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Digital society: State and development prospects

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Abstract. The digital society is characterised by the use of various technologies and exhibits diverse developmental trends. Digitalisation facilitates everyday life and enhances business process efficiency. The research aims to identify the origins of the digital society, assess its current state of development and future prospects, and analyse the impact of digitalisation on social life. The methodology is based on scientific research principles, employing general scientific methods of cognition, critical analysis, observation, and synthesis. The article reveals the role and significance of artificial intelligence in the development of the digital society and the potential problems and risks of its use: the generation and dissemination of misinformation, risks of violating personal privacy, risks of increasing inequality, and the emergence of ethical dilemmas in the use of artificial intelligence. It is concluded that alongside the opportunities opened up by the digital society, there are challenges and threats. These include overcoming the information crisis, recognising the priority of information compared to other resources, and forming a new sector of the information economy. Alongside these benefits, challenges arise, such as the impact of digital communication channels, the intrusion of technology into private life, and issues concerning the reliability of information. Ensuring cybersecurity and privacy is becoming a crucial and pressing task. It is also necessary to ensure responsible use of technology and artificial intelligence to avoid negative consequences such as inequality in access to technology and job losses due to digital transformation. While there is great potential for using technology to improve lives, its development and implementation must be carefully managed to maximise benefits and minimise risks. This will require global cooperation, responsible policies, ethical approaches, and the preparation of citizens for the realities of the digital world

Keywords: digitisation; technology; society; artificial intelligence; information society; digital era

Introduction

The digital society is evolving rapidly, transforming various aspects of people's lives. The increasing volume of data, widespread high-speed internet access, and the development of artificial intelligence technologies are creating countless opportunities that humanity can utilise for both personal development and professional activities and business. The digital society encompasses a wide range of technologies and trends. One key area is the Internet of Things (IoT), where various devices connect to the Internet to exchange data and interact with each other. This can simplify people's daily lives and increase the efficiency of business processes. Another important component is artificial intelligence, which is used to analyse large amounts of data, automate processes, and solve complex problems. The development of virtual and augmented reality will also contribute to changing how people perceive information and interact with their environment. This can have a significant impact on education, entertainment, and business. However, alongside these opportunities, there are also challenges and threats. Ensuring cybersecurity and protecting privacy are becoming important tasks. It is

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also essential to address the issue of the social responsibility of technology to avoid negative consequences such as inequality in access to technology and job losses due to digitalisation.

The issue of digitalisation is relatively new and under-researched, even though this process has encompassed most spheres of human activity. According to V.H. Voronkova & V.O. Nikitenko (2022), "theoretical knowledge about the digital society and the digital individual, as well as tactical issues related to digital technologies, will become increasingly important, especially in times of greater influence of social networks and the use of information and communication technologies, which impact social and economic changes, transforming entire sectors of the economy and individuals themselves". An analysis of the research by P.V. Kostetskyi & S.V. Ivantsov (2023) in the field of societal digitalisation has shown that the most relevant direction is the use of digital technologies in people's daily lives, although digital transformations of various sectors of the economy, particularly in the exact and natural sciences, are being studied with increasing intensity.

The problem of insufficient understanding of the essence of digitalisation is examined in a study by T. Dufva & M. Dufva (2019). The authors argue that in the 21st century, there is no comprehensive understanding of the digitalisation of societal life as a process, and therefore it is difficult to understand and assess its trends. The authors express the opinion that to understand digitalisation and its consequences, it is necessary to use novel cognitive approaches that differ from rational thinking. Such a position indicates the novelty and under-researched nature of digitalisation as a social phenomenon.

Several studies consider the interconnection between the development of the digital society and artificial intelligence and the challenges arising in this context. R. Iphofen & M. Kritikos (2019) examine the problem of legal regulation of robots and artificial intelligence. The problem lies in the fact that artificial intelligence can perform certain actions, but the responsibility for performing such actions is undefined. This gives rise to a range of ethical problems because if artificial intelligence is to bear responsibility for its actions, this would confirm its subjectivity. In this case, artificial intelligence must have its own rights and obligations, which must be specifically defined.

A collective of authors, K. Elliott *et al.* (2021), investigate the issue of responsibility in the use of artificial intelligence algorithms. It is worth noting that, as of 2024, there are no rules regulating this matter. While algorithms allow for the optimisation of certain functions, such as calculating credit risk, the decision-making of artificial intelligence poses threats of uncertain consequences. An analysis of the literature has shown that the issues of digitalisation, the formation of a digital society, and the use of artificial intelligence require further research. It is necessary to investigate the nature of this phenomenon, its current state, and future prospects.

K.V. Shymanska & V.V. Bondarchuk (2021) conducted a study on the state and prospects of the development of the digital economy in Ukraine. They emphasised that to build a digital environment for the national economy, it is necessary to ensure that it meets the needs not only of the state (government and other state institutions) but also of citizens and businesses, naming businesses and the public as the primary beneficiaries of the digitalisation of the economy and society.

Separately, it is worth noting the existing research on the ethical challenges of digitalisation and the use of artificial intelligence. Authors E. Kazim & A.S. Koshiyama (2021) outlined the ethical issues and frameworks necessary to guide the development of digital technologies and emphasised the importance of interdisciplinary approaches to addressing these problems. B.C. Stahl (2021) presented a different perspective on artificial intelligence and its ethical implications, reducing it to the complication of the structure of artificial intelligence systems and introducing the dimension of stakeholders.

This research aims to identify the origins of the digital society, assess its current state of development and future prospects, and analyse the impact of digitalisation on social life.

The scientific novelty lies in the identification and analysis of the advantages and risks arising in the process of developing a digital society, in outlining the significance of artificial intelligence in the development of a digital society, and in the potential problems of its use.

Materials and Methods

The methodological foundation of this research was based on the principles of scientific cognition and a systematic approach to identifying the problems of the digital society. The research was conducted in several stages using a complex of complementary methods. During the preparatory stage, the method of theoretical systematisation and generalisation was employed to identify the results and conclusions of previous studies. This method allowed for the creation of a theoretical basis for the research and the identification of key aspects of the digital society that require further study. Critical analysis was used to evaluate the existing opinions of authors regarding the digital society. The choice of this method was due to the need to identify the strengths and weaknesses of previous studies and to form one's own position on the research problem. During the main stage of the research, the observation method was used to collect empirical data on the current state of the digital society. This method facilitated the acquisition of relevant information about the actual processes of digitalisation. Analysis and synthesis were employed to identify the origins of the digital society; these methods allowed for the deconstruction

of the complex phenomenon of the digital society into its constituent parts and their integration into a coherent whole. A combination of quantitative and qualitative methods was utilised to achieve a deeper understanding of the research subject. Quantitative methods, such as statistical analysis, enabled the identification of numerical indicators reflecting the development of the digital society, while qualitative methods helped to uncover the causes and consequences of digitalisation. The concluding phase was conducted using comparative analysis, which was employed to identify the positive and negative implications of digitalisation for social relations. This method allowed for the comparison of various aspects of digitalisation's impact on society, leading to specific conclusions. Additionally, during this stage of the research, forecasting methods were applied to outline the future prospects of the digital society. Based on the identified trends and patterns, potential scenarios for further development in the digital realm were formulated.

A systematic approach was chosen as fundamental because the digital society is a complex system of interconnected elements that require a comprehensive study. Theoretical methods such as systematisation, generalisation, and critical analysis formed the basis for creating a solid theoretical foundation for this research, which allowed not only to systematise and structure existing knowledge but also to avoid repeating already known results. Systematisation allowed for the arrangement of information in a clear and logical order, generalisation aided in identifying common patterns and trends, while critical analysis provided the opportunity to meticulously assess and review the theories and methods of digitalisation, revealing their limitations and shortcomings. This approach ensured not only a deeper understanding of the research subject but also facilitated a focus on new aspects and advancements that have yet to be explored, thereby contributing to the development of new theoretical approaches and ideas. Empirical methods, including observation and both quantitative and qualitative studies, provided relevant data regarding the current state of the digital society. The forecasting method enabled the identification of future prospects for the development of the digital society, which is crucial for the practical application of the research findings. The combination of these methods ensured a comprehensive examination of the digital society, revealing its present condition, challenges, and developmental prospects, while also formulating well-founded conclusions and recommendations.

Results and Discussion

The digital society emerged as an evolution of the information society. This conclusion can be reached by analysing the conceptual foundations of the theory of post-industrial development and the information society. Examining A. Toffler's (1980) concept of the "three waves of civilisation" (agricultural, industrial, and information), the development of the digital society can be viewed as "the fourth wave". The digital society arises and develops within the framework of the information civilisation. Its properties and development prospects are based on the principles of technological and social determinism.

Identifying the essence of the digital society is inextricably linked to the study of contemporary changes in the institutional structure of society. In this case, the analysis of the development of new stable digital institutions and the digital information sphere of social life is based on the principles of the neo-institutional approach to the development of society. Within this framework, both the individual participation of social institutions in the development of the information society and the interaction between people and social groups are considered. In aggregate, this leads to the transformation of the information society into a digital society.

It is worth noting that the first forecasts regarding the formation of a digital society were linked to the theory of industrialism, formulated in the 1950s and 1960s by R. Aron and W. Rostow. According to their theory, the entire development of humanity is divided into three epochs: pre-industrial, industrial, and post-industrial (or information) (Rostow, 1959). The concept presented a fairly coherent model that described the stages of civilisational development of humanity on the path of technological progress and its parameters – the main resource of production (the level of development of production factors), the type of production activity, and the nature of basic technologies. R. Aron and W. Rostow demonstrated significant social changes in the information society, linked to economic trends where assembly-line production aimed at producing standardised products gives way to individualised products. This determines the trend towards the personalisation of production, focusing on the needs of a specific, rather than an abstract consumer. Such personalisation requires high-level technologies to identify and satisfy such needs. The formation of a digital society, where every member of society actively manifests themselves in the digital environment and leaves a "digital footprint", is a logical stage in the evolution of the information society.

However, the classics of industrialism and, later, post-industrialism described the digital society as a society that was only just forming. While they could trace the vector of its development, it was impossible to imagine the formation of a digital society without understanding digital technologies. Scientists from the period of industrialism and post-industrialism understood the importance of information as a resource and could only fix individual trends related to the increasing role of information and knowledge in society. In 2024, information is no longer considered a resource but rather an environment in which individuals, businesses, and societies as a whole function.

When examining the political and legal aspects of implementing an information (digital) society, it is essential to refer to the research conducted by Y.I. Krylova (2020). The author emphasises that the information society represents a new stage in the development of human civilisation, necessitating the adaptation of the political and legal system to the new realities of the digital society. This adaptation requires a comprehensive approach to regulating information relations and ensuring the digital rights of citizens. The global nature of informatisation and digitalisation is evidenced by the level of engagement of the global community in the digital environment (Fig. 1).

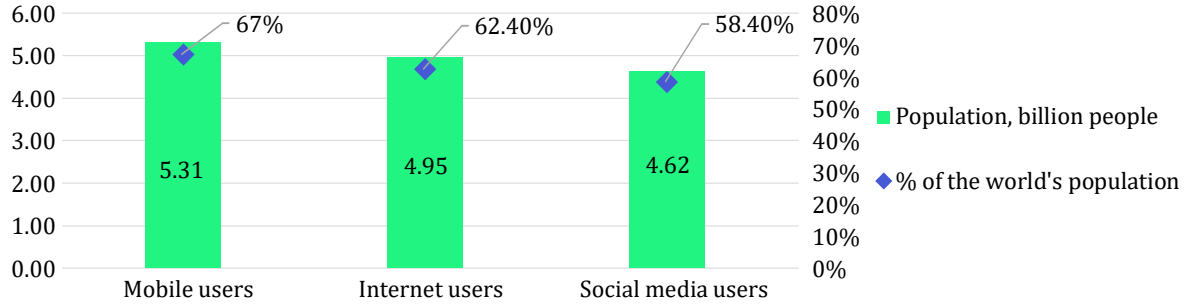

Figure 1. Engagement of the global society in the digital environment in January, 2022
Source: developed by the author based on data from Digital 2022. Global Overview Report (2022)

Technologies that can be rapidly deployed by providers to offer network access to specific computing resources (servers, data networks, storage devices) are becoming increasingly significant in digital societies. Cloud computing is opening up new possibilities for societal development across various sectors, from business to education and cultural projects. Cloud services enable data storage, transfer, and computations. In some cases, these processes can occur without direct human involvement, making them fully autonomous. The analytics firm Gartner has estimated consumer and company spending on cloud technologies in 2022-2023 and provided a forecast for 2024 (Fig. 2).

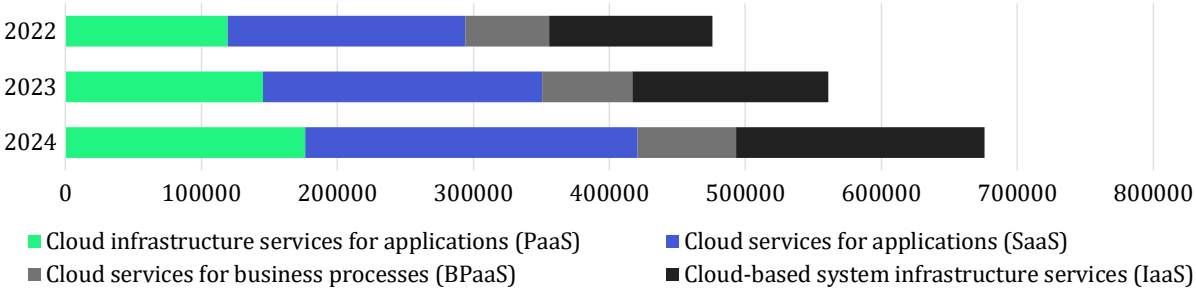

Figure 2. Forecast of end-user spending on cloud technologies in the world, USD
Source: developed by the author based on data from Gartner forecasts worldwide public cloud... (2023)

The digital society assumes that all data accumulated and utilised in both the public and private sectors are digitised. Data that cannot be digitised will remain outside of circulation in the course of information development, becoming neither sought after nor utilised. Therefore, all information generated in the contemporary world, as well as that which constitutes "heritage", primarily historical and cultural value, is subject to digitisation.

The formation of a digital society is characterised by trends such as the information explosion, manifested in a steady growth in data volume. In 2018, according to research by IDC and Seagate Technology, the total amount of data in the digital universe was 33 zettabytes, and by 2025, it is projected to increase to 175 zettabytes (Reinsel *et al.*, 2018). The development of the Internet of Things is characterised by the creation of a vast network of interconnected devices serving various purposes. This ecosystem encompasses a broad spectrum of technological, industrial, and infrastructural objects equipped with control, communication, and management modules. A key feature of these devices, including various appliances, sensors, and other technological solutions, is their ability to exchange data via internet connectivity. Such integration enables the creation of a unified information space where physical objects become active participants in digital processes, opening up new opportunities for automation, monitoring, and optimisation across various spheres of human activity. The development of the Internet of Things presents significant opportunities for the global economy.

In a digital society, the human individual takes on a new form as a digital "self". Every individual with a registered online account possesses a unique identity with distinctive digital attributes. In the digital age, each person generates a substantial volume of electronic traces that shape their digital profile. This profile comprises a diverse range of data stored in both publicly accessible and conditionally protected systems. It includes personal information posted on social media, financial transaction records, location data, advertising identifiers, and large volumes of multimedia content such as audio recordings, photographs, and videos. Additionally, the digital footprint includes a user's activity history across various mobile applications and websites. As a result, an individual's digital life becomes an integral part of their overall identity, forming a multifaceted and detailed portrait within the virtual space. This information is already widely used in 2024 for targeted advertising, retargeting marketing tools, and more. The emergence and proliferation of mobile internet, which has facilitated the rise of wearable devices, not only provides users with notifications and calls but also enables real-time monitoring of physical activity and alerts about potentially harmful health conditions. Furthermore, wearable devices expand human capabilities, such as Google Glass, which allows for more efficient use of visual perception by focusing attention on specific aspects of information.

The widespread adoption and relative accessibility of digital technologies offer significant advantages to their users. Specifically, concerning various aspects of societal informatisation, the World Bank in its report identifies the following benefits of a growing digital economy: increased labour productivity; enhanced company competitiveness; reduced production costs; creation of new jobs; and the alleviation of poverty and social inequality (World development report 2016…, 2016).

In the context of Ukraine's digital society development, it is important to consider the perspectives outlined by V.I. Liashenko & O.S. Vyshnevskyi (2018). The researchers highlight that the key drivers of Ukraine's growing information economy are the expansion of digital platforms and the development of blockchain technology. They note that the potential for Ukraine's digital economy lies in the expanded use of digital platforms, which are growth points for the modern information economy. Their study emphasises Ukraine's significant potential for digital transformation and outlines specific directions for innovation and investment in the digital economy. O. Karpenko (2020), in their monograph "Digital governance", provides theoretical and practical recommendations for implementing digital governance in Ukraine and thoroughly analyses the impact of the digital economy on society. D.O. Kotelevets (2022) explored the specific characteristics of Ukraine's digital economy, noting that as of 2022, Ukraine is not a global leader in the pace of digitalisation. The author also analysed the key indicators driving active economic digitalisation. O. Halushchak *et al.* (2023) studied the stages of digitalisation in Ukraine and identified the characteristics of each stage, noting that the digitisation process is constantly improving and penetrating various spheres of Ukrainian society. O.Y. Huseva & S.V. Lehominova (2018) examined the essence of digitalisation, which is crucial for business development and success.

It is worth noting that in 2024, it is impossible to imagine creating a startup or a new company without utilising digital technologies; in fact, companies are now being created and operating entirely based on digital technologies. However, alongside numerous benefits, digital transformation also carries risks: cyber threats, the use of personal data to manipulate behaviour, rising unemployment, the obsolescence of certain professions, a digital divide in education, and consequently, a disparity in wealth.

E. Kazim & A.S. Koshiyama (2021) offered a framework for understanding the future development of digital technologies in light of the ethical challenges arising from the convergence of the digital, physical, and biological realms. Notably, their research provides a focal point for comprehending the future of digital society. In their research, E. Kazim & R. Hanna (2021), focusing on the philosophical foundations of artificial intelligence ethics, argue that ethical frameworks guiding artificial intelligence development should prioritise human dignity and autonomy as these technologies increasingly influence the psychological, social, and political spheres. This research provides a fundamental understanding of the ethical considerations necessary for the development of a digital society, aligning with the need to ensure respect for fundamental human rights as digital technologies evolve. In a digital society, privacy remains a pressing concern. Therefore, the development of a digital society highlights the importance of confidentiality, where certain information remains outside the public domain. This applies to both businesses and individuals. The distortion, falsification, destruction, or even disclosure of certain information can cause significant harm. Even disruptions to the technological processes of collecting, recording, processing, and storing information can cause serious damage. Consequently, in modern digital society, cyberattacks and cyberterrorism have become significant threats addressed at both national and international levels.

It is also worth noting that the formation and development of a digital society has its advantages, which include: overcoming the information crisis and reducing information asymmetry; prioritising information over other resources; and the formation of a new economic sector – the information economy. Overcoming the information crisis and reducing information asymmetry can contribute to a better understanding of events and more informed decision-making at various levels. This increases civic awareness and engagement.

The prioritisation of information over other resources can be a key factor in achieving success across various sectors. Rapid and convenient access to information enables innovation, the development of new technologies, and the improvement of societal processes. Moreover, digital technologies provided significant advantages to companies during the COVID-19 pandemic when physical interactions were restricted. The development of a new economic sector, such as the information economy, generates employment, stimulates technological progress, and promotes sustainable development. This creates opportunities for new businesses and individuals to realise their potential in a digital environment with minimal resource requirements. Alongside these benefits, it is important to remember the challenges arising from the development of a digital society: the increasing influence of all digital communication channels, including low-quality ones, on society; the intrusion of information technology into people's private lives and business activities; the growing problem of ensuring accurate and high-quality information; the threat of breaches of digital data privacy; and the actual lack of security for personal information spaces.

The development of artificial intelligence within the context of a digital society both amplifies and deepens the benefits and risks associated with such societies. On the one hand, digitalisation and intelligent systems can significantly improve the efficiency of business processes, provide higher-quality technological solutions and foster innovation. On the other hand, the significant influence of digital communication channels can lead to the proliferation of low-quality information, threatening the objectivity and reliability of decision-making. It is crucial to refine algorithms for filtering and verifying information to ensure the quality of content generated within society. In this context, it is worth mentioning the ChatGPT neural network, which is capable of generating content but may produce completely fictional and inaccurate information. The developers of this neural network openly acknowledge and warn about this, yet the threat of using inaccurate information generated by neural networks is only increasing as digital society develops.

The development of a digital society is founded upon and accompanied by the generation of vast amounts of data, which must be processed for practical use. Artificial intelligence systems hold an undeniable advantage in this process compared to human resources. However, data interpretation and decision-making remain central to ongoing discussions. While the use of artificial intelligence systems for processing large datasets is highly efficient, as these systems can quickly and accurately analyse information, identify patterns, and make predictions, there are crucial aspects to consider within the context of data interpretation and decision-making in a digital society. The use of artificial intelligence for decision-making can raise ethical questions, particularly in areas related to privacy, equality, and fairness. It is essential to develop ethical standards and norms for the use of artificial intelligence in data processing and ensure their adherence.

Data interpretation requires not only technical expertise but also consideration of context and sociocultural factors. Ensuring positive interactions between artificial intelligence systems and humans aims to guarantee objectivity and fairness in problem-solving. Artificial intelligence systems learn based on the data they are provided. If the data contains distortions or biases, the systems may reflect these same issues in their outputs. It is crucial to consider and mitigate potential biases in training data. Elon Musk has repeatedly warned about the threats artificial intelligence poses to humanity but has also argued that AI could become "the most disruptive force in history" (Oros, 2023). The overarching goal of developing digital societies and artificial intelligence is to ensure transparent, fair, and ethical principles for artificial intelligence usage, which should contribute to the growth and improvement of quality of life and well-being in the digital age.

Conclusions

The development of digital society is underpinned by vast amounts of data, which play an increasingly significant role in various aspects of human life. This data has become a necessary foundation for diverse fields, ranging from business and medicine to education and public administration. In this context, artificial intelligence systems have become an integral component, enabling the efficient processing of large volumes of information and the automation of processes.

Alongside the growing capabilities of artificial intelligence, new ethical challenges have emerged. The use of artificial intelligence in addressing issues related to privacy, equality, and fairness raises questions about the ethics of such decisions. The efficiency of artificial intelligence systems should not overshadow their responsible use and consideration of ethical norms.

The evolution of digital society is determined not only by technological advancements but also by the ability to effectively utilise and interpret accumulated data. As digital society develops, people's perceptions of the world's approaches to business, and personal life organisation are also transforming. Alongside the immense potential of technology to improve lives, its development and implementation must be carefully managed to maximise benefits and minimise risks. This will require global cooperation, responsible policy-making, ethical approaches, and the preparation of citizens for the realities of the digital world.

Future research into digital societies should focus on developing models of adaptation for various social groups within digital environments, conducting in-depth studies of the ethical implications of digitalisation,

and exploring ways to bridge the digital divide. Investigating the transformation of the labour market and education systems within digital economies is also a crucial area of research, as is examining the potential of digital technologies to enhance democratic processes. Ongoing research into the psychological impact of digitalisation, cybersecurity, and the environmental consequences of digital technology remains essential. Interdisciplinary research, innovative methodological approaches, and studies of national digitalisation characteristics are recommended to develop a comprehensive understanding of the digital society phenomenon and to devise effective strategies for managing digital transformation.

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Conflict of Interest
None.

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Цифрове суспільство: стан та перспективи розвитку

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Анотація. Цифрове суспільство характеризується використанням різних технологій та має різні тенденції розвитку. Цифровізація допомагає полегшити повсякденне життя та підвищити ефективність бізнес-процесів. Мета дослідження полягає у ідентифікації витоків цифрового суспільства, оцінці сучасного етапу його розвитку та перспектив розвитку у майбутньому, а також аналізі впливу цифровізації на суспільне життя. Методологію становлять принципи наукового дослідження, використано загальнонаукові методи пізнання, критичний аналіз, спостереження, синтез. У статті розкрито роль та значення штучного інтелекту у розвитку цифрового суспільства та потенційні проблеми і ризики його використання: генерація та поширення недостовірної інформації, ризики порушення особистої приватності, ризики посилення нерівності та виникнення етичних дилем використання штучного інтелекту. Сформульовано, що разом із можливостями, що відкриваються у цифровому суспільстві, виникають виклики та загрози. Серед них – подолання інформаційної кризи, визнання пріоритетності інформації порівняно з іншими ресурсами та формування нового сектору інформаційної економіки. Разом з цими перевагами виникають виклики, такі як вплив цифрових комунікаційних каналів, проникнення технологій у приватне життя та проблеми достовірності інформації. Забезпечення кібербезпеки та приватності стає важливим та актуальним завданням. Також необхідно забезпечити відповідальне використання технологій та штучного інтелекту, щоб уникнути негативних наслідків, таких як нерівність у доступі до технологій та втрата робочих місць через цифрову трансформацію. Поряд з великим потенціалом використання технологій для покращення життя, потрібно ретельно керувати його розвитком та впровадженням, для максимізації переваг та мінімізації ризиків. Це вимагатиме глобального співробітництва, відповідальної політики, етичних підходів та підготовки громадян до реалій цифрового світу. Практична цінність статті полягає у висвітленні ключових тенденції цифровізації та рекомендацій щодо адаптації до цифрових змін. Ця інформація є цінною для науковців, політиків, підприємців та громадських діячів, що сприятиме кращому розумінню викликів та можливостей цифрової епохи та формуванню ефективних стратегій розвитку в умовах технологічних трансформацій

Ключові слова: цифровізація; технології; суспільність; штучний інтелект; інформаційне суспільство; цифрова ера