

The Role of the Virtual Economy in Advancing Sustainable Development: Exploring Network Semantics, Cyber Risks, and Digitalization

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Abstract

This study explores the role of the virtual economy in advancing sustainable development through an examination of network semantics, cyber risks, and digitalization. The article emphasizes the need for professionals to adapt to new innovations and conditions in order to thrive in the virtual economy. The article aims to highlight the new vectors of language culture and virtual economic semantics and demonstrate the importance of developing foreign language professional information and communication competencies among individuals involved in the digitalization of various aspects of life. The virtual economic environment is analyzed in the context of sustainable development, focusing on cyberspace's primary risks and challenges, and other factors that contribute to the need for a new language paradigm of virtual competence are examined. The study concludes that to succeed in the virtual economy, it is crucial to prioritize professional foreign language training and develop a new type of specialist who can work in the virtual global economy.

In addition, the article analyzes the virtualization process of the global economic system, its development and deployment in various sectors, and identifies the relationship between the development and deployment of the virtualization process and the information technology market. The study notes that the digitization of processes in various spheres of economic activity is one of the main global trends in the development of modern society, and the definition of the term "digital economy" is analyzed. Finally, the study considers the main types of information and communication technologies and tools used in modern technologies of digitalization of the economy, and their potential for advancing sustainable development.

Keywords: digitalization, sustainable development, information society, postmodern language competence, network semantics, foreign language professional information and communication competence, virtual economy, virtual communities.

1. Introduction

The fast-paced change in life paradigms and the quick dynamics of modern life dictate new rules and requirements for the communication culture of modern generations.

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The new postmodern social order of the globalized information society, which is characterized by a) rapid changes in the information environment, b) changing requirements for employees' information competence, and c) the need for appropriate social adaptation of the individual, dictates the need for new language competencies and the need for specialists who can quickly adapt to new social, cultural, educational, professional, linguistic, and terminological innovations and conditions. Modern society needs those who are capable of instantly responding to the entire range of virtual (factual and linguistic) innovations in everyday life and professional activities, while also contributing to the sustainable development of the planet.

Higher education faces the task of preparing a new social and professional type of individual, regardless of their field of expertise because mastering the new virtual terminology becomes a prerequisite for both personal and professional success in the digital age. As such, the formation of such an individual (especially within the system of training economics specialists) occurs under the influence of information and communication technologies. Therefore, at the present stage of human society development, it is justifiable to consider the development of a novel information culture as a new cultural experience and a new element of universal culture in general.

The purpose of the article is to highlight the new vectors of language culture and virtual economic semantics and establish the significance of establishing professional information and communication competence in foreign languages among future businesspeople, economists, and individuals involved in the digitalization of various aspects of life. Furthermore, the work aims to study the current state of the digital economy, analyze the fundamental information technologies that contribute to the advancement of the information society and create conditions for ensuring an adequate level of economic security for a country.

This purpose can be achieved with the following objectives:

- 1) to provide a comprehensive analysis of the virtual economic environment with emphasis on the primary risks and challenges of cyberspace;
- 2) to examine other factors that contribute to the necessity of forming the new language paradigm of virtual competence and its role in promoting sustainability.

2. Methodology

We employed classical philosophical, ideological, and general scientific methods to ensure comprehensive research and obtain reliable results.

Our linguistic methodology and cognitive approach studied problematic issues through various modes of perception and representation. Semantic and speech methodology enabled us to uncover the threat of a variety of hacking terminology to private, state, and cultural security. This allowed us to form theoretical foundations and model the complexity of the research discourse.

We used a systemic and structural approach to justify the importance of building a system to combat organized cybercrime in the economic sphere.

3. Discussion and results

The semantics of virtual information and communication competence is a fundamental issue of postmodern existence, both in professional and everyday life. An individual who has not been interested in or has fallen behind in the terminological aspects of the new virtual realities may become simply “lost” in the space of communication, feeling “deaf and dumb” in the midst of the new language culture of today.

In an attempt to demonstrate the need for the formation of foreign language professional information and communication competence, we became interested in the relatively new postmodern concept of a virtual/network economy. The study and analysis of professional works on virtual economic activity (Bondarenko, 2004; Ivanov, 2000; Maniushis *et al.*, 2003; Rheingold, 2000; Baikov, 2011; Bihych, 2018; Matveev *et al.*, 2021) have shown that cyberspace has now become not only an environment in which interpersonal interaction and intercultural communication take place but also a space where multivariate virtual economic activities are actively carried out in all aspects of everyday life (such as the urgent need to borrow money by “putting it on a card”). While virtual economic activities can provide a range of benefits, such as increased efficiency and reduced costs, they also have sustainability implications. For example, the proliferation of virtual banking and electronic marketplaces can contribute to the digital divide and limit access to financial services for marginalized communities.

As per scholarly opinions, a virtual world has emerged in the business domain in addition to the tangible surroundings. This study aims to provide a concise characterization of this virtual world based on the analysis of relevant literature.

The concept of a virtual world is prominent in the foreign economic sphere, where it is manifested in electronic marketplaces, e-commerce, virtual banking, virtual products, virtual corporations, and other similar terms.

The trend towards virtualization is increasingly evident, with numerous corporations shifting their operations online and their employees working remotely. Such virtual corporations leverage the production culture, traditions, experience, and resources of their partners, allowing them to expand their operations and achieve a competitive edge. The shift towards remote work can have implications for carbon emissions and the environmental impact of corporate operations. Therefore, it is important to consider sustainability implications when designing and implementing virtual economic activities. This could include measures such as promoting sustainable e-commerce practices, investing in renewable energy to power data centers, and prioritizing social and environmental responsibility in the virtual economy.

In the realm of virtual corporations, the Airbus Industrie, Apple, and Sony serve as notable examples of companies that have leveraged virtual environments to optimize their potential in business operations.

As part of the “Smart Infrastructure in Sustainable Urban Development: World Experience and Prospects for Ukraine” project, the Razumkov Center’s sociological service conducted an expert survey between September 25 and October 22, 2020 (Markevych, 2021). The survey aimed to assess the potential risks associated with the construction of smart infrastructure. The expert survey results revealed that the construction of smart infrastructure poses significant risks, including the potential for

personal data leakage (67.6%), malfunctioning computerized systems (46.2%), and interference with the privacy of local residents (42.1%). However, the risks associated with the city's security and the spread of primitive culture were assessed as low.

Digitalization provides opportunities for freedom of speech but also risks inaccurate information and a lack of transparency. This can lead to passivity and groupthink, exacerbating the polarization of views. Over 1.3 billion people lack constant access to electricity, 1.15 billion lack reliable telephone services, 2.5 billion lack basic sanitation, and almost 800 million lack access to water resources. Digital technologies concentrated in megacities may result in territorial digital inequality and societal stratification. It is crucial to address these risks for sustainable and equitable development.

The growth of virtual spaces, including online transactions and financial exchanges, has further amplified the importance of this phenomenon.

The proliferation of virtual supermarkets, banks, and financial systems, such as WebMoney, attest to the enlargement of virtual commerce and the rise of innovative approaches to earning and spending money in online contexts.

In July 2020, the UN outlined six systemic and global economic development models for the next decade (Future possibilities report, 2020). Two of these models are the Exabyte Economy and Experience Economy, driven by the fact that over half the world has Internet access and two-thirds use mobile phones. Online work and education will grow 7% annually, and IoT devices are projected to reach 3.5 billion by 2023. The exabyte economy's impact is significant, with the cognitive computing market projected to reach \$49.3 billion by 2025, IoT estimated to have an \$11.1 trillion economic impact yearly by 2025, 5G generating \$12.3 trillion in products over a decade, and remote monitoring devices estimated to generate \$1.1 trillion per year by 2025.

In recent years, cyberspace has experienced a proliferation of innovative technologies, such as PayPal, Google Wallet, payments and credits on Facebook, Apple, Amazon, and Vodafone. These advancements have revolutionized the way people conduct financial transactions online.

Furthermore, the emergence of the Internet has facilitated telework and telecom, enabling individuals to work remotely from anywhere in the world without having to leave their home country. This phenomenon, known as "Transborder telework", has become an integral component of the networked economy. It has also opened up new opportunities for sustainable practices due to the reduced need for commuting, which helps to decrease carbon emissions.

In addition, virtual international economic communities, including the IEEE (Institute of Electrical and Electronics Engineers), IEC (The International Engineering Consortium), and IMAPS (International Microelectronics and Packaging Society), among others, have emerged on the Internet, offering a new platform for global economic exchange.

In 2015, the World Economic Forum Report predicted 21 changes that would result from widespread digitalization by 2025. The report was based on a survey conducted by the World Economic Forum's Global Agenda Council on the Future of Software and Society. The digitalization of economies and societies is deepening, enabling the transformation of physical products into digital ones through partial and full digitalization and supplementing products with digital programs. Countries must be prepared to leverage the full potential of digitalization (World Economic Forum Survey, 2015).

In the context of the professional environment, virtual communities represent a notable element of the socio-cultural context. The communication and activities conducted by such communities are governed by established regulations and protocols.

Through the collection and processing of vast amounts of information that is tailored to the specific interests of their members, virtual communities enable communication among their members via chat and email. The advancement of the digital and electronic domains provoked significant changes in communication principles, ethics, public communications policy, and other spheres of life. This has resulted in the adaptation of well-established rules and standards of life in postmodern society. The information culture era has facilitated the creation of communities based on cultural innovations enabled by new technologies and communication systems. As a result, the concept of culture, moral values, and language have been redefined, leading to a new structure of socializing and identity formation.

In the postindustrial world, technological characteristics determine human existence, creating a virtual socio-cultural environment that requires individuals to adapt to new tools and a new reality. While technological advances and technical progress cannot be denied, they have adversely affected interpersonal communication, leading to changes in rules and standards. Computer information worlds have created self-organized spaces with symbols that strongly influence individuals, communities, societies, and humanity (Khrypko *et al.*, 2022).

A priori, businesses should prioritize working where it is most convenient for them, and due to their international nature, they are easily virtualized. The virtualization of the economy results in companies' activities transcending national borders and extending to a global scale. Researchers had predicted this phenomenon as early as the end of the 20th century. Y. Masuda (1980) predicted that the intellectual production industry will take center stage in the economy, with products being accumulated and distributed through information and communication technologies. This shift marks a change in the structure of the global economy, where it transitions from a material-based economy to an economy focused on knowledge and technology. In this new economy, knowledge capital is valued higher than material capital.

The aforementioned trends may result in significant changes in the functions of fiscal authorities, specifically in the tax service's ability to monitor money circulation to sustain the budget. These trends may also prompt changes in the role of economists themselves. Thus, we argue that it is essential to consider these developments when training future economists, including educating them on modern transformations in the economy and its virtualization. Professional foreign language training must take priority in the formation of a new type of specialist who can work in the virtual global economy. These professionals must be able to adapt quickly, find innovative solutions to unforeseen situations, and possess a thorough understanding of the language of the internet, special digital etiquette, and foreign language skills (especially English as a *lingua franca*), among other essential competencies. In the virtual economy, success is unattainable without proficient foreign language information and communication competencies. We concur with O. Bihych's (2007) perspective that virtual reality, made possible by the internet, is emerging as a novel technological, psychophysiological, and socio-cultural way of human existence.

The emergence of the internet has led to the development of a distinct subculture with its own unique languages. It is important to consider which of these languages future specialists should prioritize mastering and whether proficiency in English alone is sufficient. It should be acknowledged that not all individuals possess the algorithmic skills and fluency in internationally recognized terminology required to fully comprehend the language used on the internet, particularly within the field of information technology.

However, not all individuals possess the necessary algorithmic skills and fluency in internationally recognized terminology required to comprehend the language of the internet. This is particularly true in the context of cybercrime. The INTERPOL working group even created a codifier for cybercrimes, categorizing them into various types, such as unauthorized access and interception, unauthorized change of computer data, computer fraud, unauthorized copying, computer sabotage, and other types of computer crimes (Matveev et al., 2021, Ohnishi, 2019).

The prevalence of hacking, in its different forms and vectors, has led to increased familiarity and exposure among the general public. As a result, it has become a commonplace experience for most individuals. This phenomenon has captured the attention of researchers and practitioners alike, who seek to better understand its underlying causes, effects, and potential solutions. Hackers exploit cybersecurity vulnerabilities to achieve criminal goals. Phishing is the most common type of cyberattack, where criminals use fake pages that copy official pages of banks, payment services, and online stores to steal confidential user data. Other types of cyberattacks include SMS phishing, online phishing, vishing, skimming, shimming, online fraud, piracy, malware, and social engineering. Malware includes Trojans, spyware, and adware (Matveev et al., 2021). We want to highlight that the enumeration of cybercrime forms is not merely a list, but rather a realization of the realities of actual and linguistic-cultural contemporary existence. This emphasizes the need for a deeper understanding of the impact of cybercrime on society and the importance of developing effective measures to prevent and combat it.

So, we can state that the digital economy and new language culture (cyberslang) have become both the foundation and the contexts of the modern era. The information and communication sector has reached a potentially powerful and hyperdynamic level of development in recent years, presenting both opportunities and challenges for sustainable development. It is worth highlighting that the concept of the digital economy is attributed to Nicholas Negroponte, a co-founder of the MIT Media Lab, a renowned research facility dedicated to exploring new media and technologies. He was the first to introduce this term in his book "Being Digital" (1996). Nicholas Negroponte is also well known for his "One Laptop Per Child" project, which aims to provide every child on the planet with an affordable laptop connected to the Internet, which will open the door for children to enter the world of the digital economy. In the context of digitalization, ensuring the economic security and sustainability of the state and individuals is of particular importance. However, the term "digital economy" is multifaceted and currently lacks a clear definition. The digital economy can be understood as an economic activity that utilizes digital technologies, including electronic goods and services that are provided via digital technologies. It can also be viewed as an economy that relies on computerized digital technologies and innovative approaches to creating, handling, retaining, and transmitting data. As such, the digital economy is a complex and rapidly evolving field that poses significant challenges

and opportunities for sustainable development in businesses, governments, and individuals alike.

It is noteworthy that researchers from the World Bank have conducted a study on countries seeking to optimize the advantages brought by transformations in the information and communication sector. The study suggests that attention should be paid to enhancing the business climate, investing in education and healthcare, and promoting the reformation of the management system. These strategies are expected to yield significant positive impacts on the development of the digital economy, and by extension, the overall economic growth of the country (World Bank Group, 2016).

Positive consequences of the development of the digital economy, according to the World Bank, include increased labor productivity; improved competitiveness of companies; reduced production costs; the creation of new jobs; and the reduction of poverty and social inequality.

At the same time, the World Bank notes negative aspects of digitalization, including:

- the risk of cyber threats associated with the problem of personal data protection;
- “digital slavery” (the ability to use data about millions of people to control their behavior);
- rising unemployment in the labor market, as there is an increased risk of certain professions and even entire sectors of the economy disappearing;
- the “digital divide” associated with the level and conditions of access to the digital environment in one country or different countries.

In recent years, digital technologies and IT infrastructure have made significant progress. However, despite existing digital tools, cybersecurity remains a major issue. As technology continues to advance, cybercrime using IT tools is also on the rise, affecting not only individuals but also businesses and governments.

Between 2015 and 2019, there were over 1600 cyber attacks on business entities worldwide, with the number increasing by 40% in 2019 compared to 2015. This increase can be attributed to the widespread use of public cloud services and cryptocurrencies. Additionally, cyber incidents showed a positive trend, averaging 9% growth during the period. The success rate of cyber attacks is a crucial measure of enterprise cybersecurity, and it remained above 70% throughout the analyzed period, peaking at 79% in 2017 due to the popularity of cloud-based shared services for small and medium-sized enterprises. This highlights a critically low level of cybersecurity development in enterprises globally (Cyberthreat Defense Report, 2019).

The study related to academic procrastination and cyber hygiene (Stoliarchuk *et al.*, 2022) showed that the respondents often had to deal with fake information. Additionally, the majority of respondents reported experiencing trolling, which involved provocation, ridicule, and insult in network communication. Furthermore, some students faced dangerous challenges such as participating in extreme selfies or dangerous games, hacking of personal data, and cyberbullying, which included virtual humiliation, harassment, and terror. Table 1 shows that the prevalence of trolling decreased slightly from 85% in 2020 to 82% in 2021. In contrast, cyberbullying was felt by 13% of students surveyed in 2020 and 9% in 2021. This fact only highlights the need for greater awareness of these risks and the importance of promoting cyber hygiene practices to protect students' online safety.

Table 1: Experience receiving threats from being in social media

Threats	Students' choice* (%)	
	2020	2021
Fake information	100	100
Trolling	85	82
Call for extreme selfies	25	27
A challenge to participate in dangerous games or activities	10	36
Hacking	7	11
Cyberbullying	13	9

* the question provided for simultaneous choice of multiple response options

Digital transformation is about the use of digital technologies to transform business models, processes, and operations to better meet the needs of customers and stay competitive in the digital economy. (What is digital economy?, 2021). However, it is important to note that the level and conditions of access to the digital environment can impact the ability of organizations and individuals to participate in the digital economy and benefit from digital transformation. The digital divide, which refers to the unequal distribution of access to and use of digital technologies, can create barriers to entry for some businesses and limit access to digital goods and services for individuals. As a result, it is essential to bridge the gap in digital access to create an inclusive digital economy that makes the benefits of digital transformation available to individuals and organizations irrespective of their location or socio-economic background.

Some experts (Prykaziuk, 2020) note that external unauthorized interference in organizational activities can disrupt business processes, resulting in various negative consequences. These include economic impacts, such as theft of corporate and financial information, customer details, loss of contract and agreement information, as well as expenses related to repairing damaged systems and information recovery. Reputational consequences may also arise, such as loss of customers and investors, decreased sales, and damaged relations with partners and suppliers. Additionally, legal consequences can occur due to violations of personal data security legislation.

The US has an effective system for protecting the private information of small and medium-sized businesses and tools to punish confidentiality violations. In 2019, organizations in the US incurred average losses of \$8.1 million, up 39% from 2015. The average cost of a data breach in the US was \$9.44 million in 2022, up from \$9.05 million in the previous year. The global average cost per data breach was \$4.35 million in 2022 (Average cost of a data breach in the United States, 2022). This is primarily due to targeted attacks, which involve a suite of tools that can affect multiple systems simultaneously and undermine security at various levels.

Despite the potential threats associated with digitalization, it is important to note its benefits for industry, trade, finance, education, and government, including its potential contribution to sustainable development. The positive outcomes of digitalization for both businesses and governments are of particular significance. The benefits of the digital economy are apparent and include increased dynamism, reduced payment costs (due to the affordability of online services), and new revenue streams, while also promoting

sustainable practices. For instance, digitalization can help reduce paper usage and waste, as well as facilitate the transition to renewable energy

Moreover, digitalization enables businesses to expand their reach in the global market, providing increased access to goods and services in different parts of the world, while also reducing the environmental impact of transportation and logistics. Additionally, the production process can be streamlined to meet customer demands in a short period, even in geographically remote locations, leading to more efficient use of resources. As such, businesses can easily customize innovative products to meet the needs of their clients, regardless of their location.

Professor Walter Brenner at the University of St. Gallen in Switzerland claims that hyperconnectivity is the foundation of the digital economy. He suggests that hyperconnectivity is characterized by a ubiquitous and constant connection between people, devices, and systems. This connection creates a vast network that enables seamless communication, collaboration, and sharing of data and information. Brenner highlights the significant impact of hyperconnectivity on businesses and society. It offers efficiency, innovation, and competitiveness, but poses challenges such as data management, cybersecurity, and social inequality for those without access to digital networks. Brenner's work underscores the importance of effectively managing the opportunities and challenges of hyperconnectivity in the digital economy. (Brenner, 2014).

Additionally, it should be noted that the digital economy allows for more diverse content to be provided to ordinary consumers, including entertainment, educational, scientific, and other types of content.

Thus, the foundation of the digital economy is based on big data, blockchain technology, quantum technology, artificial intelligence, fog (cloud) computing, virtual reality, and other progressive technologies that are constantly improving and being implemented. Moreover, all of these technologies require the ability to freely operate with specialized terminology (both for experts and the average citizen) and mastery of a new postmodern language culture for communication and virtual etiquette to promote global understanding and collaboration towards sustainable development.

4. Conclusions

In the context of the global economy, technological progress has become a catalyst for economic development and competitiveness, enabling new production methods and improving quality of life. However, technology itself is becoming increasingly complex and requires greater investment. While technology can increase productivity and profits, it alone is not enough to drive socio-economic development. The rapid pace of technological change has reoriented the priorities of businesses and governments towards innovation and adaptation, and away from exclusive profit accumulation. To remain competitive, economies must invest in new technologies, digitalize industries, and prioritize sustainable development.

For professionals in any field, the development of foreign language proficiency, information processing, and communication skills is significantly influenced by the virtual economic space, which reflects the economic characteristics of society. The acquisition of such competence enables future specialists to access foreign language information and

overcome the absence of real-life communication and interaction with native speakers, which is common for language learners outside of a language environment.

Achieving proficiency in foreign language information and communication skills enables students to enhance their intercultural computer-mediated communication skills and elevate their linguistic and intercultural training to the level of active cognitive creativity. Ultimately, the presence of this competence plays a critical role in equipping students with the necessary skills to effectively navigate the virtual economic space, as well as in preparing them for the demands of the globalized economy. Such skills can contribute to sustainable business practices and global cooperation.

Cyber attacks can result in not only direct financial losses but also a decline in trust towards the organization, underscoring the critical need for security in today's digital environment. To achieve comprehensive cybersecurity, organizations should implement procedures that involve training and testing employees on cybersecurity protocols, maintaining secure devices and software, establishing secure networks and data transmission channels, encrypting data, configuring cloud services appropriately, limiting access to internal information, creating a cybersecurity team, and hiring qualified personnel.

In contemporary society, information culture remains a crucial aspect of professional culture. The proliferation of diverse and vast information flows requires individuals to possess the ability to navigate them independently, learn, and comprehend the laws of the information environment. Failure to do so could prevent one from adapting to life in a globally interconnected information society. In this context, education must be information-adequate and also sustainable to ensure that future generations have access to the resources they need to thrive in a globalized and interconnected world. Consequently, a new education model is being developed, with foreign language training as a segment, which utilizes modern information and pedagogical technologies and methodological principles of the information society and open education.

From an educational perspective, the significance of information and communication technologies in the context of professionally oriented foreign language training cannot be overstated. In a globalized and multicultural world, foreign language training is becoming an essential tool for acquiring professional skills. The role of these technologies is also critical in achieving desired learning outcomes. The key competencies that we consider to be the educational outcomes of foreign language training for future professionals are as follows: 1) professional foreign language communicative competence, 2) professional intercultural competence, and 3) foreign language professional information and communication competence.

Developing and implementing a new educational and professional program to train specialists in the digital economy is crucial, especially considering sustainability concerns. This program should enable learners to acquire a comprehensive set of digital competencies, including an in-depth understanding of technologies, products, and processes that support digital computing, telecommunications, and networking capabilities while also incorporating sustainable practices. By doing so, graduates will be well-positioned to develop and implement digital business models that align with sustainable development goals, conduct research, and propose solutions for economic security. The program should also provide practical experience in management decision-making to effectively navigate the ever-changing digital economy in a sustainable manner.

The emergence of the virtual economy is a key factor that drives the need for the development of foreign language professional information and communication competence. Additionally, there is a critical necessity for such competence. Nowadays, it is difficult to imagine a young person, let alone a professional, who cannot operate a computer. A new generation has grown up that is connected to the Internet and views it as an objective necessity. Without proficiency in computer skills, it is impossible to achieve career growth, competitiveness, or pursue further self-education and development.

The realities of postmodernity state that there is a constant dependency between the professional success of any specialist (especially economists) and their ability to operate within the linguistic cyberculture. This is particularly determined by their level of preparation with regards to information technologies, which is mostly defined not by the volume of knowledge they have acquired, but rather by the level of their cognitive development, their ability to learn independently throughout their lifetime, to exercise self-control over their actions, and to continuously self-improve with regards to information technologies, all of which are crucial for sustainable development.

References

- Average cost of a data breach in the United States from 2006 to 2022. USA, July 2022. <https://www.statista.com/statistics/273575/us-average-cost-incurred-by-a-data-breach/>
- Baikov, A. (2011). Telerabota kak odna iz raznovidnostei gibkoi zaniatosti v Latvii. [Teleworking as one of the kinds of flexible employment in Latvia]. *The Baltic Course*. <http://www.baltic-course.com/rus/opinion/?doc=48651>
- Bihych, O. (2007). Informatsiino-kovunikatyvna kompetentsiia vykladacha inozemnoi movy: rozrobka avtorskikh dodatkov. [Information and communication competence of a foreign language teacher: development of author's applications]. Materiály IY mezinárodní vědecko-praktická konference “*Vědecký potenciál světa, 2007*”. Díl 3. Pedagogika. Filologické vědy. Psychologie a sociologie. Praga: Publishing House “Education and Science”, 56–58.
- Bihych, O. (2018). Tekhnologii formuvannia metodychnoi kompetentnosti vykladacha inozemnoi movy]. Technologies of forming the methodological competence in a foreign language teacher]. *Bulletin of Kyiv National Linguistic University*. Series: Pedagogy and Psychology, 28, 189–197. http://nbuv.gov.ua/UJRN/Vknl_u_Ptp_2018_28_24
- Bondarenko, S. (2004). *Sotsialnaia struktura virtualnykh setevykh soobshchestv* [Social structure of virtual network communities] Dissertation for doctor of sociological sciences. Rostov-on-Don.
- Brenner, W. (2014). Hyperconnectivity as a Challenge and Opportunity for the Digital Economy. *Journal of International Management*, 20(4), 364-373. doi: 10.1016/j.intman.2014.06.003
- Cyberthreat Defense Report*. Cyberedge Group, 2019. <https://www.imperva.com/resources/reports/CyberEdge-2019-CDR-Report-v1.1.pdf>
- Future Possibilities Report 2020*. United Nations and Government of the United Arab Emirates. New York: UN, 2020. <https://digitallibrary.un.org/record/3898825?ln=en>
- Ivanov, D. (2000). *Virtualizatsiia obshchestva*. [Virtualization of a society]. Saint Petersburg: Peterburgskoe vostokovedenie.
- Khrypko, S., Aleksandrova, O., Ishchuk, A., Zabolotnyuk, V. (2022). The Axiological Paradigm of Virtual Community Multivector Nature as a Threat to Information Culture and National Security. *Beytulhikme Int J Phil* (12(2), 571-591. <http://dx.doi.org/10.18491/beytulhikme.1754>
- Maniushis, A., Smolianinov, V., Tarasov, V. (2003). Virtualnoe predpriatie kak effektivnaia forma organizatsii vneshneekonomicheskoi deiatelnosti kompanii. [Virtual enterprise as an effective form of foreign economic activity of a company]. *Problems of Theory and Practice of Management*, 3. http://vasilievaa.narod.ru/16_4_03.htm
- Markevych, K. *Smart-infrastruktura u stalomu rozvytku mist: svitovi dosvid ta perspektyvy Ukrainy* [Smart Infrastructure in Sustainable Urban Development: World Experience and Prospects for Ukraine].

- Razumkov Centre. Friedrich Naumann Foundation for Freedom. Kyiv. 2021. <https://razumkov.org.ua/uploads/other/2021-SMART-%D0%A1YTI-SITE.pdf>
- Masuda, Y. (1980). *The Information Society As Post Industrial Society*. Transaction Publishers.
- Matveev, V., Nykytchenko, O., Stefanova, N., Khrypko, S., Ishchuk, A., Ishchuk, O., & Bondar, T. (2021). Cybercrime in the Economic Space: Psychological Motivation and Semantic-Terminological Specifics. *International Journal of Computer Science and Network Security*, 21 (11), 135–142. <https://doi.org/10.22937/IJCSNS.2021.21.11.18>
- Negroponete, N. (1996). *Being Digital* (First Printing). Vintage.
- Ohnishi, K. (2019). *Firms' Strategic Decisions: Theoretical and Empirical Findings Volume 3*.
- Prykaziuk, N., Gumenyuk, L. (2020). Cyber-insurance as an important tool of enterprise protection in the digitization economy. *Efektivna Ekonomika*, 4. <https://doi.org/10.32702/2307-2105-2020.4.6>
- Rheingold, H. (2000). *The Virtual Community: Homesteading on the Electronic Frontier*. MIT Press.
- Stoliarchuk, O., Khrypko, S., Dobrodum, O., Ishchuk, O., Kokhanova O., Sorokina, O., Salata, K. (2022). Academic Procrastination as a challenge for Students' Mental Health in the context of distance learning and the virtual world during the COVID-19 pandemic. *International Journal of Computer Science and Network Security*, 22 (3), 276–284.
- What is digital economy? (2021, April 19). Deloitte Malta. <https://www2.deloitte.com/mt/en/pages/technology/articles/mt-what-is-digital-economy.html>
- World Bank Group. (2016). *World Development Report 2016: Digital Dividends*. Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/23347>
- World Economic Forum Survey Report: *Deep Shift Technology Tipping Points and Societal Impact*. September 2015. https://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf