

## Digital Economy in a Global Context: World Experience

IRYNA SHEVCHENKO<sup>1</sup>, OKSANA LYSAK<sup>2</sup>, ANNA ZALIEVSKA-SHYSHAK<sup>3</sup>, IRYNA MAZUR<sup>4</sup>, MYKOLA KOROTUN<sup>5</sup> VITALIY NESTOR<sup>6</sup>

<sup>1</sup>International Economics Department, West Ukrainian National University, UKRAINE

<sup>2</sup>Department of Economics and Business, Dmytro Motornyi Tavria State Agrotechnological University, UKRAINE

<sup>3</sup>Department of Economic Theory, Macro- and Microeconomics, Taras Shevchenko National University of Kyiv, UKRAINE

<sup>4</sup>Department of Environmental Management and Entrepreneurship, Taras Shevchenko National University of Kyiv, UKRAINE

<sup>5</sup>Department of Environmental Management and Entrepreneurship, Taras Shevchenko National University of Kyiv, UKRAINE

<sup>6</sup> Department of Theory of State and Law and Constitutional Law of the Volodymyr the Great Educational and Scientific Institute of Law, Private Joint Stock Company Higher Educational Institution «Interregional Academy of Personnel Management», UKRAINE

**Abstract:** - The processes related to digitalizing all branches of the world economy are irreversible components of the evolutionary development of the modern global economy. In current realities, the overriding priority in the economic sphere is the development of innovations and digital technologies using all their advantages regarding expanding the information component of enterprises' activities, creating information assets, minimizing risks, the possibility of remote cooperation and the reduction of transaction costs, the ability to quickly respond to existing security, competitive, and other types of challenges. The purpose of the academic paper is to highlight the principal directions and trends of the world experience in developing the economic sphere's digital component. System-structural, comparative, logical-linguistic methods, analysis, synthesis, induction, and deduction in the processing scientific information, abstraction, and idealization for studying and processing of statistical and analytical data were used during the research. Based on the research results, the concepts and components of the digitalization of the economic sphere, the main prerequisites, patterns and directions of developing digital economy in recent years were studied from the perspective of evaluating the global experience of this process.

**Key-Words:** - digital economy, digital infrastructure, application of digital platforms, digital models of economic development, globalization of capital markets, digital business environment

Received: May 11, 2022. Revised: May 13, 2023. Accepted: June 17, 2023. Published: July 13, 2023.

### 1 Introduction

The objective processes of computerization, which have been gaining momentum in recent years in all spheres of social development, require countries to formulate a balanced policy on digitization, regulatory liberalization, and adjustment of the regulatory and legal framework. They also require strengthening the "analog" fundamentals of digital transformation, stimulating investment processes for accelerating the development of the digital economy based on using modern information and communication technologies and applying the scientific foundations of theories and concepts of

economic development in the conditions of digital transformation of global social processes.

The theoretical part of the research substantiates the relevance, concepts, components and main stages of developing the digital economy in the global context.

The practical part of the research includes the features of distributing countries that are best prepared for the new digital economy according to the NRI rating based on the results of 2020, as well as by groups that are separate components of this index, namely, by the level of technology development, human capital, management level and degree impact on the world economic arena. An

assessment of digital economy's impact on particular nations' GDP was also done as part of the present scientific work.

Based on the research results, conclusions were drawn regarding the issues raised. In particular, it was established that Sweden, Denmark, Singapore, the Netherlands and Switzerland belong to the five countries with the highest level of the Network Readiness Index, and the USA ranks only eighth in the top ten. At the same time, Switzerland, Sweden, the Netherlands and the USA have the highest level of development in terms of digital technologies' development level. Singapore, which is one of the leaders according to the NRI indicator, occupies the penultimate place in the top ten of this index. The personnel provision's indicator of the economy is decisive in the NRI formation, forasmuch as the leading countries according to the general level of the index occupy the first places in terms of this indicator's value. Norway, Denmark and Sweden are the leaders in the "Management" component of the Network Readiness Index. Singapore, Germany and Great Britain occupy relatively low places in terms of this indicator's rating level. Therefore, the components taken into account when calculating this indicator are important but not decisive criteria when calculating the total size of the NRI index. Indicators forming the "Impact" category significantly influence on the formation of the Network Readiness Index's overall size. In general, the leading countries, according to this indicator, are the countries with the highest NRI rate. The analysis of the digital economy's ratio in the GDP of individual countries shows that the share of companies conducting their activities in the digital mode in the country's GDP has a direct impact on the absolute volume of household expenditures and a fairly conditional direct impact on the volumes of exports, imports and investments in the respective countries in the electronic segment of the economy.

## 2 Literature Review

The modern world has already taken the first step towards a fundamentally new technological and economic reality, a component of which is digital economic and social processes. The challenges of modern industrial society are difficult to overestimate. We are talking about a change in the global social-technological structure, the consequence of which is a complete reformatting of the systems we are used to, and the formation of new economic strategies. Based on them, the technological paradigm is changing, management

models and social norms are being introduced, and large-scale demographic shifts are taking place (Kan, Lyu, Huang & Yao, 2022).

In modern conditions, the acceleration of innovative development is based on introducing digital technologies that contribute to the formation of new business models. From the perspective of analyzing international and state institutions, the transition to the digital economy is considered as a mechanism of economic growth, forasmuch as ICT can positively affect the efficiency, effectiveness, profitability and quality of economic and social activities (Banga, 2022).

According to scientists' standpoint, the digital economy encompasses all types of economic activity. Summarizing the existing definitions of the digital economy, it should be noted that in most definitions, the digital economy is considered as an activity based on the active implementation of innovations and information and communication technologies in all types of economic activity and spheres of social life. This makes it possible to significantly increase efficiency/productivity in various types of economic activity. The digital economy is fundamental to globalization and the industrial revolution (Adriaens & Ajami, 2021).

In conditions when the borders between countries are becoming less and less visible, the rapid processes of technological transformations make it possible to transform business models into qualitatively new forms of activity, from simple automation of processes to strategic corporate organization (Timchuk & Evloeva, 2020).

The general regularity of the digital economy is its focus on the end consumer and the wide use of information as a driving resource, considering the specific features of this consumer (Elia et al., 2021). In modern conditions, digital platforms are becoming points of concentration of information capital. From an economic perspective, a digital platform implements a multi-market model in which demand and supply are coordinated, transaction costs are optimized, and information asymmetry in the market is reduced. There is a transition from unification to general aggregation of all possible goods and services, contributing to the optimal development of the competitive environment (Zhang, Pan, Feng & Qin, 2022).

Currently, the need to change priorities and the urgency of systemic reforms in the field of digital economy development is becoming more and more evident around the world. At the same time, according to numerous scientists' standpoints, the main principles of developing the digital segment of the economy are as follows:

- integrity (mutual understanding between members of society in the process of participation in individual components of digital economic processes);
- completeness (elimination of institutional barriers on the way to digitalization);
- accessibility (equal access to services, information, and knowledge);
- justice (all members of society and the company must follow the established rules);
- security (observance by all participants of the economic system of cyber security, norms of protection of personal data and commercial secrecy);
- efficiency (the result of switching work to digital mode should exceed its cost);
- openness (cooperation with all partners to create a global e-commerce market);
- independence (ensuring freedom to search, process, analyze and transmit information) (Ferracane & Marel, 2019), (Ferencz & Gonzales, 2019), (Qian, Liu & Pan, 2022).

Also, according to numerous scientists' standpoints, the advanced digital infrastructure is the basis of developing the economy's digital segment (Jiang, 2021).

The development of digital infrastructure makes it possible to overcome information inequality in access to economic, social, cultural and educational opportunities existing or deepening due to incomplete, uneven or insufficient access to computers and telecommunications, as well as digital technologies. Digital infrastructure with systematic state support stimulates the development of an open information society as one of the essential factors in increasing the efficiency of using ICT in order to improve the citizens' life quality, economy development, and social society (Ding, Zhang & Tang, 2021).

The purpose of the research is to determine the principal tendencies and comparative features of the digital economy's development level of different countries, as well as to outline the digital economy's main components of different countries.

### 3. Materials and Methods

A practical study of directions, tendencies and the development degree of the digital economy in the world was conducted by evaluating statistical and analytical information on the specified issues, primarily based on the data of the Network Readiness Index 2020 and Shaping Europe's Digital Future.Brussels.COM (19.02.2020).

## 4. Results

The key indicator for assessing the level of the digital aspect of the country's development is the Network Readiness Index (NRI). It is jointly calculated annually by the World Economic Forum, the World Bank and the International Business School INSEAD. This indicator measures how effectively a business uses digital technologies to increase its competitiveness and development.

This indicator is calculated to assess the state of development of the information society and achieve the main strategic goals of economic development. The NRI values for the ten countries with the highest level of network readiness are represented in Figure 1.

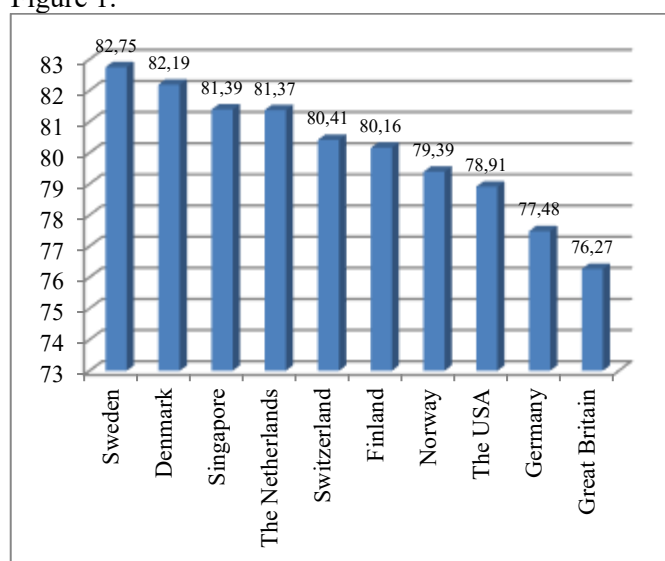


Figure 1. 10 countries best prepared for the new digital economy based on the NRI's ranking as of 2020, %

Source: compiled by the authors based on data (Network Readiness Index, 2020).

It can be seen from Figure 1 that Sweden, Denmark, Singapore, the Netherlands and Switzerland belong to the top five countries with the highest level of this indicator. At the same time, the USA occupies only the eighth place in the top ten.

The index measures the level of ICT development using 62 benchmarks, divided into four main groups: technology, people, management, and influence (the place of countries according to each of these components among other countries is shown in Figures 2 - 4).

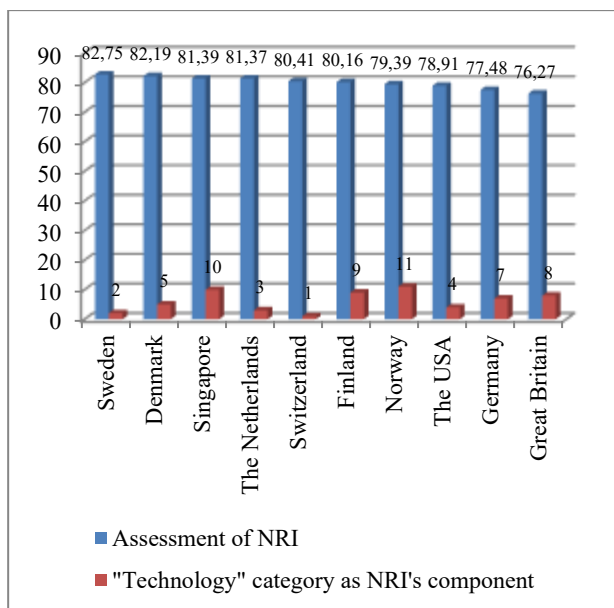


Figure 2. The level of assessing the leading countries according to the NRI rating in the "Technology" category as a component of the Network Readiness Index, %

Source: compiled by the authors based on data (Network Readiness Index, 2020).

Figure 2 shows that Switzerland, Sweden, the Netherlands and the USA have the highest level of development in terms of digital technologies' development level. However, Singapore, which is one of the leaders in terms of the NRI indicator, occupies the penultimate place in the top ten of this index.

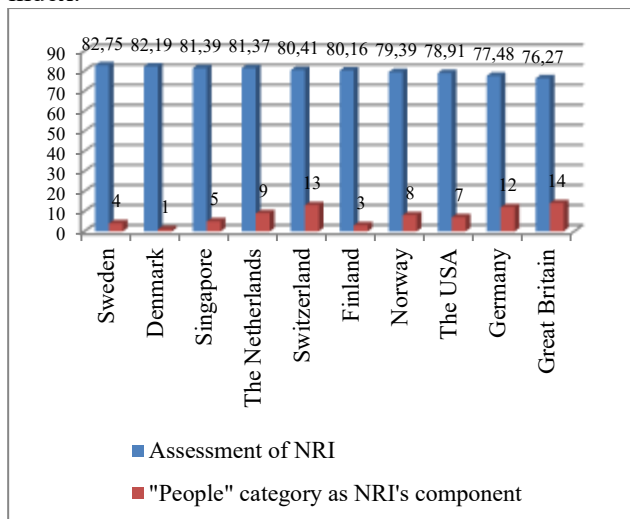


Figure 3. The level of assessing the leading countries according to the NRI rating in the "People" category as a component of the Network Readiness Index, %

Source: compiled by the authors based on data (Network Readiness Index, 2020).

Personnel support for the functioning of any sphere of the economy is a significant prerequisite for its effective development. Germany, Great Britain, and Switzerland are the top three countries in the "People" category of the Network Readiness Index. It can be seen from Figure 3 that this indicator is decisive in the NRI formation, forasmuch as the leading countries in terms of the overall level of the index occupy the first places in terms of this indicator's value.

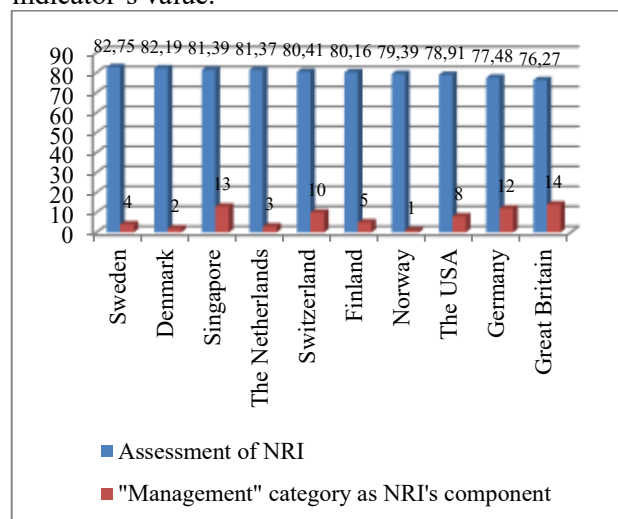


Figure 4. The level of assessing the leading countries according to the NRI rating in the "Management" category as a component of the Network Readiness Index, %

Source: compiled by the authors based on data (Network Readiness Index, 2020).

Figure 4 shows that Norway, Denmark and Sweden are the leaders in the "Management" indicator. At the same time, Singapore, Germany and Great Britain occupy relatively low places in terms of this indicator's rating. Therefore, the components taken into account when calculating this indicator are significant but not decisive criteria when calculating the total size of the NRI index.

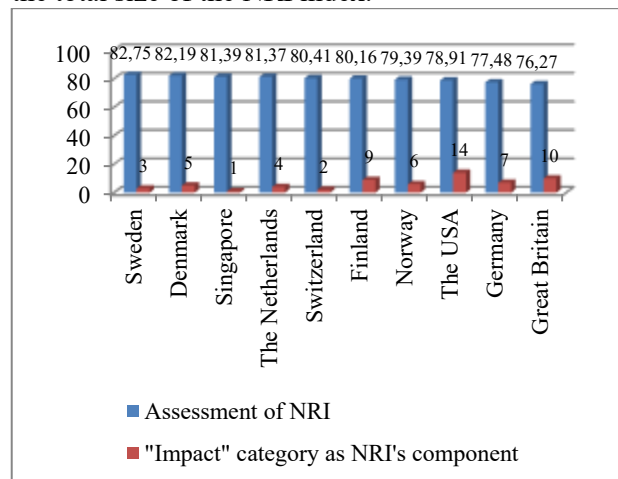


Figure 5. The level of assessing the leading countries according to the NRI rating in the “Impact” category as a component of the Network Readiness Index, %

Source: compiled by the authors based on data (Network Readiness Index, 2020).

Analyzing the NRI components by the “Impact” category showed that the indicators forming this category significantly impact the overall size of the Network Readiness Index. In general, the leading countries according to this indicator are the countries with the highest number of NRI (Singapore, Switzerland, Sweden, the Netherlands, and Denmark).

The relative share of the digital economy in the GDP of some countries of the world is shown in Figure 6.

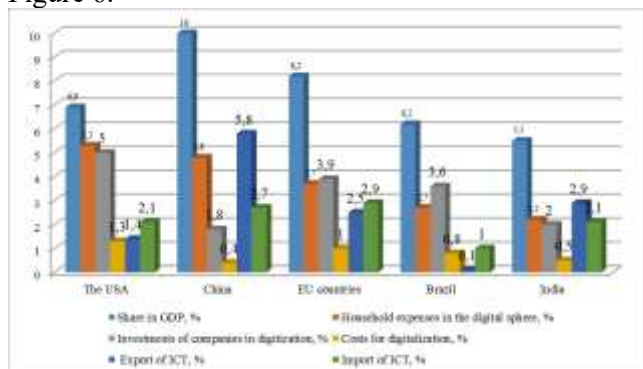


Figure 6. The contribution of the digital economy to the GDP of some countries of the world, 2018, %

Source: compiled by the authors based on data (Digital Economy and Society Index, 2018)

The experience of the USA and China proves that the development of the digital economy contributes to strengthening competition, increasing productivity and labor skills of the population, and facilitating resource management and access to information about creating several settings for both users and companies.

The Digital Business Survey as of 2018 reveals that 89% of companies plan to adopt a digital business strategy, but only 44% have fully implemented the approach. The spheres of services (95%), financial services (93%) and healthcare (92%) are leading in terms of the share of adapting digital innovations (Shaping Europe’s Digital Future, 2020).

The fields of production, education, management and leisure have long been transformed by using personal computers and the Internet. In order to remain competitive in today’s market environment, business leaders are already implementing innovations that can become engines and accelerators of developing entire industries and

economies in the coming years. This has created new market opportunities that significantly impact on the economy in various sectors (Pradhan et al., 2019).

Wireless networks, advanced mobile devices, and video and conferencing technologies have contributed to integrating information and communication technologies into various economic and social spaces and creating a new global digital economy (Lin, 2019).

The tendency of recent years is the growth of social and “cloud” technologies, which play a significant role in the information infrastructure of the corporate sector. The combinatorial effects of mobile, “cloud”, sensor and electronic analytical technologies, and artificial intelligence exponentially accelerate the process of developing the digital sector of the economic system (Digital Economy and Society Index, 2018).

The introduction of digital information platforms at various levels of the economy solves various strategic tasks within the framework of the challenges of the new industrialization system. The digital economy is developing on the basis of achievements in the information sphere. It is its continuation as an unprecedented technological breakthrough as a result of an industry’s achievements in which innovation, especially digital, is spreading at a significant speed (Ercan & Samet, 2018).

Digital technologies contribute to establishing new requirements that necessitate an immediate innovative response from economies, previously created ecosystems, individual companies and society as a whole (Chen, Gozgor & Koo, 2021).

## 4. Discussion

Currently, the development of global and local markets creates favorable conditions for the digital transformation of countries with a high level of population’s education and computerization of economies.

The analysis of statistics and data and the evaluation of scientific works on the subject of the research show that the development level of the digital economy in the country is closely related to income level. The obtained data indicate that the first twenty countries, according to the NRI indicator in 2020, are occupied by the states with a high per capita income, and low-income countries close the ranking (Genari et al., 2018).

In general, analysts remark that the country’s degree of economic growth is the single factor that determines how widely and effectively ICT

opportunities may be exploited for advancing all aspects of life, including the economic one (Goldfarb & Tucker, 2019).

Taking into account the influence of the principal tendencies of society's digitization on developing economic and social processes, it is worth noting that the economic sphere needs to ensure the digital transformation of the economy. It should be aimed at: changing the economic structure, modifying traditional markets, social relations, public administration, which is connected with the penetration of digital technologies, a fundamental change in the main source of value creation and the economy's structure through forming more effective economic processes provided by digital infrastructure (Amankwah-Amoah et al., 2021).

The systematization of conceptual approaches to the emergence of the digital economy and its development makes it possible to conclude that the digital economy is a new type of economy encompassing companies from all economic sectors around the world. It creates favorable opportunities for the globalization of capital, goods, services and labor markets, permeating all sectors in all branches of the economy (Shaping Europe's Digital Future, 2020).

The results of the NRI structure's analysis show that digital transformation is taking place nowadays at all levels of the economic system: international, national, regional and local.

The general regularity of the digital economy is the focus on a specific consumer and the wide use of information as a driving resource, taking into account the characteristics of specific consumer segments in a particular place, as well as the global use of digital transformation technologies of real business processes (Ferracane & Marel, 2019), (Qian, Liu & Pan, 2022).

At the same time, it is worth noting that digital projects are characterized by very specific conditions for their implementation in a given place and can become the subject of standardization only if positive economic results are accumulated (Goldfarb & Tucker, 2019).

The analysis of the literature on the research topic made it possible to establish that digital transformation is a difficult task. Countries that have reached the highest level of digital maturity have to solve complex cultural, organizational and technical problems. After all, only the consideration of all these factors makes such a transformation successful (Ferencz & Gonzales, 2019).

The analysis of the principal tendencies in developing the digital economy provides insight into the main directions of optimizing the process of the

digital economic environment's functioning, which will contribute to developing the digital economic system, namely:

rethinking the process of creating economic value (by including a digital component in it, improving accounting, etc.);

solving the problem of excessive concentration in the market of online platforms (including by improving regulation);

taking active measures to create new jobs (for instance, by improving professional training, reorienting the labor market to new high-tech areas, etc.);

improvement of measures of the population's social protection.

Information and communication technologies are an important factor in developing digital innovations and society as a whole.

## 5. Conclusions

Therefore, the volume of digital innovations in the global economic environment is increasing. However, innovative processes are not developing efficiently enough, and this significantly slows down the digital modernization of the world economy. The main reasons for the slowdown in the digital economy development are an unfavorable environment for business, especially at the stage of introducing innovations into production, an imperfect regulatory framework, and an insufficiently high level of using digital infrastructure.

According to the analysis of the scientific literature on the research topic, in order to achieve success in the field of digital transformation of modern business, it is necessary to purposefully build its work, relying on the latest achievements of the digital environment and using all the possibilities of the digital infrastructure.

### References:

- [1] Adriaens, P. & Ajami, N. (2021). Infrastructure and the digital economy: Reinventing our role in the design, financing, and governance of essential services for society. *Journal of Environmental Engineering*, 147, 02521001. <https://ascelibrary.org/doi/10.1061/%28ASCE%29E.E.1943-7870.0001866>. [http://doi.org/10.1061/\(ASCE\)EE.1943-7870.0001866](http://doi.org/10.1061/(ASCE)EE.1943-7870.0001866).
- [2] Amankwah-Amoah, J., Khan, Z., Wood, G. & Knight, G. (2021). COVID-19 and digitalization: the great acceleration. *Journal of Business*



- Research*, 136, 602–11.  
<https://linkinghub.elsevier.com/retrieve/pii/S0148296321005725>. doi: 10.1016/j.jbusres.2021.08.011
- [3] Banga, K. (2022). Digital technologies and product upgrading in global value chains: Empirical evidence from Indian manufacturing firms. *The European Journal of Development Research*, 34, 77–102  
<https://link.springer.com/article/10.1057/s41287-020-00357-x>.
- [4] Chen, T., Gozgor, G. & Koo, C.K. (2021). Pandemics and income inequality: what do the data tell for the globalization era?. *Front Public Health*, 9, 629.  
<https://www.frontiersin.org/articles/10.3389/fpubh.2021.674729/full>. doi: 10.3389/fpubh.2021.674729
- [5] Digital Economy and Society Index 2018 Report – European Commission. 2018. URL: <https://ec.europa.eu/digitalsingle-market/en/news/digital-economy-and-society-index-2018-report>
- [6] Ding, Y.B., Zhang, H.Y. & Tang, S.T. (2021). How does the digital economy affect the domestic value-added rate of Chinese exports? *Journal of Global Information Management (JGIM)*, 29, 71–85. <https://www.igi-global.com/gateway/article/279665>.  
<http://doi.org/10.4018/JGIM.20210901.0a5>.
- [7] Elia, S., Giuffrida, M., Mariani, M.M. & Bresciani, S. (2021). Resources and digital export: An RBV perspective on the role of digital technologies and capabilities in cross-border e-commerce. *Journal of Business Research*, 132, 158–169.  
<https://www.sciencedirect.com/science/article/abs/pii/S0148296321002484?via%3Dihub>.  
<https://doi.org/10.1016/j.jbusres.2021.04.010>
- [8] Ercan, O. & Samet, G. (2018). Literature review of industry 4.0 and related technologies. *Journal of Intelligent Manufacturing*, 31, 127–82.  
<https://link.springer.com/article/10.1007/s10845-018-1433-8>. doi: 10.1007/s10845-018-1433-8
- [9] Ferencz, J. & Gonzales, F. (2019). Barriers to Trade in Digitally Enabled Services in the G20; OECD Trade Policy Papers, No. 232; OECD Publishing: Paris, France, 2019. [https://www.oecd-ilibrary.org/trade/barriers-to-trade-in-digitally-enabled-services-in-the-g20\\_264c4c02-en](https://www.oecd-ilibrary.org/trade/barriers-to-trade-in-digitally-enabled-services-in-the-g20_264c4c02-en).  
<https://doi.org/10.1787/18166873>
- [10] Ferracane, M. & Marel, E.V.D. (2019). Do Data Policy Restrictions Inhibit Trade in Services? Robert Schuman Centre for Advanced Studies Research Paper, No. RSCAS 2019/29; Elsevier: Amsterdam, The Netherlands, 2019  
[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3384005](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3384005).
- [11] Genari, D., Costa, L., Savaris, T., Macke, J. (2018). Smart Cities e o Desenvolvimento Sustentavel: Revisao de Literatura e Perspectivas de Pesquisas Futuras. *Revista de Ciencias da Administracao*, 20, 51, 69-85.
- [12] Goldfarb, A. & Tucker, C. (2019). Digital economics. *Journal of econonomic literature*, 57, 3–43.  
<https://www.aeaweb.org/articles?id=10.1257/jel.20171452>. <http://doi.org/10.1257/jel.20171452>
- [13] Jiang, X.J. (2021). Technology and culture in the digital age. *Social Sciences in China*, 8, 4–34  
<https://www.tandfonline.com/doi/full/10.1080/02529203.2021.2003598>.  
<http://doi.org/10.1080/02529203.2021.2003598>.
- [14] Kan, D., Lyu, L., Huang, W. & Yao, W. (2022). Digital Economy and the Upgrading of the Global Value Chain of China's Service Industry. *Journal of Theoretical and Applied Electronic Commerce Research*, 17, 1279–1296.  
<file:///C:/Users/user/Downloads/jtaer-17-00065.pdf>.  
<https://doi.org/10.3390/jtaer17040065>
- [15] Lin, Y. (2019) E-urbanism: e-commerce, migration, and the transformation of Taobao villages in urban China. *Cities*, 91, 202–12.  
<https://linkinghub.elsevier.com/retrieve/pii/S026427511830012X>. doi: 10.1016/j.cities.2018.11.020
- [16] Network Readiness Index 2020. URL: <https://networkreadinessindex.org/nri-2020-analysis/>
- [17] Pradhan, R.P., Arvin, M.B., Nair, M., Bennett, S.E., Bahmani, S. (2019). Short-term and long-term dynamics of venture capital and economic growth in a digital economy: a study of European countries. *Technology in Society*. 57, 125–34.  
<https://linkinghub.elsevier.com/retrieve/pii/S0160791X18301829>. doi: 10.1016/j.techsoc.2018.11.002
- [18] Qian, W., Liu, H.A. & Pan, F.H. (2022). Digital economy, industry heterogeneity, and service industry resource allocation. *Sustainability*, 14, 8020. <https://www.mdpi.com/2071-1050/14/13/8020>.  
<http://doi.org/10.3390/su14138020>.
- [19] Shaping Europe's Digital Future (2020). Brussels. 19.02.2020 COM 65 final. URL: [https://ec.europa.eu/commission/presscorner/detail/en/fs\\_20\\_278](https://ec.europa.eu/commission/presscorner/detail/en/fs_20_278).
- [20] Timchuk, O.G. & Evloeva, M.V. (2020). Difficulties in transforming the construction industry under the digital economy. *IOP Conference Series: Materials Science and Engineering*, 880, 012082.

<https://iopscience.iop.org/article/10.1088/1757-899X/880/1/012082>. <http://doi.org/10.1088/1757-899X/880/1/012082>.

[21] Zhang, L.L., Pan, A., Feng, S.S. & Qin, Y.Y. (2022). Digital economy, technological progress, and city export trade. *PLoS ONE* 2022, 17, e0269314.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269314>.

<http://doi.org/10.1371/journal.pone.0269314>

### **Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)**

Formal analysis, Iryna Shevchenko; Investigation, Oksana Lysak; Methodology, Nestor Vitalii, Iryna Mazur; Resources, Nestor Vitalii, Oksana Lysak; Software, Mykola Korotun; Validation, Mykola Korotun; Writing—original draft, Anna Zalievska-Shyshak; Writing—review and editing, Iryna Shevchenko.

### **Sources of Funding for Research Presented in a Scientific Article or Scientific Article Itself**

This research received no external funding

### **Conflict of Interest**

The authors declare no conflicts of interest.

### **Creative Commons Attribution License 4.0 (Attribution 4.0 International, CC BY 4.0)**

This article is published under the terms of the Creative Commons Attribution License 4.0

[https://creativecommons.org/licenses/by/4.0/deed.en\\_US](https://creativecommons.org/licenses/by/4.0/deed.en_US)