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Digitalization processes vs. traditional ones: ethical and environmental aspects

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ABSTRACT: At the current level of economic development, the digital transformation of society is an important factor in advancing any social structure. The purpose of the present study was to explore the transformation of a traditional society into a digital one, with a focus on ethical and environmental aspects. The study draws on a variety of information analysis methods to identify strengths, weaknesses, opportunities, and threats of digitalization, including the environmental aspect. Our research revealed that in Russia, the only highly digitalized sectors were information technology and finance. Digitalization is strikingly different in the European countries, where only transport and building industries slowly implemented digital technologies into their business processes. We also examined digitalization levels in 7 Moscow universities. The universities managed to improve their digitalization scores with the help of recommendations developed for online learning, such as selection of quality software, having qualified teaching staff, constant monitoring, and evaluation of knowledge. The findings can be used in economic, social, and environmental spheres since they highlight the ambiguous effects of digitalization using practical examples.

KEY WORDS: Information · Ethical principles · Public awareness · Online platforms · SWOT analysis

1. INTRODUCTION

Economic development facilitates the digitalization of regional economies, social systems, and even individual companies. Many sociologists argue that the digital transformation of a traditional society provides it with a competitive advantage (Dias & Vieira 2013, Cochoy et al. 2020, Bonnaud 2021). By the end of the 20th century, the expansion of the information space in different countries had contributed to the creation of digital networks for customer interaction and information preservation (Mondejar et al. 2021, Ciriza-Mendívil et al. 2022).

Digital transformation is the process of introducing digital technologies in all domains, which implies significant changes to traditional operations that will accelerate the systematization of new products and services (Sunil & Nair 2021, Sánchez-García & Tejedor 2022). Effective digitalization requires abandoning traditional systems and operating models, paper-based data centers, etc. (Sizganova et al. 2022). Digital documentation, technological innovations in the industrial and environmental sectors, and dematerialization make it possible to conserve natural resources and minimize the negative impacts of human activity on the environment (Zhili et al. 2019, Chen et al. 2020).

Digitalization of society promotes continuity and business vitality but requires a change in the culture and ethics of companies (Garzcarek & Steuer 2019, Rezer 2021). Digital transformation can increase profits and lower costs. The transformation of a company's culture towards the digitalization of employee workflow can successfully promote the digitalization

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of other operational processes (Narbut et al. 2020). Another factor of success is having highly qualified experts. The need for qualified staff encourages universities around the world (Russia included) to offer more highly sought-after specializations, such as information technologies (IT), engineering, etc. In 2019, exports of information and computer services in Russia increased by 34 and 28% respectively, which contributed to the allocation of more budget funds (Parkhomenko et al. 2019).

Only a well-designed management system can reduce the risk of inefficient use of labor and monetary resources. Innovative digital technologies can expand various processes through data collection and storage optimization that allow for the formation of different model algorithms (Young et al. 2019). These processes contribute to the centralization of data collection, transmission, and storage, which improves their reliability and removes the boundary between the digital and physical worlds. It promotes the emergence of new capabilities but, at the same time, requires ethical considerations (reliability of data retention, accuracy of entering personal information, and compliance with legal criteria). The reliability of data retention and confidentiality is one of the most important ethical issues because the public availability of personal data can negatively affect an organization (Crawford et al. 2020). The accuracy of entering information is also an important aspect because it determines the possibilities of adapting digitalization processes in a particular industry (Olo et al. 2021). Ethical issues of digitalization can also be related to technical failures, which can affect the correctness of the information provided (Ruiz-Palomino et al. 2021). The automation of all data leads to the digitalization of management processes, freeing humans from performing labor-intensive operations (Levin & Mamlok 2021). Digitalization promotes the mobility and automation of business processes, speeding up operations performance.

1.1. Literature review

The analysis of the advantages of digitalization compared to traditional approaches was carried out by examining previously published scientific articles. An analysis of 11 articles was used to conduct the literature review. There are many theories in the literature explaining the effectiveness of digitalization versus traditional systems. Guryanova et al. (2020) outlined the primary elements of a digital economy and examined how they change the structure of a traditional economy and transform social relations. The authors believed that socio-ethical problems should be considered when describing the prospects of digital transformation. The ethical dimension, in the same way as innovative technology, is an integral part of future innovations, which are designed to combine artificial intelligence, robotics, and ethical aspects of relations in society. The theory of digitalization effectiveness is related to its relevance to the current stage of economic development, which is interconnected with social and ethical problems. For the effective functioning of the digital economy, it is necessary to take into account risks that may arise in the future, the identification of which will contribute to its positive change. Guryanova et al. (2020) analyzed various literature sources on social and ethical issues of digitalization of health care, data privacy, violation of existing social structures, inequality, and injustice. Socio-ethical issues arise from storing information digitally, allowing IT professionals to develop programs to retrieve new information.

Haider et al. (2021) pointed out that the central focus of digitalization was ethical issues. To address those concerns, the authors proposed a 5-step approach (access, knowledge acquisition, adoption, innovation, and transformation) that promotes the confidentiality of information at the national level. Quinn (2021) analyzed the ethical principles and values that affect a democratic digital society. Democratic ethical principles concern not only data transparency and trustworthiness but also data decryption. The authors of the article discovered that society's ethical reasoning should involve quantitative aspects as well as social and political issues. Proper regulation will help to strengthen trust in artificial intelligence systems. Pangrazio & Sefton-Green (2021) highlighted the existential questions of the digital transformation, which force people to come to terms with who they are, as well as their social reality and interactions. The article examines the effectiveness of addressing each of the philosophical problems associated with limiting human interference in the digital environment through conceptual and practical actions.

The COVID-19 pandemic led to the digitalization of many social activities. Information technology exacerbates the disparity between the positive impact of these changes on some people and negative impacts on others. The pandemic, however, has shown many positive aspects of using IT (Marabelli et al. 2021). Surdu et al. (2021) conducted an empirical sociological study within the 'CRESCEnt' project to explore the possibilities for improving critical

thinking, responsible communication, and responsible behavior in the digital environment. The study concluded that in order to comply with ethical norms, it is necessary to prevent the dissemination of false information, avoid social polarization, and provide only relevant and truthful data. The 'CRESCEnt' project is based on identifying errors in the workflow.

A major challenge to modern society is online science, digital technology, artificial intelligence, and robotics because they lead to loss of autonomy, cybercrime, threats to child safety and national security. Nevertheless, digitalization is very effective in climate change and disaster mitigation and improvement of the connection between smart cities. The introduction of innovative IT promotes international cooperation in cultural, economic, social, and ethical spheres (Hantrais & Lenihan 2021). Taylor & Pagliari (2018) conducted a study on the use of social media data for research. Collecting social media data can be controversial, even though the information is in the public domain. After analyzing data from PubMed, the authors concluded that there is a lack of ethical guidelines regarding the use of public information as well as a lack of sufficient public awareness. Walker (2016) discussed the protection of online data transmission and exchange, which is related to confidentiality and safety. Online data protection can be improved by cultivating trust and transparency, introducing better verification mechanisms, and raising consumers' attention (Uskov et al. 2014). Digital space facilitates extensive information dissemination but hinders the mechanisms that control how it is used. The mechanisms of control are applied not only to the moral side of the data usage but also its legal aspects connected to the copyright (McQueen 2015). The paper points out that the digital revolution has opened new opportunities for computer professions but has brought with it social and ethical responsibilities. The authors of the paper suggest that a code of ethics can be a good starting point for defining a set of guiding principles regarding the use of online data.

1.2. Problem statement

The literature review showed a great deal of attention to digitalization and its ethical aspect. This topic became most relevant during the COVID-19 pandemic, when digitalization processes accelerated because people were isolated from the outside world and many educational, informational, and social business processes moved to online space. Most of the studies addressed ethical issues related to information in the public domain. The present study also focuses on studying ethical aspects of transformation from a traditional to a digital society. To achieve this goal, the following sectors were selected and analyzed: IT, education, financial activities, wholesale and retail trade, construction, power industry, medicine, chemical and manufacturing industry, oil and gas industry, transport, and mining. These industries were chosen because they affect the most important aspects of human life. Having analyzed the literature sources presented earlier, we concluded that the most relevant issue now is the digitalization of education, as it has been greatly affected by the COVID-19 pandemic as educational institutions were urgently forced to switch to online learning. Based on current conditions, digitalization in education should develop at a rapid pace, as it requires the transition of all teaching materials and student evaluations into digital formats and online journals.

Proceeding from this background, the main goal of our work was to study the ethical components of traditional society's transformation into a digital society, including the period of the COVID-19 pandemic, taking into account the environmental component. The main objectives of the study were to (1) conduct a 'strengths, weaknesses, opportunities, and threats' (SWOT) analysis of digitalization, which is based on identifying the strengths, weaknesses, opportunities, and threats that affect the ethical components of transforming a traditional society into a digital one; (2) study the level of digitalization in various spheres of activity in Russia and other countries necessary to comply with ethical norms, which are primarily related to the confidentiality of information; (3) identify the level of use of online learning platforms in different countries; and (4) develop recommendations for online learning with an ethical component for universities in the city of Moscow.

2. MATERIALS AND METHODS

SWOT analysis is a tool for strategic planning and determination of competitive advantages of certain parameters. Here, SWOT analysis was applied to identify the strengths, weaknesses, threats, and opportunities of digital transformation (Hergüner 2021). This tool helps to collect and structure information, identify threats and risks posed by internal and external factors, and spot points of growth. At the same time, SWOT analysis is somewhat subjective and should be fitted to a specific goal. SWOT analy-

sis is a necessary tool for assessing various risks. It is also a simple presentation analysis for assessing the situation that can be used by executives.

The present study compares digitalization processes in Russia and other countries, such as Belgium, Bulgaria, Cyprus, Czech Republic, Finland, Germany, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Slovakia, Slovenia, Sweden, and the UK. The criterion for selecting countries was an analysis of a variety of areas: IT, education, financial activity, wholesale and retail trade, construction, electric power, medical, chemical industry, manufacturing, oil and gas, transport, and mining. This analysis allowed us to determine the transformation of a traditional society into a digital society. Moreover, the study examined the percentage of countries that use online platforms in the learning process and compared it to the indicators of digitalization in Russia in 2020 (http://neorusedu.ru). The platforms selected for the study were Coursera, EdX, Lektorium, Universarium, and Openedu. The comparative analysis allows one to determine the level of adaptation of different countries to online learning and develop further programs for improving the educational system. No additional criteria were used to determine levels of use of online learning platforms across countries.

The research also analyzed digitalization levels in 10 Moscow universities before the pandemic (when there was no need for online learning) and in the second half of 2020 (after the recommendations regarding online learning were introduced). The level of digitalization was calculated using the following formula (Ilyasov 2020):

$$D = \frac{k}{4} \quad (1)$$

Here, k is the coefficient of digitalization which is determined by a rating scale from 0–4, where 0 = digitalization is not implemented; 1 = automatic data collection is present; 2 = some digitalization of organizational processes, automatic data collection and analysis; 3 = intelligent decision support systems, including automatic digital data collection and analysis that are used to make real-time decisions; and 4 = digitalization of all stages of business processes. The closer D is to 1, the higher the digitalization level of the organization.

To compare the results with each other, the Student coefficient was calculated (Walker 2016):

$$t = (M_1 - M_2)/\sqrt{(m_1^2 + m_2^2)} \quad (2)$$

where $M_1 - M_2$ is the average difference in the values of the indicators; m_1 and m_2 are the standard deviations of the indicators.

If the calculated value exceeds the tabulated value, the coefficients do not correlate with each other.

The obtained data were processed with the innovative PlanMaker (2020) processor. This program allows for the application of formulas and functions, formatting and saving the data in various formats. The authors followed all the ethical considerations developed by the Committee on Publication Ethics (COPE 2021).

The limitations of the presented work are related to the detailing of digitalization in education, excluding other areas (for example, the sphere of culture). Despite this limitation, we identified the levels of digitalization in various spheres of activity in Russia, and present recommendations for online learning with an ethical component for universities in Moscow, with further calculation of their effectiveness.

3. RESULTS

The summary of the SWOT analysis presented in Table 1 highlights the positive and negative sides of the digital transformation of society. The SWOT analysis showed that digitalization, which replaced the traditional approaches in economic and social spheres, has significant advantages. The strengths include flexibility (a well-written program allows one to enter a variety of initial parameters while processing and providing the necessary data), the confidentiality of information, and continuous product development enhanced by digitalization. The weaknesses associated with digitalization are lack of internet in remote regions, difficulties in using online products encountered by the older generation, data insecurity, and the need for systematic training on the use of new technologies. These problems can be addressed by specialized courses, as well as by detailed legislation concerning the use of information in online space. The matters of environmental digitalization in the SWOT analysis are referred to in a rather generalized way. Environmental issues are not major in the discussion, but such mention directs the article towards greater compliance with ethical principles, which will be considered in further research. Fig. 1 shows the ratio of the pervasiveness of information systems in various industry sectors in Russia and the European countries. In 2019, the highest level of digitalization in Russia was observed in the IT and finance sectors. In European countries, these 2 sectors were accompanied by chemical, oil and gas, and manufacturing industries. Only 2 economic sectors in the European countries had low levels of digitaliza-

Table 1. Strengths, weaknesses, opportunities, and threats (SWOT) analysis of the transformation process from a traditional to a digital society

Strengths	Weaknesses
Digitalization of society encourages business activity and promotes learning from anywhere in the world It is flexible in use Digitalization facilitates large-scale transmission, processing, and storage of information, including in the framework of environmental digitalization It incorporates various approaches to information processing and transmission	Lack of internet access in remote areas The older generation has difficulty using online products (applies to environmental digitalization as well) Data insecurity in online space may lead to violation of ethical norms (e.g. publishing places of residence of endangered animal species that require veterinary care) A systematic approach to learning and using the new technologies is necessary to improve the existing processes
Opportunities	**Threats**
The rapid pace of digitalization contributes to continuous product development Digitalization of the economic and social spheres allows for a variation in many indicators Digitalization helps to preserve the information (including environmental) on different online servers, which minimizes the risk of its loss Digitalization provides an opportunity to improve the legislation about ethical standards of the information use	Lack of qualified specialists in the field of digital technologies Digitalization requires the development of heavy programs to process the information

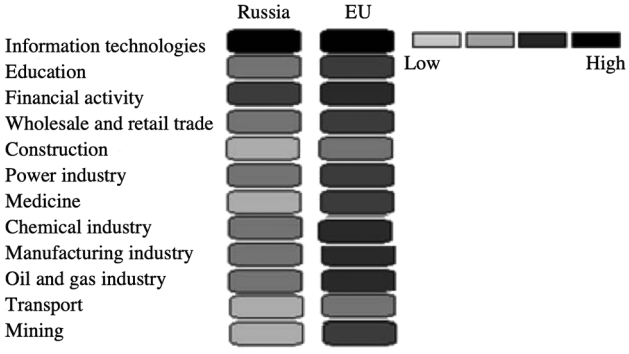

Fig. 1. The level of digitalization in various economic domains in Russia and the European countries as of 2019. Adapted from TADVISER: 'Digital economy of Russia'[1]

tion — construction and transport. In Russia, most industries, except for IT, were less digitalized.

The global COVID-19 pandemic had a significant impact on the digitalization of the economy and social systems. Previously developed and coordinated processes had to be managed online and often automatized. The educational environment was no exception, as the need for online learning emerged.

The USA was a leader in online education (51% of people used online platforms for learning) in 2019, while in the UK, only 6% of people studied on digital platforms (Fig. 2). This difference is attributed to the educational culture of the countries. In Russia, only 8% of people used online platforms for education in 2019. The platforms chosen for the study were Coursera, EdX, Lektorium, Universarium, and Openedu. These platforms are the most popular worldwide, which makes it easier to determine the number of participants. The data included people who were taking university and various corporate courses.

Based on the international standards and the ethical aspects of digitalization, we developed recommendations for the implementation of online education in Russia. These recommendations can be used by universities or other organizations that train their employees in certain skills. A well-designed online training course that takes into account ethical issues should consider the following aspects:

• quality software and appropriate choice of online learning platforms, as they are important for the good quality of images and sound. The information transmission must be uninterrupted to ensure students' interest. Quality software excludes loss of information and protects from a hacking attack

• highly qualified teaching staff who can deliver unbiased content. Universities should offer system-

[1]Available at: https://tadviser.com/index.php/Article:Digital_economy_of_Russia#McKinsey:_Digitalization_of_the_economy_will_increase_Russia.27s_GDP_by_4.1-8.9_trillion_rubles_by_2025.

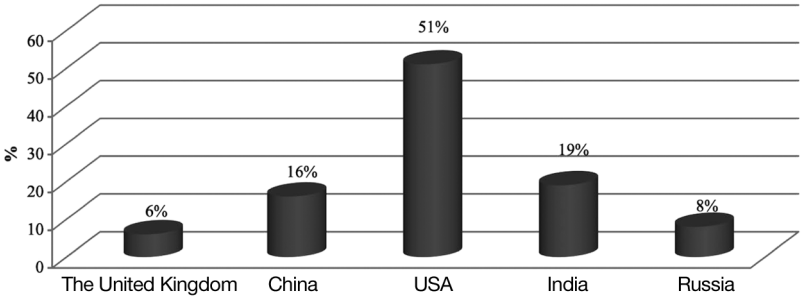

Fig. 2. Prevalence of online platforms used for education in various countries

atic courses of online teaching for staff. The systematic aspect is very important since it will help to achieve maximum effect

- accessibility and entertaining quality of the learning material. A creative approach is very important for learning. Teachers should avoid dry and monotonous presentations. Large amounts of information should be broken down into smaller blocks and presented in the form of diagrams and tables
- students must know the purpose of the course from the very beginning. They should be told why they need it, what it looks like, and what the outcomes are
- the teachers (speakers) must give frequent feedback. This will highlight the gaps in knowledge and improve the personal motivation of the students
- analysis and tracking of students' performance will keep them on track as well as prevent information leakage and violation of ethical norms
- teachers need to develop a schedule of individual online consultations, which will avoid a formal attitude to the subject and provide psychological support
- students need to be informed about the confidentiality of information to avoid violations of ethical norms regarding the usage of online information.

The ethical issues of digitalization are very important for the educational sphere. They are mostly related to data preservation, transmission, storage, and dissemination. In online learning, students are provided with a huge amount of learning materials, the rights to which belong to the person who developed the lesson. No one, except the author, has a moral right to share this information and use it for their purposes. In some countries, the author's rights to this type of content are protected at the governmental level. Germany was the first country to digitalize all libraries, which improved the learning process (Patrignani & De Marco 2014). In Switzerland, all businesses have digitized information, allowing e-commerce to develop. Digital literacy is part of the school curriculum in the USA (Popa et al. 2021). However, digital information is strictly protected in these countries and cannot be distributed without the consent of those who own the rights to it.

The effectiveness of social contacts depends upon their quantitative and qualitative dimensions. If a person has a limited number of high-quality social contacts that contribute to the solution of specific problems, it has a more significant social impact than someone having many insignificant communications.

Education is the best example of where the above recommendations can be implemented. However, other areas can also use these suggestions since the approaches to learning and information transfer are not very different across organizations. After implementation of these recommendations, the prevalence of online learning in 10 Moscow universities has increased significantly. The level of digitalization before and after the adoption of the recommendations was measured by using Eq. (1). Also, in the work, a statistical comparison of the data obtained using the Student coefficient was carried out (Eq. 2). The results are presented in Table 2.

The accelerated digital transformation of learning after 2020 in the selected universities was undoubtedly connected to the COVID-19 pandemic. However, digitalization did not reach the highest possible levels because of certain difficulties that are characteristic of the whole digital society. The comparative analysis showed that before 2019, only 2 universities

Table 2. Level of digitalization in various Moscow universities (D) and comparison of data using the Student coefficient t (tabular value: 2.571). $D_1 - D_{10}$: estimated digitalization rates according to university numbers. $t >$ tabular value: significant and shown in **bold**

University	Digitalization, D_1–D_{10}		t
	Before COVID-19	After COVID-19	
University No. 1	0.5	0.75	2.516
University No. 2	0.25	0.75	**3.019**
University No. 3	0	0.25	**3.893**
University No. 4	0	0.5	**4.002**
University No. 5	0.5	0.5	0.010
University No. 6	0.25	0.75	**3.957**
University No. 7	0.75	1	1.769
University No. 8	0.5	0.75	2.417
University No. 9	0.25	0.75	**2.931**
University No. 10	0.75	1	1.834

had the highest level of digitalization ($D = 0.75$). After the implementation of the recommendations, these 2 universities had improved their performance even more ($D = 1$), while 5 more universities reached a digitalization level of $D = 0.75$.

The established results could also relate to the specialties of ecotourism, as training is also interconnected with digitalization, which is reflected, among other things, in data privacy. Ecotourism is an element of sustainable tourism development aimed at traveling in areas where human impact is minimal. Ecotourism was introduced in the 1980s by the Mexican ecologist Hector Ceballos-Lascurain (Cao et al. 2022). The principles of ecotourism encompass the following: (1) exposure to nature that has been minimally impacted by humans, their culture, and customs; (2) minimizing the negative impact on the territory during the visit; (3) providing environmental education and awareness; and (4) financing the support of the visited territories by the purchase of tickets during tourist activities, etc. The most popular ecotourism countries are Kenya, Tanzania, Costa Rica, Australia, New Zealand, and South Africa (Vidickienė et al. 2021).

Virtual ecotourism, on the other hand, is the opportunity to visit a variety of parks and other places untouched by a man using computer technology and 3D modeling. It may well be called an element of digitalization that helps to depict the processes of transformation of traditional society into a digital one by transferring the real picture into the digital world. At the same time, virtual ecotourism is based on ethical components since 3D filming in protected areas is only possible with the permission of the management as well as the higher state authorities.

The digital space can bring researchers and policymakers even closer together as the former can predict new sanctions or opportunities. This may contribute greatly to the economy of a country that the policymakers are to address. Sanctions are restrictive measures of an economic nature imposed by an international organization or a state on another state, natural person, or another identifiable subject to exert influence on them. They are charged to stop criminal actions, violations of agreements, armed activities against other countries, and similar wrongdoings. In this respect, researchers can outline expected terms for the suspension of aid in loans to certain areas or for the application of economic measures in trade, taxation, finance, and other fields. Also, they can help in identifying the positive aspects of the digital world; for instance, the capability to determine the pollution of any territory or a positive economic impact from the sale of novel developments. The importance of interaction between researchers and policymakers stems from the possibility of taking advantage of prior knowledge, analyzing it, and thus developing new programs and resources for the country's economic growth funded by policymakers.

4. DISCUSSION

The transformation of a traditional society into a digital one is a complex process. Technological developments generate a growing need for proper digital processing of all data, correct and ethically driven storage, and transmission of information. The main difficulty lies in the ambiguous effects of digitalization on society and its adaptation to the rapid changes. Investigation of the levels of digital transformation in various social and economic domains across countries showed that in the Russian Federation only 2 sectors — financial and IT — had high levels of digitalization in 2019. These are the sectors where storage and processing of a large amount of data is necessary. All other areas, including education, wholesale and retail trade, and chemical and manufacturing industries used digital technology to a rather limited extent. In the European countries, only transport and construction lagged behind in the implementation of IT, but the oil and gas industry, medicine, and education were highly digitalized.

Colleagues (Chen et al. 2020) have noted that the introduction of digital technologies such as smartphones, robotics, remote sensing, and artificial intelligence has had a number of positive environmental effects. For example, in the industrial sector (1) production efficiency increases, less time is spent on the production process, and fewer rejects are allowed; (2) energy resources are saved; and (3) dematerialization (reduced use of materials and less waste) and paperless production (digital documents, electronic instructions) take place (Chen et al. 2020). However, the risk of cybercrime is increasing (Yar & Steinmetz 2019). In education, business, and tourism, virtual meetings, and training sessions become more frequent, previously inaccessible information becomes available, and time, costs, and resources for travel are saved (Bates 2020) — all of which reduces the impact on the natural environment. Digital inequality, lack of authenticity, personal degradation, and 'formulaic thinking' (Goncharova 2021) are negative social phenomena of digitalization that can be projected onto the human environment. In the present study, however, it is noted that the levels of digitalization development depend on the country, as well as the industry.

Digital technology has made monitoring environmental change easier and more effective through the use of sensors, microprocessors, and satellite information (Chen et al. 2020). The waste of digitalization — batteries, smartphones, and other electronic devices — are powerful environmental pollutants that can cause a number of deadly diseases in the human body (Singh et al. 2018). The transportation system is becoming less energy-intensive and safer in terms of carbon dioxide emissions, especially given the trend toward electric vehicles (Zhili et al. 2019). Digital transformation, as one of the main trends of the 21st century, in some ways is aimed at popularizing environmental sustainability because it is based on digital technology, eliminating the waste of natural resources (e.g. paper). Large international companies are developing strategies to minimize their negative impact on the environment, for example, the trend toward carbon-neutral enterprises (Lichtenthaler 2021). However, such strategies have not yet gained popularity, and most companies are not aware of the need for sustainable development of natural ecosystems in the context of digitalization. Based on the common analysis of digitalization implementation in enterprises, the present study focused on a narrower area, namely education, to determine the effectiveness of digitalization implementation.

The topic of the digital transformation of society has been examined by several authors. Livingstone & Stoilova (2021) considered the problems of conducting global research in the domain of children's rights in the digital environment. The authors examined the Global Kids Online project, which was designed to protect children's digital rights by developing a set of impact tools for research and data exchange on the topic. Nabbosa & Kaar (2020) addressed societal and ethical issues of digitalization. The authors highlighted the benefits and risks of digitalization, focusing on shifts in social values and digital ethics.

Kasavina (2019) looked at the cultural aspects of digitalization in the social sciences and humanities. The use of digital technologies leads to changes in thinking, perception, communication, and socialization. The author stated that the introduction of innovative technologies contributes to the formation of interdisciplinary thinking in terms of philosophical and humanitarian alternatives. Huda (2019) outlined ethical obligations concerning the adoption of IT. The paper explained how one could follow ethical principles during information sharing and how such actions could enhance social and personal awareness. The author also discussed the ethics of processing, transmitting, storing, and using information. Key ethical issues that arise during data archiving were explored by Suomela et al. (2019). Baeva (2019) described the threats to personal and cultural security associated with online information use. The author identified several threats related to data storage security, such as cyberterrorism and digital warfare. The roots of these threats are located in the socio-cultural identity and connected to the rise of addictions related to the specifics of online activity. To address these problems, the authors systematized international documents on information security and suggested improvements to the Russian education system in terms of ethics and digital culture.

McKay & Mohamad (2018) studied the issues of data storage in different sectors of the economy and social activities. The authors suggested that data stored in archives is a global problem because not everyone who works with such data has good digital skills. The paper described mechanisms for acquiring such data, which would be useful for both novice employees and skilled programmers. The proliferation of IT promotes a democratic approach to the use of information. Nevertheless, the use of online information does not always take place according to legal or ethical principles. To address this problem, it is necessary to instill a new digital culture in people, based not only on the principles of democracy but also on the laws and regulations in the field of artificial intelligence (Nemitz 2018). Innovative technologies advance the digital sphere but bring new ethical problems. Mahieu et al. (2018) conducted a scientometric analysis of digital ethics to understand the nature and extent of digitalization. The authors concluded that digital ethics is most relevant in the medical field. However, to understand the ethical issues of digitalization in a particular field, one must study them in detail. The article also pointed out that the rise of innovative technologies is associated with the emergence of several ethical problems. The authors found that the quality of the software determines the ethical component. In the present study, however, an analysis was conducted to determine the benefits and prospects in the process of implementing digitalization.

Societal and ethical issues of digitalization were also addressed by Royakkers et al. (2018) with respect to biometrics, robotics, the internet, virtual reality, and digital platforms. The faster the pace of digital technology development, the more pressure it puts on societal values. The authors concluded that the ethical aspects of data privacy and protection are well developed, but there are gaps in data autonomy, imbalances in data digitalization, etc. Information that is posted on social media platforms is increasingly becoming the subject of research. The use of such data

creates certain ethical problems because, on the one hand, the information is publicly available and, on the other hand, its rights belong to a certain person or group of persons. Current legislation does not cover all aspects regarding the use of social media data, so there is a need to create awareness about the ethical issues that exist (Cochoy et al. 2020). Digitalization can lead to changes in traditional structures of thinking and understanding. Schwarke (2017) found that the difference between traditional and digital society lies in inequality and freedom. The exploration of these topics can help develop alternative laws.

The overview of the studies on digitalization showed that many works focus on ethical issues of digital transformation. Every year the number of research papers on this topic grows. Many studies look at the legal regulation of ethical issues, data digitalization, and storage of medical information. We focused on education because it became quite relevant during the COVID-19 pandemic. The present study reviewed the ethical components of the digital transformation of traditional society using statistical data from various countries, including Russia. We also determined the level of digitalization in 10 Moscow universities before the implementation of the recommendations for enhancing digital transformation and after it. Seven universities demonstrated a significantly higher level of digitalization.

Although ethical principles in force in the digital world are too specific, they do have similarities if other areas are considered. For example, in healthcare, one should not violate ethical principles related to the dissemination of information about a person's diagnosis, while in river protection, one should maintain an ethical attitude to preserving information about river flora and fauna. Ethical principles are interrelated with each other and, in a global understanding, are aimed at data protection and confidentiality.

As concerns the digital world, ethical principles in force are (1) information and digital data privacy preservation; (2) respectful use of publicly accessible as well as classified data that can be obtained through pre-registration or payment; (3) compliance with the rules of the country and non-usage of banned sites, resources, or social networks; (4) prohibition of copyright infringement.

5. CONCLUSIONS

A SWOT analysis was conducted to identify the positive and negative aspects of digitalization as well as its weaknesses and strengths. The analysis revealed that digitalization has had a positive impact on business activity. It has the advantage of flexibility compared to the traditional organization of processes and contributes to constant product improvement. The lack of specialists in this area and the absence of internet in remote regions can create certain problems, but these issues can be further addressed with governmental support at the regional and local levels.

Initially, the analysis revealed that in Russia the main emphasis on the application of digitalization is in IT and the financial sector. In European countries, in addition to the industries represented in Russia, the emphasis is on education as well as chemical and manufacturing industries.

The COVID-19 pandemic accelerated the digitalization of all spheres and prompted the transition to remote work and learning. This study examined what percentage of people use online learning platforms in their education in various countries. We found that the most widespread use of online learning platforms occurs in the USA (51%) and India (19%), while digital platforms are least popular in Russia (8%) and the UK (6%). We developed recommendations for enhancing digitalization of the educational process that were implemented in 10 universities in Moscow. They include the selection of quality software, availability of qualified teaching staff, a clear indication of the purpose and outcomes of learning, accessibility and entertaining quality of the information presented, constant monitoring and evaluation of knowledge, individual online consultations, and attention to ethical issues and data confidentiality. These recommendations are appropriate for all sectors, as they cover not only the proper data storage and provision but also the key ethical issues related to the dissemination of information. Before 2019, only 2 universities extensively used digital technologies in their courses. After the adoption of the recommendations for online learning, 7 more universities reached high levels of digitalization.

Overall, it is important to state that ethical principles continue to dominate social interactions, which affects the transformation of digitalization in the wake of information technology changes.

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