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DIGITALIZATION OF UKRAINE'S ECONOMY: TRANSFORMATIONAL PROCESSES AND PATHS TO INTEGRATION

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Abstract. Digitalization, or digital transformation, is considered by leading economists as a key factor for the sustainable development of the global economy as a whole, as well as for each nation as a part of modern society. Ukraine, a country striving for integration into the European Union, is actively enhancing its approaches to the implementation of digital technologies in its economy and society. This article examines the impact of the digitalization process on Ukraine's economy and its consequences for development, integration, and utilization of digital technologies in sectors such as public services, business, and access to information technologies.

Special attention is given to evaluating Ukraine's progress in the development and implementation of information products, as well as improving the accessibility of digital resources for citizens, particularly in conditions of armed conflict. Key criteria have been identified for the development and implementation of the Digital Economy and Society Index (DESI) in Ukraine. An analysis of legislative and institutional aspects related to the adoption of DESI as a tool for monitoring the level of digital transformation in the economy is conducted, including alignment with European Union norms and compliance with national development programs in line with core digitalization strategies.

The necessity of fully establishing the DESI ecosystem in Ukraine is emphasized as a crucial condition for the successful integration of the country into the European Union. For successful integration into the European community, Ukraine needs to enhance its digital infrastructure, make amendments to its legislative framework, ratify European quality standards, and adjust statistical reporting. Implementing recommendations for data collection and calculations based on the DESI index will contribute to the transformation and expansion of societal digitalization processes, facilitate adaptation to EU standards, and enhance the competitiveness of Ukrainian enterprises in European markets.

Keywords: *digitalization, digital economy, DESI index, integration*

JEL classification: A10, F15, H41, O19

Introduction

Modern economics is undergoing complex changes due to the influence of digital transformation. Digitization of public relations leads to the restructuring of the economy, reduction of production costs, optimization of business processes, emergence of new professions and competencies, and the

creation of new jobs. The adoption of information technology enhances production efficiency, quality, and the prompt execution of orders. These factors can be viewed as part of the sustainable development program of a country's economy and the global economy as a whole. Opportunities for accessing various services, gaining new knowledge, competencies, and leisure activities are expanding for the population.

In general, digitization is considered by modern researchers as a key factor in the development of the modern world. Every developed country develops and implements its digitization programs. The universally recognized indicator of a country's digitization level is the Digital Economy and Society Index (DESI).

Ukraine, on its path to integration into the European community, actively develops and improves its approaches to implementing digital technologies in the economy and society. The implementation of the DESI index in Ukraine is accompanied by changes in data collection and processing, the development and adoption of new quality standards, and technological innovations in the provision of internet services.

Analysis of Recent Research and Publications.

Digitization is one of the key resources of the "Industry 4.0" paradigm and the main growth factor for the global economy in the coming decades. This phenomenon of rapid development and broad influence has become the subject of research for scholars and practitioners, as reflected in the works of Ukrainian and international researchers. Leading experts such as P. Verhof, T. Brockguitzen, J. Bart, A.-M. Stepitz, L. Ivancic, D.-S. Vugec, M.V. Kryachko, E.V. Chernyaev, S.S. Shtepa, I.S. Vasyliiev, S.M. Larin, and V.A. Podgornaya have studied digitization.

The goal of this article is to analyze the impact of transformational processes and digital technologies on Ukraine's economy on its path to European integration through the use of the DESI index.

Main Content

Every year, starting in 2014, the European Commission (EC) publishes the Digital Economy and Society Index report. The report includes not only Eurostat survey results but also justifications for the priority directions of digital economy development in EU member states, recommendations for their development, investment, and the adoption of specific measures.

When creating the DESI index report, 34 indicators from four different categories are analyzed: digital competencies and skills of the population, the extent of internet use by citizens (in various areas of activity), digital technologies in business (integration, online activities), and the availability and use of public services (e-government services). From 2022, the category of communication (communication infrastructure and its quality, broadband internet) has been separated into a separate index.

Figure 1 shows a histogram of the structure of the composite index based on the weighted sum of its components.

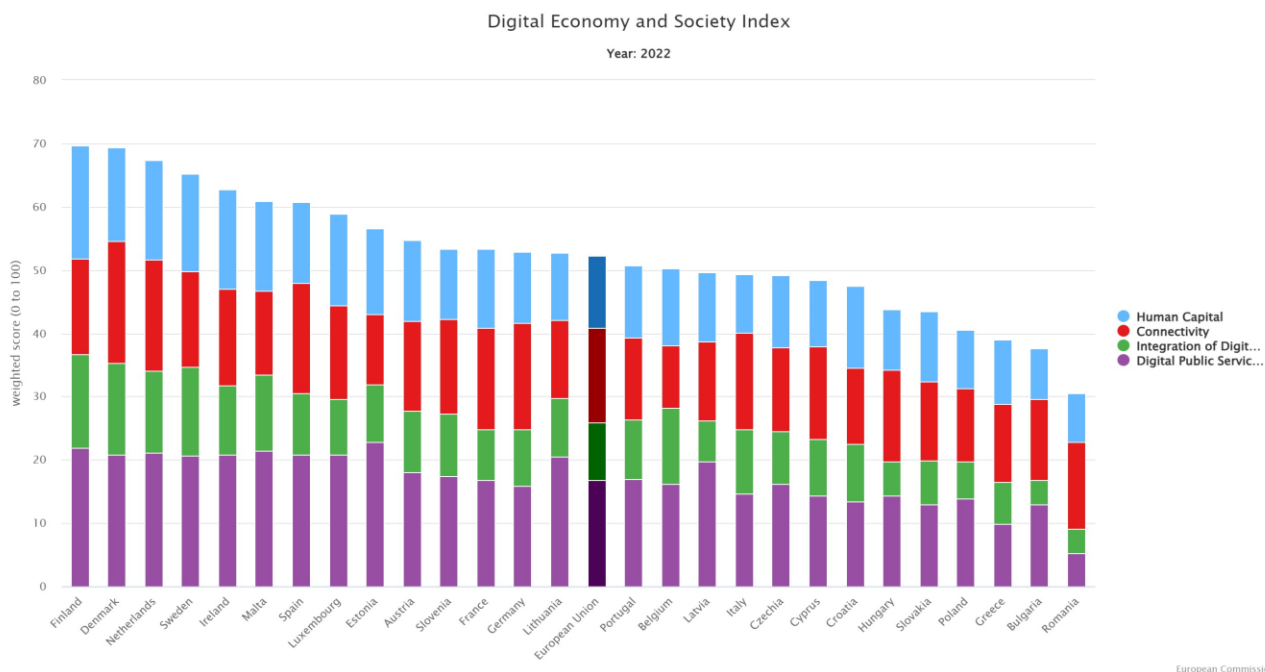


Figure 1: DESI Index in the 2022 Report for European Union Countries

Source: https://digital-decade-desi.digital-strategy.ec.europa.eu/datasets/desi-2022/charts/desi-composite?indicator=desi_sliders&breakdownGroup=desi&period=2022&unit=pc_desi_sliders

The European Commission compares the performance of EU member states with the indicators of 17 other countries, whose level of digital economy and statistical information from open sources allows for such analysis. For this purpose, the International Digital Economy and Society Index (I-DESI) has been developed. Both indices (DESI and I-DESI) share a common formula:

$$\text{DESI} = 0.25 \text{ Digital Skills} + 0.25 \text{ Internet Usage} + 0.25 \text{ Integration of Digital Technologies in Business} + 0.25 \text{ Public Services}$$

This formula clearly shows that it's not sufficient to focus on just one category; each category has almost equal weight. A preference for investing in, for example, telecommunications and broadband internet, won't significantly improve the overall ranking. Efforts need to be made, and government programs for the development and support of all sectors are essential.

The annual report is based on data from the previous year and reflects the progress of different countries in digitization. It allows for conclusions to be drawn about the soundness and quality of decisions made, investment programs, and the utilization of resources by both individual countries and the EU.

It's worth noting that the EU annually allocates significant funds for digital transformation, national reform programs, and recovery plans to enhance the digital economies of its member states. In 2021, 127 billion euros were invested in digital technology reforms, which will help accelerate the overall digital resilience of the European Union and reduce dependence on external sources [1].

Ukraine has confidently embarked on the path of integration with the European community. In 2014, an Association Agreement was signed between Ukraine and the EU, one of its provisions being the adoption of state programs for standardizing legal, political, institutional, and methodological legislation. The result of this was the development of the Concept and Action Plan for the Development of Ukraine's Digital Economy and Society. These documents laid the foundation for a data-driven digital transformation policy. In November 2022, with the support of EU4DigitalUA experts, work began on assessing the current state of DESI implementation in Ukraine and identifying the necessary measures for Ukraine to be included in the DESI [2].

Digitization has a profound impact on various aspects of Ukraine's economy, which is especially important during times of full-scale war. On one hand, digitization promotes increased productivity and efficiency in production, accelerates automation processes, and creates and promotes innovative products and services. On the other hand, it requires new skills and competencies from workers, affects job distribution, leads to unemployment, and necessitates stronger cybersecurity measures.

The extended period of the pandemic and war has significantly affected traditional sectors of Ukraine's economy, such as manufacturing and agriculture. Prolonged lockdowns, the transition to remote work and learning, and power outages have led to instability in many industries, reduced GDP, and decreased tax revenue. However, according to surveys, digital skills have improved for a majority of the population. For example, among young people (up to 35 years old), around 85% use the internet daily in 2022, compared to 76% in 2020. However, the situation has remained nearly unchanged among the older generation (over 60 years old) at 30% in 2021 and 32% in 2022 [3].

In contrast, the IT industry in Ukraine has been in a much more favorable position. By the end of 2022, it had become the most stable sector of the economy, showing consistent growth. In 2021, the industry's revenue amounted to \$6.943 billion, while in 2022, it reached \$7.35 billion, constituting 4.5% of the GDP [3].

The prolonged winter blackout highlighted the vulnerability of internet networks and providers. To avoid such a situation in the near future, many providers invested in new technologies and actively offered customers internet services based on GPON technology. According to estimates by Vodafone experts, as of the beginning of autumn 2023, approximately 130,000 households-subscribers are connected to high-speed broadband internet using GPON technology. There are more than 6,000 providers in Ukraine, and over half of them are actively developing GPON technology, which also enhances Ukraine's DESI index.

Another crucial indicator is public services. For many countries, the Ukrainian application "Diya" serves as an example. The application was launched at the end of 2019 with only 2 documents available. Over the past nearly four years, more than 17 million Ukrainians have used the application and portal, which now offer 72 government services, with 9 services and 15 digital documents available in the mobile version. The Ministry of Digital Transformation of Ukraine plans to transfer 100% of government services to the "Diya" portal by 2024 [4].

In conclusion, Ukraine is making significant progress in implementing digitization across various sectors of its economy and society. Businesses are actively adopting electronic management systems, online commerce, and digital marketing, thus creating and expanding digital ecosystems. The use of digital currency and payment systems is also increasing, making financial transactions more straightforward, supporting flexibility, reducing risks, and lowering corruption levels.

The digital economy sector can provide stable and growing financial investments and become the engine for Ukraine's economic recovery in the post-war period. Digital solutions being implemented have the potential to enhance the efficiency of various sectors of the economy, particularly in the public and military sectors. This not only serves financial interests but also changes the strategies for future development.

The foundation of digitization lies in information technology, education in all its forms, science, and innovation. To achieve balanced development in these areas, it's essential to make informed decisions while simultaneously working to improve each component included in the DESI index.

In September 2023, the Cabinet of Ministers of Ukraine issued an order approving the list of indicators for the Digital Economy and Society Index and the procedure for data collection and exchange based on the EU methodology. This order will provide the prerequisites for tracking the progress of the digital economy and comparing Ukraine's path with those of digital economies in the EU [5].

Conclusions. For successful integration into the European community, Ukraine must enhance its digital infrastructure and policies. Implementing the recommendations of the DESI index can contribute to the development of a digital society, adaptation to EU standards, and increased competitiveness.

In conclusion, digitization is an integral part of Ukraine's economic development. Strengthening digital technologies opens up new opportunities for growth and innovation. The DESI index, in turn, offers valuable recommendations for achieving a high level of digital transformation and successful integration with European partners.

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