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# MACROECONOMIC AND FINANCIAL DIMENSIONS OF UKRAINE'S DIGITAL SERVICES TRADE: TAXONOMY, INSTITUTIONS, AND GLOBAL INTEGRATION

## ABSTRACT

The article provides a comprehensive analysis of the structural, dynamic, and institutional characteristics of Ukraine's digital services trade within the context of global digital transformation and evolving international financial markets. Given the increasing role of intangible assets, digitally deliverable services, and financial technologies in global economic relations, the study aims to assess the export potential of Ukraine's digital services sector and to identify key macrofinancial, regulatory, and institutional determinants shaping its development.

The methodological framework integrates internationally recognized statistical classifications (EBOPS, CPC, ISIC) with descriptive and comparative analysis, time-series evaluation, and PEST analysis, ensuring analytical consistency, cross-country comparability, and relevance for macroeconomic and financial policy assessment. The empirical analysis is based on UNCTADstat data for the period 2011–2023 and focuses on digitally delivered services as the most measurable component of digital trade.

The results reveal a more than 100-fold increase in Ukraine's digital trade surplus over the study period, accompanied by a significant structural reconfiguration of the national export portfolio. By 2023, digitally delivered services accounted for approximately 60% of total service exports, reflecting the dominance of telecommunications, information technology, and professional consulting services. These trends indicate a deepening integration of Ukraine into global digital value chains and highlight the growing role of digital and financial infrastructure in supporting export resilience. Despite persistent geopolitical shocks, macroeconomic volatility, and financial constraints caused by the ongoing war, Ukraine demonstrates a high level of digital and financial adaptability, supported by targeted government policies, regulatory reforms, the development of e-governance and FinTech ecosystems, and institutional convergence with the European Union.

The study confirms that digital services have become a structural driver of export growth, balance-of-payments sustainability, and innovation-based competitiveness. The scientific contribution lies in refining the classification and macrofinancial interpretation of digitally delivered services, while the practical implications relate to strengthening financial institutions, improving regulatory coherence, expanding access to finance, and enhancing Ukraine's participation in global digital and financial markets.

**Keywords:** digital services exports, FinTech development, financial service, resilience, balance of payments, digital economy, financial integration, global value chains, regulatory constraints

**JEL Classification:** F14, F36, L86, O33, O57, F63

## INTRODUCTION

In the current era of digital transformation, the global economy is undergoing profound structural reconfigurations, within which digital services have assumed an increasingly pivotal role in international trade. Acting as a key driver of export expansion, digitally delivered services sustain growth not only in advanced economies but also across

emerging and developing markets. At the same time, the rapid expansion of digital services trade is accompanied by a range of systemic challenges, including regulatory fragmentation, technological asymmetries, limited access to enabling financial infrastructure, and persistent methodological difficulties in identifying, measuring, and classifying digital transactions. The COVID-19 pandemic further exposed these vulnerabilities, while simultaneously demonstrating the resilience and scalability of digital services as a core component of contemporary global trade.

The analytical complexity of digital services trade is intensified by the blurred boundary between cross-border digital trade and traditional services exports. Many digital services are delivered as hybrid products that combine elements of goods and services, thereby eluding conventional statistical and accounting frameworks. As a result, national and international reporting systems often fail to capture the full economic contribution of digital services, creating a structural gap between their actual role in trade flows and their formal representation in official statistics. These shortcomings are exacerbated by the uneven pace of institutional adaptation to digital globalization, which undermines the formulation of coherent regulatory and export promotion strategies.

Within this context, the role of enabling digital and financial infrastructures has become increasingly important. Financial technologies, by facilitating cross-border payments, reducing transaction costs, and easing financial constraints for firms, constitute an integral institutional component of digital trade ecosystems. However, their contribution to export performance and structural transformation remains insufficiently explored in country-specific analyses. For Ukraine, these challenges are compounded by regulatory constraints, infrastructural disparities, and prolonged geopolitical shocks, which limit the ability to fully exploit comparative advantages in digital services. Against this background, a systematic analysis of Ukraine's digital services trade – integrating classification issues, institutional conditions, and the enabling role of FinTech – is essential for understanding its integration into global digital value chains and its prospects for sustainable export growth.

## LITERATURE REVIEW

The contemporary scholarly discourse emphasizes the multifactorial nature of digital trade in services, highlighting the interaction between regulatory, technological, institutional, and firm-level determinants. Wu et al. (2023) and Zhao (2025) identify bilateral and multilateral digital trade agreements as important catalysts for export expansion, while Zheng and Sun (2023) stress the necessity of differentiated policy frameworks that reflect varying degrees of digital dependency across partner economies. Well-designed regulatory environments and harmonized digital trade rules reduce uncertainty and facilitate cross-border digital transactions, particularly in highly digitalized service sectors.

Technological capability constitutes a key determinant of competitiveness in digital services trade. Natanael (2025) demonstrates that access to advanced digital technologies significantly enhances a country's ability to export digitally deliverable services. Chowdhury et al. (2023) show that the rapid development of FinTech and blockchain-based solutions improves transparency, efficiency, and risk management in financial transactions, thereby strengthening the infrastructure underlying digital commerce. Kyrylieva and Polyvana (2022) similarly underline the importance of reliable information and analytical systems for managerial decision-making and operational sustainability of trading enterprises in the digital economy. These findings are consistent with Lee and Falahat (2019), who argue that digitalization, innovation, and learning capabilities jointly generate competitive advantages in international markets. Empirical evidence from Wajda-Lichy et al. (2022) further confirms a strong correlation between investment in digital infrastructure and services export performance, while also revealing persistent inequalities in ICT access across countries.

Within this technological dimension, financial technologies are increasingly conceptualized as an institutional enabler of digital trade integration. Hajizamani (2025), synthesizing theoretical and empirical evidence, shows that FinTech reduces structural and financial barriers to the internationalization of small and medium-sized enterprises by simplifying cross-border payments, expanding access to finance, and scaling digital financial services. From this perspective, FinTech may be interpreted as a core component of digital trade infrastructure that supports the operation and expansion of exports of digitally deliverable and knowledge-intensive services and strengthens integration into global digital value chains. Consistent with this view, the global review by Cumming, Johan, and Reardon (2023) demonstrates that platform-based financial solutions, data-driven business models, and regulatory innovation reshape international business by reducing information asymmetries and embedding firms more deeply into transnational value creation networks. At the microeconomic level, Boratyńska (2019) emphasizes that the digital transformation of FinTech services directly enhances value creation through innovative business models and customer-oriented digital solutions.

Beyond their quantitative impact on trade flows, financial technologies also contribute to the qualitative transformation of exports. Cheng and Wu (2025) find that FinTech development indirectly improves export quality by enhancing firms' access


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to innovation resources, optimizing the financing of research and development activities, and improving capital allocation efficiency, which is consistent with broader evidence on the role of digital finance in supporting enterprise internationalization and outward investment (Fan et al., 2025; Lawal et al., 2025). Complementary evidence provided by Kumari (2025), based on a structural gravity model, confirms a statistically significant positive impact of FinTech diffusion on global trade flows through reduced trade costs and increased financial inclusion, including more efficient cross-border payments and trade settlement mechanisms enabled by advanced financial technologies and blockchain-based solutions (Zhang, 2023; Schoggers et al., 2025). Taken together, these findings indicate that FinTech not only stimulates trade volumes but also facilitates the upgrading of export structures toward higher value-added digital and professional services, reinforcing the strategic role of financial technologies in modern digital trade ecosystems (Krasnova et al., 2023).

Regulatory constraints nevertheless remain a critical impediment to the development of digital services trade. Nikensari et al. (2024) document the negative effects of restrictive regulatory regimes on export efficiency, particularly during periods of crisis. This conclusion is reinforced by Ferencz and Gonzales (2019), Hao et al. (2023), and Guo et al. (2024), who show that barriers to digitally enabled services constrain economic growth and limit firms' participation in cross-border digital markets. In this context, firm-level adaptability becomes crucial. Kerner and Kitsing (2023) argue that companies operating in digital services demonstrate greater flexibility and resilience in response to global disruptions, including the COVID-19 pandemic.

Another important strand of the literature addresses persistent conceptual and methodological challenges related to the definition and measurement of digital services. Shubailat et al. (2024) note that many digitally delivered transactions – such as cloud computing, software-as-a-service, and remote technical support – remain difficult to classify within existing statistical frameworks. For economies with a strong IT export orientation, including Ukraine, this creates significant challenges for accounting, taxation, and value-added assessment. Ferracane and van der Marel (2021) further emphasize that insufficiently developed data governance and regulatory coherence constrain the expansion of digital services trade, while Wajda-Lichy et al. (2022) underline the importance of continued investment in digital infrastructure to unlock export potential.

Taken together, the literature indicates that successful integration into global digital trade depends not only on technological capabilities, supportive financial and regulatory institutions, coherent policy frameworks, and firm-level adaptability, but also on the presence of bilateral agreements, regulatory quality, and market openness (Zhao, 2025; Hao et al., 2023; Mulenga & Mayondi, 2022; Chang-Hwan, 2025). However, existing studies largely overlook economies undergoing profound structural transformation and facing prolonged economic and geopolitical shocks, while also underestimating how insufficiently adapted tax, customs, and statistical frameworks, the hybrid nature of digital and "as-a-service" products, and the growing transactional invisibility of cloud- and platform-based exports complicate trade classification, measurement, and policy design (Fan et al., 2013; Liu et al., 2023; Lyu et al., 2024; Natanael, 2025; Gaweł & Mińska-Struzik, 2023), thereby underscoring the relevance of analyzing Ukraine's digital services trade through the lens of taxonomy asymmetries, regulatory constraints, and the enabling role of FinTech in export resilience and integration into global digital value chains.

## AIMS AND OBJECTIVES

The purpose of this study is to conduct a comprehensive assessment of the export potential of digital services in Ukraine, identify key opportunities and constraints faced by domestic producers of digital services and solutions, and formulate policy-relevant recommendations in the context of international digital integration. Specifically, the study aims to evaluate Ukraine's position in the global digital economy through statistical and comparative analysis; identify structural, regulatory, technological, and financial determinants of digital services exports, including the enabling role of FinTech; analyze the dynamics and composition of digitally delivered services based on UNCTAD and OECD frameworks; and develop recommendations to enhance regulatory coherence, institutional capacity, and Ukraine's integration into global digital trade and value chain networks.

## METHODS

This study combines conceptual generalization and empirical analysis to assess the dynamics and export potential of digitally delivered services in Ukraine. At the theoretical level, a comparative analysis of international classifications (EBOPS, CPC Ver.2, ISIC Rev.4, OECD Framework, UNCTAD DDS) was conducted to identify the core categories of digital services

and ensure data comparability. The methodological basis is formed by the OECD–WTO–IMF Handbook on Measuring Digital Trade and the UNCTADstat platform, which provides detailed digital trade data in accordance with international standards.

The empirical part of the research is based on the analysis of Ukraine's external trade from 2011 to 2024 using UNCTADstat data. Key indicators were calculated: the digital trade balance, the share of digital services in total exports and imports, and the dynamics of digitally delivered services by category. The structure of digital services was analysed according to the UNCTAD DDS classification, which includes telecommunications, computer and information services; charges for the use of intellectual property; professional, consulting, and other digitally intensive services.

To assess the relative importance of digital services within the overall trade structure, methods of comparative analysis, time series, and relative indicators were applied. Additionally, a PEST analysis was conducted to identify political, economic, social, and technological factors influencing the development of Ukraine's digital services sector. The combination of quantitative and qualitative methods provides a comprehensive understanding of both the structural features and the contextual determinants of digital trade transformation.

## RESULTS

International trade has traditionally been understood as the exchange of goods and services between countries. However, under the influence of globalization and digital transformation, the distinction between these categories is gradually becoming less clear. Digital products – both goods and services – often lack a tangible form and may be ordered, delivered, and consumed entirely online, which complicates their classification in conventional statistical reporting.

In classical terms, goods are physical objects that can be stored, transported, delivered, and owned. Yet in the digital economy, intangible goods have emerged, such as e-books, software, and digital artworks, that, although possessing characteristics of traditional goods, functionally resemble services due to the mode of their delivery or consumption.

This complexity is reflected in the official frameworks adopted by international institutions. For example, according to the OECD, digital trade encompasses transactions involving both goods and services, yet current statistical systems primarily capture digitally delivered transactions – mostly services, which represent the fastest-growing component. Similarly, UNCTAD emphasizes that digitally delivered services are currently the only well-represented component of digital trade in global trade statistics. As a result, digital services remain the dominant focus in quantitative accounting.

Consequently, the international methodology for digital trade measurement has shifted from the traditional "goods–services" dichotomy toward classifications based on the nature of digital interaction – specifically, how a product is ordered, delivered, and consumed. Therefore, contemporary approaches to measuring digital trade employ functional, product-based, and activity-oriented classifications. These are developed and supported by key international organizations, including the OECD, UNCTAD, IMF, WTO, and the United Nations, through systems such as ISIC, CPC, and EBOPS. Table 1 below summarizes the main international approaches to classifying digital products, their purposes, methodological differences, and examples of relevant codes used in country-level practices.

**Table 1. International approaches to the digital services taxonomy.**

| Classification / Organization | Approach Type | Application | Classification of Digital Products |
|---|---|---|---|
| BPM6 / EBOPS 2010 (IMF, OECD, WTO, UN) | Statistical (official) | Used for services trade statistics by policymakers, trade negotiators, analysts, businesses, and academics. Forms the basis of balance of payments reporting for most countries. | EBOPS: Computer services, Telecommunications, Information services, IP charges |
| OECD Digital Trade Framework | Conceptual/ analytical | Definition and measurement of digital trade | Digitally ordered / Digitally delivered / ICT-enabled services (за EBOPS) |
| UNCTADstat DDS | Practical | DDS statistics by country | Insurance and pension services, financial services, charges for intellectual property, telecommunications, computer and information services, R&D, professional and management consulting, architectural, engineering, scientific and technical services, trade-related services, other business services, audiovisual and related services, personal, cultural, recreational and medical services |
| WTO (Digital trade, E-commerce) | Conceptual/ political | Trade negotiations, digital trade policy | Digitally ordered, digitally delivered, platform-enabled |
| ISIC Rev.4 (UN) | Activity classification | Used in statistics, policy, and comparative analysis to assess the size of the digital economy, identify digital sectors, and estimate the ICT share in GDP | ISIC: 5820 – Software publishing, 6201–6209 – IT services, 6311–6312 – Data processing and hosting. The extended digital sector includes: 5829 – Digital publishing, 5911–5912 – Digital media, 6399 – Analytics and Big Data, 6619 – FinTech and related financial services |
| CPC Ver.2 (UN) | Product classification | For a detailed statistical representation of digital goods and services | CPC: 831 – Telecommunications, 832 – Computer services, 733 – Intellectual property licenses, 843 – Audiovisual services, 83149 – Cloud and other electronic communications services, 84390 – Other audiovisual services (post-production, localization), 84320 – Video-on-demand (VoD), 84321 – Online music, 84322 – Digital game development |


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Taking into account the OECD's analytical approaches to the digital economy, as well as the external trade accounting structure used by the National Bank of Ukraine, digital services can be meaningfully grouped into several key segments to facilitate the presentation of applied forms of implementation (Table 2). According to the study by Melnyk and Zavhorodnya (2024), published in the International Science Journal of Management, Economics & Finance, computer services dominated the structure of ICT services exports in Ukraine between 2008 and 2022, accounting for 89.4% of the total volume. This indicates that Ukraine's digital exports are primarily composed of IT services, particularly software development, SaaS solutions, hosting, cloud computing, and related services.

Another important segment comprises digital financial services (FinTech), including electronic payments, neobanking, RegTech, online lending, and blockchain-based financial solutions, which are widely recognized in the literature as key drivers of efficiency, transparency, and scalability in cross-border digital transactions (Krasnova et al., 2023; Zhang, 2023; Schoggers et al., 2025). Leading players in this area in Ukraine include Monobank and Portmone, whose platforms illustrate how advanced FinTech ecosystems support both domestic financial inclusion and the internationalization of digitally delivered services by reducing transaction costs, improving the speed and reliability of cross-border settlements, and easing financial constraints for exporting firms, in line with empirical evidence on the trade- and investment-enhancing effects of financial technologies (Hajizamani, 2025; Kumari, 2025; Lawal et al., 2025; Fan et al., 2025).

Creative digital services encompass digital design, multimedia and media production, digital marketing, as well as educational online solutions (EdTech), forming an increasingly export-oriented segment of Ukraine's digital economy, while a distinct niche is occupied by digital public governance (e-Gov), represented by initiatives such as Diia, ProZorro, Trembita, and e-Customs. Although e-Gov services are not directly exported, they strengthen Ukraine's digital reputation, enhance institutional transparency, and create an enabling environment for digital trade and service exports. The institutional development of digital services in Ukraine is supported by coordinated efforts of the Ministry of Digital Transformation, the National Bank of Ukraine, the IT Ukraine Association, the Ukrainian Cultural Foundation, and other specialized organizations, with the main regulatory frameworks governing these segments summarized in the table below.

**Table 2. Segmentation of digital services in Ukraine and their regulatory framework.** *(Source: compiled by the authors based on the legal framework)*

| Digital Services Segment | Key Services | Institutions and Regulation | Core Regulatory Framework |
|---|---|---|---|
| ICT/IT Services | Outsourcing, software development, R&D, SaaS, cloud computing | Ministry of Digital Transformation, IT Ukraine Association | Law of Ukraine "On Stimulating the Development of the Digital Economy in Ukraine", 2021, Law of Ukraine "On Digital Content and Digital Services", 2023, Resolution of the Cabinet of Ministers of Ukraine No. 1351-r, 2024 |
| Digital Financial Services (FinTech) | Neobanking, payments, RegTech, online lending | National Bank of Ukraine (NBU), UAFIC | Law of Ukraine "On Payment Services", 2021, National Bank of Ukraine, 2021 |
| Creative Digital Services | Design, audio-visual content, games, multimedia, EdTech | Ukrainian Cultural Foundation, Office for Entrepreneurship and Export Development | Resolution of the Cabinet of Ministers of Ukraine No. 265-r, 2019, Law of Ukraine "On Culture", 2010 |
| E-Government (e-Gov) | Diia, ProZorro, Trembita, e-Customs, digital business services | Ministry of Digital Transformation, State Enterprise "Diia", State Service of Special Communications | Law of Ukraine "On the Peculiarities of Providing Public (Electronic Public) Services", 2021, Resolution of the Cabinet of Ministers of Ukraine No. 56, 2019 |

In the context of analyzing the digital transformation of international trade in services, an important analytical category is that of digitally-deliverable services (DDS – services that can be entirely transmitted through digital communication channels. The DDS classification proposed by UNCTADstat is based on the BPM6 and EBOPS 2010 statistical standards and incorporates the recommendations of the OECD, IMF, and WTO, which also form the basis for the calculations and analysis presented here. These services are essential for assessing a country's integration into the global digital economy and for evaluating its digital export potential.

UNCTAD does not treat DDS as a separate sector but rather as an intersection of several service categories that are either fully or partially functional in digital format. The fully digital services include:

1. Telecommunications, computer, and information services – the core of digital exports.

2. Intellectual property-related services – including software licensing and digital rights.

3. Audiovisual and related services – encompassing digital distribution of music, films, streaming, and video games.

Categories classified as partially digital (digital-enabled) include financial services, consulting, scientific and technical services, R&D services, trade-related intermediation, as well as insurance and pension services – but only when delivered remotely or via digital channels.

Notably, UNCTADstat formally includes insurance and pension services in the DDS category. This inclusion is justified by the fact that certain components of these services (e.g., online contracting or account management) can be digitally delivered. However, in most analytical frameworks, they are not part of the core of digital trade and are instead considered as partially digital-enabled components.

Thus, for the assessment of Ukraine's digital services trade structure (exports and imports), it is appropriate to distinguish between two main categories: Core digitally-deliverable services (telecommunications, computer, information, intellectual property, audiovisual services); Partially digitally-enabled services (financial, insurance, consulting, R&D, engineering, etc.) - as presented in Table 3.

**Table 3. Typology of digital services categories according to UNCTAD classification.**

| UNCTADstat Category | DDS Type | Explanation |
|---|---|---|
| Insurance and pension services | Partially digitally-enabled services | Typically require physical presence or a local intermediary. |
| Financial services | Partially digitally-enabled services | Considered digital-enabled but not fully DDS; depends on the mode of delivery. |
| Charges for the use of intellectual property, i.e. | Core digitally-deliverable services | Includes software licenses, copyrights, and digital products. |
| Telecommunications, computer, and information services | Core digitally-deliverable services | The core of digital services (telecom, IT, information systems). |
| Research and development (R&D) | Partially digitally-enabled services | Included if results are delivered digitally. |
| Professional and management consulting services | Partially digitally-enabled services | Considered DDS if provided online. |
| Architectural, engineering, scientific, and other technical services | Partially digitally-enabled services | Included if fully delivered through digital channels. |
| Trade-related services | Partially digitally-enabled services | Generally digital-enabled, though not always considered DDS. |
| Other business services n.i.e. | Partially digitally-enabled services | Depends on the specific nature of the service. |
| Audiovisual and related services | Core digitally-deliverable services | Includes streaming, digital distribution of films, music, games, etc. |
| Other personal, cultural, and recreational services, Health services | Partially digitally-enabled services | May be delivered digitally (e.g., online concerts, telemedicine), but often require physical interaction. eHealth / telemedicine – digital; tourism/individual services – mostly physical. |

Given the outlined international approaches to the classification of digital services, it is important to understand how these principles are reflected in the Ukrainian context. An accurate assessment of Ukraine's export potential in digital services is not possible without considering the overall state of the country's external trade, as the digital component is inherently integrated into broader trade flows. Therefore, it is appropriate to begin with an analysis of the dynamics of Ukraine's exports and imports of goods and services in recent years. As illustrated in Figure 1, trade in goods significantly exceeds trade in services. At the same time, despite the rapid increase in the import of services starting in 2020, the volume of service imports began to decline from 2022 onwards, gradually approaching the level of exports. This trend has led to a reduction in the negative balance of trade in services, bringing it closer to zero.


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**Figure 1. Dynamics of Ukraine's Exports and Imports of Goods and Services in 2011–2024, USD million**. *(Source: prepared by the authors based on data compiled from UNCTADstat)*

Accordingly, special attention should be paid to the dynamics of the trade balance in goods, services, the overall trade balance, and the balance of digital trade. As shown in Table 4, Ukraine's trade balance in goods – as well as the total trade balance – remained negative throughout the entire study period (2011–2024). In contrast, the balance of trade in services was positive between 2011 and 2021, but experienced a sharp decline in 2022, reaching its most negative value. By 2024, however, this indicator had improved by nearly half, indicating the preservation of export potential despite ongoing military aggression and widespread destruction.

Due to the absence of a distinct "digital goods" category in international statistics, most empirical studies on digital trade focus specifically on digitally delivered services (DDS), which currently represent the only clearly measurable component of digital trade. In this study, the digital trade balance was calculated as the difference between exports and imports of digitally delivered services. The calculations cover the period from 2011 to 2023, as data for 2024 is not yet available from open sources.

The results indicate a consistently positive trend: the digital trade balance was negative only in 2011, while in 2023 it had increased more than 105-fold. This growth reflects not only a quantitative strengthening of digital exports but also significant qualitative structural shifts, suggesting that digital services have become one of the key drivers of Ukraine's positive external trade performance.

**Table 4. Dynamics of Ukraine's Trade Balance in Goods, Services, and Digital Trade in 2011–2024, USD million.** *(Source: prepared by the authors based on data compiled from UNCTADstat)*

| Year | Goods Balance | Services Balance | Overall Trade Balance | Digital Trade Balance |
|---|---|---|---|---|
| 2011 | -14134 | 7886 | -6248 | -66 |
| 2012 | -16109 | 7500 | -8609 | 348 |
| 2013 | -12449 | 6494 | -5955 | 381 |
| 2014 | -529 | 2522 | 1993 | 1365 |
| 2015 | 610 | 1093 | 1703 | 1167 |
| 2016 | -2892 | 489 | -2403 | 1424 |
| 2017 | -6344 | 919 | -5425 | 1979 |
| 2018 | -9852 | 1336 | -8516 | 2646 |
| 2019 | -10746 | 1750 | -8996 | 3752 |
| 2020 | -5145 | 4400 | -745 | 4672 |
| 2021 | -4770 | 3971 | -799 | 6233 |
| 2022 | -11160 | -11085 | -22245 | 7428 |
| 2023 | -27487 | -8942 | -36429 | 6990 |
| 2024 | -29469 | -5508 | -34977 | |

Following the analysis of the overall state of foreign trade and the balance of digital flows, it is appropriate to focus directly on the dynamics of digital services as a key and reliable indicator of the development of Ukraine's international digital trade. As illustrated by the graph in Figure 2, the share of digital services in Ukraine's total services exports has been

steadily increasing – from 19% in 2011 to a record 60% in 2022. This positive trend reflects a significant strengthening of the global position of Ukrainian digital services.

At the same time, the share of digital services in total imports of services has almost tripled downward over the same period. These further highlight Ukraine's export advantage in the digital trade domain and its potential to generate a sustainable surplus in this area.

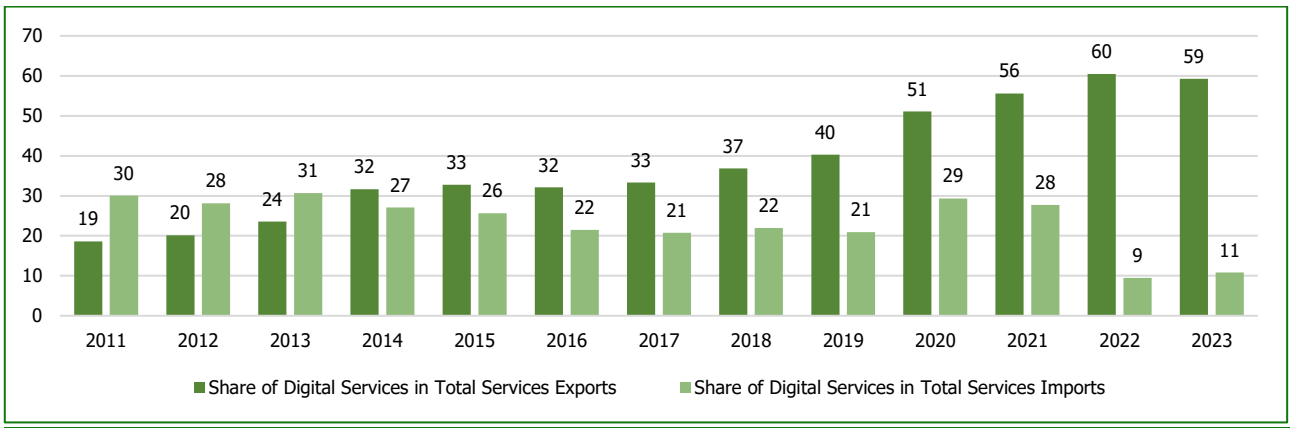


**Figure 2. Share of Digital Services in Ukraine's Total Exports and Imports of Services in 2011–2023, %.** *(Source: prepared by the authors based on data compiled from UNCTADstat)*

The summarized results indicate not only a substantial increase in Ukraine's digital trade balance but also a consistent strengthening of the role of digital services within the country's external trade structure. In light of this, the next stage of the study involves a detailed analysis of the composition of digital services according to UNCTAD categories. This approach enables the identification of key development areas, leading export segments, and the assessment of future growth potential.

As shown in Figure 3, the category Telecommunications, computer and information services has consistently played a dominant role in Ukraine's digital services exports over the 2013–2023 period. Its share increased from 34% in 2013 to 71% in 2023. This dynamic is largely driven by the rapid development of Ukraine's IT sector, the high qualification of its workforce, and global demand for outsourcing and software solutions. The growth of this category reflects the predominance of high-tech services exports that do not require physical presence and are easily scalable in international markets.

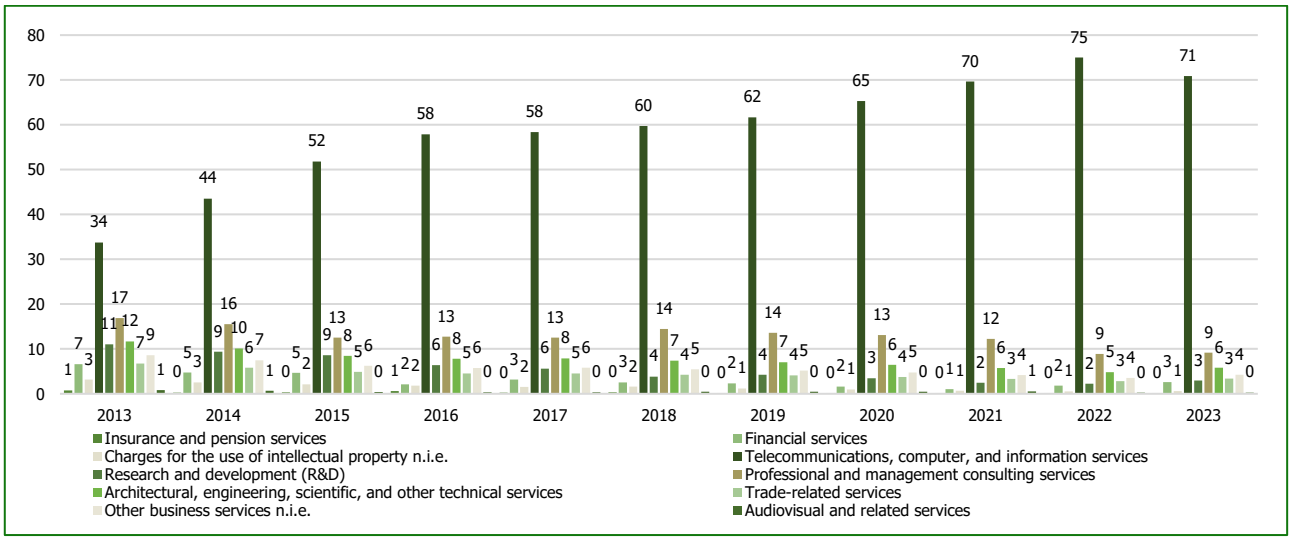


**Figure 3. Structure of Ukraine's Digital Services Exports by UNCTAD Categories, 2013–2023, %.** *(Source: prepared by the authors based on data compiled from UNCTADstat)*

Professional and management consulting services have held the second position, accounting for 9% of digital exports in 2023. Although smaller in scale, this segment demonstrates growing interest in intangible consulting, particularly in the fields of strategic management, business analytics, and enterprise digital transformation.


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The third-largest category in 2023 was Research and development (R&D), with a 6% share, indicating a growing role for scientific and applied research as well as increasing involvement of Ukrainian specialists in high-value-added projects. Meanwhile, other categories – such as audiovisual services, architectural services, and financial services – remain relatively modest in their contribution, though they may serve as niche areas for further development.

Thus, the structure of Ukraine's digital services exports reflects a high concentration in the IT sector, while also offering opportunities for diversification through the expansion of adjacent categories, particularly R&D and professional consulting.

In today's context of rapid digital transformation, international trade in services is undergoing profound structural changes. The growing role of digital communication channels and automation enables companies to provide services remotely, without the need for physical presence in target markets. Traditional services that once required direct interaction with clients can now be delivered through electronic networks, significantly expanding firms' access to global markets and reducing transaction costs.

Within this framework, the analysis of barriers hindering the development of digital trade in services becomes particularly relevant. One of the leading analytical tools in this field is the Digital Services Trade Restrictiveness Index (DSTRI), developed by the Organisation for Economic Co-operation and Development (OECD). The DSTRI measures regulatory obstacles that hinder or entirely prevent the provision of services via electronic networks, regardless of the sector in which companies operate. The index encompasses five key components: infrastructure and digital connectivity; conditions for conducting electronic transactions; functionality of electronic payment systems; protection of intellectual property rights; and other barriers to cross-border delivery of digital services.

For Ukraine, which seeks to strengthen its position in the global digital services market, the study of such barriers is of utmost importance. Identifying regulatory and infrastructural bottlenecks will enable more targeted policy measures aimed at removing restrictions and fostering an open digital environment.

Thus, an in-depth analysis of Ukraine's digital services export structure reveals a strong concentration in IT services, along with the gradual strengthening of related segments that contribute to the country's digital ecosystem. However, to fully understand the opportunities and limitations of digital trade development, it is essential to consider not only internal dynamics but also the external conditions under which the sector operates. These include political stability, economic tools, social capacity, and technological foundations. Therefore, the next analytical step is a PEST analysis of the external environment to identify both drivers and barriers to the further digitalization of Ukraine's foreign trade (Table 5).

**Table 5. PEST Analysis of the Export Potential of Ukraine's Digital Services.** *(Source: compiled by the authors based on (Hao et al., 2023; Xing, 2024)*

| Factor | Positive Impact | Negative Impact |
|---|---|---|
| Political | Active government support (Ministry of Digital Transformation, Diia, Diia City) | Military and geopolitical risks (war, regional instability) |
| | Ukraine's Digital Economy Strategy until 2030 | Regulatory instability (frequent legislative changes, bureaucracy) |
| | Cooperation with the EU on digitalization (EU4Digital, Digital Visa-Free Regime) | |
| | Participation in international digital trade agreements (e.g., DEPA) | |
| Economic | High foreign demand for Ukrainian digital services (U.S., EU, UK) | Economic volatility and currency devaluation (UAH) |
| | Competitive pricing for IT outsourcing services | Limited access to international financial instruments (investments, loans) |
| | Significant share of IT in GDP | High tax burden outside the Diia City regime |
| | Growth in the number of startups and venture investments | |
| Social | High level of education and professional qualifications in the digital sectors | Brain drains of highly skilled professionals (IT emigration) |
| | A large number of youths oriented toward IT and digital services | Demographic challenges (aging population, migration) |
| | Rapid adoption of digital financial services among the population (e.g., Monobank, digital payments) | Regional disparities in access to digital services |
| | High adaptability of the population to digital services (e.g., Diia, Privat24, Monobank) | |
| Technological | Rapid development of digital infrastructure (4G, upcoming 5G, data centers) | Uneven development of digital infrastructure in regions (limited high-speed internet in small towns) |
| | Proliferation of cloud technologies (AWS, Azure) | High cybersecurity risks (attacks, data breaches) |
| | Strong growth in FinTech and digital payment systems | Limited access to advanced technologies among small businesses |
| | Notable progress in e-government development (Diia, ProZorro) | |

Political factors play a decisive role in shaping a favourable environment for the development of digital services in Ukraine. Active state support for digitalization – particularly through initiatives of the Ministry of Digital Transformation and the launch of Diia City – is a notable positive. At the same time, military and political instability caused by the ongoing aggression of the Russian Federation remains the main barrier to strategic predictability in the sector.

From an economic perspective, Ukrainian digital services remain competitive in global markets due to their high quality, adaptability, and cost-effectiveness. However, macroeconomic instability, currency risks, and limited access to long-term financing hinder the expansion of export potential, especially for small and medium-sized enterprises.

Social factors also have a dual character. On the one hand, Ukraine retains a large pool of highly skilled IT professionals capable of generating world-class digital products. On the other hand, there is ongoing emigration of talent, particularly among the youth, which exacerbates the "brain drain" problem and deepens regional digital disparities.

In the technological dimension, Ukraine demonstrates strong momentum in digital transformation, particularly in large urban centers. The implementation of cloud solutions, the development of FinTech, and the rapid rollout of digital services are clear strengths. Nonetheless, challenges remain: uneven access to digital infrastructure in rural areas and growing cybersecurity threats require strategic attention.

In the short term, it is advisable to focus on strengthening cybersecurity and stabilizing business conditions through the digitalization of public services. In the medium term, efforts should aim to improve startup access to financing and ensure the balanced development of digital infrastructure across regions. The long-term priority should be to enhance Ukraine's international integration through participation in global digital trade initiatives and the development of competitive digital export ecosystems.

The analysis conducted confirms that digital services are gradually becoming one of the key components of Ukraine's external trade. The steady growth of exports, the positive dynamics of the trade balance, and the expansion of service categories indicate the systemic strengthening of the country's digital export capacity, even amid war and economic turbulence.

Particularly notable is the dominance of computer and information services, alongside the gradual increase in the share of professional consulting and R&D services. This suggests not only the growth in volume but also an increase in the quality and value-added of digital exports. At the same time, the structure of digital service imports reveals a relatively low level of external dependence, further highlighting Ukraine's surplus-oriented digital trade model.

Nevertheless, the results of the PEST analysis demonstrate that sustaining and enhancing this potential requires a targeted policy response. Alongside the strengths of Ukraine's digital sector, several challenges persist – from regional disparities to cybersecurity threats and insufficient access to affordable financing for innovative enterprises.

Thus, against the backdrop of a favourable trajectory in external digital trade, it is essential to focus not only on current achievements but also on creating resilient conditions for future growth. In this context, strategic actions to digitally integrate Ukraine into global trade networks, expand digital infrastructure, and stimulate high-tech exports become critically important.

## DISCUSSION

The above results indicate that Ukraine has made considerable progress in developing its digital services sector, emerging as one of the leading developing economies in the field of digital trade. Between 2011 and 2023, the country's digital trade surplus increased more than 100-fold, while digital services accounted for approximately 60% of total service exports. This dynamic underscores the growing importance of telecommunications, IT services, and professional consulting as the structural backbone of Ukraine's export portfolio. Notably, these developments have occurred despite ongoing geopolitical instability and the large-scale economic disruptions caused by war, highlighting a high level of digital resilience and adaptability supported by government initiatives such as Diia City and deepening cooperation with the European Union.

A key factor underpinning this resilience is the enabling role of digital financial services. The expansion of FinTech solutions has contributed to maintaining cross-border operability of digital exporters by facilitating international payments, mitigating financial frictions, and supporting business continuity under conditions of constrained access to traditional finance. In this respect, FinTech functions not only as a complementary service sector but also as an institutional backbone of digital trade, reinforcing Ukraine's integration into global digital value chains. This interpretation aligns with Cumming et al. (2023), who emphasize that platform-based financial technologies and data-driven financial infrastructures enhance firms' ability to


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participate in transnational production and value creation networks by reducing information asymmetries and transaction costs.

Compared to earlier studies, the findings are consistent with global evidence highlighting the central role of digitalization in export growth. Similar to Wajda-Lichy et al. (2022) and Zheng and Sun (2023), the results confirm that investment in digital infrastructure and the presence of a supportive regulatory environment significantly improve digital export performance. However, unlike many developed economies examined in the literature, Ukraine's progress has been achieved under conditions of macroeconomic volatility and external shocks, reinforcing the argument of Kerner and Kitsing (2023) regarding the superior adaptability of firms operating in digitally delivered services.

Importantly, the observed expansion reflects not only quantitative growth but also a qualitative transformation of exports. The increasing share of high-value-added IT, professional consulting, and R&D-related services suggests an upgrading of Ukraine's export structure toward more knowledge-intensive activities. Financial technologies indirectly support this shift by improving access to innovation financing, optimizing capital allocation, and enabling scalable service delivery models, thereby reinforcing the structural modernization of digital exports.

Nevertheless, several limitations should be acknowledged. The analysis relies primarily on aggregated UNCTADstat data and official classifications, which may not fully capture firm-level heterogeneity or informal digital transactions. In addition, the absence of a unified international methodology for distinguishing between digitally delivered and digitally enabled services introduces potential classification biases. Finally, while the study incorporates a PEST analysis, it does not employ econometric modeling that could more rigorously identify causal relationships between FinTech development, digital infrastructure, and export performance.

Overall, Ukraine's digital services sector has become a critical driver of foreign trade performance and economic resilience. Sustaining this trajectory will require addressing regional infrastructure disparities, strengthening cybersecurity, and further expanding access to FinTech-enabled financing for innovative firms. Future research should incorporate micro-level data and explicitly examine the long-term role of financial technologies in shaping Ukraine's integration into the evolving global digital trade ecosystem.

## CONCLUSIONS

This study has demonstrated that digital services have become a structural driver of Ukraine's external trade and an increasingly significant component of its economic resilience. The analysis of trade flows from 2011 to 2023 revealed not only a more than 100-fold increase in the digital trade surplus but also a substantial rise in the share of digital services in total service exports, reaching 60% in 2023. These dynamics underscore the central role of telecommunications, IT, and professional consulting as the dominant segments of Ukraine's digital exports, while emerging contributions from R&D and creative services indicate potential for future diversification.

The findings also highlight Ukraine's strong digital adaptability despite geopolitical instability and war-related disruptions. Government initiatives such as Diia City and regulatory strategies aligned with EU integration have fostered an enabling environment for digital exporters. At the same time, structural constraints – including uneven regional infrastructure development, cybersecurity vulnerabilities, talent outmigration, and limited access to finance – pose persistent barriers to sustaining growth.

In this context, the development of financial technologies plays a complementary role as an instrument of structural export modernization, facilitating the scaling of digitally delivered services, reducing transaction costs, and strengthening Ukraine's integration into global digital value chains as part of its broader digital trade integration trajectory.

Overall, the study confirms that digital services not only enhance Ukraine's competitiveness in global markets but also provide a foundation for building a surplus-oriented, innovation-driven trade model. Future research should deepen the exploration of firm-level dynamics, assess the effectiveness of regulatory reforms, and examine the long-term impacts of Ukraine's digital trade integration on sustainable economic development. In this regard, it is of particular scientific interest to assess the long-term effectiveness of public policies such as Diia City and other digital integration initiatives by analyzing their real impact on export performance and innovation potential. In addition, a comparative analysis involving other emerging economies can provide valuable insights into best practices in regulatory harmonization, digital infrastructure development, and promoting sustainable growth in digital exports. Finally, future work should undoubtedly include an analysis of new digital trade models, including artificial intelligence-based services and platform-based ecosystems, considering the changing nature of the global digital economy.

## ADDITIONAL INFORMATION

### AUTHOR CONTRIBUTIONS

*All authors have contributed equally.*

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### CONFLICT OF INTEREST

*The Authors declare that there is no conflict of interest.*

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## МАКРОЕКОНОМІЧНІ ТА ФІНАНСОВІ АСПЕКТИ ТОРГІВЛІ ЦИФРОВИМИ ПОСЛУГАМИ УКРАЇНИ: ТАКСОНОМІЯ, ІНСТИТУЦІЙНЕ СЕРЕДОВИЩЕ ТА ГЛОБАЛЬНА ІНТЕГРАЦІЯ

У статті здійснено комплексний аналіз структурних, динамічних та інституційних характеристик торгівлі цифровими послугами України в контексті глобальної цифрової трансформації й еволюції міжнародних фінансових ринків. З огляду на зростання ролі нематеріальних активів, цифрово наданих послуг і фінансових технологій у глобальних економічних відносинах, метою дослідження є оцінка експортного потенціалу сектора цифрових послуг України та ідентифікація ключових макрофінансових, регуляторних і інституційних детермінант його розвитку.

Методологічна основа дослідження поєднує загальновизнані міжнародні статистичні класифікації (EBOPS, CPC, ISIC) з описовим і порівняльним аналізом, аналізом динамічних рядів і PEST-аналізом, що забезпечує аналітичну узгодженість, міжкраїнну порівнюваність і релевантність для макроекономічної та фінансової політики. Емпіричний аналіз базується на даних UNCTADstat за період 2011–2023 рр. і зосереджується на цифрово наданих послугах як найбільш вимірюваному компоненті цифрової торгівлі.

Отримані результати засвідчують більш ніж стократне зростання позитивного сальдо цифрової торгівлі України протягом досліджуваного періоду, що супроводжувалося суттєвою структурною перебудовою національного експортного портфеля. Станом на 2023 рік цифрово надані послуги становили близько 60% загального експорту послуг, що відображає домінування телекомунікаційних, інформаційно-технологічних і професійно-консультаційних послуг. Зазначені тенденції свідчать про поглиблення інтеграції України в глобальні цифрові ланцюги створення вартості й зростання ролі цифрової й фінансової інфраструктури в забезпеченні експортної стійкості. Незважаючи на тривалі геополітичні шоки, макроекономічну волатильність і фінансові обмеження, зумовлені війною, Україна демонструє високий рівень цифрової та фінансової адаптивності, що підтримується цілеспрямованою державною політикою, регуляторними реформами, розвитком екосистем електронного врядування та фінансових технологій, а також інституційною конвергенцією з Європейським Союзом.

Дослідження підтверджує, що цифрові послуги перетворилися на структурний драйвер зростання експорту, стійкості платіжного балансу та інноваційно орієнтованої конкурентоспроможності. Науковий внесок полягає в уточненні класифікаційних і макрофінансових підходів до інтерпретації цифрово наданих послуг, а практичне значення пов'язане зі зміцненням фінансових інституцій, підвищенням регуляторної узгодженості, розширенням доступу до фінансування та поглибленням участі України в глобальних цифрових і фінансових ринках.

**Ключові слова:** експорт цифрових послуг, розвиток FinTech, фінансові послуги, стійкість, платіжний баланс, цифрова економіка, фінансова інтеграція, глобальні ланцюги створення вартості, регуляторні обмеження

**JEL Класифікація:** F14, F36, L86, O33, O57, F63


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