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Export of ICT services as a factor of economic development in the Baltic States: lessons for Ukraine

Abstract. Introduction*. The export of information and communication technology (ICT) services has become a critical driver of national economic growth, particularly for small, open economies. While the Baltic States – Lithuania, Latvia, and Estonia – are often cited as examples of successful digital transformation, Ukraine has emerged as an important exporter of ICT service, demonstrating higher absolute export volumes than any individual Baltic country. However, these countries' achievements are based on fundamentally different development models, creating an opportunity for comparative analysis and the identification of transferable best practices.*

Purpose. *This study aims to analyze the experience of the Baltic States in developing ICT service exports as an economic growth factor and to identify opportunities for adapting this model to Ukraine's national context.*

Results. *The dynamics of ICT services exports, the structure of the ICT industry, the institutional environment, and innovative activity were analyzed in Lithuania, Latvia, Estonia, and Ukraine. Ukraine's ICT export performance is primarily driven by large-scale outsourcing. This is supported by an abundant pool of highly skilled professionals, competitive pricing, and advantageous geographical positioning. In contrast, the Baltic States' model centers on developing innovative product solutions. This model is enabled by institutional excellence, robust start-up ecosystems, access to venture capital, and a strategic focus on high-tech niches. Two distinct but effective growth paths were identified: (1) the Ukrainian large-scale outsourcing model and (2) the Baltic product innovation model. The research revealed substantial potential for mutual learning. Ukraine could benefit from the experience of the Baltic States in creating and scaling product-based companies, and the Baltic States could adopt Ukrainian expertise in expanding IT outsourcing services.*

Conclusions. *The findings emphasize the importance of accounting for specific institutional, human capital, and market conditions in national digital development strategies. Proposed areas of future research include analyzing the impact of the war on Ukraine's IT transformation, assessing the feasibility of establishing a Ukrainian-Baltic technological partnership, exploring the replicability of the identified models in other Central and Eastern European countries, and evaluating the long-term resilience of ICT sector strategies amid global technological shifts. These results provide valuable guidance for policymakers, industry stakeholders, and international partners in developing sustainable and competitive ICT policies.*

Keywords: *ICT services; export; economic development; Baltic states; Ukraine; information technology sector; foreign trade relations.*

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Експорт ІКТ-послуг як чинник економічного розвитку країн Балтії: досвід для України

Анотація. *Стаття присвячена порівняльному аналізу експорту послуг інформаційно-комунікаційних технологій (ІКТ) в Україні та країнах Балтії з метою виявлення ефективних моделей цифрового розвитку та можливостей взаємного запозичення досвіду. Встановлено, що Україна демонструє значно вищі обсяги експорту ІКТ-послуг порівняно з Естонією, Латвією та Литвою. Виокремлено дві відмінні моделі розвитку: українська – орієнтована на масштабний ІТ-аутсорсинг із використанням значного кадрового потенціалу та конкурентних цін і балтійська – зосереджена на створенні інноваційних продуктів, що спираються на інституційну досконалість, доступ до венчурного капіталу та роботу у вузьких високотехнологічних нішах. Здійснено оцінку сильних сторін кожної моделі та визначено потенційні напрями співпраці: для України – розвиток продуктових компаній за зразком балтійських країн, для країн Балтії – масштабування ІТ-аутсорсингових практик, успішно реалізованих в Україні. Наголошено на важливості врахування національних економічних, інституційних та соціокультурних особливостей під час розроблення стратегій цифрової трансформації. Окреслено перспективи подальших досліджень: аналіз впливу війни на українську ІТ-галузь, вивчення можливостей формування спільного українсько-балтійського технологічного простору та оцінка потенціалу адаптації виявлених моделей у країнах Центрально-Східної Європи.*

Ключові слова*: ІКТ-послуги; експорт; економічний розвиток; країни Балтії; Україна; інформаційно-технологічна сфера; зовнішньоторговельні відносини.*

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Formulation of the problem. In the current era of global economic digitization, information and communication technologies (ICT) are pivotal drivers of economic growth and determinants of national competitiveness in the international market. Exporting ICT services is particularly important because it generates foreign currency inflows, creates high-value jobs, and fosters an innovation-oriented economy.

Notably, the Baltic States (Estonia, Latvia, and Lithuania) have built dynamic ICT services sectors and established themselves as leaders of the digital economy in Europe within a relatively short period following the restoration of independence. For Ukraine, which is striving to integrate into the European economic area and diversify its export structure, developing the ICT services sector is a strategic priority.

The Baltic States' experience could provide a useful benchmark for developing an effective strategy to promote Ukraine's ICT services exports. Such a strategy would foster economic growth and provide a solid foundation for developing strategic policy recommendations that harness the ICT sector's potential as a catalyst for economic recovery and modernization.

Ukraine's urgent need to modernize its national economy and identify new growth drivers in the context of martial law and subsequent post-war reconstruction further reinforces the importance of addressing this issue.

Analysis of recent research and publications. The role of the ICT sector as a driver of economic development has been the focus of extensive research by domestic and international scholars. The theoretical underpinnings of ICT's impact on economic development are articulated in the works of P. Drucker [1], M. Castells [2], and J. Stiglitz and B. Greenwald [3], who substantiated the concepts of the information society and the knowledge-based economy.

Among Ukrainian scholars, substantial contributions to the study of Ukraine's ICT sector have been made by H. Aleksejevsjka and M. Chajkovsjka [4], who examined the trends and strategic transformation of the ICT sector in Ukraine; I. Makarchuk and I. Fedulova, who analyzed the IT industry within the structure of the national economy; and V. Khaustova, O. Reshetnjak, M. Khaustov and V. Zinchenko, who assessed Ukraine's ICT sector development through international indices and rankings.

Numerous foreign scholars have explored the experience of the Baltic States in developing ICT. For example, M. Himma-Kadakas and R. Kõuts-Klemm analyzed the Estonian model of digital transformation; R. Kerner examined Estonian companies engaged in ICT services exports; V. Koutsogeorgopoulou focused on Lithuania's experience; and Saranya Kanna Baskar investigated Latvia's achievements in this area.

Despite the extensive research on this topic, a comprehensive comparative analysis of the Baltic States' ICT services export strategies adapted to Ukraine's specific economic and institutional context remains understudied.

Formulation of research goals. The primary goal of this research is to analyze the experience of the Baltic States in developing ICT services exports as a factor of economic growth and to identify opportunities for adapting it to Ukraine's national context.

Outline of the main research material. In recent years, the digital economy and the information and communication technology (ICT) sector in Central and Eastern Europe have grown substantially and undergone significant transformation. Trade in ICT goods and services is a key indicator of the degree to which Central and Eastern European economies are integrated and internationalized with external partners. Only countries that actively engage in global trade and avoid protecting narrow domestic interests can access the technologies and capital necessary for growth investments.

Between 2005 and 2021, exports of ICT services per capita increased more than sixfold in all Central and Eastern European economies, with Estonia emerging as the regional leader. This position is attributable not only to the broad scope of its ICT sector, but also to its relatively small population size. Over the same period, Western European countries recorded a threefold increase in ICT services exports.

The Baltic States have demonstrated outstanding achievements in developing their ICT sectors, establishing themselves as frontrunners in Europe's digital transformation. Each country has pursued its own development trajectory, achieving notable successes in various areas of ICT advancement.

In the Baltic context, the implementation of comprehensive digital transformation policies, including e-government mechanisms, a favorable regulatory and tax framework for technology start-ups, and initiatives to support venture capital financing, has fostered an ecosystem integrating product-oriented companies and service providers. This hybrid model facilitates the expansion of ICT service exports and mitigates vulnerability to cyclical external shocks by increasing the share of product-based exports and diversifying export markets geographically.

The dynamics of ICT services exports in the Baltic States have been generally positive since 2010 (Fig. 1). Since 2020, all three countries have significantly increased their export volumes. Estonia led with ICT services exports totaling $3,5 billion in 2024, followed by Lithuania with $2,8 billion. Latvia recorded the lowest volume at $1,5 billion.

In contrast, Ukraine's performance significantly exceeded that of the Baltic States. Until 2022, Ukraine increased its ICT services exports every year, reaching a record USD 7,5 billion in 2022 – surpassing the combined exports of all three Baltic states that year. Despite the adverse impact of the war and the resulting contraction in export volumes, Ukraine's ICT services exports amounted to USD 6,6 billion in 2024 – nearly double that of Estonia, the Baltic region's leader in ICT services exports (USD 3,5 billion) [12].

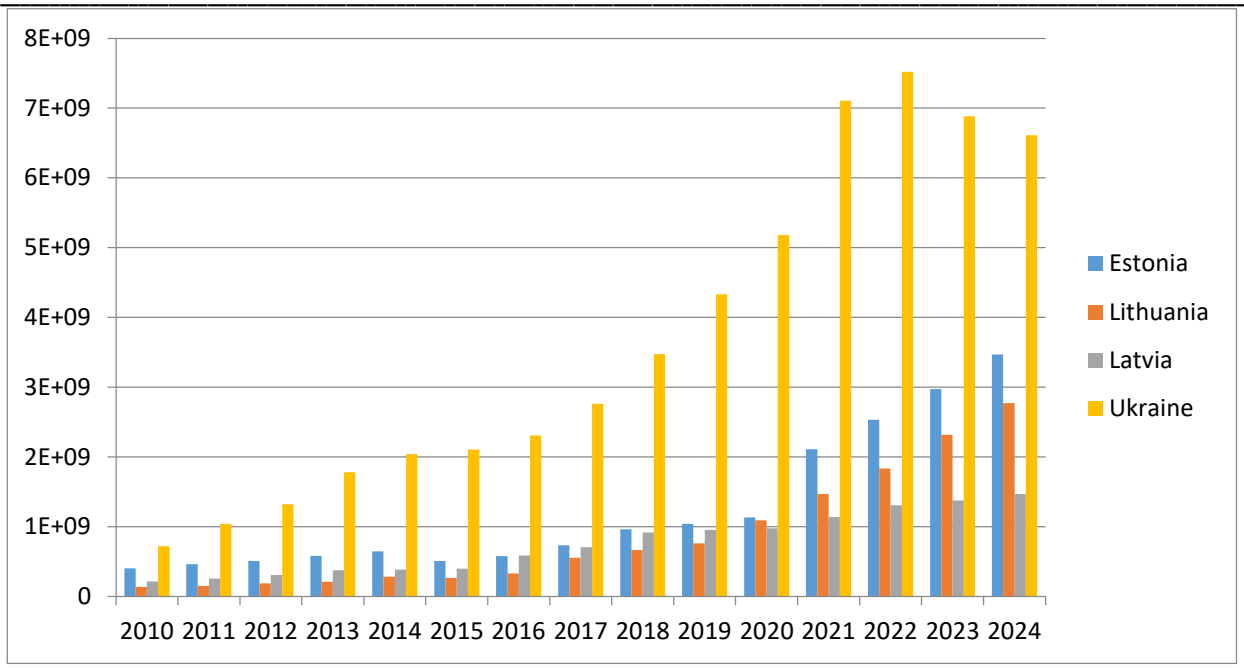

Figure 1 – **Dynamics of ICT Services Exports of the Baltic States and Ukraine in 2010–2024, USD**

Source: developed by the author using [12]

The share of ICT services in Ukraine's total service exports grew from 3,9% in 2010 to 38,4% in 2024. For comparison, Estonia – the Baltic leader in this indicator – saw growth from 8,5% in 2010 to 25,7% in 2024 (Fig. 2). Currently, Latvia ranks second among the Baltic states, with ICT services accounting for 17,6% of total exports in 2024. Lithuania follows with 11,5% [13].

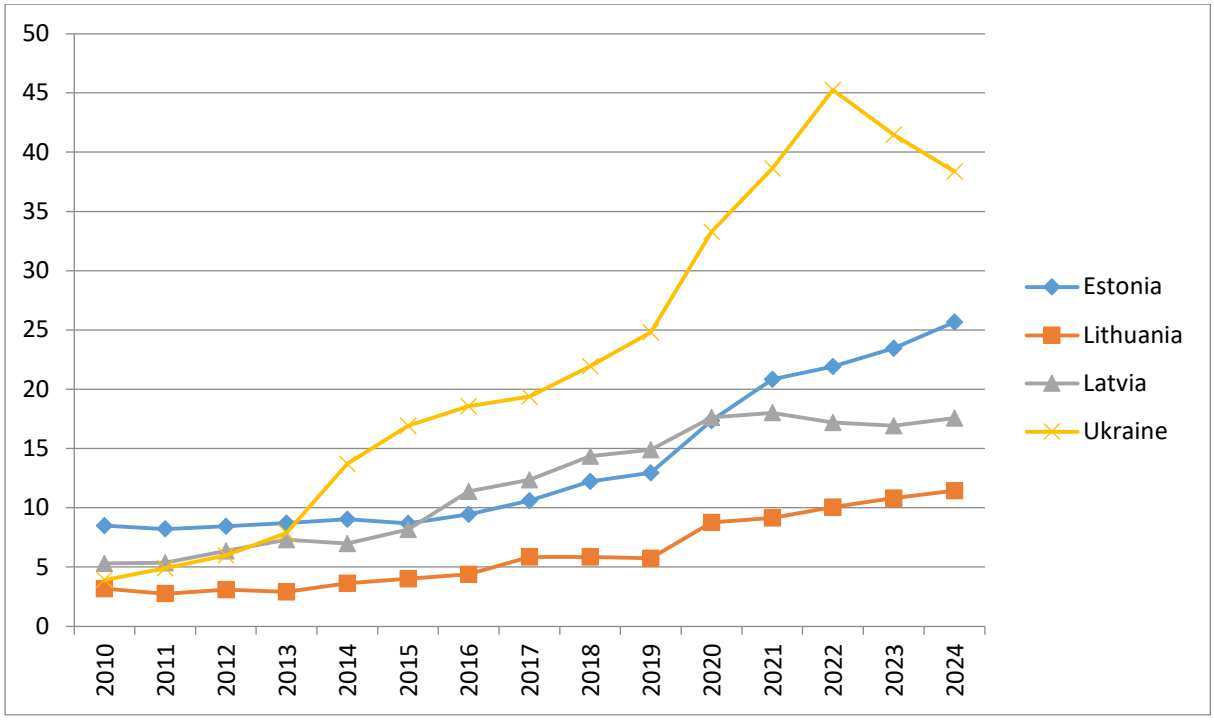

Figure 2 – **ICT service exports of the Baltic States and Ukraine in 2010-2024, % of service exports**

Source: developed by the author using [13]

In terms of service composition, the Baltic States' ICT exports are characterized by substantial diversification. These exports encompass software development, software publishing, IT consulting, data processing, cloud computing, and telecommunications solutions. Notably, product-oriented companies coexist with B2B outsourcing

firms that are integrated into pan-European value chains, particularly with the Nordic countries [14; 15].

In contrast, Ukraine's ICT services exports predominantly consist of outsourcing. Most exports consist of custom software development, testing, DevOps services, R&D outsourcing, and freelance projects. Geographically, exports are concentrated primarily in the United States, the European Union, and the United Kingdom. This results in high dependence on English-speaking segments of the global market [16; 17].

From an organizational perspective, the Baltic ICT sector consists of many small and medium-sized innovative enterprises and successful start-ups, including "unicorn" projects that are supported by state-backed incubation programs and venture financing mechanisms. In Ukraine, export volumes are mainly generated by numerous small and medium-sized service companies, complemented by a large community of freelance specialists concentrated in key IT clusters such as Kyiv, Lviv, Kharkiv, and Odesa. While this model ensures substantial foreign currency inflows, it also makes the sector vulnerable to fluctuations in external demand.

The institutional and regulatory environments likewise display significant differences. The Baltic States implement comprehensive digital policies, including e-government systems, digital identification mechanisms, tax incentives for technology companies, and streamlined market entry frameworks (e.g., Estonia's e-Governance and e-Residency programs). In Ukraine, despite active industry associations and digital transformation initiatives, institutional support is fragmented, and infrastructure and regulatory development is uneven across regions.

In summary, the ICT services exports of the Baltic States demonstrate a more diversified and innovation-driven structure, whereas Ukraine's exports are highly specialized in-service outsourcing (Table 1). To enhance the resilience and competitiveness of Ukraine's ICT exports, it would be wise to draw on the Baltic States' experience developing product-oriented companies, fostering innovation clusters, and diversifying export markets.

Table 1 **Comparative characteristics of ICT services exports: Ukraine and the Baltic States**

Indicator	Ukraine	Estonia	Latvia	Lithuania
Main types of services	Outsourcing: custom software development, testing, DevOps, R&D outsourcing, freelance services	Software publishing, IT consulting, cloud services, telecom solutions, Fintech, cybersecurity, e-Governance solutions	Software development, integration solutions, business system support, telecom services, software outsourcing	Software development, Fintech, cybersecurity, data centers, gaming industry, laser technologies, life sciences, ICT component manufacturing
Organizational structure of the sector	Predominantly service-oriented SMEs and freelance community; concentrated in IT clusters (Kyiv, Lviv, Kharkiv, Odesa)	SMEs and start-ups (including "unicorns"); integration into Nordic value chains	SMEs, technological hubs; EU market-oriented	SMEs, start-ups, Fintech ecosystems
Geographical orientation of exports	USA, EU, United Kingdom	EU (especially Nordic countries), USA	EU, United Kingdom	EU, USA
Institutional support	Industry associations, digital transformation initiatives (Diia), yet fragmented institutional policy	Comprehensive digital strategy, e-Governance, e-Residency, tax incentives	State programs for IT support, integration into the EU digital market	Innovation development programs, tax incentives for start-ups

Source: developed by the author using [14-19]

Adapting ICT export development practices from the Baltic States requires considering Ukraine's national economy's specific features. Ukraine has significant scale advantages, including a much larger domestic market and greater human resources compared to the Baltic States. This creates potential for domestic scaling of ICT capacities and the formation of vertically integrated value chains [17].

Ukraine's location at the intersection of European and Asian trade routes creates opportunities for developing transit-based digital services and regional data hubs. The country's educational foundation, rooted in strong mathematical and technical traditions, gives it a competitive advantage in developing a highly skilled workforce for the ICT industry. In 2024, the number of specialists employed in Ukraine's IT sector was estimated at approximately 258,200 people. Between 2019 and 2024, Ukraine's higher education system produced 180,400 IT-related graduates. This number increased 2.5 times over the six-year period. Wage levels in the IT sector

are significantly higher than the national average. According to official statistics and professional surveys, average IT salaries substantially exceed the country's mean wage.

At the regional level, it is advisable to establish specialized ICT clusters with a clear functional focus (e.g., Kyiv: FinTech and GovTech; Lviv: outsourcing and software development; Kharkiv: industrial automation; Dnipro: AgriTech and logistics IT solutions). This approach combines scaling potential with deep specialization and facilitates technology transfer to the industrial and service sectors.

Implementing Baltic practices should be done in stages. First, there should be pilot projects in selected regions and niches. Then, instruments should be adapted to the local legal and cultural context. Next, there should be active international cooperation, such as exchange programs and joint R&D. Finally, there should be a monitoring and evaluation system to ensure timely policy adjustments. Useful reference points include e-Governance tools, models for encouraging product-oriented startups, and mechanisms for supporting the venture ecosystem that have been successfully implemented in the Baltic States.

The cooperation potential between these models lies in their synergy. Ukraine can adopt the Baltic States' mechanisms for developing product companies and innovation promotion policies, while Baltic partners may be interested in Ukraine's practices for scaling outsourcing and human resources. Promising formats for interaction include joint R&D projects, personnel exchanges, cross-border tech hubs, and coordinated entry into third-country markets (Asia, Africa, Latin America).

Conclusions. The study revealed that Ukraine's ICT service export indicators are significantly higher than those of the Baltic States. Two effectives, yet fundamentally different, development models were identified: Ukraine's model of large-scale outsourcing and the Baltic States' model of innovative product solutions.

Ukraine's success factors include a substantial pool of talented professionals, competitive pricing, and geographical advantages. In contrast, the Baltic States' success is based on institutional excellence, access to venture capital, and a focus on high-tech niches.

The analysis revealed substantial potential for mutual learning. Ukraine could adopt the Baltic States' experience in developing product-based companies, and the Baltic States could benefit from Ukrainian practices in scaling IT outsourcing. The study's results underscore the importance of considering national specificities when shaping digital development strategies.

Future research prospects include analyzing the impact of the war on Ukraine's ICT transformation, exploring opportunities for creating a Ukrainian–Baltic technological space, examining the potential for replicating the identified models in other Central and Eastern European countries, and assessing the long-term resilience of different ICT sector development strategies in the context of changes in the global technological landscape.

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