Digitalisation: prerequisites and challenges in modern conditions

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Abstract. Digital transformation is becoming an integral part of modern business, opening up new opportunities, but also involving risks. This article presents a study of the risks of digital transformation, focusing on identifying key aspects and recommendations for effective management. The authors analysed cybersecurity, data management, changes in corporate culture, staff training and partnership development in the context of digital transformation. The findings revealed the need for an integrated approach to risk management that includes strategic planning, responding to changes in the environment, and ongoing staff training. The recommendations presented offer organisations the tools and approaches to successfully overcome the challenges of digital transformation and ensure sustainable growth in the digital age. The generalised approach to risk management presented in the article facilitates effective adaptation and innovative development in today's digital environment. In addition to analysing risks, the article also discusses the importance of strategic planning and developing flexible strategies to respond to changes in the digital environment. Particular attention is paid to managing change within an organisation and developing an innovation culture that facilitates successful adaptation to new technologies. The authors emphasise the importance of continuous training and development of employees so that they can effectively use digital tools and actively participate in the transformation process. In addition, the article discusses the implementation of effective risk monitoring and assessment systems that allow for the timely identification and management of potential threats.

1 Introduction

Digitalisation is not just a shift from paper to electronic documents. Digitalisation is not just a transition from paper to electronic documents; it is a profound transformation affecting all aspects of society. Digital transformation is not a local, but a global phenomenon that affects all spheres of human life and the business community. It changes the way of thinking, social relations, and business relations in the business community, among other things. Digitalisation in economic sectors promotes the creation of new digital business models to improve production processes and the development of digital trade. It is changing the way companies and organisations work by expanding opportunities for online sales, digital marketing and remote management.

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In terms of social relationships, digitalisation facilitates communication and information exchange between people, fostering online communities and the spread of ideas. It also improves access to education, cultural resources and entertainment services through digital platforms and services.
In health care, digitalisation facilitates the development of telemedicine, electronic medical records and analytical systems for processing medical data.provides new opportunities for diagnosis, treatment and monitoring of diseases.
In politics and governance, digitalisation is changing the way citizens interact with the state, improving access to public services, simplifying procedures for obtaining documents and certificates, and increasing the transparency and efficiency of public administration. It is worth noting that in the current conditions of digital transformation of the economy, there is a need for coordinated actions on the part of the state and the business community, because without comprehensive support from the state, be it financial or legal, it is very difficult for the business community to achieve success in the relevant fields in the modern world. Undoubtedly, joint initiatives will help to achieve the desired results faster and solve the growing problems. The integration of all participants in the digitalisation process is a key success factor. Entrepreneurs and investors should invest in innovation and the creation of new digital products and services, and ensure that these products are accessible to all segments of the population. Public authorities, in turn, must develop suitable policies and regulations that promote the development of the digital economy and protect the interests of citizens. Public organisations and educational institutions also play an important role in raising the awareness and competences of the population in the field of digital technologies.International cooperation also plays an important role in the successful adaptation to the digitalisation process. In a global world where information flows and technological innovations cross borders, cooperation between countries becomes one of the most important tools for achieving joint goals in the digital sphere. Digital technologies are made up of many different concepts and components, and it is the Internet that has in many ways become the foundation for this development, providing people with access to information and flexibility not available in the past. In today's world, the role of digital technology is becoming an integral part of our daily lives. Penetrating various spheres of society, digitalisation is reworking structures, changing approaches and opening new horizons [1,2,3,4,5,6]. It is not just the introduction of new devices and programmes, but a real transformation of traditional systems.

The opinions of foreign and Russian scholars on this topic may vary depending on the context and specifics of their research. It is necessary to highlight several sources reflecting the views of scholars on digitalisation:

1. "Digital Transformation: A Roadmap for Billion-Dollar Organisations" (2018) by A. McCormack - the author examines digital transformation in the context of businesses and organisations, offering practical recommendations and strategies for successful adaptation to the digital age [7].

2. "The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies" (2016) by E. Brynjolfsson and A. McAfee - the book explores the impact of digital technologies on the economy and society and offers perspectives on the future of digital transformation [4]. McAfee - the book explores the impact of digital technologies on the economy and society, and offers perspectives on the future of digital transformation [8].

3. "Digital Russia: The Language, Culture and Politics of New Media Communication" (2014) by N. Roudakova - the book examines digitalisation in the context of Russia, exploring its impact on the language, culture and politics of new media communications [9].

4. "The Fourth Industrial Revolution" (2017) by Klaus Schwab, which describes the key aspects of the fourth industrial revolution, which include digital technologies and their impact on the economy, society and global relations [10].

5. "The Digital Transformation Playbook: Rethink Your Business for the Digital Age" (2016) by David L. offers a detailed overviewof strategies and techniques that companies can Rogers - author use to successfully digitally transform their business [11].

6. "Digital Russia: The Challenges and Opportunities of the Information Age" (2018) edited by M. Blinnikov and V. Strukov - the book contains essays and studies on the impact of the digital revolution on Russia, including aspects of economics, culture and politics [12].

Thus, it is undeniable that digitalisation and the ensuing transformation of the economy and society is an irreversible process with both frightening and gratifying consequences for society. It is now clear that this global process, which involves all areas of humanity, cannot be left behind. In anticipation of future global changes, which have already begun to take place, the world community must recognise the fact that both the global threat of digitalisation and its positive effects must be addressed together. It is also indisputable that digital transformation will increase disparities between countries, and the country that does not react in time to the global trends associated with digital transformation will be left far behind in the global changes. Therefore, despite the financial instability and the complexity of geopolitical relations around the world, the importance of supporting digital transformation cannot be understated. Digital transformation requires a fundamental restructuring of all business processes in society, as well as a restructuring of civic attitudes towards it, as not all societies are ready to accept digital transformation. There are plenty of reasons to see digitalisation as a threat, first of all, the risk of personal data loss, as already in the first few months of this year about 3 billion records of personal data have been leaked, and it is worth noting that even highly protected information marked ‘trade secret’ has also been subject to a 13 per cent leakage rate since the beginning of the year. All of the above shows the need to pay special attention to improving the level of cyber security in the country, the fact that the situation with the leakage of personal data is getting worse over time suggests that this issue is not given due attention. The most important direction of increasing the competitiveness of the country in the market and in general on a global scale is to focus on the digital environment, to ensure all legal and economic conditions for the successful transformation of all sectors of the economy and, in general, civil society. Despite the enormous financial resources that accompany digital transformation, in the future they will undoubtedly serve to ensure that the country and society will be ahead of all ongoing transformations in the global community.

2 Materials and Methods

In the process of the research the system approach, evolutionary approach, approaches of the theory of sustainable development were used. The methods of analysis and synthesis, grouping and comparison were used as a methodological technique of the research.

3 Results and Discussion

The general consensus among scholars on the essence of digitalisation is that it is more than just the introduction of digital technologies. Digitalisation is a complex process involving various aspects of society, business and technology. Summarising the key aspects that unite the views of scholars, the following should be formulated:

1.Digitalisation is a strategic process that involves changing an organisation's business models, processes and culture using digital technologies.

2.Digitalisation not only introduces technology but also changes the way people, companies and government interact, creating new digital ecosystems.

3.Digitalisation aims to create new value for customers, improve service quality and optimise business processes through digital innovation.

4.Digitalisation requires a change in corporate culture and structures, including training staff in new skills and adopting an agile and innovative approach.

5.Digitalisation involves integrating various technologies such as artificial intelligence, data analytics, and the like to achieve complex outcomes.

6.Digitalisation aims to improve the user experience by providing more efficient and personalised services.

7.Digitalisation facilitates the creation of innovative ecosystems where different actors can interact and collaborate on new, digital platforms.

All these aspects come together in the understanding that digitalisation is not just a technological upgrade, but a comprehensive change in the way we think, work and interact in the digital age.

Considering the key prerequisites that form the basis of the digital transformation of the economy and society, they can be presented in the form of a table of periods grouped in chronological order (Table 1):

Table 1. Key prerequisites for digital transformation of the economy

Period	Event and technology
1950s to1960s	Development of computers and information technologies. The beginning of the first electronic computing machines, such as UNIVAC I, and the appearance of the first programming languages (Fortran, LISP). Development of information theory and the emergence of the concept of bit.
1960s - 1980s	The creation of the ARPANET and the early stages of the Internet. In 1969, ARPANET became the first network to use packet switching. The advent of microprocessors and the first personal computers (Altair 8800). The development of UNIX and the C language.
1980s - 1990s	Growth in the field of software. Proliferation of personal computers, development of graphical user interfaces (GUIs). Introduction of operating systems such as MS-DOS and Windows. Development of databases (Oracle, Microsoft SQL Server).
1990-e	The digital revolutionincommunications.Widespread use ofthe Internet with the emergence of the World Wide Web. The development of mobile technology and the increased use of email. The emergence of browsers such as Netscape Navigator.
2000s onwards	Development of e-commerce and digital platforms. Growth of online commerce, emergence of large electronic platforms (Amazon, eBay). Development of cloud computing and virtualisation. Emergence of social networks and mobile applications.
2010s onwards	Development of artificial intelligence and data. Expanded use of machine learning algorithms, neural networks. Development of big data and data analytics. Introduction of robotisation and automation of processes. Emergence of the Internet of Things (IoT).

It is undeniable that digitalisation is having a significant impact on all areas of human life. Digital technologies are having a profound impact on the economy, transforming traditional business practices. The adoption of digital platforms and automation systems improves production efficiency, optimises supply chains and facilitates the development of new business models. Electronic financial instruments such as cryptocurrencies and digital payment systems are also redefining financial relationships and opening up new opportunities for global transactions. In education, digital technologies are in turn increasing access to knowledge and changing the way we learn. Online platforms, educational apps and virtual classrooms are creating flexible and personalised learning. The use of artificial intelligence and analytics helps tailor learning programmes to individual student needs, creating a more effective learning space. In the medical field, digitalisation is bringing revolutionary changes. Electronic health records, telemedicine and medical apps are making it easier to access health care. The use of data analytics and machine learning helps in diagnosis and prevention of diseases. Robotic surgery and virtual reality are opening up new opportunities in medical practice. The areas of urban management, transport, habitat and social connectivity are also undergoing changes influenced by digitalisation. Smart cities, autonomous vehicles, environmental technologies and social networks are all shaping the new face of modern society. Digitalisation is becoming an integral element of everyday life, contributing to a variety of aspects of our existence. At the same time, this contribution can have both positive and negative character. Positive is the acceleration and facilitation of all processes of society and economy as a whole. Negative is the problem of leakage of personal data and the problem of loss of communication in society. If we look at the economic side, it is also the problem of cybercrime, increased competition, which may lead to the fact that small and medium-sized companies will simply not be able to survive in this high-tech environment, as the increase in the level of digitalisation of companies, the restructuring of business processes of the company on a digital basis requires large financial injections, which, perhaps, the organisation may not have. In this case, the role of the state as the main regulator of economic stability in the country increases, which will require it to make appropriate legal and economic decisions. More specifically, the state should develop and implement appropriate laws and regulations that will protect personal data and ensure the security of transactions. Due attention should be paid to the structures that monitor and control the activities of economic entities in the country in order to prevent unauthorised access. and marketing communications, in order to increase control over the market. In this context, it is necessary to emphasise the need to review the legal and regulatory framework for digital transformation, since digital transformation is still in the implementation phase and, therefore, the legal framework is not perfect. We should not forget about the need for educational campaigns to improve the digital competences of the population and the business community in general. Since, according to numerous studies, the country is still characterised by a low potential of financial literacy. It is also worth noting the need to partner with the private sector, including fintech companies, to develop joint strategies to ensure the safe and sustainable development of financial technologies.

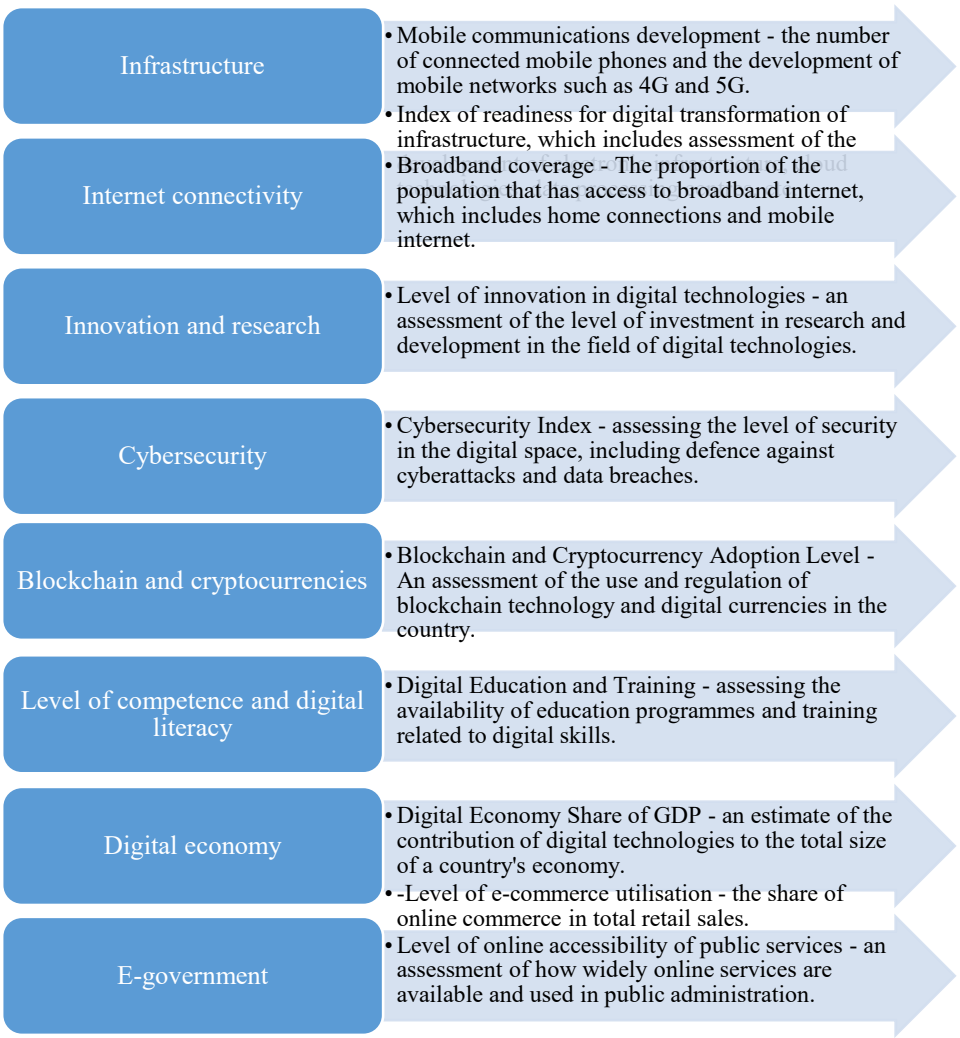

Fig. 1: Key indicators used in assessing the level of digitalisation.

The level of digitalisation in different countries can be assessed using a number of key indicators. It is important to note that these indicators may vary depending on the methodology of the data sources, but general trends and comparative analyses can give an indication of the digital readiness of countries. The following indicators should be noted as the most popular in determining the level of digitalisation (Figure 1).

These indicators are actively used to assess the level of digitalisation by such world-class organisations as the World Bank, the International Telecommunications Union (ITU), the Forum for Economic Cooperation and Development (OECD), as well as other national and international agencies. According to the published results of the World Bank's international rating "GovTech Maturity Index" (GTMI), which includes 198 countries with different levels of information technology development in the public sector [13]. Russia ranked 10th in the World Bank's GovTech Maturity Index 2022. There are 198 countries in it in total. Russia's maturity index was 0.897 points (table 2).
Evaluated:

1. "Core Government Systems" - Core Government Systems Index, CGSI; 2. "Public Service Delivery" - Public Service Delivery Index, PSDI;
3. "Public Engagement" - Digital Citizen Engagement Index, DCEI; 4. "Institutional Enablers" - GovTech Enablers Index, GTEI.

According to the maturity index, countries are also categorised into groups with a rating from A to D, from leaders to laggards. This year, 69 countries (35% of all participants in the rating) received an A rating, 46 countries (23%)

received a B rating, 53 countries (27%) received a C rating, and 30 countries (15%) received a D rating. Russia was in the A-rated group for all four sub-indices. The average value of GTMI in 2022 was 0.552 points, while Russia has this indicator equal to 0.897.

Table 2. GTMI top 10 ranking

Location	Economy	GTMI	CGSI	PSDI	DCEI	GTEI
1.	South Korea	0,991	0,990	0,998	0,994	0,984
2.	Brazil	0,975	0,980	0,969	0,970	0,981
3.	Saudi Arabia	0,971	0,963	0,979	0,966	0,977
4.	UAE	0,961	0,922	0,989	0,976	0,956
5.	Estonia	0,956	0,910	1,000	0,998	0,916
6.	France	0,945	0,923	0,957	0,950	0,952
7.	India	0,940	0,935	0,966	0,955	0,904
8.	Lithuania	0,918	0,822	0,961	0,950	0,940
9.	Mongolia	0,907	0,934	0,864	0,883	0,946
10.	Russia	0,897	0,881	0,960	0,828	0,919

Total digitalisation leaders - 2022:

1. South Korea (0.991 points) 2. Brazil (0.975 points)
3. Saudi Arabia (0.971 points)

The average score for all countries in the world is 0.552.

While digital transformation offers many opportunities to improve business processes and grow companies, it also comes with certain risks. First and foremost is also worth noting those risks associated with management effectiveness, as a lack of understanding of digital strategy among top management and employees can slow down the adoption of new technologies, leading to chaos and reduced productivity. Legislative and regulatory risks also play an important role - changes in legislation related to data processing or cybersecurity may entail the need to adapt business processes.

Consequently, digital transformation risk management requires a comprehensive approach and continuous monitoring, but also represents a key success factor in the era of digital change. In turn, monitoring is ensured by the development and application of specialised tools and methods, as well as the active involvement of all stakeholders. The monitoring and control system consists of relevant indicators and is under state control.

4 Conclusion

Digital transformation is not only a technological shift but also a cultural, social and economic process, providing a wide range ofopportunitiessuch as increased productivity, better accessto informationand services, accelerated innovation and new business models. However, along with this, it also brings a number of challenges, such as cybersecurity threats, digital inequality and job losses due to automation. In the context of Russia, digitalisation is of particular interest as the country strives to become a leader in the digital economy and

ensure sustainable development of national infrastructure. The Russian government actively supports digital transformation by introducing digital technologies into various spheres of life and developing strategies and programmes to stimulate it. However, successful digital transformation requires taking into account not only technological aspects, but also social, cultural and legal factors. This requires concerted efforts on the part of the state, business, education and civil society. The future belongs to the digital age, and it is crucial to ensure that digitalisation serves the well-being of all members of society and contributes to the achievement of sustainable development. However, we should not forget about the risks that accompany digital transformation not only in all sectors of the economy, but also in civil society as a whole. all of the above points to the need to develop systems for assessing the effectiveness of the implementation of certain digital technologies, and the systems for assessing effectiveness should be ranked by the relevant areas and levels, as well as by the functional areas of the relevant enterprises. When it comes to risks, the global threat to all humanity posed by digital transformation, it is worth emphasising the threat of cybersecurity, which can directly threaten the entire national security of a country.

We should also not forget about the factors that have both positive and negative impacts on the digital transformation of society and the economy. First of all, a significant obstacle is the high cost of the transformations to be made; undoubtedly, the state needs to find the necessary resources, otherwise the country, in the light of global trends, will find itself on the list of outsiders. Of no less importance is the growing human resources problem, as the rapid deployment of digital technologies requires an equally rapid growth in the qualitative and quantitative characteristics of the educational environment serving the digital industry, which is impossible at this stage of economic development.Accordingly, the problem of providing the digital industry with specialists of the appropriate level requires a priority solution. The solution to the problem of providing the digital industry with specialists of the appropriate level will be facilitated by ways of financial support for specialists in the digital industry, relevant institutional measures taken by the state and, of course, in general, the improvement of the geopolitical situation in the world, since at this stage of economic development no country has ‘digital sovereignty’.

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