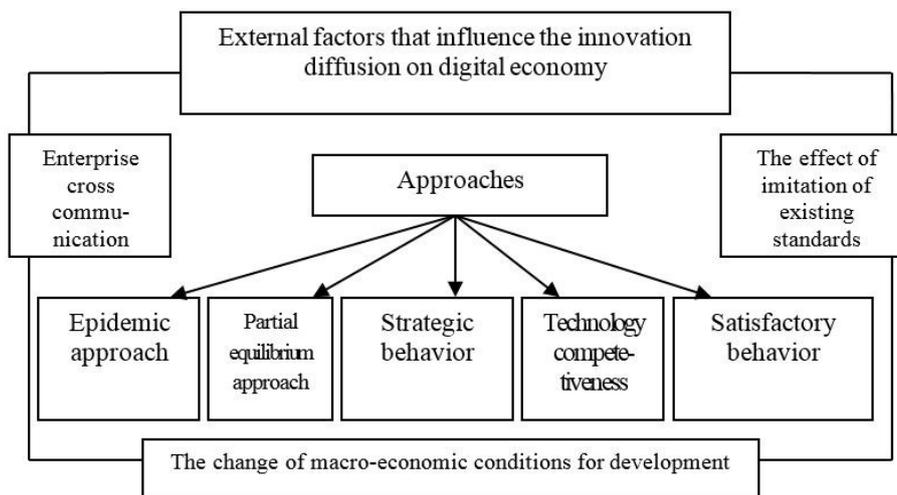


Fig. 1. The approaches for modeling innovation diffusion in the digital economy [4].

The approach of partial equilibrium. According to economic performance indicators, the enterprise adopts the innovations either now or later when the price of innovation implementation is acceptable. This approach assumes pure market competitiveness, free access to information about technologies and known enterprise management system.

Strategic behavior – the interdependence of all decisions.

Technology competitiveness. Here the external conditioning mode is applied. The enterprise adopts a standard most suitable pattern while the possibility to adopt new technology remains.

Satisfactory behavior. This approach exploits the role of inertness based on gained experience and knowledge for decision making. Established technologies dominate the rational choice of new technology to be applied.

Gosteva O.V. gives the example of different digitalization models for different countries in her study “The problems of innovation transfer in the digital economy” [2] (see table 1).

Table 1. Models of digital economy [2]

Asian model	Implementation of new technologies, “internet of things”, big data, on-line medicine Examples: Asia-Pacific countries - PRC, Taiwan, etc.	Economy added value: 5-7 tln. RUR yearly Lag in technology in comparison with the market leaders: less than 5 years
Middle East model	The increase in online market share Examples: Middle East countries, UAE, Saudi Arabia	Economy added value: 0,8-1,2 tln. RUR yearly Lag in technology in comparison with the market leaders: 8-10 years
Venezuela model	Digital economy depression Substantial lap in comparison with the market leaders Example: Venezuela	Economy added value: 0,1-0,2 1,2 tln. RUR yearly Lag in technology in comparison with the market leaders: 15-20 years

According to the table above Russia follows the Venezuela model. Today Russia falls behind the digital economy market leaders in many key criteria: the level of digitalization, the e-market share in GDP, average time lap in technologies adoption, etc. The digital market share in Russia reaches only 3.9% which is twice or three times lower in comparison with market leaders, although a number of positive trends are also present. One of the key figures – the digital market volume has been increasing drastically in the last few years. Major market players, such as Yandex and Mail.ru, already internationally known, started here in Russia as greenfield projects. Apart from them “Tranzas” - manufacturer of offshore simulators and navigation systems, “Avito” – online advertising service for individuals, social network “V Kontakte”, “Kaspersky Lab” which specializes on cybersecurity, OJSC Sberbank and others. The major share of this market belongs to electronic sales (e-commerce, e-services, online search). A good example of a smart city concept is “Marino Smart District”, Rostov-Na-Donu” city and Perm town. [5-7].

Recently the problem of The Republic of Crimea digitalization has also come insight. At the present moment the project of governmental program “Digital Economy of The Republic of Crimea” is being developed. The aim of this program is boosting regional economic growth and improving living standards with the use of digital technologies as well as forming the basis for economic development.

Among the main directions of region digitalization are:

1. The development of IT infrastructure for data collection and processing (data centers), development of digital platforms for social services, etc;
2. Provision of robust and secure functioning of IT infrastructure, i.e. the cybersecurity issues;
3. The organization of research competence pool and introducing the platforms for accumulating such competence, development of technical capacities, boosting the demand for digital economy products, increasing of overall digital literacy of the region;
4. The development of integrated service platforms:
 - Consolidation of existing and potential services, including those administered by different operators on different platforms;
 - Personalization of service profile for each citizen or business representative on the basis of their personal demand;
 - Constant communication and established feedback channels between users, developers and regulators;
 - Interaction of regional service platforms with federal and global service chains/networks [3].

The development of this program will allow solving problems of the touristic industry, production sector, agricultural sphere, transport. According to the National Duma Chairman for Financial markets Anatoly Aksakov, this program will also help local market players to avoid European sectoral sanctions.

R.R. Timirgalieva and I.Y. Grishin in their co-study “Background and perspectives of Russian south regions digital market development” [7] define the key factors proving the necessity to establish and develop the digital market in the Republic of Crimea, such as:

- – absence of IT-infrastructure gives the possibility to create and develop a new model based on “digital economy” principles;
- – long-term growth of Crimea region: digital and economic;
- – free economic zone;
- – capabilities of regional development and building of satisfactory ecosystem;
- – establishment of major universities
- – presence of local human capital assets and the possibility to attract top-ranked specialists;
- – mild and comfortable climate conditions;
- – sanction barrier which excludes western companies lobby and deployment of outdated business models, employed by western companies;
- – approved financing programs for regional development.

One of the ways to change the situation is to adopt innovations in Russia. For innovations introduction and deployment including micro- and medium-sized businesses it is necessary to allocate technology diffusion. The main objectives of information exchange are [1]:

- Collection, processing, and provision of actual information regarding ready-to-use technologies and products;
- Market demand for these technologies and products;
- Existence of potential users;
- Availability of developers and competitors;
- Availability and expectations of market upstream (sellers) and downstream (users);
- Quality and pricing indicators for technology and products: consumer and operational characteristics;
- Establishment of the market network: dealers, distributors, suppliers and contractors.

Digital technologies become a routine part of the economic, political and cultural life of Russian business entities and the drive of modern society in general [6]. Russia is part of the progressive development stage of the modern world, which is characterized by the predominance of knowledge, science and information in all aspects of life.

4 Conclusion

For Russia digital economic development becomes an actual strategic goal. The digital economy is an innovational type of economic relations covering all spheres of the national market which at present moment is developing drastically and in the nearest future can become the leading form of goods-money exchange considering the galloping spread of high-tech technologies. The digital economy penetrates into all spheres of production and management activities, it is the practical aspect of the IT economy and new system of informational society functioning.

Considering the international political situation and worldwide tendencies Russia faces the problem of global competitiveness and national security. Here the development of the digital economy becomes not a minor issue. Some elements of it have already been introduced and successfully function, i.e. countrywide transfer of public services into digital platforms (e-services, digital signatures, digital documents etc.)

Therefore the digital economy develops not only in regional centers but also covers remote areas and towns of Russia, which means the diffusion of the digital economy as an innovation phenomenon.

Reference list:

1. Rogers E.M., Singhal A. Diffusion of innovations. In M.B. Salwen & D.W. Stacks (Eds.) An integrated approach to communication theory and research, Mahwah, NJ: Erlbaum 1996, pp. 409-420. DOI: 0203887011
2. Gosteva O. V. The problems of innovation transfer in digital economy [publication, abstract of publication, abstract of conference publications]: problems and perspectives, 2017, pp. 41-44
3. Kopylenko T.T. Digital Russia: "The national program Digital Crimea is being projected", Electronic media: <http://rf.life/regiony/cifrovizaciya-strany-v-krymu-formiruetsya-proekt-gosudarstvennoj-programmy-cifrovaya-ekonomika-respubliki-krym/>

4. Ovchinnikova T.I, Ovchinnikova T.I. Bulgakova I.N, Shtefan V.I., Diffusion of innovations “Practical Marketing”, 2006, No. 12, (118). DOI: 10.1111/j.0887-378X.2004.00325.x
5. “Digital Economy of the Russian Federation”, Electronic Media: <http://src-sakha.ru/wp-content/uploads/2018/01/2.-Kislyakov1.pdf>
6. Development of digital economy in Russia as a key factor for economic growth and living standard development: article thesis, Nizhny Novgorod: «Professional Science” publication, 2018.
7. Timirgalieva R.R., Grishin I.Y, Korotitskaya V.V. “Background and perspectives of Russian south regions digital market development”, 18th international scientific conference, 2018, pp. 135-138.
8. How the concept of “Digital economy” is defined by experts, Electronic media, <https://ria.ru/science/20170616/1496663946.html>
9. Yudina T.N. Digital economy conceptualization, Theory of economy, 2016, No. 3, pp. 12-16. DOI: 10.1088/1757-899X/497/1/012104
10. R.R. Timirgaleeva and I.Yu. Grishin “Information and logistics to ensure the security of a business entity”, Maritime strategy and policy of Russia in the context of national security and sustainable development in the 21st century. Collection of scientific papers. May 2018, pp. 242–245.