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EVALUATING EFFECTIVENESS OF DIFFERENT INDUSTRIES IN DIGITAL ECONOMY OF THE YEAR 2020

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Abstract

The article examines the industries that are most actively implementing digitalization in the work of their enterprises. The authors compare the number of industries marked by digitalization processes in the years before the COVID-19 pandemic and after the forced transition to digitalization technologies in 2020. The need for digitalization processes in the context of a sharply increased need for digital forms of interaction between all participants in economic processes is marked by an increase in the number of industries that actively use digital technologies in their work. New industries are emerging, categorization of enterprises by degree of digital maturity and stages of digital transformation becomes more difficult. There are industries that were not studied in previous years, but that have made a qualitative digitalization leap and have become leaders in digitalization processes or potentially promising industries in terms of introducing digital technologies into their work. Not all of the most frequently represented promising industries have a high level of digital maturity and are at a high stage of digital completion. The relevance of the study is determined by the need to identify the most developed industries in terms of digitalization. The purpose of the research is to assess the prospects for the early digital development of individual industries. Prospects for the application of the obtained results are connected with an improvement in the quality of work performed, a wider range of work results notification, an increase in the quality of digital activities of enterprises, and an increase in innovative potential.

Keywords: Digitalization, digital economy, digital maturity, digital transformation, digital technologies

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1. Introduction

Sociocultural changes in recent years have led to certain changes in public consciousness: there is a shift towards the massive introduction of information technologies and the digitalization of industries in general, which has a beneficial effect on the development of the country's digital economy as a whole. The beginning of digital adoption is characterized by rising expectations for innovative technologies such as cloud computing, mobile services and artificial intelligence (Watanabe et al., 2018), which have not previously impacted workflows within organizations. In addition, in recent years, there has been an increase in the intention of entrepreneurs to introduce digital technology into their business (Youssef et al., 2020). Special prospects are traditionally considered in the application of digital technologies in the home business of individual countries and regions, which remains a predominantly offline trade option **(**Reuschke & Mason, 2020). In any case, the advantages of the digital version of the economy in relation to the profitability of its various industries have not been questioned and is considered as a promising direction for the development (Teece, 2018). The 2020 pandemic has opened up the need for a massive transition to an electronic environment in all sectors of the economy.

Self-isolation prompted enterprises to move to a remote work process, develop mechanisms for interaction with employees, and actively and quickly develop channels and services for doing business online. At the state level, the necessary decisions that contributed to the acceleration of the transition to a digital model of interaction were made. This trend can be traced not only in individual countries, but around the world as a whole. The approach, with its strong use of digital technologies, has been noted to be on the rise in various parts of the world. Li et al. (2020) register the growing influence of the digital economy in Asia. A similar situation is noted by Marshall et al. (2020) in Australia. The introduction of digital technologies is closely related to the economic growth of the countries located there and is interdependent with it.

In general, it is noted that the COVID epidemic is bi-directional: on the one hand, the rapid transition to digital platforms in various areas of enterprise activity provoked a sharp surge in activity to bring technologies into a more adequate form, and, on the other hand, the epidemic made it possible to postpone the decision of some social economic problems at a later date in order to solve them after the pandemic. It should be noted that the most pressing areas that required an immediate transition to digital technologies were online communications, healthcare, education, e-commerce, as well as electronic options for interacting with government bodies, financial instruments, etc. This paper examines how successful the implementation of digitalization in the work of organizations of various orientations is in comparison with previous years from the point of view of employees of these enterprises.

For comparison, the study used statistics from digital consulting company KMDE. This company, among its main activities, conducts active monitoring and analytics of digital transformations in Russia, as they are closely related to the activities of enterprises of various orientations that apply to the company for advice. The data of the KMDE survey on digital technologies, conducted in 2018 and 2020, demonstrate significant differences in the number of industries that use digitalization in their work, as well as qualitative differences in the degree of advanced digital processes taking place in the organization and the overall picture in the degree of development of digital technologies in various industries (Table 1).

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Table 1. Industries implementing digitalization in their work

Industry	Status 2018	Status 2020
Telecommunications and communication	Leader	catching up (1)
IT and software development	Leader	leader (1)
Banking and financial services	Leader	leader (1)
Housing and Public Utilities	-	leader (1)
Advertising	-	catching up (1)
FMCG	-	catching up (1)
Trade	catching up	catching up (1)
Insurance	catching up	catching up (1)
Education	catching up	catching up (2)
Auto business	catching up	beginners (2)
Transport	catching up	catching up (2)
Government Services	-	catching up (1)
Construction	beginners	catching up (2)
Medicine	beginners	catching up (2)
Business services	beginners	beginners (1)
Services to the general public	-	catching up (2)
Power and Energy	-	catching up (1)
Entertainment industry	beginners	beginners (2)
Oil and Gas	low-performing	catching up (1)
Industrial production	low-performing	catching up (2)
Steel industry	-	catching up (1)
Mining	-	catching up (1)
Tourism and restaurant business	low-performing	catching up (2)
Consulting	low-performing	catching up (1)
Electronics and components	-	beginners (2)
Publishing business and media	low-performing	-
Agribusiness	-	beginners (2)

Source: authors based on (KMDE, 2018; 2020).

According to the KMDE report, companies that are leading in the use of digital technologies are distinguished by the following features:

- constant search for innovations in the digital sector and openness to new technologies;
- active support of digital changes by the company's management and a high degree of employee motivation;
- the presence of a digitalization management body in a company;
- compliance of the digital infrastructure of a particular company with business needs;
- a high degree of digitalization of business processes:
- comprehensive monitoring of digital transformations and increasing the competence of employees;
- constant work on the development of the company's digital system;
- the development of digitalization is planned in the general development strategy of the company (KMDE, 2020).

A distinctive feature of the 2020 economy is the growing role of corporations in digitalization, which affects the number of companies represented in various industries. However, the decline in the number of companies using digital processes in their work leads to an improvement in the quality of digital transformations, provoking dramatic technological shifts in the use of digital technologies, which positively affects the assessment of the digital maturity of companies (Karacuka & Haucap, 2020).

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2. Problem Statement

It is worth mentioning the fact that some industries are more adaptable to new digital processes. The data obtained for the year 2018 and the data for 2018 are different in terms of the number of industries and digitalization maturity. The study needs a proper analysis of the number of industries applying the digital process and their importance to the digital economy. In order to correctly assess the changes that have occurred in 2020 with enterprises representing different industries, it is necessary to compare the data for the previous period of time (2018) and data for the current period (2020). Changes in the digital activities of enterprises in various industries make it possible to assess the most promising industries for the development of digitalization in Russia. Also, it becomes admissible to mark the industries in which digitalization processes are in their initial state, but have development potential. Moreover, there are some industries that are considered more developed in terms of applying the digital processes in their work.

3. Research Questions

The research questions were the following. Which industries are highly advanced in terms of digital work? Which industries are potentially promising in terms of development? Are there any industries where the use of digital technology has improved significantly over the specified time period? Are there industries where digital adoption has deteriorated? What new industries have emerged in research? After answering those questions, it is possible to make conclusions about the general processes n digital economy.

4. Purpose of the Study

The authors of the article compared the indicators of digitalization in various industries. Those industries were indicated in studies conducted over the past two years by the KMDE company. The studies marked the completeness of digital processes in the work of enterprises of different industries and their digital maturity. By comparing the results for the two years, the authors established a new methodology for assessing the effectiveness of the use of digital technologies for various enterprises. This comparison will improve the quality of activities carried out for the successful implementation of digitalization, which is a priority for the development of the country's economy in the coming years. The main purpose of the study is to identify the most actively developed industries. It is also important to understand the most promising and profitable industries for the digitalization of the state.

5. Research Methods

The main research method is the comparison of data obtained through a survey of representatives of organizations of different industries. Direct surveys to assess the degree of digital maturity of organizations were carried out by KMDE in 2018 and 2020. The surveys were online and offline ones. The surveys included the answers of 700 people. They represent different industries mentioned in the survey. The number of the companies participated in the surveys is 300.The respondent work in various positions within the company: from ordinary employees to executives.

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6. Findings

According to the indicators of 2018, digitalization in Russia affected enterprises representing 17 large industries: (Telecommunications and Communications; IT and Software Development; Banking and Financial Services; Trade; Insurance; Education; Auto Business; Transport; Construction; Medicine; Business Services; Industry Entertainment; Oil and Gas; Manufacturing; Tourism and Catering; Consulting; Publishing and Media). These industries were classified according to 4 categories in the report: Beginners, Low-Performing, Catching Up, and Leaders.

In 2020, 10 others were added to the above-mentioned industries: Housing and Communal Services; FMCG (fast moving consumer goods); Advertising; Government Services; Services to the Public; Energy; Metallurgy; Mining; Electronics and Components; Agroindustry. The study has emerged such an indicator as the degree of digital maturity of industries that are implementing digitalization in their work. According to this criterion, the following 3 categories were distinguished: beginners, catch-ups and leaders. However, it should be noted that these categories have been divided in two directions: one of them is the degree of digital maturity, and the second is the stage of digital transformation. Digital maturity increases from low (2) to high (1), and the stages of digital transformation change from start to finish. According to these parameters, the industry can be a leader in the use of digitalization, however, digital processes in it do not demonstrate the highest indicators, indicating the completion of the implementation of digitalization. It is worth noting a more complex categorization of industries, which in 2020 totals not 4, but 6 parameters that make it possible to assess the degree of completeness and maturity of digitalization in the aforementioned industries clearly and in more detail.

The number of industries leading in the implementation of digitalization remains unchanged in 2018 and 2020 and amounted to 3 industries that have undergone significant changes. In 2018, the following industries were the leaders in the implementation of digitalization: Telecommunications and Communications, IT And Software Development, The Banking Sector And Financial Services. In 2020, the leaders are IT and Software Development, the Banking Sector and Financial Services, and Housing and Communal Services. Over the past period of time, Housing and Communal Services not only appeared on the map of industries, but also became a leader in the processes of introducing information technologies at once by two indicators: digital maturity and the stage of digital transformation (marked on the graph as close to completion). The low-performing category in 2018 (absent in 2020) was Oil And Gas; Industrial Production; Tourism And Restaurant Business; Consulting; Publishing Business And Media. The category of publishing business and media was abolished in 2020, and the aforementioned industries moved into the category of catching up with the introduction of digitalization, with a different index of digital maturity. The Oil & Gas and consulting industries were noted as having high digital maturity. In the same category, the compilers included Government Services, Advertising, Telecommunications and Communications, FMCG, Trade (Retail), Insurance, Energy, Mining.

Less advanced in digitalization processes are the catch-up categories with a low digital maturity score. Of the industries identified in 2018, this category includes industries such as Manufacturing, Tourism and Restaurant Business. This also includes the branches of Education, Construction, Medicine, Transport, And Public Services. In 2018, the catching-up industries were Trade, Insurance, Education, Auto Business and Transport. It is noteworthy that in 2020 Trade and Insurance improved their indicators and in the

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category of catch-up companies are represented by companies with a high indicator of digital maturity (1). Transport and Education are in the catch-up category, but have a low level of digital maturity (2), and the Auto Business has generally moved to the category of beginners with a low degree of digital maturity. Its interesting to note that Education, which was particularly active in introducing information technology in connection with the pandemic in 2020, is rated as an industry with a low degree of digital maturity according to the respondents' answers.

Industries such as Electronics, Agriculture, and Entertainment are in the same category in 2020. Moreover, in terms of quality, the entertainment industry did not demonstrate any fundamental changes regarding digitalization processes, which is confirmed by the data of 2018. Electronics Components, together with the Agroindustry category, are an example of industries with low digital maturity that are beginning to digitalize processes, which can be explained by the initial stage of digitalization in these industries, which were not identified at all in the 2018 study. Business Services is the only industry representing startups with a high level of digital maturity (1). In general, it can be noted that the largest breakthrough was made by the housing and utilities sector, which did not exist in the 2018 research.

7. Conclusion

The number of industries actively using digital processes in their work increased by 10 units in 2020 and amounted to 27 industries. The layout of industries, which in 2018 consisted of 4 categories, is divided into 6 subcategories in 2020, which provides greater accuracy in terms of assessing the company's digitalization. In 2020, companies began to be measured by the degree of digital maturity and the stage of digital transformation (from low to high). The housing and communal services industry, having appeared in 2020 for the first time, takes a leading position and becomes one of the established leaders together with telecommunications and communications companies, it and software development. Potentially promising in terms of the introduction of digitalization are industries located in the category of catching up with a high degree of digital maturity (oil and gas; consulting; public services; advertising; telecommunications and communications; FMCG, trade; insurance, energy, mining). Industries in which the use of digital technologies has significantly improved over a specified period of time is oil and gas, industrial production and consulting. The industry showing regression in the use of digital technologies is the publishing business and the media, which was not included in the 2020 study.

The study is limited by the number of survey participants, insufficient coverage of cities - most of the respondents were representatives of Moscow and St. Petersburg. In addition, there is no data on the number of representatives of each specific industry, which significantly complicates the accuracy of the calculations. Also, it should be noted that 2020 is not over yet at the time of this writing, so the data can hardly be called comprehensive. Future studies seem promising in terms of assessing the probabilistic prospects for the development of technologies in enterprises of the industries presented in the table. In addition, it is potentially effective to calculate which specific digital technologies are used in each industry and to identify patterns of whether specific technologies are a catalyst for industry development or not. 2020 was a catalyst for change and the drive for digitalization, as the impact of the health crisis and the forced transition to digital work methods acted as an incentive for such changes. However, the enterprises

most frequently cited in the context of the pandemic and the necessary digitalization have not shown, for the most part, dramatic qualitative changes in relation to digitalization.

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