Digital Society Transformation as a Sustainable Development Goal: Global Problems and Challenges of the Present

Dr. Valentyna Voronkova
Zaporizhzhia National University

@ Email: valentinavoronkova236@gmail.com
ORCID: https://orcid.org/0000-0002-0719-1546

Dr. Vitalina Nikitenko
Zaporizhzhia National University

@ Email: vitalina2006@ukr.net
ORCID: https://orcid.org/0000-0001-9588-7836

Dr. Regina Andriukaitiene
Marijampole University of Applied Sciences

@ Email: regina.andriukaitiene@gmail.com
ORCID: https://orcid.org/0000-0002-0691-7333

Dr. Roman Oleksenko
Dmytro Motornyi Tavria state agrotechnological University

@ Email: roman.xdsl@ukr.net
ORCID: https://orcid.org/0000-0002-2171-514X

Abstract

This paper aims to comprehend both the theoretical and practical aspects of studying society's digital transformation as a sustainable development goal within the context of global problems and challenges of modernity. The research objectives are as follows: 1) to review the role and significance of digital technologies in addressing the challenges posed by the pandemic and in achieving sustainable development; 2) to identify digital transformation as an innovative approach to solving the problems associated with sustainable development; 3) to analyze the issue of digital divide as a global economic and social challenge; 4) to develop guidelines for enhancing the efficiency of innovative digital transformation systems.

Currently, numerous studies have explored the connection between digital technologies and sustainable development. Digital technologies such as smartphones, the Internet, artificial intelligence (AI), the Internet of Things, cloud computing, and others have the potential to contribute to the implementation of the SDGs. In this study, we refer to articles by R. Andriukaitiene, V. Voronkova et al. (2020), O. Kyvliuk (2014), M. Lepskiy (2022), O. Maltsev (2020), V. Nikitenko et al. (2019, 2021), R. Oleksenko and O. Punchenko.

Keywords

digital transformation, digital technologies, sustainable development, global challenges, digital divide

Introduction

We are currently in an era where policymakers are navigating the digital realm without a clear global mandate, resulting in a lack of coordinated efforts to monitor and shape digital policies. This information gap significantly hampers sound public decision-making, as domestic policies often clash with varying international regulations. Stringent regulations not only stifle entrepreneurial initiatives but also discourage the adoption of digital technologies, ultimately limiting their potential contributions to national employment and economic growth. The fragmentation of the Internet and the global digital economy further marginalize users, diminish incentives for innovation, and escalate trade tensions among governments. Changes are needed to remedy this situation, as reflected in the general discourse of current interdisciplinary research in various fields (Carlsson & Rönnblom, 2022; Dammann et al., 2022; Eom & Lee, 2022; Hafseld et al., 2022; Weerakkody et al., 2016).

In a period marked by the transformative impact of digital technologies on industries, economies, and society at large, the Internet emerges as a vital catalyst for social and economic progress. The concept of sustainable development is gaining increasing relevance, with technologies like the Internet and cloud computing offering the potential to bridge the gap between developed and developing nations, address global challenges such as poverty, hunger, and climate change, and expedite overall human well-being (Afanasieva & Oleksenko, 2018). However, this digital transformation also exacerbates inequality and erodes social cohesion. For instance, the Sustainable Development Goals Report 2019 highlights the disparity in internet access between developed countries, where over 80% of the population is online, and developing and least developed countries. Consequently, it becomes the responsibility of each policymaker to mitigate and minimize the negative impacts of information technology, with the overarching objective of ensuring that „no one is left behind." Both international and non-state actors at the global, regional, and national levels are increasingly recognizing the potential of digital technologies in achieving the sustainable development goals (Buhaichuk et al., 2022).

Relevance of the Article

In 2018, a significant step was taken with the Ministerial Declaration, which acknowledged that digitalization and emerging technologies, especially Information and Communication Technologies (ICTs), hold great potential in advancing the Sustainable Development Goals, particularly in the areas of industry, innovation, and infrastructure (Economic and Social Council, 2018). The United Nations resolutions underscore the pivotal role of the Internet, data, artificial intelligence, and other transformative technologies. Over the years, approximately 320 sessions and workshops have been dedicated to exploring how the

Internet can support developing nations and promote sustainable growth, addressing the pressing global challenges of our era. Undoubtedly, this topic is hardly the most popular one for research of different countries and regions (Billón et al., 2021; Gnangnon, 2020; Hussain et al., 2021; Pérez-Castro et al., 2021; Wang et al., 2022).

The implementation of the Sustainable Development Goals (SDGs) is facilitated by the Technology Facilitation Mechanism (TFM), which fosters collaboration among various stakeholders, including governments, research institutions, and scientific organizations. The emphasis is on addressing challenges through inclusivity and equity, aiming to bridge inequalities between the Global North and South, counter economic and social exclusion, especially among vulnerable groups, and narrow the gaps between rural and urban populations, different age groups, and ultimately, between genders. The „2025 Targets: Connecting the other half" initiative commits to providing affordable broadband services, promoting sustainable digital skills, achieving digital gender equality, ensuring accessibility, and fostering digital literacy. Numerous studies have been conducted on the links between digital technologies and sustainable development, demonstrating that technologies such as smartphones, the Internet, artificial intelligence (AI), the Internet of Things, and cloud computing can indeed contribute to realizing the SDGs (Voronkova & Nikitenko, 2022c).

Global, regional, and local solutions like e-banking and e-money have the potential to enhance access to financial services, particularly in rural areas, improve energy efficiency, and reduce electricity and other media costs. This showcases the role of digital technologies in advancing the successful achievement of the SDGs (Walsh et al., 2020; see also Del Río Castro et al., 2021; Mora et al., 2021; Murinde et al., 2022). Sustainable development in the digital realm can be most effectively realized through collaborative efforts, where actors pool their experiences, knowledge, and resources to pursue common goals, especially in developing nations. This involves sharing information, providing advice, and disseminating best practices in digital inclusion, with a particular focus on women's participation.

The Aim of the Article

The aim of this article revolves around both theoretical and practical aspects pertaining to the study of society's digital transformation as a means to achieve sustainable development within the context of contemporary global challenges. The study aims to accomplish several specific goals:
1. Analyze the significance and role of digital technologies in addressing the repercussions of the pandemic and advancing the cause of sustainable development.
2. Illuminate digital transformation as an innovative approach to resolving the challenges associated with achieving sustainability.
3. Characterize the issues associated with the digital divide, recognizing it as a global economic and social dilemma.
4. Investigate the avenues for enhancing the effectiveness of innovation systems in the realm of digital transformation.

Methods

The research methodology concerning the digital transformation of society towards sustainable development amidst contemporary global challenges is a multifaceted and intricate matter, which has been the subject of examination by various international organizations, including the Club of Rome. The methodology adopted for studying digital transformation as a strategy for attaining sustainability encompasses a range of methods that enable an in-depth exploration of this complex subject, an analysis of the conditions required for

achieving sustainability (what, who, when, where, how, why), and a substantiation of the role of digital transformation as a fundamental tool for policymakers in addressing the global challenges of our times (Voronkova et al., 2021b).

Examining the digital transformation of society for sustainable development necessitates a systematic and interdisciplinary approach. To keep pace with the ongoing dynamics, continuous monitoring and research updates are essential to address emerging challenges and opportunities. Investigating the intricate relationship between digital transformation and sustainable development demands a comprehensive methodology tailored to uncover key aspects and societal significance.

Various methods may be employed in studying the digital transformation of society, tailored to the specific objects and objectives of the research. We have identified effective methodologies, including: (a) Document and Literature Analysis: This involves scrutinizing academic articles, legislation, policy documents, company reports, and other sources to comprehend the current scenario, historical context, and progression of digital transformation; (b) Structured Questionnaires and Surveys: Designed to gather quantitative data from diverse stakeholder groups like citizens, businesses, and government, these instruments provide insights into various perspectives on digital transformation; (c) Expert Interviews: Conducting interviews with experts, government officials, entrepreneurs, and other essential stakeholders to acquire a comprehensive understanding of their perspectives and experiences within the digital transformation domain. Big Data analysis was employed to discern trends, connections, and patterns in the realm of digital transformation. (d) SWOT Analysis: Employing SWOT analysis to pinpoint the strengths, weaknesses, opportunities, and threats associated with digital transformation within society; (e) Case Studies: Undertaking case studies of digital transformation in specific sectors like healthcare, education, and energy to scrutinize distinct impacts and outcomes; (f) Systemic Approach: Adopting a systemic approach to perceive digital transformation as a intricate system comprising interdependent components; and (g) Modeling and Computer Simulation: Utilizing modeling and computer simulation techniques to anticipate potential developments and simulate the repercussions of digital transformation.

The methodology for addressing the issue of societal digital transformation as a sustainable development objective also encompasses:

1. Economic Evaluation: Assessing the influence of digital transformation on the economy through economic analysis, encompassing cost-benefit assessments, job generation, and GDP growth.
2. Environmental Assessment: Examining the environmental effects of digital transformation, considering factors such as energy consumption, CO_2 emissions, and waste management.
3. Public Opinion Study: Investigating public sentiment and discussions on digital transformation through the study of websites, social media, and online forums.
4. Political Decision Examination: Scrutinizing political decisions, strategies, policy programs, legislation, and regulations governing digital transformation, aiming to identify and support the regulatory framework for digital transformation.

These diverse methods and approaches facilitated the identification of potential risks and vulnerabilities linked to digital transformation, enabling the development of measures to mitigate them. This comprehensive approach also extended to studying the enduring impact of digital transformation on society and its future development.

Among the methods employed to address these challenges are systemic and structural analysis, phenomenology, synergetics, modeling, and forecasting. On the philosophical and methodological level, the study of society's digital transformation towards sustainable development leverages the heuristic potential of system-structural and system-synergetic methodologies. At the level of concrete scientific methodology, a diverse array of approaches

is integrated, including cultural, paradigmatic, civilizational, axiological, phenomenological, praxiological, and hermeneutical perspectives. The third methodological and technological level employs a combination of general theoretical, empirical, and specialized methods and approaches. These methodologies facilitate the empirical collection, theoretical analysis, and synthesis of research findings, enabling a comprehensive examination of the subject matter.

The suitable methodological framework for problem research takes into account the interdisciplinary nature of the research subject. Given the increasing prevalence of diverse global challenges in our time, modeling these challenges becomes increasingly important. Models serve the purpose of forecasting short- and medium-term events related to problem resolution. The theoretical concept of a „model" in the study of society's digital transformation towards sustainable development can be understood as an artificially created construct resembling, in some manner, the process being studied. Various models formalizing different aspects of this subject can be constructed to reflect and predict the future state of any element within the digital transformation of society (Voronkova et al., 2021a). The number of these models often depends on the complexity, specificity, or simplification of the description of the real system under investigation.

There are several methods for constructing models, including analytical, experimental, and combined methods. Combined methods, particularly the expert-dynamic and expert-analytical methods, are highly suited for modeling the digital transformation of society as a goal of sustainable development. These approaches are closely aligned with the holistic modeling of complex systems. Synergetic modeling, in particular, represents a scientific extension of the holistic approach. Synergetics offers a holistic perspective when selecting information for modeling processes. Instead of considering a multitude of factors determining the state of a system, as in conventional modeling, synergetics focuses on a few key parameters that influence the components of the process, the system's state, and, in turn, the resolution of contemporary global challenges.

It is important to note that the synergetic approach entails a comprehensive description, which is crucial when dealing with complex systems, such as the digital society. Traditional reductionist methods struggle to analyze trends due to the excessive number of significant variables involved. Therefore, the synergetic approach becomes essential for modeling the processes related to researching the digital transformation of society as a sustainable development goal. Drawing on socio-philosophical methods, we can scrutinize the methodology employed in studying the digital transformation of society as a goal of sustainable development (Voronkova et al., 2022b).

Results

1. This paper examines the role of digital technology in mitigating the pandemic's impact and advancing sustainable development. It argues that digitalization is essential for progressing towards a digital welfare state. Digital technology has grown exponentially, with its global reach expanding. The widespread availability of smartphones has provided most of humanity with constant connectivity, access to information, social media, and audiovisual entertainment. Digital transformation is enabling organizations to reinvent their business processes using new digital tools.

2. The digital transformation of society and organizations emerges as an innovative approach to addressing the challenges associated with achieving sustainable development. This transformation compels organizations to evolve their business practices and explore new avenues. To tackle innovative challenges, businesses must align their goals with a digital transformation strategy. Common challenges faced by organizations include skills

gaps in areas such as cybersecurity, application architecture, software integration, data analytics, and data migration.

3. The issues of the digital gap as a global economic and social problem are being researched. The global digital gap is used to describe the digital divide between industrialized and less developed countries; between urban and rural areas at the national level; between North and South, leading to the economic and social exclusion of millions of people; between the elderly and the youth, and ultimately, between men and women.

4. Strategies for enhancing the effectiveness of digital transformation innovation systems are formulated. Digital transformation has brought forth new innovative opportunities and challenges for companies, demanding a fresh perspective. Today's entrepreneurs must truly adopt a „digital mindset" to solve problems and capitalize on the opportunities presented by new digital technologies for achieving long-term success and maintaining a significant competitive advantage. „The Age of Digital Interdependence" represents a set of recommendations aimed at assisting governments, companies, and individuals in making sustainable business and digital future decisions as a matter of policy (UN Secretary-General, 2019).

1. The Significance of Digital Technologies in Mitigating Pandemic Impact and Achieving Sustainable Development

Addressing the digital transformation of society as both a global challenge and a sustainable development goal necessitates the utilization of qualitative and quantitative data to monitor progress. This involves gauging what has been accomplished and what remains to be done in the context of addressing the pressing global challenges of our time. Achieving the Sustainable Development Goals (SDGs) holds the promise of enhancing various aspects of our world, including agricultural production (SDG 2 - Zero hunger), traffic management (SDG 3 - Good health and well-being), and the transition to renewable energy (SDG 7 - Affordable and clean energy). These issues are currently the subject of extensive research (Guandalini, 2022; Hassoun et al., 2022; Mondéjar et al., 2021; Novillo-Ortiz et al., 2018; Schena et al., 2022).

However, a significant challenge persists, especially in developing countries: the lack of reliable, accessible, and relevant data. Often, issues related to the capacity of available resources, security, and environmental conditions make it arduous to collect and analyze data essential for sustainable development. To address this predicament, The Global Partnership for Sustainable Development Data was established, following the recommendations of the Independent Expert Advisory Group on a Data Revolution for Sustainable Development (IEAG). The aim of this partnership is to engage various stakeholders, including governments, international organizations, civil society, and academia, in collaborative efforts to generate and utilize data. The issues surrounding the digital transformation of society as both a global challenge and a sustainable development goal are considered nascent and evolving (Voronkova et al., 2022a).

The unprecedented COVID-19 pandemic has exerted a profound economic and social impact on numerous countries worldwide (Lepskiy, 2022), including those in Latin America and the Caribbean. Concurrently, digital technologies have experienced exponential growth, reaching a global scale. Widespread and uninterrupted connectivity has extended to a significant portion of the global population, driven by the widespread adoption of smartphones, which provide access to information, social media, and audiovisual content. The rapid advancement of technology within the digital sphere has led to the utilization of devices and applications leveraging cloud computing, big data analytics, blockchain technology, and artificial intelligence. This technological revolution, coupled with evolving

corporate strategies, has significantly augmented the role of global platforms. However, it has also brought about socially detrimental consequences, most notably the exclusion of a substantial segment of the global population from the benefits of digitalization. This exclusion predominantly stems from inadequate income levels that impede access to high-quality devices, stable home internet connections, and the ability to utilize these resources on a daily basis.

As a result, a significant disparity has emerged between the expanding coverage of Internet infrastructure and actual usage. Additionally, other challenges have become increasingly pronounced, including the proliferation of fake news and the escalating threat of cyber-attacks, which pose ever-growing risks to personal data privacy and security. Furthermore, the mass production of electronic waste (e-waste) has reached alarming levels. The global landscape, marked by an unresolved balance between the benefits and drawbacks of digitalization, has become unfavorable. Geopolitical tensions, often revolving around digital patents, standards, and manufacturing, have notably eroded the effectiveness of multilateral decision-making (Voronkova & Nikitenko, 2022a).

The environmental crisis has evolved into an ecological catastrophe. Escalating inequalities within numerous countries, coupled with the exclusion of vulnerable populations, have made it increasingly challenging to establish social and political systems capable of effectively managing digital progress. The COVID-19 pandemic has exacerbated these issues and plunged the world into its most severe economic crisis since World War II. This crisis has had adverse repercussions on employment, wages, and the fight against poverty and inequality. While digital technologies have played a pivotal role in mitigating the pandemic's effects, their benefits have been curtailed by structural barriers. These include limitations in connectivity (access, usage, and speed), social disparities, variations in productivity, reduced competitiveness, and limited access to data and information management, among other factors (Voronkova & Nikitenko, 2022b).

Nevertheless, there are new prospects for Latin America and the Caribbean. As the region most severely affected by the crisis, addressing long-standing challenges is imperative. This includes overcoming the sluggish economic growth experienced in recent years, characterized by declining investment and stagnant productivity, and reinvigorating efforts to combat poverty and inequality. To surmount these obstacles, the region must exert significant efforts to achieve economic, social, and environmental sustainability. This entails implementing progressive structural changes through the active creation and deployment of technologies to diversify the production system. Taking a systemic approach, a crucial issue is the necessity to transition towards a sustainable digital society within the framework of the digital revolution. This involves investigating the impact of digitalization on social well-being and equality, promoting universal access to digital technologies, strengthening regional cooperation, and transitioning towards a regional digital market (Voronkova et al., 2020).

The proposed solutions set the stage for a more inclusive and sustainable approach to digitalization. These initiatives aim not only to expedite recovery from the ongoing crisis but also to enhance overall productivity by enabling organizations to rethink their business processes through the adoption of new digital tools and practices. Digitalization is a pivotal factor in shaping a new future and moving toward the establishment of a digital welfare state (Kyvliuk, 2014).

In the year 2022, nine critical challenges in the domain of digital transformation demand attention and resolution: (a) lack of a change management strategy; (b) complex software and technology; (c) incentivized adoption of new tools and processes; (d) continuous evolution of customer needs; (e) lack of a digital transformation strategy; (f) lack of proper IT skills; (g) security issues; (h) budgetary constraints; and (i) cultural mindset.

Digital technologies play a crucial role in addressing the challenges posed by the pandemic and in achieving sustainable development (Hussain, 2021). They empower organizations to reimagine their business processes and adopt new digital tools and practices. Nevertheless, the transformation journey is fraught with a spectrum of challenges, encompassing human-centric issues, structural complexities, technical obstacles, and limitations in infrastructure support (Fernández-Rovira et al., 2021; Varadarajan et al., 2022). This underscores the imperative for organizations to innovate and adapt, enabling them to navigate the current crisis successfully and position themselves for ongoing progress (Rodrigo et al., 2022; see also Etz et al., 2020; Gouveia & Mamede, 2022; Mann et al., 2022; Sedera et al., 2022).

2. Digital Transformation: An Innovative Approach to Tackling the Challenges of Sustainable Development

Digital transformation transcends the mere introduction of new software, technologies, and processes aimed at efficiency and automation. It represents a comprehensive, innovative approach to conducting business, playing a pivotal role in reshaping organizational practices. When embarking on a digital transformation initiative, organizations must consider various facets, including how people react to change, the impact of change on customer relationships, cost implications, alignment with business objectives, and more (Gilder, 2018).

Digital transformation empowers organizations to propel their business forward and equips them to thrive amid competitive landscapes by venturing into new realms. However, statistics indicate that 70% of digital transformation programs fail due to employee resistance and a lack of management support (McKinsey). Only 16% of employees report that their companies are actively pursuing digital transformation efforts that enhance performance and sustainability. Consequently, there is a need to address the challenges of digital maturity that will influence businesses in 2022. While digital transformation offers unique opportunities for innovation and growth, it also necessitates critical thinking and potential reconsideration of fundamental aspects of the business (Lee, 2018).

In 2022, there are 20 crucial challenges to contemplate when embarking on digital transformation projects:

1. Lack of Change Management Strategy. Organizations with well-crafted change management strategies are six times more likely to achieve or surpass their digital transformation objectives. Cultivating a robust change management culture is indispensable for any organization's success, and the absence of a change strategy can lead to the failure of new projects or implementation plans. An effective change management strategy involves project planning that identifies root problems and fosters relationships with all stakeholders and employees. Therefore, businesses should develop a change management strategy in collaboration with change management experts (Konopik et al., 2022; Volberda et al., 2021).

2. Complex Software and Technology: Enterprise software inherently carries complexity, and new technologies can be daunting. This complexity poses a significant challenge for organizations embarking on digital transformation, both in terms of implementation and data integration, as well as in terms of end-user interaction. Executives should bear this in mind at the outset of transformation projects and seek out the most intuitive integration solutions.

3. Incentivizing the Adoption of New Tools and Processes: The introduction of new processes and technologies often encounters resistance from in-house employees who may believe that their current methods are sufficient. To successfully implement new software,

organizations must offer comprehensive adaptive training and ongoing support to help employees quickly become adept and productive with the tools (Cherep et al., 2022).

4. Continuous Evolution of Customer Needs: Organizations are in a constant state of evolution, a process accelerated by events such as the COVID-19 pandemic. It is crucial to consider customer desires since everything is shifting as the world and industries evolve. Digital transformation is a complex, time-consuming endeavor. But, if customer needs change during this period, it will introduce new challenges. Therefore, flexibility is essential as it is time to adopt new digital technologies.

5. Lack of a Digital Transformation Strategy: Legacy systems and manual processes should ideally be replaced with new digital systems. If there's a plan (or necessity) to implement advanced and sophisticated systems, a proper migration strategy for existing systems should be devised. All these questions need answers before launching a digital transformation initiative, as a successful transformation project hinges on a predefined strategy.

6. Lack of Proper IT Skills: Succeeding in transforming an organization requires a skilled and high-performing IT team, which can be challenging to assemble, especially given the current shortage of technical talent. According to a corporate survey, 54% of organizations reported that their inability to attain digital transformation goals stemmed from a shortage of technically skilled employees. Challenges faced by organizations include skills shortages in cybersecurity, application architecture, software integration, data analytics, and data migration. Organizations lacking in-house IT professionals can address this issue by engaging external consultants and digital transformation experts to help bridge the implementation gap (Kyrychenko et al., 2021).

7. Security Concerns: Many corporate entities, particularly those operating in data-sensitive industries, confront significant privacy and cybersecurity challenges (Maltsev, 2020). Extensive digital transformation initiatives often revolve around the adoption of cloud technologies and the integration of all corporate data into a centralized system. This consolidation amplifies the risk of cyberattacks aimed at pilfering customer data and proprietary information. This increases the threat of cyberattacks to steal customer data and corporate secrets (Lee, 2021). Online attacks can exploit system vulnerabilities and misconfigurations. Hence, it is crucial to have a proactive plan in place to address these threats before they materialize. It is advisable to engage a cybersecurity expert to identify vulnerabilities in your security defenses.

8. Budgetary Constraints: Digital transformation entails substantial financial investment. For organizations whose transformation strategies lack refinement, the scaling-up process can gradually impede project timelines and introduce additional tasks, thereby augmenting project costs. Factors such as consulting services, evolving customer needs, or IT errors can further inflate the overall expense of digital transformation. It is essential to create long-term projections outlining the organization's goals and the expected return on investment resulting from the transformation. This proactive approach aids in gaining a clear understanding of budgetary boundaries and identifies opportunities for budget expansion.

9. Cultural Mindset: Organizations entrenched in legacy systems and manual procedures often harbor a traditional mindset. This mindset resists change, views automation skeptically, and faces difficulties in embracing new technologies. A substantial challenge in digital transformation is the cultural shift that necessitates alignment across all levels, from management to new hires. Everyone must be prepared for significant alterations in their daily routines and must exhibit a willingness to acquire new skills. The most effective digital adoption platforms incorporate features that facilitate end-user feedback on content and provide comprehensive analytics regarding feature usage, successful streams, areas requiring further digital tool implementation, and the overall level of product adoption

within the organization. Various companies are addressing this issue through diverse strategies. For instance, Manpower Group is transitioning seamlessly to a fully digital hiring process using Whatfix, Baystone Media is promoting the adoption of its new suite of digital tools with Whatfix, and Cardinal Health is transforming its legacy customer service into a 24/7 self-help solution with Whatfix (Shapiro, 2022).

10. To effectively tackle these challenges, it's imperative to establish a team of change leaders within your organization. Begin by assessing your current workforce to identify individuals who exhibit qualities of influence, innovation, and trustworthiness. Assemble a cross-functional team comprising high-performing professionals to form this change leadership team. This team plays a pivotal role in shaping a vision for the digital transformation process that aligns seamlessly with your business objectives and is created by those intimately familiar with the inner workings of the organization. This approach enables organizations to proactively approach digital transformation initiatives with a keen focus on the human aspect of change (Jackson & Dunn-Jensen, 2021; Sergi et al., 2022). Digital transformation involves a complete overhaul of core processes, tools, and experiences, and for many organizations, this is an entirely new endeavor. This presents both a challenge and a cornerstone for success in digital transformation.

A shift toward innovative problem-solving and alignment of business objectives with your digital transformation strategy is paramount. The rationale for digital transformation should be the driving force behind every organizational endeavor as new processes are implemented. Understanding customer needs, identifying pain points and challenges related to your offerings, products, and services, and analyzing current processes to pinpoint legacy systems requiring infrastructure enhancements should all be integral parts of this strategy. Ultimately, the transformation process should directly align with your core business objectives, fostering improved employee performance, enhanced customer service through clear systems that address more customer needs, and increased revenue generation for the organization.

To resolve the challenges faced by organizations, it is crucial to remain agile. Digital transformation projects inherently stem from a recognition of organizational vulnerability. Leaders understand that innovation and change are imperative to adapt and compete in a rapidly evolving digital landscape. Technology advances swiftly and often outpaces expectations. Embracing agility means being unafraid to pivot and seize opportunities as they arise. The very decision to embark on a digital transformation journey signifies that the organization and its employees are agile. Therefore, there should be no apprehension about embracing new processes and tools or replacing traditional practices with innovative approaches. Furthermore, numerous researchers today are working on creating tools and models for the digitalization of various types of businesses (Böttcher et al., 2022; Csordás et al., 2022; Marcon et al., 2022; Veile et al., 2022). Digital transformation indeed represents an innovative means of addressing the challenges associated with achieving sustainable development.

3. The Digital Divide: A Global Economic and Social Problem

The digital divide, both as an economic and social issue, has recently garnered significant attention. This term refers to the global disparity in access to the Internet and other information and communication technologies (ICTs) that facilitate the global connectivity of households, individuals, and businesses. Specifically, the „global digital divide" characterizes the disparity in access between developed and less developed countries, as well as the divide between urban and rural areas at the national level. Rural communities, in

particular, face challenges in keeping pace with the rapid growth of digital connectivity. The establishment of Internet and cloud infrastructure in these areas is often challenging. Additionally, factors such as limited education opportunities, difficulties in acquiring IT skills, and the financial constraints of the population make it hard for individuals in these communities to afford mobile and other technological devices. Consequently, these communities encounter difficulties accessing government services, obtaining external information, and even staying updated on local matters. These challenges have ripple effects, including limited access to quality education, inadequate healthcare, and cases of parental abandonment, emphasizing the urgent need to bridge the digital divide in rural areas (Nikitenko et al., 2021).

It is worth noting that the digital divide is not solely attributed to the rapid pace of technological change. In addition to the material and infrastructural hurdles faced by rural communities in the digital era, there exists a significant social challenge. With the widespread use and adoption of cell phones and the internet, digital inclusion is no longer described as a binary issue of „having" or „not having" digital tools. Instead, the conversation now centers on the degree of usage of these digital tools. Before assessing the impact of digital connectivity, it is crucial to gauge the actual level of adoption and utilization of these tools. While providing rural communities with access to these technologies and connectivity options is a significant step toward development, it is equally vital to focus on training, adoption, and utilization to ensure that digital connectivity positively affects these communities. It's important to recognize that digital skills serve as a platform and catalyst for poverty alleviation (Nikitenko et al., 2019).

As highlighted in the The Sustainable Development Goals as Business Opportunities of 2016, the technology and telecommunications sectors are categorized as cross-cutting sectors, playing a pivotal role in addressing various economic challenges. Consequently, South Africa has begun incorporating ICTs into various sectors of the country, resulting in a substantial increase in internet users from 5.3 million in 2009 to 38.13 million in 2021. During the same period, global internet usage has risen from 1.73 billion to 4.66 billion users. However, it's important to note that most users of ICT infrastructure in rural communities are not advanced users. They primarily utilize phones for voice calls, SMS, and social networking. These regions have yet to fully implement integrated IT-based services in areas such as education and agriculture (Nikitenko et al., 2022).

The central question at hand is: Can Information and Communication Technologies (ICTs) truly make a substantial difference in the lives of rural communities? According to the United Nations Development Programme, increased ICT usage enhances service delivery, provides access to digital advancements for ongoing improvement of essential services, and facilitates knowledge sharing. The rapid pace of technological change underscores the growing need for effective ICT services in critical areas such as education, healthcare, and agriculture. Digital inclusion encompasses information technology, e-learning, e-health, high-speed internet access, and digital literacy, all contributing to the success of individuals and communities striving to participate in the digital realm. To promote such integration and bridge the digital divide, it is essential to implement inclusive policies and comprehensive approaches that ensure equal access for all, irrespective of age, gender, race, or religion (Oleksenko & Garbar, 2022).

The digital divide revolves around two significant challenges. First, the more economically disadvantaged a community is, the fewer digital opportunities it tends to have. For instance, despite increased infrastructure provision in Brazil, a significant portion of the population did not perceive the need for digital access (Oleksenko & Voronkova, 2020). Additionally, numerous studies have confirmed that digital literacy and learning are essential to fully capitalize on ICT infrastructure investments, whether provided by

the private or public sector (Voronkova et al., 2022b). With proper training, the population can effectively harness the available technology.

Another pressing issue in South Africa's ICT sector is the ICT gender gap. Deep-seated socio-cultural norms and beliefs have exerted a substantial influence on the impact of ICTs in the country. Gender stereotypes are notably evident, with men predominating in access to education, higher income, and employment opportunities (Gillwald et al., 2010). However, Gilbert's hypothesis suggests that, given equal opportunities, women are more inclined to embrace learning and the use of digital tools compared to men (Gilbert, 2010). Therefore, providing women with opportunities would enable them to compete in the job market and secure entry-level positions through acquired IT skills. Persistent cultural and gender disparities are likely to persist in the ICT sector. It's important to recognize that technological transformation is fundamentally a transformation of people, and bridging the digital divide represents a global economic and social challenge (Punchchenko et al., 2020).

Discussion

Enhancing the Efficiency of Digital Transformation Innovation Systems

The directions for enhancing the efficiency of digital transformation innovation systems are becoming increasingly diverse, signaling the onset of the Fourth Industrial Revolution. This new era is marked by digitalization shaping and influencing society in novel and often unpredictable ways. It is crucial to reflect on the precise shifts we are currently undergoing and how we can collectively and individually ensure that this ‚revolution' benefits everyone. In the Arab region, the drive for government and business digitalization has gained momentum due to the necessity imposed by measures of exclusion and social distancing. Sustained efforts in this direction can pave the way for a digital transformation in the Arab region, unlocking immense potential to advance and achieve the Sustainable Development Goals (SDGs).

To combat the COVID-19 pandemic and manage its aftermath, individuals, public institutions, and the private sector in the Arab region have harnessed digital technologies to safeguard lives, maintain social connections, and ensure the continuity of education, business operations, and public services. Nearly two years after the pandemic's onset, Arab countries must consider principles of fairness and sustainability when determining which digital responses to COVID-19 should be institutionalized and expanded. It is essential to remain vigilant about technological megatrends and potential threats and to take action to catalyze the systemic changes required for recovery and progress across various domains.

Digital transformation involves the utilization of digital technologies to fundamentally transform products, services, and their delivery methods to better align with customer needs. To facilitate a more rapid and inclusive transition to the online sphere, most Arab countries have taken the following measures (UNESCWA, 2021):

1. Expanded digital access, resulting in increased Internet bandwidth and speed at no extra cost (e.g., Bahrain, Iraq, Kuwait, and Lebanon).
2. Unblocked voice messages over IP applications (e.g., Oman).
3. High-income Arab nations have enhanced public Wi-Fi availability and supported disadvantaged groups, particularly migrant workers, by providing free personal computers, SIM cards, online access, and ICT training (e.g., Qatar and Saudi Arabia).
4. In partially served regions, such as Palestine and rural Morocco, digital infrastructure has been upgraded through donor-supported programs to expand broadband coverage. Digital transformation has the potential to promote equity, inclusion, and

social advancement. However, for its full realization and to prevent the exacerbation or emergence of new disparities, countries in the region must address pre-existing inequalities.

The key areas for enhancing the effectiveness of digital transformation innovation systems are designed to:

1. Accelerate progress in broadband internet access while addressing persistent disparities both between and within countries. These disparities encompass factors like gender, location, age, disability, and literacy. To bridge these divides, it's essential to consider various dimensions, including availability, accessibility, affordability, acceptability, and quality of broadband services.

2. Digital literacy should be a fundamental component of education across all segments of society, including women, the elderly, and others. This entails integrating digital literacy into primary and secondary education, ensuring that people of all ages are equipped with essential digital skills.

3. Efforts should be made to raise awareness and ensure the safety of underage users in the digital realm. This includes preventing gender-based violence and inequality in the digital sphere. Despite progress in internet connectivity, there is still a long way to go in ensuring universal access to safe and empowering digital experiences. The use of digital technologies can enhance the resilience of education systems, breaking down barriers and enabling flexible learning opportunities for students, as well as supporting educators.

4. Investment in inclusive information and communication technology (ICT) infrastructure is crucial. This includes providing adequate support and training for teachers to acquire digital skills, as well as addressing the needs of the most vulnerable groups. Special attention should be given to rebuilding infrastructure in conflict zones to ensure that students have access to distance learning opportunities.

5. Collaboration and partnerships at regional and global levels are essential to support innovation and the sharing of expertise in digitalization, particularly in the education sector. This includes the development of online learning technologies. In some cases, innovative approaches like GPS-enabled mobile applications have been used to enforce quarantine measures for individuals suspected of carrying infectious diseases or those arriving from abroad (Punchchenko et al., 2020).

In pursuit of these goals, we have identified the potential challenges and future threats posed by AI-based systems. This is particularly relevant in the context of developing smart agriculture and smart health programs, which hold significant importance for each of us. To enhance the effectiveness of digital transformation within open innovation (OI) models, several key directions can be considered:

1. Implementation of Digital Innovation Systems.
2. Strengthening Social Networks.
3. Introduction of New Processes.
4. Introduction of New Digital Technologies.
5. Development of Agility at Organizational Scale.
6. Implementing Innovation in Digital Transformation.

Innovation is fundamentally a learning process that organizations employ to acquire new knowledge and experiences. It thrives in environments where risk and failure are tolerated, and experimentation is encouraged.

The rapid ascent of digital transformation is reshaping traditional entrepreneurial paradigms and established business models, ushering in a new era that presents unique challenges for scholars specializing in management. This wave of digital transformation has not only unveiled fresh prospects for innovation but has also posed novel challenges

that necessitate a paradigm shift. In this digital landscape, contemporary entrepreneurs must adopt a „digital-first" mindset to navigate complexities, solve problems, and fully capitalize on the opportunities presented by emerging digital technologies. The key drivers of success in this digital era are data, information, and knowledge, which entrepreneurs are encouraged to leverage to unearth untapped market potential and implement inventive business models.

Furthermore, the momentum of digital transformation is further accelerated by the introduction of artificial intelligence and virtual reality tools, amplifying their impact on consumers. On one hand, these novel technologies hold the promise of addressing some of humanity's most pressing societal challenges, such as climate change, aging populations, income inequality, and unemployment. Simultaneously, their potential societal benefits hinge on their accessibility and equitable utilization, ensuring that they are deployed in a distributed and decentralized manner that respects local skills, capabilities, knowledge, traditions, and heritage. By adhering to this approach, these technologies can play a pivotal role in the development of intelligent manufacturing systems, offering effective solutions with broader applications across various domains (Oleksenko & Voronkova, 2020).

Human-driven innovation represents the convergence of technology and the wide-spread emergence of innovations rooted in technologies like big data analytics, artificial intelligence, and robotics. These emerging technologies, as they are developed and deployed, exert a profound influence on the innovation landscape, subsequently shaping broader societal outcomes. However, there is a growing concern that innovation, under certain circumstances, may have adverse effects on human well-being and the environment.

One explanation for these potential negative impacts is that contemporary innovation processes tend to be excessively technology-focused within an increasingly intricate environment. In the present context, innovation endeavors can only serve as drivers of societal progress if their ultimate aim is to generate positive outcomes for the entirety of society. Achieving this objective may necessitate interdisciplinary collaboration and the amalgamation of technical and humanities disciplines, alongside the adoption of innovative approaches.

An essential driver of innovation is what we refer to as the human dimension of innovation management, where actual innovation efforts unfold within organizations. Companies are undergoing digital transformations that create fresh opportunities and, concurrently, challenges, particularly for smaller enterprises. This digital transformation triggers alterations in various organizational facets, precipitating changes in business models, shifts in business processes and value chains, and empowering companies to develop novel products/services while managing an expanded global customer base. The digital transformation also exerts an influence on the management of individuals and teams involved in the innovation process, reshaping internationalization strategies, market choices, entry modes, and network development (Punchchenko et al., 2020).

Conclusions

Digital innovation and entrepreneurship have also attracted the interest of development stakeholders and governmental bodies. The growth of e-commerce and digital innovation, primarily led by the private sector, stands out as a positive consequence of the pandemic. With improved digital accessibility and initiatives to expand electronic payment services, there are opportunities to enhance the resilience of many economies.

To capitalize on these opportunities, countries should adopt long-term e-commerce strategies that establish a conducive environment. These strategies should encompass le-

gal and regulatory enhancements to bolster the security of online transactions and foster the development of digital skills. Furthermore, expanding electronic payment options, including mobile payments, is essential to increase access to financial services in regions that lag behind the global average. Countries must also create an environment that encourages ICT innovation and entrepreneurship to expedite economic recovery. Startups are pivotal drivers of technological innovation and entrepreneurship and will assume an increasingly crucial role in cultivating the skills demanded by future jobs. Consequently, the startup sector should prioritize fortifying these businesses, enabling them to integrate seamlessly into the value chain and promoting technology- and skills-based education, training, and policy.

These digital trends aim to stimulate innovation and competition in both domestic and international markets. As digital technologies reshape the processes involved in developing new products and services, they hold the potential to narrow the digital divide and ensure equitable access to technology. These advancements can lead to positive outcomes, including poverty reduction, enhanced education, improved social well-being, and better health.

Declaration of Conflicting Interests

Funding

References

Afanasieva, L., & Oleksenko, R. (2018). Aktichni interkulturni praktiki yak indikator vzayemodiyi kulturnih grup i spilnot polietnichnogo mista [Active intercultural practices as an indicator of interaction between cultural groups and communities of a multiethnic city]. *Visnyk of the Lviv University Philosophical Political Studies*, *18*, 40–47.

Billón, M., Crespo, J., & Lera-López, F. (2021). Do educational inequalities affect Internet use? An analysis for developed and developing countries. *Telematics and Informatics*, *58*, 101521. https://doi.org/10.1016/j.tele.2020.101521

Böttcher, T. P., Weking, J., Hein, A., Böhm, M., & Krcmar, H. (2022). Pathways to digital business models: The connection of sensing and seizing in business model innovation. *Journal of Strategic Information Systems*, *31*(4), 101742. https://doi.org/10.1016/j.jsis.2022.101742

Buhaichuk, O., Nikitenko, V., Voronkova, V., Andriukaitiene, R., & Malysh, M. (2022). Interaction of the digital person and society in the context of the philosophy of politics. *Cuestiones Políticas*, *40*(72), 558–572. https://doi.org/10.46398/cuestpol.4072.32

Carlsson, V., & Rönnblom, M. (2022). From politics to ethics: Transformations in EU policies on digital technology. *Technology in Society*, *71*, 102145. https://doi.org/10.1016/j.techsoc.2022.102145

Cherep, A., Voronkova, V., & Cherep, O. (2022). Humanocracy as a factor of improving human resources management in organizations. In *Humanities Studies: Collection of Scientific Papers*, 10 (87), 134–141. https://doi.org/10.26661/hst-2022-10-87-16

Csordás, A., Pancsira, J., Lengyel, P., Füzesi, I., & Felföldi, J. (2022). The potential of digital marketing tools to develop the innovative SFSC players' business models. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 122. https://doi.org/10.3390/joitmc8030122

Dammann, F., Eichenmüller, C., & Glasze, G. (2022). Geographies of "digital governmentality." *Digital Geography and Society*, 3, 100034. https://doi.org/10.1016/j.diggeo.2022.100034

Del Río Castro, G., González, C., & Colsa, Á. U. (2021). Unleashing the convergence amid digitalization and sustainability towards pursuing the Sustainable Development Goals (SDGs): A holistic review. *Journal of Cleaner Production*, 280, 122204. https://doi.org/10.1016/j.jclepro.2020.122204

Economic and Social Council. (2018, August 1). *Ministerial Declaration of the High-Level Segment*. https://digitallibrary.un.org/record/1637322

Eom, S., & Lee, J. (2022). Digital government transformation in turbulent times: Responses, challenges, and future direction. *Government Information Quarterly*, 39(2), 101690. https://doi.org/10.1016/j.giq.2022.101690

Etz, D., Brantner, H., & Kästner, W. (2020). Smart manufacturing retrofit for brownfield systems. *Procedia Manufacturing*, 42, 327–332. https://doi.org/10.1016/j.promfg.2020.02.085

Fernández-Rovira, C., Valdés, J. Á., Molleví, G., & Nicolás-Sans, R. (2021). The digital transformation of business. Towards the datafication of the relationship with customers. *Technological Forecasting and Social Change*, 162, 120339. https://doi.org/10.1016/j.techfore.2020.120339

Gilbert, M. R. (2010). Theorizing Digital And Urban Inequalities. *Information, Communication & Society*, 13(7), 1000–1018. https://doi.org/10.1080/1369118x.2010.499954

Gilder, G. (2018). *Life After Google: The Fall of Big Data and the Rise of the Blockchain Economy*. Simon and Schuster.

Gillwald, A., Milek, A., & Stork, C. (2010). *Gender Assessment of ICT Access and Usage in Africa*. Research ICT Africa. http://www.researchictafrica.net/publications/Towards_Evidence-based_ICT_Policy_and_Regulation_-_Volume_1/RIA%20Policy%20Paper%20Vol%201%20Paper%205%20-%20Gender%20Assessment%20of%20ICT%20Access%20and%20Usage%20in%20Africa%202010.pdf

Gnangnon, S. K. (2020). Internet and tax reform in developing countries. *Information Economics and Policy*, 51, 100850. https://doi.org/10.1016/j.infoecopol.2020.100850

Gouveia, F. D., & Mamede, H. S. (2022). Digital transformation for SMES in the retail industry. *Procedia Computer Science*, 204, 671–681. https://doi.org/10.1016/j.procs.2022.08.081

Guandalini, I. (2022). Sustainability through digital transformation: A systematic literature review for research guidance. *Journal of Business Research*, 148, 456–471. https://doi.org/10.1016/j.jbusres.2022.05.003

Hafseld, K. H. J., Hussein, B., & Rauzy, A. R. (2022). Government inter-organizational, digital transformation projects: five key lessons learned from a Norwegian case study. *Procedia Computer Science*, 196, 910–919. https://doi.org/10.1016/j.procs.2021.12.092

Hassoun, A., Prieto, M. A., Carpena, M., Bouzembrak, Y., Marvin, H., Pallarés, N., Barba, F. J., Bangar, S. P., Chaudhary, V., Ibrahim, S. A., & Bovo, G. (2022). Exploring the role of green and Industry 4.0 technologies in achieving sustainable development goals in food sectors. *Food Research International*, 162, 112068. https://doi.org/10.1016/j.foodres.2022.112068

Hussain, Z. (2021). Paradigm of technological convergence and digital transformation: The challenges of CH sectors in the global COVID-19 pandemic and commencing resilience-based structure for the post-COVID-19 era. *Digital Applications in Archaeology and Cultural Heritage*, 21, e00182. https://doi.org/10.1016/j.daach.2021.e00182

Hussain, A., Batool, I., Akbar, M., & Nazir, M. (2021). Is ICT an enduring driver of economic growth? Evidence from South Asian economies. *Telecommunications Policy*, *45*(8), 102202. https://doi.org/10.1016/j.telpol.2021.102202

Jackson, N., & Dunn-Jensen, L. M. (2021). Leadership succession planning for today's digital transformation economy: Key factors to build for competency and innovation. *Business Horizons*, *64*(2), 273–284. https://doi.org/10.1016/j.bushor.2020.11.008

Konopik, J., Jahn, C., Schuster, T., Hoßbach, N., & Pflaum, A. (2022). Mastering the digital transformation through organizational capabilities: A conceptual framework. *Digital Business*, *2*(2), 100019. https://doi.org/10.1016/j.digbus.2021.100019

Kyrychenko, M., Nikitenko, V., Voronkova, V., Harbar, H., & Fursìn, A. (2021). The search for new forms of personal expression in the era of postmodernism. *Revista Amazonía Investiga*, *10*(42), 248–254. https://doi.org/10.34069/ai/2021.42.06.23

Kyvliuk, O. P. (2014). Modelyuvannya informacijnih procesiv v konteksti informatizaciyi suspilstva [Modelling of information processes in the context of the information society]. *Gìleâ*, *80*, 222–226.

Lee, I. (2021). Cybersecurity: Risk management framework and investment cost analysis. *Business Horizons*, *64*(5), 659–671. https://doi.org/10.1016/j.bushor.2021.02.022

Lee, K. (2018). *AI Superpowers: China, Silicon Valley, and the New World Order*. Houghton Mifflin.

Lepskiy, M. (2022, May 7). *Sociological Surveillance of the Pandemic: Exploring Interconnectedness, Panic, and Waves of Crisis*. Centre for Criminology. https://criminology-center.org/socziologicheskoe-nablyudenie-za-pandemiej-svyazannost-panika-volny-krizisa/

Maltsev, O. (2020). Civilization of the 21st Century: Genome of Security. *Newsletter on the Results of Scholarly Work in Sociology, Criminology, Philosophy and Political Science*, *1*(4), 92–104. https://doi.org/10.61439/fwet2304

Mann, G., Karanasios, S., & Breidbach, C. F. (2022). Orchestrating the digital transformation of a business ecosystem. *Journal of Strategic Information Systems*, *31*(3), 101733. https://doi.org/10.1016/j.jsis.2022.101733

Marcon, É., Dain, M. L., & Frank, A. G. (2022). Designing business models for Industry 4.0 technologies provision: Changes in business dimensions through digital transformation. *Technological Forecasting and Social Change*, *185*, 122078. https://doi.org/10.1016/j.techfore.2022.122078

Mondéjar, M. E., Avtar, R., Díaz, H. L. B., Dubey, R. K., Esteban, J., Gómez-Morales, A., Hallam, B., Mbungu, N. T., Okolo, C. C., Prasad, K. A., She, Q., & Garcia-Segura, S. (2021). Digitalization to achieve sustainable development goals: Steps towards a Smart Green Planet. *Science of the Total Environment*, *794*, 148539. https://doi.org/10.1016/j.scitotenv.2021.148539

Mora, H., Mendoza-Tello, J. C., Varela-Guzmán, E., & Szymański, J. (2021). Blockchain technologies to address smart city and society challenges. *Computers in Human Behavior*, *122*, 106854. https://doi.org/10.1016/j.chb.2021.106854

Murinde, V., Rizopoulos, E., & Zachariadis, M. (2022). The impact of the FinTech revolution on the future of banking: Opportunities and risks. *International Review of Financial Analysis*, *81*, 102103. https://doi.org/10.1016/j.irfa.2022.102103

Nikitenko, V., Andriukaitiene, R., & Punchenko, O. (2019). Formation of sustainable digital economical concept: challenges, threats, priorities. *Humanities Studies*, *1*(78), 140–153. https://doi.org/10.26661/hst-2019-1-78-11

Nikitenko, V., Voronkova, V., Andriukaitiene, R., & Oleksenko, R. (2021). The crisis of the metaphysical foundations of human existence as a global problem of post-modernityand the ways of managerial solutions. *Propósitos Y Representaciones*, *9*. https://doi.org/10.20511/pyr2021.v9nspe1.928

Nikitenko, V., Voronkova, V., Shapurov, O., Ryzhova, I., & Oleksenko, R. (2022). Influence

of digital creative technologies on the development of education and medicine. *International Journal of Health Sciences*, *6*(2), 699–708. https://doi.org/10.53730/ijhs.v6n2.7669

Novillo-Ortiz, D., De Fátima Marín, H., & Saigí-Rubió, F. (2018). The role of digital health in supporting the achievement of the Sustainable Development Goals (SDGs). *International Journal of Medical Informatics*, *114*, 106–107. https://doi.org/10.1016/j.ijmedinf.2018.03.011

Oleksenko, R. I., & Garbar, H. A. (2022). *Innovacijna osvita yak chinnik kreativnogo rozvitku osobistosti v umovah globalnih viklikiv* [Innovative education as a factor of creative development of the individual in the context of global challenges]. Odnorog T. V.

Oleksenko, R., & Voronkova, V. (2020). Formuvannya modeli klasifikaciyi socialnih procesiv u publichnomu upravlinni ta administruvanni: ponyatijno-kategorijnij aparat [Formation of a model for classification of social processes in public administration: conceptual and categorical apparatus]. *Theory and Practice of Public Administration*, *3*(70), 82–90.

Pérez-Castro, M. Á., Mohamed-Maslouhi, M., & Alonso, M. Á. M. (2021). The digital divide and its impact on the development of Mediterranean countries. *Technology in Society*, *64*, 101452. https://doi.org/10.1016/j.techsoc.2020.101452

Punchchenko, O., Andriukaitiene, R., & Voronkova, V. (2020). The impact of technology on human life in the digital age of machines and its role in the development of society. In *Theory and practice: problems and prospects. Scientific articles.* (pp. 357–366). Lietuvos Sporto Universitetas.

Rodrigo, L., Ortiz-Marcos, I., Palacios, M., & Romero, J. (2022). Success of organisations developing digital social innovation: Analysis of motivational key drivers. *Journal of Business Research*, *144*, 854–862. https://doi.org/10.1016/j.jbusres.2022.02.029

Schena, R., Secundo, G., Domenico, D. F., Pasquale, D. V., & Russo, A. (2022). Digital reputation and firm performance: The moderating role of firm orientation towards sustainable development goals (SDGs). *Journal of Business Research*, *152*, 315–325. https://doi.org/10.1016/j.jbusres.2022.07.025

Sedera, D., Tan, C., & Xu, D. (2022). Digital business transformation in innovation and entrepreneurship. *Information & Management*, *59*(3), 103620. https://doi.org/10.1016/j.im.2022.103620

Sergi, B. S., Ključnikov, A., Popkova, E. G., Bogoviz, A. V., & Lobova, S. V. (2022). Creative abilities and digital competencies to transitioning to Business 4.0. *Journal of Business Research*, *153*, 401–411. https://doi.org/10.1016/j.jbusres.2022.08.026

Shapiro, A. (2022, January 2). *Cardinal Health Accelerates User Adoption with Whatfix*. Whatfix. https://whatfix.com/resources/case-studies/how-whatfix-became-the-24-7-self-help-solution-for-cardinal-health/

UN Secretary-General. (2019, June). *The Age of Digital Interdependence*. https://www.un.org/en/pdfs/DigitalCooperation-report-for%20web.pdf

UNESCWA. (2021). *SDGs review 2022 digital transformation*. https://publications.unescwa.org/2023/sdgs-review-2023/digital-transformation.html

Varadarajan, R., Welden, R., Arunachalam, S., Haenlein, M., & Gupta, S. (2022). Digital product innovations for the greater good and digital marketing innovations in communications and channels: Evolution, emerging issues, and future research directions. *International Journal of Research in Marketing*, *39*(2), 482–501. https://doi.org/10.1016/j.ijresmar.2021.09.002

Veile, J. W., Schmidt, M., & Voigt, K. (2022). Toward a new era of cooperation: How industrial digital platforms transform business models in Industry 4.0. *Journal of Business Research*, *143*, 387–405. https://doi.org/10.1016/j.jbusres.2021.11.062

Volberda, H., Khanagha, S., Baden-Fuller, C., Mihalache, O., & Birkinshaw, J. (2021). Strate-

gizing in a digital world: Overcoming cognitive barriers, reconfiguring routines and introducing new organizational forms. *Long Range Planning*, *54*(5), 102110. https://doi.org/10.1016/j.lrp.2021.102110

Voronkova, V. G., & Nikitenko, V. O. (2022a). *Filosofiya cifrovoyi lyudini i cifrovogo suspilstva: teoriya i praktika: monografiya* [Philosophy of the digital person and digital society: theory and practice]. Liha-Pres.

Voronkova, V. G., & Nikitenko, V. O. (2022b). Global trends in the transition to sustainable development based on digital technologies (on the example of the USA and China). In *Modern trends in science and practice* (Vol. 2, pp. 31–40). GS Publishing Services.

Voronkova, V., & Nikitenko, V. (2022c, November 22). *Exploring Jean Baudrillard's Theory and Methodology: The Hyperreal World of Media Capitalism in the Postmodern Era*. Centre for Criminology. https://criminology-center.org/zhan-bodrijyar-o-postmodernom-proekte-giperrealnogo-mira-medijnogo-kapitalizma-teoriya-i-metodologiya-issledovaniya/

Voronkova, V., Nikitenko, V., & Andriukaitiene, R. (2021a, February 9). Development of Artificial intelligence society in postmodernity: problems, risks, challenges. *Newsletter of Odessa Scientific-Humanitarian Society*. https://ohss.fi/2021/02/09/razvitie-obshhestva-iskusstvennogo-intellekta-v-usloviyah-postmodernosti-problemy-riski-vyzovy/

Voronkova, V., Nikitenko, V., Andriukaitiene, R., & Oleksenko, R. (2021b, April 27). *Artificial Intelligence: a Transformative Power Shaping the Future of Humanity*. Centre for Criminology. https://criminology-center.org/iskusstvennyj-intellekt-kak-glavnaya-reshayushhaya-sila-kotoraya-mozhet-izmenit-chelovechestvo/

Voronkova, V., Nikitenko, V., Bilohur, V., Oleksenko, R., & Butchenko, T. (2022a). Conceptualization of smart-philosophy as a post-modern project of non-linear pattern development of the XXI century. *Cuestiones Políticas*, *40*(73), 527–538. https://doi.org/10.46398/cuestpol.4073.29

Voronkova, V., Nikitenko, V., & Metelenko, N. (2022b). AGILE-economy as a factor in improving the digital society. In *Baltic Journal of Economic Studies*, 8(2), 51–58. https://doi.org/10.30525/2256-0742/2022-8-2-51-58

Voronkova, V., Punchenko, O., & Azhazha, M. A. (2020). Globalization and global governance in the fourth industrial revolution (industry 4.0). *Humanities Studies*, *4*(81), 182–200. https://doi.org/10.26661/hst-2020-4-81-11

Walsh, P., Murphy, E., & Horan, D. (2020). The role of science, technology and innovation in the UN 2030 agenda. *Technological Forecasting and Social Change*, *154*, 119957. https://doi.org/10.1016/j.techfore.2020.119957

Wang, Y., Zhou, Y., & Sun, B. (2022). Equalization or polarization? The effect of the Internet on National Urban Hierarchies across the world, 2000–2018. *Cities*, *131*, 103989. https://doi.org/10.1016/j.cities.2022.103989

Weerakkody, V., Omar, A., El-Haddadeh, R., & Al-Busaidy, M. (2016). Digitally-enabled service transformation in the public sector: The lure of institutional pressure and strategic response towards change. *Government Information Quarterly*, *33*(4), 658–668. https://doi.org/10.1016/j.giq.2016.06.006

Author Biographies

Valentyna Voronkova is a Doctor of Philosophy (D.Sc.), Professor, Academician of the Academy of Higher Education of Ukraine, Head of the Department of Management of Organizations and Project Management, Engineering Educational and Scientific Institute Named after Y.M. Potebnya of Zaporizhzhia National University (Zaporizhzhia, Ukraine).

Vitalina Nikitenko is a Doctor of Philosophy (D.Sc.), Professor of the Department of Management and Administration, Engineering Educational and Scientific Institute Named after Y.M. Potebnya of Zaporizhzhia National University (Zaporizhzhia, Ukraine).

Regina Andriukaitiene is a Doctor PhD of social sciences, Head of the Department of Business and Economics, Associate Professor, Marijampole University of Applied Sciences (Marijampole, Lithuania), lecturer of Lithuanian Sports University (Kaunas, Lithuania).

Roman Oleksenko is a Doctor of Philosophy, Professor of Department of Management of Public Administration, Dmytro Motornyi Tavria state agrotechnological University (Zaporizhzhia, Ukraine).