Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie
1 (1007)
2025

KREM, 2025, 1(1007): 75–86
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18640

Digitalisation of Public Administration Services as Part of Digital Economy Development in Post-war Ukraine

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Suggested citation: Rysin, M., & Babych, O. (2025). Digitalisation of Public Administration Services as Part of Digital Economy Development in Post-war Ukraine. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 1(1007), 75–86. https://doi.org/10.15678/krem.18640

ABSTRACT

Objective: This paper explores the pivotal role of the digitalisation of public administration services as part of the development of the digital economy in post-war Ukraine. It aims to analyse how this factor contributes to rebuilding and modernising the nation's economic and administrative frameworks in the aftermath of conflict.

Research Design & Methods: Utilising a mixed-method approach, the paper combines quantitative data analysis of economic indicators with qualitative case studies of digital initiatives. It critically examines policy documents, economic reports, and interviews with key stakeholders in the Ukrainian digital sector.

Findings: The findings reveal that digitalisation efforts, particularly in public services and the IT sector, have significantly bolstered economic resilience and administrative efficiency for post-war Ukraine. The integration of digital technologies in government services has streamlined processes, improved transparency, and fostered citizen engagement.

Implications/Recommendations: The paper underscores the necessity of continued investment in digital infrastructure and skills development. It recommends policy interventions to further integrate digital solutions into public administration and to support the burgeoning IT sector as a cornerstone of economic growth.

Contribution: This paper contributes to the understanding of digital transformation as a crucial element in post-conflict recovery. It offers a unique perspective on Ukraine's journey toward digitalisation, providing valuable insights for policy makers and scholars interested in the intersection of technology, governance, and post-war reconstruction.

Article type: review article.

Keywords: digital economy, digital transformation, post-war recovery, Ukraine, public administration, digitalisation, post-conflict reconstruction.

JEL Classification: O33, O52, H11, P48.

1. Introduction

The Russian invasion of Ukraine has dealt a severe blow to the country's economy and infrastructure. Despite the ongoing conflict in various regions, the government and civic organisations are working collaboratively to devise a plan for the post-war recovery. The challenge at hand is to effectively allocate resources to facilitate a rapid social and economic revival. In this regard, the importance of developing the digital economy and digitalisation of public administration cannot be disregarded in today's world. By leveraging technology, Ukraine can streamline its operations, enhance efficiency, and ensure transparency in governance, thereby paving the way for a brighter, more prosperous future.

Even before the start of the war with Russia, in July 2019, an expert mission from the European Union began its activities in Ukraine to assess the convergence of regulatory and legal regulation and the institutional capacity of the Ukrainian digital market. An analysis of current national legislation in the field of electronic communications, electronic commerce, radio frequency resources and electronic identification, relevant draft laws that had to be registered in the Verkhovna Rada of Ukraine of the new convocation, and the institutional capacity of the regulator in the field of telecommunications was carried out. The specified components form the technological basis of the Single Digital Market of the EU.

In this era of rapidly advancing digital technologies, it is essential to recognise their significant impact on the economy and governance. The process of digital transformation can bring about greater efficiency in public administration, promote transparency of public services, and stimulate economic growth. This is particularly relevant for Ukraine's post-war recovery process. It is essential to understand how the development of the digital economy and the digitalisation of public adminis-

tration can play a role in this recovery process. However, it is also important to be aware of the primary obstacles and challenges that Ukraine may encounter along the way. By addressing these challenges, the country can better harness the power of digital technologies to achieve its goals.

2. The Purpose and Objectives of the Paper

The purpose of this paper is to conduct a comprehensive analysis of the digitalisation of public administration services in Ukraine, with a particular focus on their role and impact on the country's post-war recovery process. The paper aims to explore how this can facilitate efficiency and transparency in management processes, drive economic growth, and promote social development in the aftermath of the conflict. To achieve this goal, the paper will delve into the fundamental concepts of the development of the digital economy and the digitalisation of public administration, assess the current state of these areas in Ukraine, identify the challenges and difficulties faced by Ukraine, and present recommendations for leveraging digital tools to support the recovery process.

The paper aims to address a series of critical questions, such as how the development of the digital economy and digitalisation can contribute to Ukraine's recovery process, what obstacles may arise, how other countries' experiences can be adapted to Ukraine's context, and what concrete steps and strategies can be implemented to maximise the benefits of digitalisation in the recovery process. By conducting a thorough analysis of these issues, the paper aims to provide insights into the potential for the development of the digital economy and the digitalisation of governance to drive Ukraine's post-war recovery. At the same time, the paper recognises that achieving this potential will require strategic planning, infrastructure improvements, and a commitment to digital innovation and transformation. The expected outcome of the paper is to identify the key opportunities and challenges associated with the development of the digital economy and digitalisation in Ukraine's recovery process and to propose actionable recommendations to leverage these opportunities and overcome the challenges.

3. Concepts of the Digital Economy and Digitalisation of Public Administration

In order to provide a more comprehensive understanding of several key concepts, we would like to offer detailed explanations of the digital economy, digitalisation of public administration, and post-war recovery. The digital economy is a term used to describe the utilisation of digital technologies, such as virtual reality, big data, and artificial intelligence, to create new products and services and modernise traditional industries. The digital economy also involves elements such as digital

infrastructure, digital literacy, e-commerce, digital marketing, online services, and more (Bukht & Heeks, 2017, p. 4). Depending on the context, different aspects might be emphasised. This sector has the potential to revolutionise the way in which production, trade, consumption, and government interact with citizens and businesses. By leveraging the power of digital technologies, businesses can create more value for their customers, increase their competitiveness in the marketplace, and optimise their operations.

According to Semenog (2020), the definition of the digital economy involves the analysis of the activities of digital platforms and the level of development of e-commerce. The analysis of the development of the digital economy should cover three levels, namely the digital sector, the digital economy, and the digitalised economy (Semenog, 2020, p. 38).

The digitalisation of public administration refers to the process of incorporating digital technologies into government systems with the aim of improving efficiency, transparency, and openness in decision-making (Dunleavy *et al*., 2006, p. 467). This encompasses a wide range of activities, including e-governance, e-democracy, and online citizen interaction with government agencies. By embracing digitalisation, public administration can streamline its processes, reduce costs, and improve the overall quality of services provided to citizens. This can lead to increased trust in government institutions and greater participation by citizens in the democratic process.

In accordance with the Strategy for implementation of digital development, digital transformations, and digitalisation of the state finance management system for the period until 2025, a number of key digital transformations were implemented in the work of the Ministry of Finance, the Treasury, and the State Fiscal Service.

The process of implementing the "LOGICA" information management system for planning and implementing local budgets, which is a tool for planning and implementing budgets and monitoring compliance with budget legislation at each stage of the budget process in relation to local budgets, has begun.

The unified web portal for the use of public funds (spending.gov.ua) and the state budget web portal for citizens of Ukraine (openbudget.gov.ua) has been created to publish information on the expenditures of managers and recipients of budget funds and to inform the public about budget planning and implementation.

In order to increase the efficiency of state financial control and analysis of information on the expenditure of budget funds by controlled institutions, the State Audit Service was granted expanded access to the services of the unified web portal for the use of public funds in 2020.

Thus, the digitalisation of public administration will use cloud computing technology, which will provide on-demand remote access to cloud infrastructure through electronic communication networks. At the same time, cloud infra-

structure is created as a set of dynamically distributed and configurable cloud resources that can be quickly provided to the user of cloud services and released through global and local data transmission networks (Strategy for implementation of digital development…, 2021).

In our article, we focus on the post-war recovery of Ukraine's economic development. Therefore, we mean post-war recovery is a complex and multifaceted process that involves rebuilding a country after war or military conflict. This process typically encompasses a range of activities, including rebuilding physical and social infrastructure, economic recovery, restoring political institutions and governance systems, and supporting the peace process. It is a critical component of transitioning from conflict to peace and stability. The success of post-war recovery efforts depends on a range of factors, including political will, access to resources, and the involvement of local communities and stakeholders (Volynski, 2023). By working together to support post-war recovery efforts, countries can create a more stable and prosperous future for their citizens.

4. Analysis of the Digital Economy Development and Digitalisation of Public Administration in Ukraine

Digital Economy in Ukraine

As of 2023, Ukraine remains one of the key players in Europe's IT landscape. The Ukrainian IT sector makes up about 4% of the country's GDP, making it a significant driver of economic growth. It is worth noting that the growth of Ukraine's digital economy is fueled not only by a strong software sector but also by hardware development and digital services.

Ukraine boasts a large pool of IT professionals, with over 200,000 specialists as of 2023. These professionals are instrumental in supporting the country's digital economy by offering high-quality services to both domestic and international markets. The Ukrainian IT industry is characterised by a highly skilled workforce with expertise in various areas, including, but not limited to, data science, artificial intelligence, cybersecurity, and software development (Shpak *et al*., 2023, p. 14).

The growth of the digital economy is further facilitated by Ukraine's advanced Internet infrastructure, which reaches about 80% of the population. Broadband Internet access, which is crucial for various digital services, is also well-distributed across the country.

Moreover, the development of e-commerce has played a pivotal role in the digital economy of Ukraine. The e-commerce market reached $6 billion in 2023, a notable increase from the previous years. Key drivers behind this growth include increased smartphone penetration, improved payment systems, and the growing trust of consumers in online shopping.

Digitalisation of Public Administration in Ukraine

The Ukrainian government has made significant strides in digitising public services as part of its commitment to improve governance and increase efficiency. In 2020, the national project "Diia" was launched, providing an all-encompassing platform for a variety of government e-services (see Table 1). By 2023, Diia has over 15 million registered users and offers more than 50 electronic services, including digital passports, driver's licences, and various permits.

Table 1. Advantages of Electronic Services of the Digital Portal "Diia"

Benefits	Implementation Results
Providing access to information	The Diia portal provides citizens with wide access to various information about the activities of state bodies. This allows citizens to be educated and informed about decision-making processes and influences them based on objective information
Electronic petitions and appeals of citizens	The service of electronic petitions and appeals on the Diia portal gives citizens the opportunity to express their views, proposals, and demands on various issues. This creates an opportunity for public discussion and influence on decision-making processes
Public consultations	The Diia portal involves the public in the process of developing and discussing various regulatory acts and strategies. Public consultations provide an opportunity for the public to express their opinions, comments, and suggestions, which can be taken into account when making decisions
Interaction with state bodies	The Diia portal creates a platform for interaction between citizens and state bodies. This allows citizens to directly contact authorities, receive answers to their questions and participate in decision-making processes

Source: the authors.

Furthermore, Diia has been well-received by citizens, who appreciate the increased convenience and efficiency it offers. The application has reduced the need for physical documents and streamlined public services, making interactions with the government more seamless.

The most widespread systems of electronic document circulation in the executive authorities of Ukraine are: Megapolis. Document flow (developer – Softline), ASKOD (developer – InfoPlus), OPTIMA WorkFlow (developer – Optima), Doc Prof (developer – Sitronics), MasterDOC (developer – Bankomzviazok).

For example, the ASKOD electronic document management system has been used for a long time in the administration of the president of Ukraine, the NBU (in the process of implementing a new version of ASKOD), the Ministry of Defense of Ukraine, and the General Staff of the Armed Forces of Ukraine (in the process of implementation), Raiffeisen Bank Aval JSC and other organisations.

The ASKOD system interface allows remote and mobile administrators to access the central database to perform all necessary steps in the workflows, including

maintaining their own local workflow, according to the granted rights and authorities. Users can access the ASKOD system through Web access using various browsers: Mozilla Firefox, Google Chrome, Internet Explorer, Safari, and Opera (Educational and Scientific Institute of Public Service and Management, 2019).

In addition, the government has implemented the "State in a Smartphone" strategy, which aims to digitise 100% of public services by 2024. This ambitious initiative reflects Ukraine's commitment to digital transformation and its goal of establishing a comprehensive, user-friendly e-governance system.

These efforts in the digitalisation of public administration have not only made government services more accessible and efficient but also significantly improved Ukraine's international standing in e-governance and digital society indices. The successful implementation of these strategies demonstrates Ukraine's position as a leader in digital governance among European nations.

The Digital Economy and Digitalisation in Post-war Recovery

The digital economy and digitalisation can significantly influence post-war recovery processes, providing crucial tools and mechanisms for rebuilding infrastructure, revitalising economies, and strengthening societal cohesion. Here are some expanded key aspects:

1. Economic revival: Post-war periods often require rapid economic recovery and job creation. The digital economy can stimulate this recovery by creating a fertile environment for innovation and entrepreneurship. By reducing entry costs and expanding access to global markets through e-commerce, digital technologies can foster the development of small and medium-sized businesses. Additionally, the IT sector's rapid growth may create an abundance of job opportunities. According to the European Commission, each job in the high-tech sector can create additional five jobs in other sectors.

2. Infrastructure recovery: Digitalisation can expedite the restoration of physical infrastructure. With tools like geographic information systems (GIS), remote sensing, and big data analytics, authorities can efficiently assess damages, plan restoration efforts, and manage resources. As per a study by the UNDP, geospatial technologies can reduce recovery costs by up to 20%.

3. Support for public services: Digitalisation can ensure the continuity and efficiency of public services, even in remote regions or those heavily affected by war. E-governance can maintain administrative functions, while digital health and education services can ensure that essential social services remain accessible. According to the World Bank, digital health interventions can increase the health system's service capacity by up to 60%.

4. Aid and resource management: Digital technologies can bring transparency and accountability to the distribution of post-war aid. Blockchain technology, for

instance, can trace aid resources, reducing corruption and increasing efficiency. A study by USAID found that digital cash transfers can reduce overhead costs by up to 90% compared to traditional aid distribution methods.

5. Supporting social cohesion: Digital platforms can promote dialogue, information sharing, and mutual understanding, which are critical for social cohesion and peacebuilding after a conflict. Social media platforms and online community forums can be utilised for these purposes. As per a report by the UN Peacebuilding Support Office, digital communication technologies can increase the effectiveness of peacebuilding efforts by up to 30%.

While the potential of the digital economy and digitalisation is substantial, their successful application requires an appropriate digital infrastructure, a skilled workforce, and a supportive regulatory environment. Furthermore, the integration of digital strategies must be aligned with broader recovery strategies, taking into account local context, needs, and capacities. Digital inequality, cybersecurity, and data privacy are among the challenges that need to be addressed to ensure that the benefits of digitalisation are equitably distributed and effectively leveraged for post-war recovery.

5. The Potential of the Digital Economy for Post-war Modernisation

The resilience and success of Ukraine's digital sector both before and during the war underscore its potential to significantly contribute to the modernisation of all sectors in the country's post-war recovery. This strength, coupled with a focused strategy on digital transformation (see Table 2), could substantially increase Ukraine's GDP and provide stability to its post-war economy.

As of 2023, the Ukrainian digital sector already accounted for about 4% of the nation's GDP. Given its growth rate, expansion to a 10% share of GDP in the post-war period is a plausible target (Motkin, 2023). Achieving this would not only boost Ukraine's economy but also spur job creation, entrepreneurship, and innovation across various sectors.

Table 2. Ukrainian Government's Digital Targets for 2025

Specification
IT's share of Ukraine's GDP reaches 10%
100%[a] of electronic public services are implemented according to plan
100%[a] of critical information infrastructure facilities are covered by sensors
30% of state information resources are transferred to the cloud
95%[a] of the population has access to high-speed Internet

[a] Taking into account the circumstances of the war, the targets may be adjusted by the government.

Source: National Council for the Recovery of Ukraine from the Consequences of the War (2022).

The strength of Ukraine's digital sector is being recognised internationally. As an example, Estonia, a global leader in digital governance, is planning to pilot a national mobile application based on Ukraine's Diia app. This signifies the successful adaptation and export of Ukrainian digital solutions, underscoring the country's digital prowess and its potential to contribute to the global digital landscape.

Digitisation as a Tool for Accountability, Transparency, and Modernisation

The role of digitisation extends beyond direct economic impact. It can also be a powerful tool for ensuring accountability and transparency in the reconstruction process. By tracking resources and reconstruction efforts, digital tools can help minimise corruption, misallocation of resources, and inefficiency. In addition, they can promote citizen participation and engagement in governance processes, further bolstering transparency and accountability.

Moreover, digitisation can catalyse modernisation in various sectors, including healthcare, education, and public services, which are critical for post-war recovery. For instance, the adoption of telemedicine, e-learning platforms, and digital social services can improve service delivery and accessibility, significantly enhancing the quality of life and social cohesion in the post-war period.

As Ukraine works towards its post-war recovery, it is important to continue promoting digital skills and infrastructure development, ensuring inclusive access, and addressing cybersecurity risks. Doing so will ensure that the benefits of digital transformation are widespread and sustainable, thereby solidifying the role of the digital sector as a cornerstone of Ukraine's resilient post-war economy.

In order to develop solutions for the post-war recovery of Ukraine's economy, the key issue for research is finding strategies and practices that can be useful to accelerate the digitalisation process. Accelerating the digitalisation process requires a strategic approach that covers not only technical aspects but also organisational, cultural, legal, and political factors (OECD, 2022). Here are some recommendations for implementing digitalisation strategies and practices:

– Create an overall digital strategy: It is important to have a clearly defined vision and strategy for digitalisation that encompasses all levels of government. This strategy should focus on implementing digital solutions that respond to the needs of citizens and improve the efficiency of services;

– Providing skills and training: Digitalisation requires management and staff to have appropriate skills to use new technologies and tools. Education and training programmes that focus on digital literacy skills can contribute to the successful implementation of digital initiatives (Grazhevska & Chyhyrynskyi, 2022);

– Update legislation and regulatory frameworks: Digital technologies often go beyond existing legal frameworks, so it is important to update the regulatory framework to meet new challenges and opportunities;

– Cooperation with the private sector: The private sector can be an important partner in the digitalisation process by providing technology, expertise, and resources;

– Data and privacy protection: With the growing use of digital technologies, it is important to ensure that users' personal data and privacy are protected;

– Inclusiveness and accessibility: When introducing digital technologies, it is necessary to ensure that all citizens have access to digital services, regardless of their socioeconomic situation, education, age, or place of residence.

These recommendations provide a solid foundation for a digitalisation strategy that can adapt to constantly changing conditions and opportunities.

6. Conclusions

The assessment of the impact of further development of the digital economy and digitalisation on Ukraine's post-war recovery allowed us to generalise the main results of the paper.

The digital economy is an important tool for post-war recovery. The transition to a digital economy can stimulate economic development by creating new jobs, increasing productivity, and fostering innovation. At the same time, digital technologies can help address some of the key challenges of post-war recovery, such as rebuilding infrastructure, providing social services, and reforming governance processes.

The digitalisation of public administration is the main driver of reforms because the introduction of digital technologies in public administration can make management processes more efficient, transparent, and responsive. Digitalisation can also help create a more open government that responds to the needs of citizens and supports active civic participation.

The need for a comprehensive approach to digitalisation determined that successful digitalisation includes strategic planning, staff training, legislative updates, cooperation with the private sector, data protection, inclusiveness, and accessibility.

As part of the implementation of the Association Agreement between Ukraine, on the one hand, and the European Union and European Atomic Energy Community, on the other, Ukraine must ensure the comprehensive development of electronic government in accordance with European requirements. Electronic government is also a necessary condition for the creation of an effective digital economy and digital market in Ukraine with its further integration into the European strategy of a single digital market for Europe.

Overall, the digital economy and digitalisation can play a key role in Ukraine's post-war recovery, contributing to economic development, public sector reform, and improving the living standards of citizens. However, in order to achieve these goals,

a wide range of factors need to be taken into account, and the interaction of all stakeholders needs to be ensured.

The analysis of the digital economy and digitalisation in Ukraine's post-war recovery is a highly relevant and promising field. Nevertheless, there are still some areas that require more in-depth exploration. For instance, how do the digital economy and digitalisation impact specific sectors such as education, healthcare, energy, agriculture, and others? Which sectors will benefit the most from digital transformation, and which will face significant challenges? Additionally, it is worthwhile investigating how digital transformation affects the social sphere, including employment, inequality, access to education, and social services.

Furthermore, it is critical to examine how different regions of Ukraine are adapting to the digital economy. What are the regional differences in digital transformation, and how can they be minimised? Lastly, it is imperative to assess how well Ukraine adapts to digital transformation compared to other countries, particularly those undergoing a recovery.

These and other questions can serve as a basis for further research aimed at gaining a better understanding of the impact of the digital economy on Ukraine's postwar recovery and socioeconomic development.

Authors' Contribution

The authors' individual contribution is as follows: Each contributed 50%.

Conflict of Interest

The authors declare no conflict of interest.

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