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Anastasiia Mostova
Doctor of Science in Economics, Associate Professor,
Varna University of Management
Alla Kapiton
Doctor of Pedagogical Sciences,
Professor of the Department of Computer
and Information Technologies and Systems,
National University "Yuri Kondratyuk Poltava Politechnics"
Valeriia Baranova
Doctor of Science in Economics,
Professor of the Department of Banking Business and Financial Technologies,
Education and Research Institute "Karazin Banking Institute"
V.N. Karazin Kharkiv National University

DIGITAL TRANSFORMATION OF BUSINESS IN UKRAINE: CURRENT TRENDS, CHALLENGES AND PROSPECTS

Summary

The paper examines the main trends in the global digital economy. The theoretical foundations of the digital transformation of business are considered. The indicators of digital transformation of large and small enterprises in the EU were studied. Ukraine's position in international "digital" rankings was studied; the gaps and weaknesses in Ukraine's digital competitiveness were studied. The main indicators of digital transformation of Ukrainian enterprises are analyzed. The prospects for the further digital transformation of enterprises and directions for the development of the infrastructure supporting digital projects are shown. The main initiatives of the Ukrainian government and stakeholders in the development of the digital economy and digital transformation, the construction of ecosystems supporting ICT innovations and startups in Ukraine were studied. The factors influencing the acceleration of digital transformation of business, such as the development of the IT sector, the construction of a powerful infrastructure, the system of education and support for innovations and startups, have been thoroughly investigated. The main problems and directions of further development of the digital transformation of SMEs in Ukraine have been determined.

Introduction

The digital economy stimulates the implementation of digital technologies and innovations in all business sectors, creates new jobs and accelerates

economic growth. According to the OECD report, the share of the digital economy is from 4.5 to 15.5% of global GDP, which is rapidly growing (UNCTAD, 2019). A study by Oxford Economics and Huawei provides a scenario for the growth of digital transformation, according to which the global digital economy can grow to 24.3% of global GDP by 2025, which is equal to 23 trillion US dollars (Huawei & Oxford Economics, 2017).

The rise of the digital economy enables countries to accelerate GDP and employment growth, improve business productivity and economic efficiency, improve public welfare, and benefit consumers through cost or time savings.

The digital transformation of business contributes to the growth of productivity in all sectors of the economy, creating additional value for consumers, optimizing the internal business processes of enterprises and reducing costs. In socially significant sectors, digital transformation contributes to solving social problems, improving access to public and social services, in particular, in the areas of health care, communal services, education, and others. In the digital economy, consumers get faster access to products and services at a lower cost. Therefore, the transition to a digital economy is an important strategic priority of the governments of all countries. Digitally transformed organizations gain from intangible assets, networking, new business models creating synergetic effect, creating value through digital technologies and digital environment.

Today, countries strive to create a strong digital economy by investing in digital infrastructure, supporting the digital transformation of business and socially important areas such as public services, medicine and education. In Ukraine, the digital transition is laid at the level of strategic government documents, in particular, the Concept of Development of the Digital Economy and Society of Ukraine for 2018–2020 (Digital Agenda of Ukraine) and other laws. At the same time, the study of current issues of digital transformation of business and its role in the formation of the digital economy in Ukraine needs to be deepened. A comprehensive and systematic research of the aspects of the digital transformation of enterprises, the factors affecting it, will contribute to the development of strategies and policies aimed at supporting the digital transformation of business and accelerating the processes of forming the digital economy in Ukraine in the long term.

Chapter 1. Theoretical foundations and global trends of digital business transformation

Revealing the theoretical background, the digital transformation of business involves the introduction of new digital technologies, such as social media, mobile technologies, analytics or embedded devices, which allows to create new business models, increase the efficiency of operations, and improve the customer experience (Fitzgerald et al., 2014; Westerman et al., 2015). Digital

transformation means the rebuilding an enterprise's business model through investments in the implementation of digital technologies at every touch point in the customer experience lifecycle (Solis et al., 2014).

Digital transformation is the implementation of digital innovations that create new actors (and groups of actors), structures, practices, values and beliefs that change, replace or complement the existing rules of the game within organizations, ecosystems, industries or sectors of economy (Hinings et al., 2018).

Digital transformation involves the use of digital technologies for radical changes and the creation of new opportunities in business, public administration, as well as in the lives of people and society (Stolterman et al., 2004; Martin, 2008).

Digital transformation involves the transformation of the organization by integrating digital technologies and business processes into the digital business environment and ultimately adapting to the new conditions of the digital economy (Liu et al., 2011; Bondar et al., 2017).

Digital transformation is a strategic process, which fundamentally distinguishes it from the basic operational processes of digitization and digitalization. The digitization involves the conversion of analog data into a digital format. The digitalization is the transformation of existing traditional offline processes into digital ones. After all, the digital transformation ensures the creation of new business processes, products, services, activities and business sectors. Digitization, digitalization and digital transformation are data-driven, tech-based and aimed at increase in economic performance. However, they differ in scope, impact level, and end goals. Digitization is a task-level change which focuses on data conversion. Digitalization improves operations processes with digital solutions, while digital transformation is leveraging tech for a total organizational rebuilding. Digitization aims to make data more accessible. Meanwhile, digitalization targets operational efficiency. Digital transformation aims at complete strategic organizational transformation.

Therefore, digital business transformation is a comprehensive strategy that optimizes all operations and processes of an enterprise, changes business strategies and digital strategies, models, operations, products, marketing strategies, goals and strategic orientations, and creates new values for consumers through the systematic implementation of digital technologies. Digital transformation requires changes in culture, structure, processes and business management. Ultimately, digital technologies help to better meet customer expectations, adapt to changes in the business environment and stay competitive.

Digital transformation is inextricably linked with the concepts of "digital intensity" and "digital maturity of business" (Heinze et al., 2018), which affects individual enterprises and sectors of the economy, contributing to the growth

of the digital economy and digital GDP. While in 2018, digitally transformed enterprises accounted for $13.5 trillion of the global nominal GDP. In 2023 they are forecast to account for $53.3 trillion, more than half of the overall nominal GDP. This proves the upcoming digital supremacy in the global economy (Statista, 2023a).

A higher level of digital maturity contributes to higher financial performance. In particular, about 49% of organizations reported that their net income and revenues were significantly higher than their industry averages, compared to 17 and 19%, respectively, of less mature organizations (Deloitte, 2019). Digitally mature organizations use new opportunities, develop new businesses, adapt more quickly to customer preferences and changes in business environment, and operate more efficiently. These prospects drive business leaders to digital transformation. In 2023, spending on digital transformation is estimated to reach $2.15 trillion. By 2027, global digital transformation spending is forecast to reach $3.9 trillion (Statista, 2023b).

The EU has set itself 2 main goals for the digital transformation of businesses by 2030: more than 90% of SMEs should reach at least a basic level of digital intensity, and 75% of EU companies should use cloud computing services, perform big data analysis or use artificial intelligence (Eurostat, 2023).

The European Comission adopted the Digital Intensity Index (DII), which measures the use of 12 different digital technologies by businesses, for example using artificial intelligence or making e-sales. In 2022, 70% of all EU businesses reached a basic level of digital intensity. The share for SMEs was 69%, around 20 percentage points (pp) below the EU 2030 target, while for large businesses it stood at 98% (Eurostat, 2023).

Large businesses had a bigger share for very high (30%) and high digital intensity (54%) compared with only 4% of SMEs with a very high level and 27% with a high level of digital intensity. Most of the SMEs recorded low (38%) or very low (31%) digital intensity levels. The proportion of SMEs with a basic level of digital intensity ranged from 41% in Greece and 47% in Bulgaria to 89% in Denmark and 90% in Finland (European E-Commerce report, 2023).

Owerall, large enterprises adopt digital technologies faster and achieve the maximum economic effect from digital transformation projects, because they have sufficient financial and labor resources at their disposal, and management processes are established and optimized. Small enterprises have less digital intensity compared to large enterprises, they face a number of problems on the way to digital transformation, such as insufficient digital skills, knowledge, lack of financial resources to implement digital technologies.

Therefore, the digital transformation of business contributes to the digital economy and, in turn, is driven by the level of digital intensity of enterprises, that is, the implementation and use of digital technologies by them, which

depends on investments, the level of development of digital infrastructure, the ICT sector, digital literacy and digital skills of the population.

The digital transformation of business is carried out at the enterprise level and stimulates the development of the digital economy by integrating digitized enterprises into the global digital environment and interacting with its other actors, such as business partners, the state, and consumers. Digital transformation at the enterprise level requires qualified personnel and digital infrastructure. Consumers need a sufficient level of digital literacy, access to digital infrastructure and digital technologies to benefit from the digital economy. At the state level, it is necessary to have a highly developed digital infrastructure, a sufficient level of digital literacy of the population, strategies and policies for the development of the digital economy and digitalized enterprises.

International ratings that evaluate the level of development of information and communication technologies and the degree of readiness of digital infrastructure are becoming key indicators for evaluating the digital transformation of business and digitalization of the economy. The digital economy of Ukraine is evaluated in some digital ratings (Table 1).

Table 1

Ratings of Ukraine in international "digital" rankings

Ranking / index name	Rating of Ukraine	Total number of countries assessed
Global Connectivity Index (GCI), 2020	52	79
Digital Intelligence Index (DII), 2021	62	90
Global Innovation Index (GII), 2023	55	132
WEF / WITSA Networked Readiness Index (NRI), 2023	43	134
UN E-Government Development Index (EGDI), 2022	46	193
World Digital Competitiveness Ranking (WDCR), 2021	54	64
UNCTAD B2C E-commerce Index, 2020	51	152
Digital Platform Economy Index (DPE Index), 2020	54	116
ICT Development Index (IDI), 2020	79	176

Source: compiled by author

Ukraine's positions in international rankings are quite mediocre and do not contribute to the systematic and comprehensive realization of the potential of the digital economy and digital transformation of business.

Chapter 2. Digital transformation of business in Ukraine: trends and challenges

In Ukraine, the State Statistics Service provides basic data that allow a fragmented assessment of progress in the digital transformation of enterprises and the formation of a digital economy.

Through the joint efforts of Ukrainian enterprises and the Ukrainian authorities, in particular, the Ministry of Digital Transformation of Ukraine, the Ministry for Communities, Territories and Infrastructure Development of Ukraine and other ministries and departments that regulate the digitalization of the economy and promote the implementation of digital technologies for the population, startups and projects supporting the digital economy, Ukraine has made significant achievements in this area.

The main indicators of the digital transformation of business in Ukraine, collected by the State Statistics Service of Ukraine in the "Information Society" panel, are presented in Table 2.

Table 2

Main indicators of digital transformation of Ukrainian enterprises, share in the total number of enterprises, %

Indicator	Years		
	2019	2020	2021
enterprises with access to fixed Internet	86.4	86.6	85.1
enterprises engaged in electronic trade	4.8	4.9	5.0
share of e-commerce turnover in the total volume of turnover, %	4.5	5.0	5.3
enterprises selling goods through a website or web application	–	–	3.9
enterprises selling goods through marketplaces	–	–	2.5
enterprises that used social media	29.7	30.1	29.1
enterprises with their own website	35.6	35.2	35.3
enterprises that have a chat service for communicating with customers	–	–	9.1
enterprises purchasing cloud computing services	10.3	10.2	9.8
enterprises conducting big data analysis	12.5	11.9	12.7
enterprises that provided training in ICT	3.7	3.8	4.5
enterprises that have hired specialists in ICT	22.3	21.6	21.7

Source: State Statistics Service of Ukraine, 2024

Digital transformation of business contributes to the development of e-commerce in Ukraine, which depends on Internet penetration, use of digital devices, as well as the stability and quality of digital infrastructure (Figure 1). Among drivers are of e-commerce are growing consumer purchasing power

and confidence in online shopping, as well as the emergence of new marketplaces and e-commerce platforms.

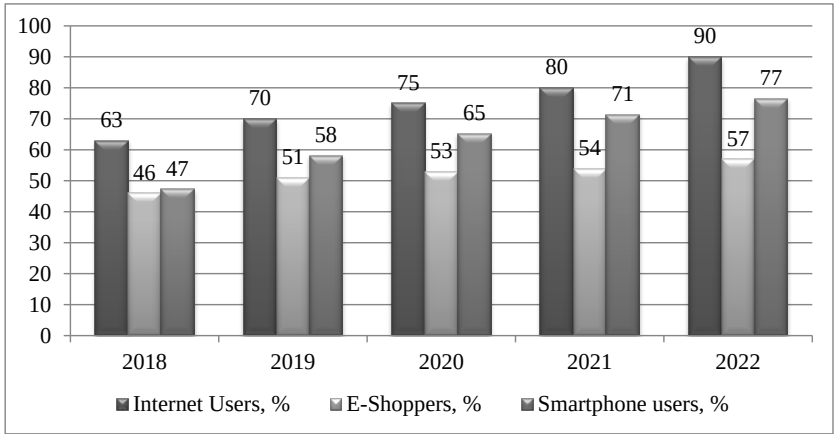

Figure 1. Internet and e-commerce penetration, as well as use of digital devices in Ukraine in 2018-2022, %

Source: Statista, 2024; European E-Commerce report, 2023

The number of enterprises engaged in e-commerce and the total volume of online-trade increased in Ukraine (Figure 2). However, the e-commerce indicators are lower comparing to the EU.

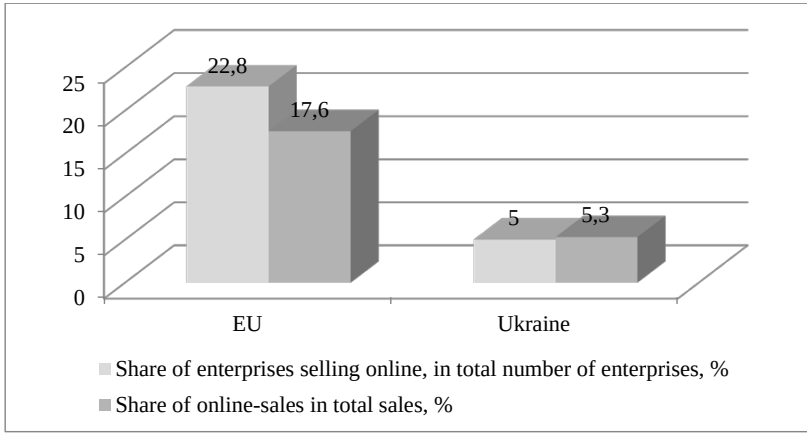

Figure 2. E-commerce indicators in EU and Ukraine, 2022

Source: Eurostat, 2023; State Statistics Service of Ukraine, 2023

Ukrainian e-commerce market was growing and in 2021, the pre-war year, reaced $3 billion. According to the forecast, Ukrainian e-commerce will reach its pre-war volume only in 2025 (Figure 3).

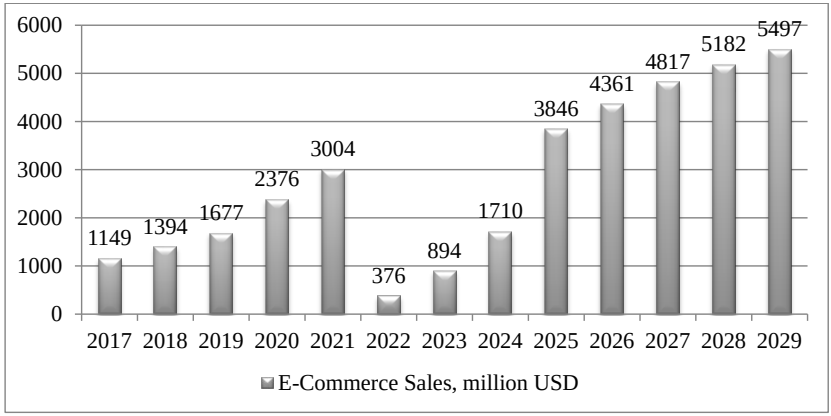

Figure 3. E-Commerce sales in Ukraine, fact (2017–2023) and forecast (2024–2029)

Source: Statista, 2024

The main threats to the further development of e-commerce in Ukraine are the decline of consumer market and the decrease in the purchasing power of Ukrainians. The Russian invasion of Ukraine destroyed the economy and logistics. According to the UN, in 2022 the Ukrainian economy shrank by 35%, and inflation amounted to 26.6% (UkrInform, 2023). Humanitarian losses will have long-term negative socio-economic consequences even after the end of the war. Migration, poverty and depopulation will continue having negative economic and social impact on digital transformation processes in Ukraine (Kliuchnyk, 2020).

"Economic Strategy of Ukraine-2030", developed by experts of the Ukrainian Institute for the Future, contains two scenarios for the development of the digital economy, which depend on the pace of implementation of digital technologies and the development of human capital in Ukraine. According to the first, inertial scenario, the development of the digital economy in Ukraine will be gradual, which will not contribute to a sharp increase in digital competitiveness and GDP growth due to the digitalization of the real sector of the economy and the rapid development of ICT sectors. The target scenario envisages a rapid digital transformation of the economy in the coming years and an increase in the share of the digital economy in Ukraine's GDP to 65% (Table 2). This requires investments in the development of ICT and

infrastructure, human capital, institutional and legal environment, as well as the integration of information technologies in all sectors of the economy (Ukrainian Institute for the Future, 2021). To achieve such targets, the Ukrainian market should produce and consume digital products worth $4 billion in 2024, and by 2030 increase ICT consumption to $16 billion. In addition, the share of business processes, transactions and business interactions that are electronic and online should reach 90%. The digital transformation of the economy will contribute to the growth of employment and GDP, ICT exports and business development in all sectors of the Ukrainian economy. To achieve this goal, it is necessary to invest $70 billion in digital technologies over the next ten years (Table 3).

Table 3

Adoption of digital technologies and their impact on Ukraine's GDP by 2030

Years (forecast)	Domestic market (ICT consumption), billion USD	Impact on GDP growth, %	The share of digital economy in GDP, %
2021E	2	0,5	3%
2022E	2,5	1	5%
2023E	3	2	8%
2024E	4,5	3,5	11%
2025E	6	4,5	15%
2026E	8	6	20%
2027E	10	7,5	28%
2028E	12	9	40%
2029E	14	11	52%
2030E	16	14	65%

Source: Ukrainian Institute of the Future, 2021

The key factors contributing to the rapid digital transformation of business and the development of the digital economy in Ukraine are powerful educational institutions, a competitive ICT sector and human capital, as well as a highly developed infrastructure and support system for ICT and startups development at the government and business levels.

Chapter 3. Infrastructure and support for innovations and startups for digital business transformation

Urgent issues of innovative development of Ukraine and promotion of digital transformation of business have been in the focus of attention of the government, scientific experts and investors in recent years. The innovative infrastructure supporting the digital transformation of small and medium-sized businesses, as well as the development of ICT and startups, has grown rapidly.

The Government of Ukraine has launched a number of initiatives aimed at creating opportunities for the development of the domestic ecosystem of innovations, ICT and startups.

First of all, the project of Ministry of Digital Transformation, Diia Business aims to increase exports, support enterprises entering new markets, and assist foreign companies in importing goods and services from Ukraine and establishing partnerships (ITU, 2021). Diia Business includes various opportunities for enterprises. It provides with online consulting for entrepreneurs, online school, a catalogue of services and documents for entrepreneurs, self-assessment for entrepreneurs, many successful business cases and useful articles on entrepreneurship and financial management, support centres, overview of events and exhibitions for entrepreneur, infrastructure map with details of organizations supporting entrepreneurs, partnership and collaboration opportunities and others.

"E-residency" is an online service for foreigners that enables them to remotely access government services and conduct business in Ukraine from abroad. E-residents will have the possibility of remote registration of individual entrepreneurs, conducting business activities on the territory of Ukraine, opening bank accounts online, access to administrative services using a qualified electronic signature (ITU, 2021).

An important project for the development of the IT sector in Ukraine is "Diia City", launched by the Ministry of Digital Transformation of Ukraine. "Diia City" is a special legal framework to provide the IT sector with modern and flexible employment conditions, a European system for the protection of intellectual property rights, and assistance in conducting investigative actions and criminal proceedings in the industry. Diia City aims to create the most powerful IT hub in Central and Eastern Europe, with unlimited investment prospects, job opportunities and brand-new technologies. Ukrainian and foreign entrepreneurs will be able to realise innovative and business ideas here. The project gives an opportunity to attract international IT companies into Ukraine, prevent brain drain by creating favourable conditions for the employment of IT specialists. It is planned to create more than 450 000 new jobs and earn $16,5 billion in IT industry by 2025 (ITU, 2021). "Diia City" will be open to both Ukrainian and foreign enterprises on equal terms and will be governed by special rules established by the Ministry of Digital Transformation. Diia City provides participants with the numerous benefits, in particular: software development and testing, software publishing and distribution, tutoring, digital marketing and advertising, R&D in IT and telecom, cybersecurity and robotics, special taxation framework and employment conditions, intellectal property protection guarantees, foreign venture capital investment (ITU, 2021).

In September 2021, the Ministry of Digital Transformation, and the United Nations Development Programme (UNDP) in Ukraine launched the National Diia Centres Web Platform for Centres of Administrative Services (CASPs). It helps entrepreneurs to realise administrative functions and participate in online trainings, get clarifications and guidance, access resources, and learn best practices (ITU, 2021).

360 Tech Ecosystem Overview is an online platform for business information on IT-ecosystem: IT companies, people, investors, universities, startup-accelerators, techno hubs, etc. It's available for entrepreneurs in Diia Business.

Ukrainian Startup Fund (USF) was organised in 2018 by the Minister of Finance of Ukraine for the presentation of Ukrainian startups on well-known international platforms and expansion of collaboration and partnership. Since its launch, USF has supported more than 380 startup teams, hosted more than 360 events, and received more than 7,000 applications. Ukrainian startups received $8.7 million in funding, more than 287 participants attended 30 of the world's largest technical events, and more than 180 partners were involved in the USF projects.

Eastern Partnership (EaP) Startup Ecosystem is the platform for ICT innovation, which provides information on startups, innovation, investors and funding, and many other insights. The project was initiated by the Europepan Comission and EU4Digital Initiative, the Ministry of Digital Transformation of Ukraine, Startup Moldova, Ukrainian Startup Fund, Ukrainian Tech Ecosystem project. Since its launch in January 2022, the EaP startup ecosystem has united 12,046 companies in the Eastern Partnership countries.

Overall, there are about 2600 startups in Ukraine as of January 2024; 90% of them have high growth potential. There are at least 6 companies with a billion-dollar valuation (IT Ukraine Association, 2024)

According to the Concept of Development of the Digital Economy and Society of Ukraine for 2018–2020, the digital economy and digital transformation of business in Ukraine require a strong and competitive domestic market for the development and consumption of ICT and digital technologies.

In 2022, there was a record increase in exports of the IT sector to $7.35 billion or 4.6% of GDP (Figure 4). The IT industry remains one of the key sectors in the Ukrainian economy. IT services make up 41.5% of the total volume of service exports and 13.2% of the total exports in 2023. At the same time, for 2023, the export turnover of IT services decreased by 8.4%, which in monetary terms amounted to $6.7 billion. Despite the decline in revenue, the IT industry increased its tax payments by 11.5% in 2023 (IT Ukraine Association, 2024).

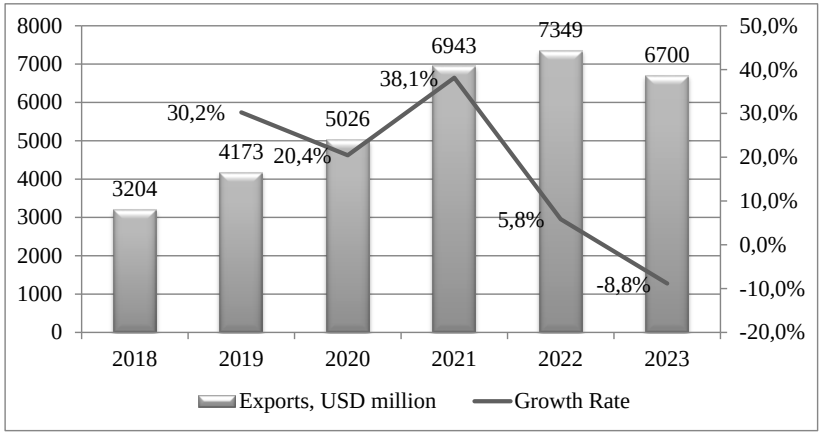

Figure 4. IT sector exports in Ukraine in 2018–2023

Source: IT Ukraine Association, 2024

The approximate number of enterprises in the IT sector in 2023 was about 8,100, about 2,600 companies are technological startups. The number of IT specialists working in Ukraine in 2023 increased by approximately 2.7% to 346,200 people. At the same time, the number of professionals registered as individual entrepreneurs decreased to 265,000 in 2023 against 272,800 in 2022. In total, over the five years from 2018 to 2023, the growth in the number of IT specialists in Ukraine amounted to 78.4% (IT Ukraine Association, 2024).

The landscape of Ukrainian IT education became more competitive and motivated. In 2023, Ukrainian universities graduated 31,500 IT specialists. Universities provide only 50% of the total number of required specialists. EdTech companies have trained 620,000 graduates in recent years. IT companies create their own universities (IT Ukraine Association, 2024).

As of 2022, the digital development market of Ukraine amounted to UAH 1,180.3 million. According to preliminary estimates, in 2023 the market volume will reach UAH 1,465.4 million, which is 19.50% more than in 2022. About 59% of the market belongs to the development of web projects, 23% – to the creation of mobile applications and 18% – technical support of existing projects (Digital Developers Committee, 2023).

As for IT service providers, the Ukrainian market is divided into freelancers and companies. Despite the thousands of self-employed professionals in Ukraine, companies still have a much larger market share in financial inflows – 28% versus 72% (Digital Developers Committee, 2023).

The development of the ICT sector depends on the demand for digital services among enterprises, as well as among their customers and the

population of Ukraine. This growth in demand requires advanced digital infrastructure (such as mobile coverage and broadband internet access) and a high level of digital skills of people.

More than 85% of Ukrainian enterprises have access to broadband Internet (State Statistics Service of Ukraine, 2021).

According to the latest data from the International Telecommunication Union (ITU), as of 2021, Ukraine's fixed- and mobile-broadband penetration rates reaching 18.3% and 80.1% respectively. Mobile internet speeds remain poor. The median mobile download speed in May 2023 was 24.74 Mbps, compared to a global average of 42.30 Mbps, according to the network intelligence company Ookla. The median fixed-broadband speed was much faster, per Ookla, clocking in at 66.88 Mbps (Freedomhouse, 2023).

According to the latest ITU data, 91.6% of the total population of Ukraine was covered by at least 3G mobile cellular network in 2021. At the end of June 2020, three major mobile operators (Kyivstar, Vodafone, and Lifecell) started a 4G long-term evolution (LTE)-900 technology network expansion as a part of a nationwide program to provide fourth-generation (4G) technology for mobile networks to 90% of the population by 2024 (Freedomhouse, 2023). By the end of 2021, Kyivstar's 4G network reached 90% of Ukraine's population, closely followed by Vodafone Ukraine with 83% coverage. Further growth of the 4G network was put on hold with the operators' attention being shifted to emergency restoration of base stations destroyed by Russian military. According to the ITU, as of 2021 at least 92% of the population was covered by 4G mobile network and 83% of households had Internet access at home (ITU, 2022).

For Ukraine, the indicators for digital skills presented in the European Digital Compass 2030 are guidelines: by 2030 in the EU, 80% of the population will master basic digital skills. According to the plans of the Ministry of Digital Transformation, it is planned to train 6 million Ukrainians in digital skills in 3 years, starting in 2021. The Digital Competence Framework for Ukrainian citizens was developed on the basis of:

– The EU DigComp 2.1: Digital Competence Framework for Citizens, which offers a tool to improve citizens' digital competence and includes 8 proficiency levels and examples of use;

– Other recommendations in the field of digital competences from European and international institutions, which are adapted to the national, cultural, educational and economic characteristics of Ukraine.

Today, the Digital Competence Framework for Ukrainian citizens includes 4 dimensions, 6 areas, 30 competencies and 6 levels of digital skills. According to the research of Ministry of Digital Transformation, in 2019, 53% of Ukrainians had digital skills below the "basic level". In 2021, the level of digital skills has increased. The share of Ukrainians with digital skills below the

“basic level” decreased by 5.2% (1.42 million people), and currently amounts to 47.8%. The share of Ukrainians who have no digital skills decreased by 4% or by 1.09 million people. Information (78.9%) and communication skills (79.2%) are more developed. The least developed are the skills of solving life problems (55.8%) and creating digital content (36.8) (Ministry of Digital Transformation of Ukraine, 2021).

Among the most threatening problems of digital transformation of business in Ukraine are weak institutional anl legal environment, low level of digital transformation of SMEs and their engagement into digital economy. Basically, the main issues of slow development of innovations, ICT and startups are:

– insufficient support and regulation of the industry at the state level;

– low level of research quality in higher educational institutions and research institutions;

– lack of IT specialists in small enterprises and low level of digital skills of entrepreneurs;

– lack of practical application of domestic innovations in the field of ICT and digital solutions for small businesses in the domestic market;

– imperfection of the ICT startup infrastructure;

– cases of pressure by law enforcement agencies on IT companies.

These negative factors affect the digital transformation of Ukrainian enterprises and prevent them from realizing their growth potential. The analysis showed that small and medium-sized enterprises often face obstacles on the way to digital transformation, in particular, due to a lack of funding, insufficient awareness of organizational, legislative, and financial support measures for projects of digital transformation of enterprises. Therefore, strategies, policies, frameworks and best business practices should focus on SMEs as important contributors to the development of the economy and the IT sector, the development of innovation and the provision of ICT services.

Conclusions

Summarizing, the main recommendations for digital transformation of business and its state support must cover the creation of new opportunities for growth of IT sector, increase domestic IT consumption, support the Ukrainian industries of software development, IT consulting, IT services, innovations and startups.

First, it is necessary to increase awareness of the need for digital transformation, in particular, in small and medium-sized enterprises, to stimulate them to implement digital transformation projects through measures of financial, informational and organizational support. SMEs need informational and advisory support when looking for financing for digital innovation. On the one hand, a number of effective government initiatives have been launched to solve this problem, such as the “Diia City” project, platforms

to support innovation and startups, etc. However, existing support platforms sometimes duplicate each other and are not updated, and the information about available funding opportunities provided by the platforms is not convenient for entrepreneurs. It is necessary to develop a freely available online database with a list of financial sources available to entrepreneurs from different countries and different organizations. This will help SMEs in choosing those sources that are relevant for specific cases and the stage of the life cycle of digital transformation projects. It is necessary to stimulate the joining of Ukrainian enterprises to existing large-scale foreign platforms that connect SMEs looking for finance with investors and creditors outside the banking system.

Financing the digital transformation of enterprises requires expanding opportunities. In particular, there are no special funds for digital transformation in Ukraine, and bank financing is not available for this. It is necessary to expand the existing instruments and sources of financing, in particular, through grants, funds of donor organizations, foundations, etc. The directions of financing digital transformation projects should include, in particular, the specific areas of digital transformation: internal processes; business development; supply chain management; product/service innovations; relations with customers; innovative business models; security; digital skills and digital competences. This will help to clearly predict the socio-economic effect of digital transformation projects and create flexible and adaptive financial, information and organizational support tools. It is necessary to organize joint management and co-financing of digital transformation together with EU enterprises in related sectors, in particular, through existing ICT and startup support platforms, such as the Ukrainian Startup Fund and others.

In general, for the further development of the digital transformation of business in Ukraine, it is necessary to take a number of measures. In particular, Ukrainian government and educational institutions should focus on increase the number of qualified workforce in the IT and ICT sectors, through the development of education, the creation of innovative scientific and educational hubs and projects.

It’s important to further eliminate the gaps in the field of regulation and e-government, which will improve the business processes of SMEs and increase their confidence in the digital environment. It is necessary to implement measures of state support and increase access of SMEs to best experience, expertise and knowledge, to improve measures of state financial support for projects of implementation of digital technologies and investments by SMEs. Finally, improved mechanisms of interaction of the Ukrainian ecosystem of innovations, ICT and startups with other international and European similar ecosystems of ICT innovations and networks of financial support for digital transformation and innovative development are needed.

References:

1. Bondar, S., Hsu, J. C., Pfouga, A., & Stjepandić, J. (2017). Agile digital transformation of system-of-systems architecture models using Zachman framework. *Journal of Industrial Information Integration*, *7*, 33–43.

2. Cabinet of Ministers of Ukraine (2018). On Approval of the Concept of Development of the Digital Economy and Society of Ukraine for 2018–2020 and Approval of the Plan of Measures for its Implementation. (2018), Ordinance of the Cabinet of Ministers of Ukraine. 67-p. Available from: https://zakon.rada.gov.ua/laws/show/67-2018-%D1%80?lang=uk #Text (Last accessed: 18.04.2024)

3. Deloitte (2019). Pivoting to digital maturity. URL: https://www.deloitte.com/ cbc/en/our-thinking/insights/topics/digital-transformation/digital-maturity/digital-maturity-pivot-model.html (Last accessed: 18.04.2024)

4. Digital Developers Committee (2023). Ринок цифрової розробки в Україні зростає попри війну [The digital development market in Ukraine is growing despite the war]. Research by Digital Developers Committee. Available from: https://iab.com.ua/rynok-tsyfrovoyi-rozrobky-v-ukrayini-zrostaye-popry-vijnu-doslidzhennya-digital-developers-committee/#:~:text=%D0%A1%D1%82%D0%B0%D0%BD%D0%BE%D0%BC%20%D0%BD%D0%B0%202022%20%D1%80%D1%96%D0%BA%20%D1%80%D0%B8%D0%BD%D0%BE%D0%BA,%25%20%E2%80%93%20%D1%82%D0%B5%D1%85%D0%BD%D1%96%D1%87%D0%BD%D0%B0%20%D0%BF%D1%96%D0%B4%D1%82%D1%80%D0%B8%D0%BC%D0%BA%D0%B0%20%D1%96%D1%81%D0%BD%D1%83%D1%8E%D1%87%D0%B8%D1%85%20%D0%BF%D1%80%D0%BE%D1%94%D0%BA%D1%82%D1%96%D0%B2. (Last accessed: 18.04.2024)

5. Eurostat (2023). Digitalisation in Europe. Available from: https://ec.europa.eu/ eurostat/web/interactive-publications/digitalisation-2023 (Last accessed: 18.04.2024)

6. Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). Embracing digital technology: A new strategic imperative. *MIT Sloan Management Review*, *55*(2), 1.

7. Freedomhouse (2023). Ukraine. Available from: https://freedomhouse.org/ country/ukraine/freedom-net/2023 (Last accessed: 18.04.2024)

8. Huawei &Oxford Economics (2017). Digital Spillover. Measuring the true impact of the digital economy. Available from: https://www.huawei.com/minisite/gci/en/digital-spillover/files/gci_digital_spillover.pdf (Last accessed: 18.04.2024)

9. Heinze, A., Griffiths, M., Fenton, A., & Fletcher, G. (2018). Knowledge exchange partnership leads to digital transformation at Hydro-X Water Treatment. *Ltd. Global Business and Organizational Excellence*, *37*(4), 6–13.

10. Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, *28*(1), 52–61.

11. HITECH office (2016). Digital Agenda of Ukraine 2020: Conceptual Framework (Version 1.0). Priority Areas, Initiatives, Projects for Digitization of Ukraine until 2020. Available from: https://www.ucci.org.ua/uploads/files/58e78ee3c3922.pdf (Last accessed: 18.04.2024)

12. ITU (2022). Interim assessment on damages to telecommunication infrastructure and resilience of the ICT ecosystem in Ukraine. https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Interim%20assessment%20on%20damages%20to%20telecommunication%20infrastructure%20and%20resilience%20of%20the%20ICT%20ecosystem%20in%20Ukraine%20-2022-12-22_FINAL.pdf (Last accessed: 18.04.2024)

13. ITU (2021). Digital Skills Development – Ukraine – Good practice case study. Available from: https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/

Publications/2021/Digital%20Skills%20Development%20–%20Ukraine%20%20Good%20 practice%20case%20study.pdf (Last accessed: 18.04.2024)

14. IT Ukraine Association (2024). Digital Tiger: the Power of Ukrainian IT. Available from: https://mind.ua/publications/20270953-it-industriya-v-cifrah-najcikavishi-dani-z-doslidzhennya-digital-tiger (Last accessed: 18.04.2024)

15. Kliuchnyk, R.M. (2020). Global problems of modernity: economic dimension. *Academic review*. № 1 (52). P. 5–12.

16. Liu, D., Chen, S., & Chou, T. (2011). Resource fit in digital transformation: Lessons learned from the CBC Bank global e-banking project. *Management Decision, 49*(10), 1728–1742.

17. Lone, S., Weltevreden, J.W.J. (2023). European e-commerce report. Amsterdam/ Brussels : Amsterdam university of applied sciences & Ecommerce Europe. 97 p. Available from: https://www.upu.int/UPU/media/wwwUpuIntUniversalPostalUnionAboutUpuBodiesConsultativeCommittee/2023EuropeanEcommerceReportEn.pdf (Last accessed: 18.04.2024)

18. Martin, A. (2008). Digital literacy and the "digital society". *Digital Literacies Concepts Policies Practices, 30*, 151–176.

19. Ministry of Digital Transformation of Ukraine. (2021). Digital literacy of the population of Ukraine. Report on the Results of the National Survey. Available from: https://osvita.diia.gov.ua/uploads/0/2623-research_eng_2021.pdf (Last accessed: 18.04.2024)

20. Solis, B., Lieb, R., & Szymanski, J. (2014). The 2014 state of digital transformation. Altimeter Group.

21. Stolterman, E., Fors, A. C., Truex, D. P., & Wastell, D. (2004). Information technology and the good life. In B. Kaplan, D. P. Truex, & D. Wastell, et al. (Eds.), Information systems research: Relevant theory and informed practice (pp. 687–693). Kluwer Academic Publishers.

22. State Statistics Service of Ukraine (2024). Use of information and communication technologies at enterprises. Available from: https://ukrstat.gov.ua/operativ/operativ2018/zv/ikt/arh_ikt_u.html (Last accessed: 18.04.2024)

23. Statista (2023a). Nominal GDP driven by digitally transformed and other enterprises worldwide from 2018 to 2023. Available from: https://www.statista.com/statistics/1134766/nominal-gdp-driven-by-digitally-transformed-enterprises/ (Last accessed: 18.04.2024)

24. Statista (2023b). Spending on digital transformation technologies and services worldwide from 2017 to 2027. Available from: https://www.statista.com/statistics/870924/worldwide-digital-transformation-market-size/ (Last accessed: 18.04.2024)

25. Statista (2024). eCommerce – Ukraine. Available from: https://www.statista.com/outlook/emo/ecommerce/ukraine (Last accessed: 18.04.2024)

26. UNCTAD (2019). Digital Economy Report. https://unctad.org/system/files/official-document/der2019_en.pdf (Last accessed: 18.04.2024)

27. Ukrainian Institute of the Future (2021). Economic Strategy of Ukraine-2030. Available from: https://strategy.uifuture.org/kraina-z-rozvinutoyu-cifrovoyu-ekonomikoyu.html (Last accessed: 18.04.2024)

28. Ukrinform (2023). *Ekonomika Ukrainy cherez viinu skorotylasia na 35% – OON* [Ukraine's economy shrank by 35% due to the war – UN]. Available from: https://www.ukrinform.ua/rubric-economy/3659424-ekonomika-ukraini-cerez-vijnu-skorotilasa-na-35-oon.html (Last accessed: 18.04.2024)

29. Westerman, G., & Bonnet, D. (2015). Revamping your business through digital transformation. *MIT Sloan Management Review, 56*(3), 2–5.