

# Digital technologies in the management of socio-economic systems

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**Abstract.** Digital technologies are actively used in the activities of the Federal Executive authorities, through which the provision of necessary public services to citizens is carried out. The article describes the electronic services of the Federal tax service created by digital technologies. The article discusses current issues of the digital economy, its role, the importance of creating and using BigData technology for digitalization and data sharing in countries of the economic union. Modern trends in the field of management, the impact of digitalization of the economy on management can hardly be overestimated. In this regard, the changes taking place in the field of economic management require the study of effective interaction in various areas of socio-economic relations. It is important to form an integrated management system in the field of digital transformation. It is no coincidence that countries aimed at increasing the competitiveness of their national economies have adopted appropriate development programs.

## 1 Introduction

“The digital economy, or rather, the digital transformation of the public administration economy, is a certain set of social and economic relations between subjects, where electronic channels of interaction are predominantly used to reduce transaction costs ... familiar relations are now being replaced by an electronic counterpart. Accompanying these changes is the need to transform classical social institutions in order to provide a level of trust. to the electronic sphere” [2]. Digital technologies can also play a key role in integrating the economies and social relations of countries among themselves, especially for countries that are members of economic unions. So, with the development of BigData technologies, it is important to actually create and use common databases in all industries.

The end-to-end penetration of technologies into all sectors of the economy, both as digital (intangible) assets in the form of new business models, and in the form of the industrial Internet of Things, leads to the formation of large arrays of economically significant industry and cross-industry data. The equally end-to-end penetration of technologies into the social sphere — in the form of communication technologies and the Internet of Things, when almost every household item and the world around a person is connected to the global digital space,

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forms the prerequisites for using relevant data to assess and predict economic development. Thus, as people, business, and equipment become increasingly connected in a single digital space, digitalization offers ample opportunity for new decision-making models, proving to be the basis of the current global economic and social transformations that are changing business and consumer models, models provision of social services and economic activities of the population. The potential of digitalization to provide data for making informed decisions creates the prerequisites for the emergence of competitive advantages for states, as well as businesses, both at the national and global levels [2]. However, in order for data to gain value and become a new productive force that gives competitive advantages, data processing systems are needed for the purpose of analysis, tying into systems (graphs) and building predictive models. The development of such technologies should proceed at a faster pace. At the same time, at the first stage, for a qualitative leap in the growth of the economy, it is enough to have such a volume of digitized data, in which each next set of data leads to an exponential growth of effects. The primary and basic task of digitizing the economy is the formation of the necessary infrastructure for digitization, namely [3-4]:

*Providing universal affordable connectivity to high-performance.* broadband Internet networks Universal access to the Internet will enable the development of the benefits of the Internet of Things and the Industrial Internet of Things. According to the most conservative estimates, by 2045 more than 100 billion devices will be connected to the Internet around the world. These will be mobile and portable devices, appliances, medical devices, industrial sensors, security cameras, cars, clothing and other technologies. All of these devices will produce and share vast amounts of information that will revolutionize the way we work and live. People will use the information received through the Internet of Things (IoT), to make smarter decisions and gain a deeper understanding of their own lives and the world around them. At the same time, Internet-connected devices also automate many of the monitoring, management, and repair tasks that currently require human labor. The intersection of IoT, analytics and artificial intelligence will create a global network of smart machines that perform a huge number of critical business operations without human intervention. While the IoT will improve many aspects of economic efficiency, public safety, and productivity, it will also require additional cybersecurity and privacy protections [3].

*Digital platforms.* There are now many digital platforms that provide markets for goods, services and information delivered both physically and digitally. State digital platforms are a digital ecosystem, a technological environment with an API that provides services for managing the life situations of citizens, as well as a platform where agreements are formed between the state and various categories of stakeholders interested in obtaining public services [4]. Public platforms can also provide free services based on the processing of open big data, both for businesses and the public.

Platform Companies are one of the basic elements of the new economy. Investments in national digital platforms should be increased. The development of digital technologies should be included in all programs and plans for socio-economic development. Private companies involved in the development of digital platforms should be provided with the easiest possible access to loans, subsidies, tax and other financial benefits [5].

In order to unleash the potential of digital platforms for business development, one should consider following [6-7]:

- Policies should aim at both encouraging and facilitating the creation and use of digital platforms in the business environment, including the SME sector, including educating the public about the multiple benefits that platforms offer to business across the global market;
- Business and government, intentionally or unintentionally, can reduce the benefits of platforms by introducing restrictions and barriers. Business needs to be encouraged to manage digital platforms on the terms of maintaining interoperability and competition through engineering solutions. Conservative regulation that conflicts with the stated goals

should be avoided. Achieving these goals will require more effective coordination of the activities of business and the state [8].

Digital platforms created by civil society are extremely important as a source of open data that is important for building state economic policy and feedback from the population.

Digital platforms open up opportunities for data sharing among various stakeholders, creating favorable conditions for analytics, forecasting and multifunctional services.

## 2 Research methodology

Digital innovation in the narrow sense refers to the introduction of a new or significantly improved ICT product (good or service), i.e. innovative ICT products; more broadly, to the use of ICT to introduce a new or significantly improved product, process, marketing method or organizational method, that is, innovation using ICT.

Technologies in the field of working with data [8-9]:

Artificial Intelligence - the science and technology of creating intelligent machines, especially intelligent computer programs; the property of intelligent systems to perform creative functions that are traditionally considered the prerogative of man. Artificial intelligence is related to the similar task of using computers to understand human intelligence, but is not necessarily limited to biologically plausible methods;

Fog Computing is a system-level architecture for extending cloud storage, computing, and networking functions. The concept involves data processing on the end devices of the network (computers, mobile devices, sensors, smart nodes, etc.), and not in the cloud [9];

Quantum Technologies are technologies that use the specific features of quantum mechanics, primarily quantum entanglement. The goal of quantum technology is to create systems and devices based on quantum principles, which usually include the following: discreteness (quantization) of energy levels (quantum size effect, quantum Hall effect), Heisenberg uncertainty principle, quantum superposition of pure states of systems, quantum tunneling through potential barriers, quantum entanglement of states [7-8];

Supercomputer Technologies is a set of tools used to solve specialized tasks using specialized computers (supercomputers) that surpass most computers in the world in terms of technical parameters and computation speed. Supercomputers are a large number of high-performance server computers connected to each other by a local high-speed backbone to achieve maximum performance within the framework of the parallelization approach of a computational task;

Identification Technologies - automatic identification and data collection (AIDC, from the English Automatic Identification and Data Capture) - a general term for methods for automatically identifying objects, collecting data about them and processing data by automatic and automated systems. Object identification technologies include: magnetic card, chip card, optical (barcode, Data Matrix, OCR), radio frequency (RFID, RTLS), biometric (dactyloscopy, in vitro, DNA detection), audiological (voice recognition), optical (identification by iris, face recognition) [7];

Mathematical Modeling is an indirect practical or theoretical study of an object, in which not the object of interest to us is directly studied, but some auxiliary artificial or natural system (model) that is in some objective correspondence with the cognized object, capable of replacing it in certain respects and giving at its study, ultimately, information about the modeled object itself [7-8];

End-To-End Technologies is a set of processing methods, in which, on the basis of one system, there is a set of specialized programs that do not depend on specific methods and allow for interactive data exchange. Straight-through processing (STP) is a process of continuous, fully automated processing of information. At all stages of data processing, manual intervention is excluded, which is achieved by using standards for the exchange of

information between automated systems and their full interaction. Primary data can be generated both by automatic systems and by manual input, but their subsequent transfer and processing takes place fully automatically. In a narrower sense, STP technology assumes that a brokerage company acts as an automatic intermediary between clients and the external market. Client orders are automatically forwarded to conclude transactions on the external market or to a large counterparty;

Blockchain Technologies are multifunctional and multi-level information technologies designed to reliably record various types of assets (Melanie Swan). Blockchain is a distributed database that contains a continuously growing set of ordered records (blocks), each block contains a timestamp and a link to the previous block. Blockchains are open, distributed ledgers that can record transactions between two participants in a secure and trustworthy manner;

Neural Networks - mathematical models, as well as their software or hardware implementations, built on the principle of organization and functioning of biological neural networks - networks of nerve cells of a living organism [6-7].

### 3 Results

To prevent global challenges in the field of food and biological security, humanity needs a new type of agriculture that corresponds to the model of a circular (wasteless) economy and the principles of sustainable development. Leading international organizations and national governments are paying more and more attention to the issues of transition to a new economic model and to "smart" agriculture as its integral component. "Smart" agriculture is based on the use of automated decision-making systems, integrated automation and robotization of production, as well as technologies for designing and modeling ecosystems. It involves minimizing the use of external resources (fuels, fertilizers and agrochemicals) while maximizing the use of local factors of production (renewable energy sources, biofuels, organic fertilizers, etc.) [9].

Promising technologies of "smart" agriculture provide effective, environmentally friendly pest control, restoration and preservation of useful properties of soils and groundwater, as well as remote integrated control of compliance with certification requirements for organic agriculture. Among such technologies: biopesticides for integrated pest control, nanobiotechnological remediation of water and soil, integrated agricultural production control systems, etc.

E-commerce is a significant institution of the digital economy, penetrates into an increasing number of legal relations in the field of trade, and covers the entire spectrum of relations - direct interaction of consumers with consumers (C2C), interaction of sellers with consumers (B2C), interaction between entrepreneurs (B2B) , interaction between business and government in electronic form (B2G), etc. According to UNCTAD, the global turnover of e-commerce in 2015 amounted to 22.1 trillion US dollars, which means an increase in e-commerce by 38% compared to 2013 [1-2]. The above statistics reflect the role of electronic commerce in the current conjuncture of national and world markets. The data presented not only testify to the rapid growth of electronic commerce, but suggest that economies that cannot be included in the new system of economic relations will be significantly inferior in development in the coming years. Currently, the Russian national market estimates the volume of e-commerce in 2015 at around USD 550 billion in the B2B and B2G sectors and RUB 760 billion in the B2C sector. At the same time, the results of research for 2015 show that, despite a noticeable decrease in the average indicators of the purchasing activity of companies, in 2015 the volume of the Russian B2B e-commerce market showed about 10% growth. At the same time, the increase in the share of purchases carried out in electronic form, including by the largest corporate customers, was attributed to the key factors of market

growth [5]. Objective indicators of the competitiveness of corporate purchases were also characterized by positive dynamics. Currently, there are more than six thousand B2B electronic trading platforms and six federal B2G electronic trading platforms in Russia. The number of companies participating in electronic trading is estimated at approximately 1.2 million [4]. According to various estimates, from 40 to 45 thousand online stores operate on the market. The above figures for the Russian electronic market B2C, B2B and B2G reflect the positive economic effect of electronic commerce recognized by the world market, due to a significant reduction in the cost of conducting trade operations, solving problems associated with the disadvantageous geographical position of entrepreneurs, and favorable conditions for establishing direct contractual relations between customers and suppliers, merchants and consumers. Micro, small and medium-sized enterprises (MSMEs) are also able to successfully compete in the market in such conditions, which contributes to the emergence of new market participants and, ultimately, ensures the growth of national GDP.

## 4 Discussion

The development of e-commerce thus creates favorable conditions for the development of Russia's domestic manufacturing market, as well as for improving the competitive environment and the general business climate in the trade sector. At the same time, the volume of electronic commerce in Russia and the resulting degree of development of electronic commerce technologies, primarily in the B2B and B2G sectors, allow us to talk about the possibilities of Russia's full participation in international economic exchange in the electronic market, which will equally stimulate the growth of production, as well as create conditions for increasing state revenues related to the export-import activities of Russian business. Recognition of the development prospects associated with electronic commerce was reflected in a number of previously adopted strategic documents of the Russian Federation [5-6]. The Forecast of the Long-Term Socio-Economic Development of the Russian Federation for the period up to 2030, prepared by the Ministry of Economic Development of Russia and approved by the Government of the Russian Federation, notes that the growth of labor productivity in trade and some other industries will be ensured by the transition to new forms of production, such as online commerce and other types of electronic services. The creation of conditions for the development of companies operating in the field of electronic commerce is provided for in the text of the Concept for the long-term socio-economic development of the Russian Federation for the period up to 2020, approved by Decree of the Government of the Russian Federation dated November 17, 2008 No. 1662-r [8]. The importance of the harmonious development of electronic commerce is also emphasized in the draft Strategy for the Development of the Information Society in the Russian Federation for 2017-2030. In order to implement the national interests of the state when creating a digital economy, the strategy provides for the use of mechanisms aimed at protecting citizens from counterfeit products, developing legislation to protect competition, equalizing tax conditions for Russian and foreign companies, creating a payment and logistics infrastructure for online commerce, transparency of cross-border payments, ensuring the protection of consumer rights on the Internet. [5-6]

The strategic task of the state is to develop a set of measures to implement special technical and organizational measures to support exporters in the B2B, B2G and B2C sectors; formation of a separate regulation in relation to the activities of electronic trading platforms, rights and obligations and ways to protect the legitimate interests of participants in electronic commerce, taxation, electronic payments, electronic document management in the field of import-export customs procedures; development of international dialogue in this area to ensure parity conditions for trade and economic cooperation. The role of electronic commerce in the development of the national and world economy, in turn, necessitates the

formulation of the task of developing statistical indicators and appropriate methods of calculation and analysis to assess the development of electronic commerce in Russia.

## 5 Conclusions

The digital economy offers ample opportunities for the development of the public administration system. Modern technologies make it possible in the near future to create an environment of a high-tech digital platform for public administration, which will ensure the minimization of the human factor and the accompanying corruption and errors, automate the collection of statistical, tax and other reports, and ensure decision-making based on an analysis of the real situation. The provision of public services will be built on the basis of a single digital cloud platform that has open interfaces for machine-to-machine interaction and allows, among other things, independent providers to expand the opportunities for citizens to interact with the state by creating their own applications based on this platform (with mandatory certification for security and compliance with legislative norms) [8].

As a result of the implementation of the above trends, it is possible to increase the efficiency of the new generation economy through [9-10]:

- Minimization of the corruption component by minimizing the human factor in the administrative system and creating a “deserted” interaction scheme;
- “Entrusting subjectivity” to intelligent agents – their taxation, responsibility, identification, etc.;
- Optimization of taxation through the use of intelligent agents operating on the principle of “smart contracts” with an individual calculation of the tax burden;
- Implementation of an adaptive model for automated prioritization of part of the budget expenditures;
- Widespread use of participatory budget models, including as a way to influence political decisions.
- Provision of public services through a single digital platform with open interfaces for machine-to-machine interaction.

The state should equally strive to create favorable conditions for increasing the competitiveness of the national digital environment in order to attract foreign entrepreneurs to the Russian jurisdiction of the digital economy. It is necessary to provide businesses with preferential financing conditions, assist in testing and implementing innovative developments, and allocate grants for talented entrepreneurs and scientists [10].

A promising area of interaction between the state and business is the format of public-private partnership for the development of the digital economy. For public institutions, PPP is a tool to help make research and innovation policies more responsive to the changing nature of innovation, as well as to social and global challenges. For businesses, PPP will enable the development of new markets and the creation of value through collaboration and co-production. National and regional governments can also improve the competitiveness of companies and clusters by promoting smart specialization strategies.

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