

# Highly Advanced Projects for the Development of Digital Economy: Opportunities for Small Business

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**Abstract:** *The article aims to analyze and specify the existing aspects of executing highly advanced projects aimed to use various digital technologies in small business at the modern stage of economic development and in the near future (in the conditions of the digital economy) and to formulate the authors' vision of this problem, specifically, to study the use of digital technologies in various areas of the activities of small businesses.*

*In the article, the authors have analyzed and specified aspects related to the use of various digital technologies in the operation of small businesses nowadays and in the near future. The authors have compiled a rating of digital technologies used in the operation of small businesses. The application of digital technologies in the operation of small businesses has been described and the application of digital technologies in the areas of activities of small businesses has been determined.*

**Keywords:** *digital economy, digital transformation, digital technologies, Internet of Things.*

## I. INTRODUCTION

The digitalization of the economy should be viewed as a tool but not as an end in itself. The digitalization of the Russian economy should provide every citizen with equal opportunities of access to services, information and knowledge, which are provided on the basis of information and communications technologies (ICT). Moreover, it should aim to create benefits in various aspects of everyday life. Digital technologies, applications, etc. are tools for the achievement of goals related to various areas of the economy: creation of new jobs, development of entrepreneurship, agriculture, transport, environmental protection and natural resource management, assistance in the efforts to eradicate poverty, etc.

The concept of digital technologies has recently become widespread, particularly in the context of the concept of digital economy and digital transformation. Digital technology includes all types of electronic equipment and programs, which use information in the form of a numerical code, usually binary, symbols of which are 0 and 1 [1-3].

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Digital technologies relate to the following: mobile devices (smartphones, tablets, gadgets); the Internet of Things; technologies enabling to determine accurate location; innovative interfaces for interaction with electronic devices; verification (with the help of passwords and biometric data); anti-fraud means; complicated multi-level interaction with the user and personification; augmented and virtual reality; smart sensors; Big Data; cloud computing (services) [4-6].

The well-thought-out use of modern digital technologies in a business can help enterprises substantially improve their operating efficiency [7]. However, these technologies can lead to both changes in the current business processes and the emergence of new ones [8]. Digital technologies are, above all, innovation, the introduction and use of which requires the availability of relevant professionals who are able to constantly learn and acquire new competences. According to studies [9, 10], nearly all executives agree that digital technologies will cardinaly change entrepreneurial processes in the near future. However, more than half of them say that they have not yet elaborated any development strategy taking into account the existing and new digital technologies. The absence of such a strategy makes the use of digital technologies less effective for both an enterprise and the national economy as a whole.

## II. LITERATURE REVIEW

The following can be highlighted among the sources used in conducting this research:

studies conducted by leading international companies, organizations and various professional groups regarding conceptual changes and the impact of digital technologies on businesses in the conditions of a digital economy, including Industry 4.0 [11-15];

publications, which bring to the light separate aspects of using digital technologies in the operation of a business [16-18];

publications devoted to modern digital technologies in the digital economy as a whole [19-21].

On the other hand, the publications can be divided into those, which study the current aspects of project introduction through the use of digital technologies in business processes, and those, which describe possible future changes in business processes following the introduction of projects aimed to use digital technologies.



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The digital economy has been replacing the traditional economy, changing everyday life and business, providing substantial advantages to the sectors of the economy, in which the use of digital technologies is well-thought-out and the introduction of digital technologies is fast. Every year new digital technologies emerge and the existing ones are updated. The following can be marked among them in terms of the time of their emergence and use [22, 23]:

1) digital technologies of the past, which constituted a trend in 2014-2015, but remain relevant nowadays: high-speed Internet, smartphones, tablets, laptops, supercomputers, servers, data storage facilities, cloud computing, social networks and messengers, etc.;

2) digital technologies, which were also used in the past but have rapidly developed in recent times (2016-2019): virtual and augmented reality, individual gadgets for various purposes, quadcopters, drones, smart home, diverse sensors, Big Data, nanotechnologies, Blockchain;

3) digital technologies, which are used even now but they are expected to be used widely in the near future (2020-2025): artificial intellect, cognitive computing, robotics, 3D printing, distributed computing, self-driving cars, new technologies in energy, implant technologies.

The ability of digital technologies to change fundamentally well-established business processes has been confirmed, particularly in [13, 14], which indicate that the current linear information structure is being replaced by the network information structure. Even now, linear information chains are being transformed into interconnected open dynamic systems (digital networks), in which information flows are constant and simultaneously available for all interested members of a network, making it possible to avoid various problems and delays in the operation [17]. Information flows in digital networks are digital and can run as follows [24]:

1) from the physical into the digital world (data is recorded on digital information media, which correspond to the real world);

2) information circulates within the digital world (exchange of data, comprehensive analysis of data, economic mathematical modeling, particularly with the use of artificial intellect);

3) from the digital into the physical world (analysis and modeling of the impact of decisions, which are executed in the physical world).

The study hypothesis: digital technologies in small business largely concern information flows.

## III. PROPOSED METHODOLOGY

### A. General description

In the course of the study, we analyzed foreign publications, which are in line with the present study, are devoted to the impact of digital technologies on ongoing business processes nowadays and in the near future and define prospects of the use of digital technologies in the operation of small businesses.

We also used the survey method to measure to what an extent digital technologies are used in the areas of business, in which small businesses operate.

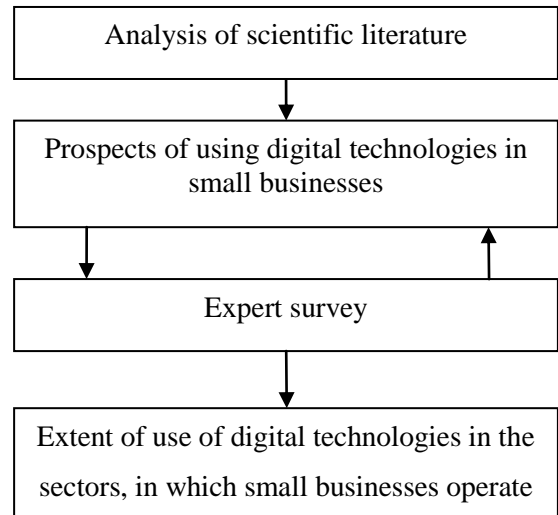
Eighteen experts participated in the survey, eight of them are IT professionals and ten are small business executives that operate in different sectors.

### B. Algorithm

At the first stage of the study, we analyzed scientific research related to the prospects of using digital technologies in the activities of small businesses.

At the second stage, we surveyed experts about current prospects, problems and spread of digital technologies in the sectors, in which small businesses operate.

### C. Flow chart



## IV. RESULT ANALYSIS

The results of analysis conducted in several sources [12-21] with regard to the extent of using digital technologies in the operation of small businesses nowadays and in the near future are shown in Table 1 where the asterisk (\*) means that a digital technology is mentioned in a publication in the context of its use in the operation of small businesses. Digital technologies in Table 1 are shown in the descending order (the number of references in various publications).

Despite a small sample group of publications used in compiling Table 1, one can assume that the obtained trend of distributing places among digital technologies in terms of their use in the operation of small businesses is well in line with the current global trends relating to the spread of digital technologies for both separate companies and small business as a whole.

As the results of the expert survey show, digital technologies which are widely used or are of interest to small businesses or will be interesting in the near future are technologies that are mainly related to information flows. Information in the digital economy is given a special status and, if used properly, it can provide companies with substantial competitive advantages (Table 2). The asterisk (\*) means that digital technology is already used in the relevant area of business or will be used in the near future.

As the expert survey's results show, manufacturing, transportation and marketing are those small business activities where the largest number of digital technologies is used or can be used. However, the expert survey's results, which are shown in Table 2, are not final and can be discussed.



Specifically, this is due to constant changes in the area of digital technologies, their rampant development and the complexity of adapting modern business processes to such fleeting changes, among which it is hard to immediately identify those, which are really important and can substantially impact the operation of a small business, and those, which are temporary and insufficient.

## V. DISCUSSION

During the discussion by experts, the above digital technologies were considered in detail.

*The Internet of Things.* The Internet (including the Internet of Things) can be regarded as the basis of the digital economy. The Internet of Things helps physical devices connect and interact with one another (exchange data) without human interference [19]. Customary physical objects whose main existence, use and operation have nothing to do with a computer in generating, storing and processing information will be connected to the Internet of Things [20]. For example, as experts note, in warehouse logistics, small businesses use pallets to pile up and transfer products; they can be equipped with some innovative devices (sensors, controllers), which, through the Internet of Things, can exchange information with one another in order to improve the operating efficiency of a warehouse as a whole.

The experts point out that the interaction of devices and the provision of various services to the digital economy require high-speed mobile and fixed broadband communication lines, as well as wireless and wired local connections that would ensure quality and stable exchange of information. In the European Union, 98% of Europeans have access to fixed broadband services and 80% of European households have access to broadband Internet access (with the speed of at least 30 Mbps), with 58% of them enjoying connection speeds of at least 100 Mbps [25]. Relevant expensive equipment can help achieve the high speed of Internet access and this predetermines the relevant high price of access for users, which can be a hurdle for the expansion of the Internet in terms of higher speed and coverage. Specifically, according to the Speedtest Global Index report for August 2019 [25], Russia ranked 47<sup>th</sup> among countries surveyed in terms of fixed broadband, with download and upload speeds of 56.42 Mbps and 60.41 Mbps, while the world's average numbers are 66.52 Mbps and 35.09 Mbps. The speed of Internet access for mobile devices is lower; namely, the world's average download and upload speeds are 28.02 Mbps and 10.87 Mbps and Russia's figures are 20.53 Mbps and 9.64 Mbps (or 92<sup>nd</sup> place in the relevant Speedtest Global Index rating for August 2019) [25].

However, the experts believe that the expansion of the Internet of Things is restrained not only by the speed and coverage of the Internet but also by the number of connected devices, standardization and cybersecurity issues. All this also impacts the development of the Internet of Things among small businesses.

Provided that the relevant innovative means and technologies are used, in small businesses the Internet of Things can be used as follows:

1) to conduct inventory of valuables. Information about

available inventories can be updated immediately, includes diverse indicators and does not require manual calculations. Moreover, special sensors and scanners can track damages of a product and its exact location;

2) to increase efficiency of technical devices. Various sensors can track the utilization rate of machinery throughout the period under study in order to adjust its further operation, its technical condition for the timely replacement of machinery and repair, etc. Furthermore, the experts think that special autonomous machinery, which does not require human interference for the conduct of routine operations, will be widespread in the digital economy;

3) to improve employees' efficiency and safety. Various accidents can occur at production facilities. Unfavorable situations can be avoided by using relevant digital technologies, particularly IoT-connected sensors and cameras. In addition, employees can be IoT-connected via individual communication means in order to monitor their health, fatigue and fulfillment of assignments;

4) to influence the environment. Energy consumption can be optimized by using LED devices, modern heating, air-conditioning and ventilation systems, the operation of which can be regulated automatically through the Internet of Things [26-29].

Data obtained using the Internet of Things, as the experts think, can be useful for various activities of small businesses, particularly trade and procurement activities. Prompt and reliable information about the condition and amounts of products available in a warehouse makes it possible to achieve an optimum sequence of delivery for required products, to avoid overstocking or the lack of required products in a warehouse during peak periods for the delivery of products and to make a reasonable choice of suppliers.

Experts believe that the Internet of Things can help small transportation enterprises precisely monitor the location and the condition of vehicles throughout their routes. This allows them to define whether they will arrive at a required location on time, to ensure reliability and safety of transportation, to prevent theft and substitution of transported products, damage of original packaging and the violation of storage conditions.

The surveyed experts think that in marketing business, the Internet of Things can help make more substantiated and prompt managerial decisions on the distribution of products in sales markets, the impact on consumers' preferences and demand for products, the formation of orders to be placed to a producer, etc. As noted by one of the experts surveyed (Vyacheslav P.), "after-sales support, which is a component of marketing, can include constant monitoring of the condition of products using various sensors, which, if some parts of products are damaged or components are worn out, will be able via the Internet of Things to transfer information to a producer or a service center in order to send to a consumer of this product a professional and/or components required".

However, as the experts emphasize, constant quality communication, the general use of all possible electronic meters, sensors, scanners, etc. are necessary for all





participants of the delivery chain to make full use of the Internet of Things, and a well-thought-out, reliable (resistant to cyber-attacks) system of transmission, processing, analysis and storage of big sets of data in the context of such digital technologies as Big Data, Cloud or Cloud Computing and Blockchain.

*Big Data.* According to the opinion of the experts surveyed, the clearly organized operation with big amounts of diverse structured and unstructured data for data storage, processing and analysis can provide small businesses with competitive advantages.

Big Data is an aggregate of means designed to search, analyze and process big amounts of structured and unstructured data in order to obtain qualitative new knowledge. The concept of Big Data occurred when data arrays became so big and complicated that this resulted in difficulties in the use of conventional applied software to fulfill the following tasks: collection, storage, analysis, search, exchange, transmission, visualization and update of data, creation of inquiries, support of confidential data and their sources [17].

As the surveyed experts believe, Big Data can help substantially increase analytical data on business processes in terms of various aspects in order to improve the quality of customer services, reduce costs and save time, etc.

*Cloud Computing.* Big Data also require bigger and more powerful places for data storage and processing. The experts believe that this problem can be solved by cloud computing technologies, which imply remote data processing and storage. Cloud computing is software and hardware support for a consumer's self-service on their demand through the Internet or a local network via the relevant data processing and storage services. A model for network access to a variety of hardware and software resources, which consumers of these resources can promptly use with minimum interaction with suppliers who provide such resources [14].

Cloud computing makes it possible to reduce costs related to the use of hardware and software. This way of using software and hardware, as the experts believe, has become especially topical for small businesses as year after year computers' computing capacity grows together with rising computing requirements for memory (operative memory and read-only memory) on the part of applications and it is not always economically feasible to buy expensive computers for the use during a short period of time in comparison with the lease of similar computers.

*Blockchain.* With amounts of digital data and their availability on the rise, it becomes necessary to ensure that digital data is reliable and stored in a safe place. The experts think that this can be done via the Blockchain technology, which is a technology of an innovative distributed database when data is not stored in one place (on one server) but is distributed in a definite way among a network's computers (servers) but a user has an impression about the integrity of a database. The experts believe that the lack of possibilities to correct or delete records in a database without any trace, cyphering and decentralized data storage while using Blockchain should ensure that the conduct of business operations is transparent and controllable.

According to an expert (Lyudmila R.), "Thanks to Big

Data technologies, cloud computing and Blockchain, information can be analyzed fast at any time for persons concerned to make prompt substantiated decisions".

*Autonomous robots* are robots, which can independently fulfill tasks without human interference and serve as an irreplaceable means to improve efficiency of production processes in small businesses through the exact fulfillment of a large number of routine operations [18]. The experts suppose that autonomous robots can be used in production and transportation.

*Artificial intellect.* As the experts believe, artificial intellect is a powerful tool for decision-making in small businesses because it helps improve the quality, feasibility and promptness of decisions. The experts specify that it is feasible to use artificial intellect to process a big set of data (Big Data) and to provide cloud computing services. As a matter of fact, artificial intellect can be used everywhere if it is necessary to analyze data and make data-based decisions.

For example, the experts think that when analyzing demand for some products in the course of marketing activities, a big set of structured and unstructured data can be generated, including significant (important for the assessment of demand) and insignificant information and there are non-evident connections among data, etc. In this case, in order to accelerate data analysis without losing accuracy of results, one can use algorithms of collective artificial intellect (Genetic Algorithm, Ant Colony Optimization and Artificial Bee Colony Optimization, Artificial Immune Systems, Particle Swarm Optimization, and Bat Algorithm), features of which include simultaneous analysis of several possible solutions of a set task. One can use cognitive computing, which partly reproduces the operation of a human brain, for unstructured data. Cognitive technologies, as the experts think, are a promising means designed to forecast demand without conducting large-scale market research with the participation of a large number of professionals. This can substantially reduce the cost of such surveys and accelerate the generation of results without losing accuracy and validity.

*Augmented Reality and Virtual Reality.* Nowadays, augmented reality and virtual reality are in broad use in entertainment, video games and medicine. However, as far as business is concerned, the surveyed experts point out that there are only a few examples of using augmented and virtual reality, specifically in production, retailing and logistics by leading international companies.

Augmented and virtual reality help make certain actions in the virtual space, see results of their execution, make relevant changes to improve them and then to take these actions in the real world. The experts think that this can be used in small businesses to considerably reduce the time of development and introduction of various new projects, as well as to save funds and other resources. For instance, one can model the operation of a production unit in the virtual world while using data from a real operating unit and make changes in virtual reality with regard to diverse aspects of its operation in order to improve its operating efficiency as a whole, as well as choose the best option and introduce it in the real world in a real production facility [30].



However, what constrains fast expansion of augmented and virtual reality in small businesses, as the experts think, is the need for developing and introducing relevant specialized hardware and software

## VI. CONCLUSION

The study results confirmed the hypothesis that digital technologies in small businesses, to a large extent, are associated with information flows.

Discussed issues of the use of digital technologies include standardization of various aspects of their operation, which is especially relevant in business processes due to a big number of parties concerned, the conduct of a big number of operations, etc. Furthermore, the use of digital technologies in small businesses requires highly skilled personnel and this, in turn, stipulates changes in education and sciences when training new-generation professionals; thus, relevant studies need to be conducted promptly.

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