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Foreign Trade of Ukraine's ICT Sector: state and prospects

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Abstract: The article analyses the dynamics, features and structure of foreign trade of the ICT sector of Ukraine in 2008-2022, focusing on the exports and imports of ICT goods and services. It has been determined that the commodity structure of Ukraine's ICT sector exports is dominated by communication equipment and consumer electronics, and that Ukraine mainly exported ICT goods to European countries, in particular to Hungary, Russia, Moldova, and Austria. At the same time, Ukraine imported the most communication equipment, as well as computer and peripheral equipment, mainly from China and Vietnam. The study of dynamics showed a long-term trend of decreasing exports and increasing imports of ICT goods by Ukraine. Additionally, the trade balance and indices of international trade in ICT goods showed a low level of specialization of Ukraine in the production and export of ICT goods. Having examined the structure of Ukraine's ICT services exports, we found that computer services predominate. The main importers of ICT services from Ukraine include the United States, the United Kingdom, Switzerland, Malta, and other countries. In addition, it has been determined that technology companies from countries that import ICT services from Ukraine have gradually opened their own R&D centres in Ukraine. The study of the dynamics of foreign trade in ICT services during 2008-2022 showed a constant upward trend in the volume and share of ICT services in Ukraine's exports of services. In addition, the calculation of the trade balance and international trade indices for 2008-2022 showed a high level of specialization and competitiveness of ICT services in the Ukrainian economy. The article identifies the main factors and reasons that influenced the trends in foreign trade of the ICT sector of Ukraine. Finally, three possible scenarios for the development of Ukraine's ICT sector over the next few years were outlined.

Keywords: ICT sector, ICT goods, ICT services, foreign trade, competitive advantages, international competitiveness.

1. Introduction

Ukraine has become a significant player in the global Information and Communication Technology (ICT) market, including software development, IT services, cybersecurity, and telecommunications, with a growing community of skilled professionals and a conducive business environment. The demand for skilled IT professionals has surged, positioning Ukraine at the forefront of global outsourcing and software development markets. Moreover, Ukraine's reputation for educating and training highly skilled and innovative IT specialists facilitates successful

collaboration with international tech giants. Hence, researching Ukraine's foreign trade in ICT goods and services is essential for identifying investment opportunities, supporting economic growth, as well as negotiating favourable trade agreements. Therefore, it is essential that policymakers and investors pay close attention to this sector's trends and developments.

2. Object and subject of research

The object of the research is the commodity and geographical structure of Ukraine's exports and imports of ICT goods and ICT services in 2008-2022. The subject of the research is the trends, changes and challenges faced by Ukraine's ICT sector in the global IT market.

3. Purpose of research

The purpose of the article is to conduct a dynamic analysis of the commodity and geographical structure of Ukraine's exports and imports of ICT goods and ICT services during 2008-2022 in order to identify: (1) trends and patterns in Ukraine's foreign trade in ICT goods and services; (2) main reasons for trends and patterns of Ukraine's foreign trade in ICT goods and services; (3) potential areas for ICT goods and services foreign trade development; and (4) opportunities for increasing foreign trade volumes in the international IT market.

4. Literature analysis

The interest of the scientific community in the research and analysis of Ukraine's ICT sector in the global IT market in recent years is presented in the works of Melnyk T. M. and Zavhorodnya E. O. [1-2], Makarchuk I. and Fedulova I. [3], Rudenko I. [4], Kudyrko L. P. and Shevchenko D. S. [5], Balashova V. [6], Prodanova, L. V. and Tomchuk, O. V. [7], Gren, R. [8], and others, which include studies of the workforce, business environment, innovation, market share, cybersecurity capabilities, and the impact of external factors.

Common to the above-mentioned scientific works is a general overview of Ukraine's ICT sector foreign trade (as part of a comprehensive study of ICT sector state and prospects) with a predominant focus on ICT services but without a detailed consideration of the hardware segment. However, a detailed analysis of the commodity structure of Ukraine's ICT sector's foreign trade may be important as: (1) understanding the strengths and weaknesses of different product groups in the ICT sector is crucial for policy makers and industry stakeholders; (2) it helps to identify trends in market demand, resource allocation, global competitiveness, skills development, policy formulation, focus on innovation and research, etc.; (3) by analysing individual product groups, Ukraine can strategically position itself in the global IT market, adapt educational and training programmes, and set R&D priorities; (4) understanding the structure of foreign trade in the Ukraine's ICT sector facilitates identifying potential partners and markets for cooperation.

5. Research methods

To conduct the study, we used the following research methods: statistical analysis, trade balance and trade indices, commodity and geographical distribution analysis, graphic (for visual representation of the results of the research.

6. Research results

Despite the full-scale war in Ukraine, the ICT sector remains a crucial contributor to the country's economy. With 242 thousand IT professionals in Ukraine and 65 thousand IT professionals abroad, Ukraine's ICT sector is a significant source of employment for many Ukrainians [9]. Additionally, the total economic effect of the ICT sector in Ukraine is 12.74 bln. USD, with a turnover of 7.96 bln.

USD, contributing to gross value added is 5.5 bln. USD. Regardless the challenging environment, in 2022, representatives of Ukraine's ICT sector paid 585 mln. USD in taxes to the state budget and attracted 238 mln. USD in FDI. Finally, even in the midst of the war, the share of ICT in Ukraine's GDP remains notable at 4.9%, demonstrating its resilience and ability to maintain a substantial footprint within the broader economic landscape.

Defining a structural metric for the study of foreign trade in ICT products is indispensable for informed decision-making, policy formulation, and strategic planning in the context of a rapidly evolving global digital economy for several reasons (Table 1). Firstly, it allows for a standardized classification of ICT products, which facilitates the comparison of data across countries and regions. The Harmonized System (HS) provides a common language for trade statistics, which ensures that countries use the same criteria to classify goods. Secondly, a structural metric based on the HS enables a more detailed analysis of ICT trade flows, as HS system provides a hierarchical structure that allows for the disaggregation of trade data into different categories and subcategories, which makes it possible to identify specific products that are driving trade growth or decline, as well as to analyse trends in different segments of the ICT market. Thirdly, a structural metric based on the Harmonized System can help policymakers to design more effective trade policies as well as identify areas where Ukraine is importing more than it is exporting and take measures to address the trade imbalance.

Table 1. HS-Based Structural Metric for Foreign Trade in ICT Goods

Group Title	Group General Description	HS Codes	Number of HS Codes
Computers & peripheral equipment	This group includes computers, laptops, monitors, printers, scanners, and other peripheral devices that are used to input, process, and output data.	844331; 844332; 847050; 847130; 847141; 847149; 847150; 847160; 847170; 847180; 847190; 847290; 847330; 847340; 847350; 852842; 852852.	17
Communication equipment	This group includes devices that enable communication between people or machines, such as telephones, communication, transmission & signalling apparatus etc.	851711; 851712; 851718; 851761; 851762; 851769; 851770; 852550; 852560; 853110.	10
Consumer electronic equipment	This group includes electronic devices, such as microphones, loudspeakers, headphones and earphones, amplifiers, recording or reproducing apparatus, projectors, video game consoles and machines etc.	851810; 851821; 851822; 851829; 851830; 851840; 851850; 851890; 851920; 851930; 851950; 851981; 851989; 852110; 852190; 852210; 852290; 852580; 852712; 852713; 852719; 852721; 852729; 852791; 852792; 852799; 852849; 852859; 852862; 852869; 852871; 852872; 852873; 950450.	34
Electronic components	This group includes individual electronic parts and components that are used to build electronic devices or systems, such as magnetic media, semiconductor media circuits, tubes, electronic integrated circuits etc.	852321; 852352; 853400; 854011; 854012; 854020; 854040; 854060; 854071; 854079; 854081; 854089; 854091; 854099; 854110; 854121; 854129; 854130; 854140; 854150; 854160; 854190; 854231; 854232; 854233; 854239; 854290.	27
Miscellaneous	This group includes other ICT products that do not fit into the above categories.	852351; 852359; 852380; 852910; 852990; 901320.	6

Source: composed by authors based on Harmonized System (2024) and UNCTADstat (2024)

The following product groups prevailed in the commodity structure of Ukraine's ICT goods exports in 2008-2022: (Figure 1): communication equipment – 2 702 mln. USD (37% of total ICT goods exports), consumer electronic equipment – 2 457 mln. USD (34%), electronic components – 703 mln. USD (10%), as well as computers and peripheral equipment – 460 mln. USD (6%). In terms of the commodity structure of Ukraine's ICT goods imports in 2008-2022, the most imported groups were communication equipment – 13 190 mln. USD (33% of total ICT goods imports), computers and peripheral equipment – 8 705 mln. USD (23%), electronic components – 8 320 mln. USD (22%) and consumer electronic equipment – 6 197 mln. USD (17%). Additionally, on average, Ukraine's exports of ICT goods declined by 1% during 2008-2022, while imports grew by 9%.

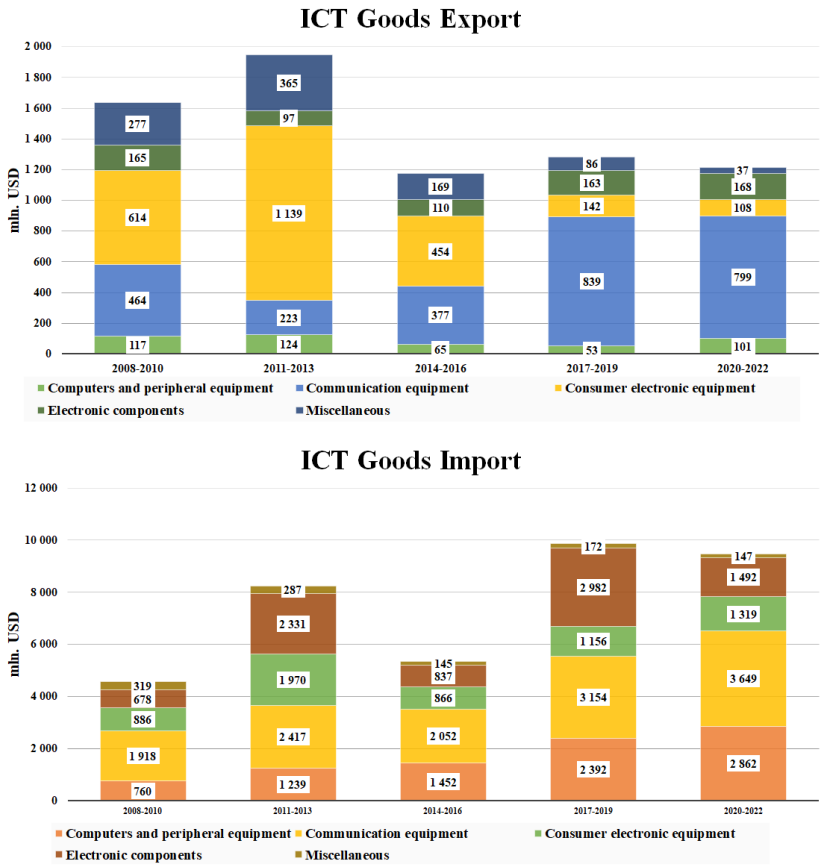

Figure 1. Dynamics in Ukraine's ICT Goods Foreign Trade in 2008-2022.
Source: developed by authors based on UNCTADstat (2024) and Trade Map (2024)
* presented latest available data

It should be noted that the following product groups dominated in Ukraine's export of ICT goods in 2008-2022:

1) 8528 (Monitors and projectors) – 2 026,3 mln. USD (share of 0,13% in world's exports of product group);
2) 8525 (Transmission apparatus for radio-broadcasting or television) – 504,45 mln. USD (0,076%);
3) 8531 (Electric sound or visual signalling apparatus) – 428,40 mln. USD (0,14%);
4) 8518 (Microphones and stands therefor) – 272,89 mln. USD (0,05%);
5) 8471 (Automatic data-processing machines and units thereof) – 234,89 mln. USD (0,0046%);
6) 8541 (Semiconductor devices) – 209,58 mln. USD (0,012%);
7) 8517 (Telephone sets, incl. smartphones and other telephones for cellular networks) – 190,45 mln. USD (0,027%).

As can be seen in Figure 2, despite significant achievements, Ukraine failed to form a strong and competitive segment of ICT equipment production (the share of ICT in total exports of goods was mostly less than 1% in 2008-2022). Generally, the failure of Ukraine to develop the production and

export of ICT goods is due to a combination of factors, many of which are directly related to Russia's war in Ukraine, as the ongoing military aggression has created a climate of political instability, disrupted supply chains, led to a brain drain, caused a loss of markets, reduced investment, and caused infrastructure damage. Additionally, Ukraine had a non-systematic approach to the development of the information society, which led to an increase in the gap in socio-economic, innovation, technological and digital development compared to the developed countries of the world, and also had a negative impact on the competitiveness of the domestic IT sector at the international level, which caused an urgent need to develop a comprehensive national strategy for the development of the information society.

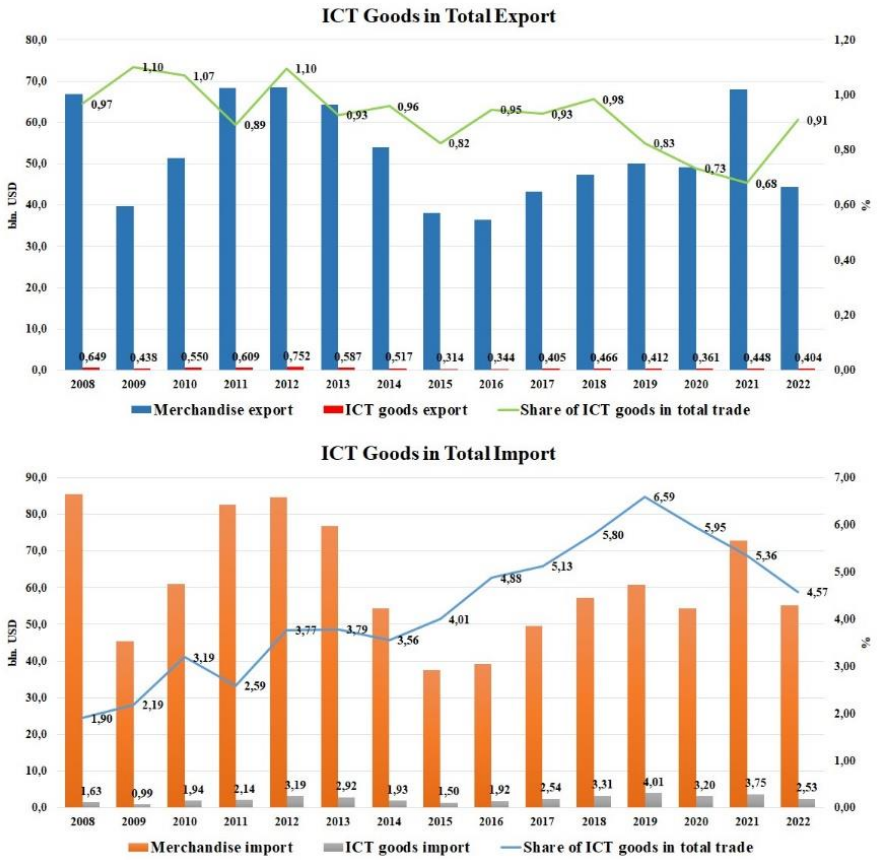

Figure 2. ICT Goods Share in Ukraine's Foreign Trade in Merchandise, 2008-2022.
Source: developed by authors based on UNCTADstat (2024) and Trade Map (2024)
* presented latest available data

On the other hand, during 2008-2022, there was a noticeable increase in the share of ICT goods in Ukraine's total imports of goods (from 1.9% to 4.57%). This trend was associated with the gradual development of the ICT services segment in Ukraine (mainly in IT outsourcing form), which had both positive and negative effects on Ukraine's ICT sector international competitiveness development. Firstly, the growth of IT outsourcing in Ukraine increased demand for ICT equipment, which led to an increase in ICT equipment imports. Secondly, in order to support the IT outsourcing industry, Ukraine's ICT sector needed to improve its infrastructure, including its telecommunications networks and power supply.

However, this approach has strategic drawbacks and negative consequences for Ukraine's ICT equipment segment, particularly IT outsourcing led to dependence on foreign technology, hindering the development of Ukraine's ICT hardware industries. Moreover, having ICT equipment imports exceeding exports can result in a trade deficit, negatively impacting the economy (Table 2). Besides, focusing on outsourcing instead of developing local ICT hardware industries may result in a lack of innovation, affecting the Ukraine's long-term growth prospects.

Additional reasons that contributed to the growth of imports of ICT goods were: growing demand for IT in all spheres of life, including business, education, public services, healthcare, etc.; technological backwardness of domestic production in some areas of ICT technologies prompted companies and government agencies to import technologies and resources to meet domestic demand; importing IT services was a more cost-effective option than own production or development; importing technologies and services to bridge the digital divide and to develop domestic IT infrastructure, which in turn contributed to the development of the IT sector.

Furthermore, based on Table 2 data, Ukraine's specialization in the production and export of ICT goods is relatively low, as:

1) the negative trade balance indicates that Ukraine is importing more ICT goods than it is exporting;

2) the low export-to-GDP ratio and the low trade-to-GDP ratio suggest that the ICT sector is not a major contributor to Ukraine's economy;

3) the terms of trade of 0.1 and the net export index of -77 also indicate that Ukraine is not getting favourable prices for its ICT exports, and that it has a relatively low level of competitiveness in the global market for ICT goods;

4) the export-import ratio index suggests that Ukraine's ICT sector is not very specialized, as it is not exporting a high proportion of the goods it produces relative to the amount it imports.

Table 2. Ukraine's ICT Goods Trade Openness Indicators

Trade Indicators	**2008-2010**	**2011-2013**	**2014-2016**	**2017-2019**	**2020-2022**	**Absolute change**
	T_1	**T_2**	**T_3**	**T_4**	**T_5**	**T_5-T_1**
Trade Balance, mln. USD	-2 924	-6 296	-4 177	-8 573	-8 256,9	-5 332,9
Import-to-GPD ratio, %	1,01	1,52	1,68	2,48	1,83	0,82
Export-to-GPD ratio, %	0,36	0,36	0,37	0,32	0,23	-0,13
Trade-to-GDP ratio	0,01	0,02	0,02	0,03	0,02	0,01
Terms of Trade	0,4	0,2	0,2	0,1	0,1	-0,23
Net Export Index	-47	-62	-64	-77	-77	-30,12
Export-Import Ratio Index	0,44	0,29	0,22	0,16	0,14	-0,29

Source: developed by authors based on UNCTADstat (2024), Trade Map (2024), World Bank (2024), Mazur M. V. (2009), Balassa B. & Noland M. (1989) and BALASSA, B. (1977)

The main buyers of ICT goods from Ukraine were Hungary (3 488 mln. USD), Russia (867 mln. USD), Moldova (291 mln. USD), Austria (236 mln. USD), Poland (143 mln. USD), Netherlands (135 mln. USD), Belarus (133 mln. USD), USA (119 mln. USD) and India (103 mln. USD), which accounted for 76% of all ICT goods exports during 2008-2022 (Figure 3).

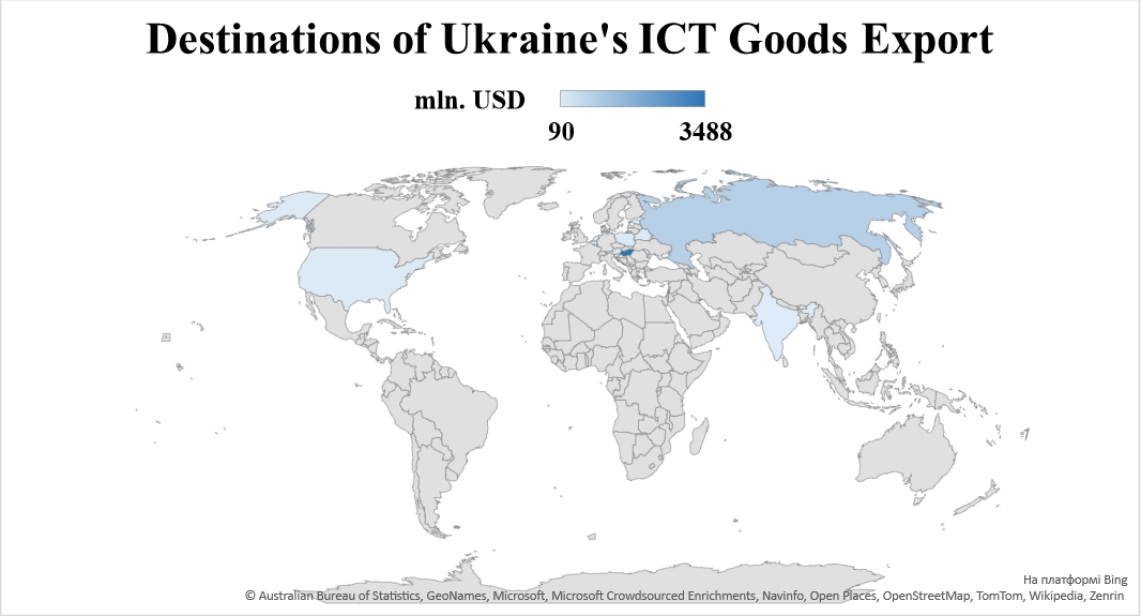

Figure 3. Main Buyers of Ukraine's ICT Goods, 2008-2022.
Source: developed by authors based on UNCTADstat (2024) and Trade Map (2024)
* presented latest available data

The main suppliers of ICT goods to Ukraine were China (18 734 mln. USD), Vietnam (2 171 mln. USD), Russia (1 940 mln. USD), Hungary (1 264 mln. USD), Taiwan (1 135 mln. USD), Republic of Korea (1 093 mln. USD), Germany (1 020 mln. USD), USA (811 mln. USD) and Malaysia (681 mln. USD), which accounted for 77% of all ICT goods imports by Ukraine during 2008-2022 (Figure 4). Such pattern in import geography can be explained by the following factors:

1) some of these countries specialize in certain types of ICT goods, which allows them to become experts in their field and produce high-quality products at a lower cost (e. g. Taiwan in semiconductors or China in electronics);

2) most of the mentioned countries have a comparative advantage in the production of ICT goods; as a result, it may be more cost-effective for Ukraine to import these goods from these countries rather than produce them domestically;

3) some of these countries (e. g. China) may offer incentives or subsidies to their ICT goods producers, making it more attractive for Ukrainian companies to import from them;

4) many of these countries have trade agreements with Ukraine, which makes it easier and more cost-effective for them to export their ICT goods to Ukraine.

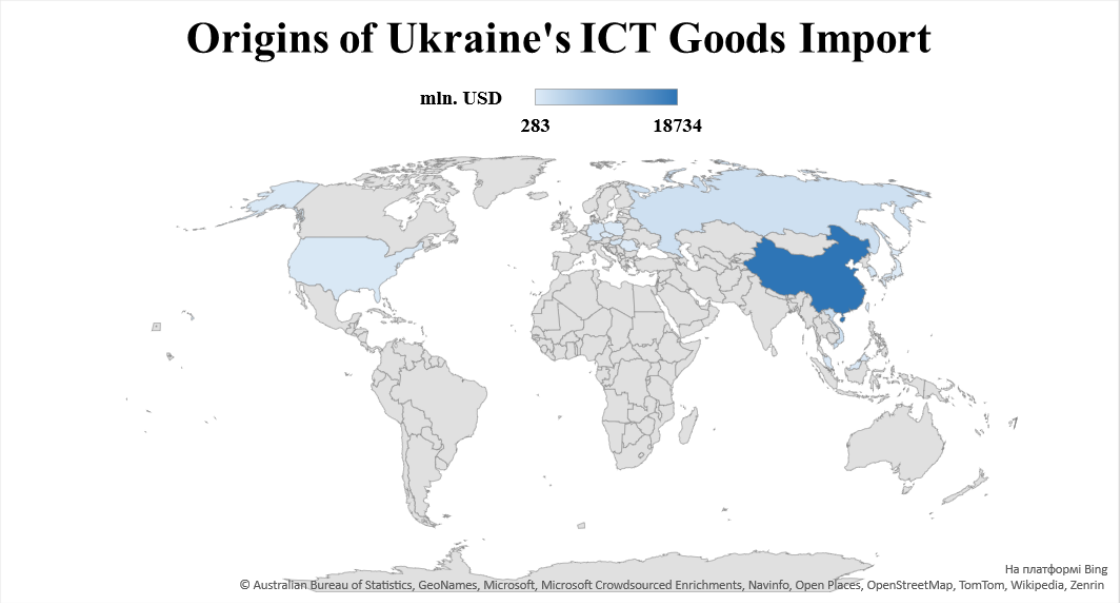

Figure 4. Main Sellers of ICT Goods to Ukraine, 2008-2022.
Source: developed by authors based on UNCTADstat (2024) and Trade Map (2024)
* presented latest available data

We believe it is appropriate to highlight the main reasons why Ukraine's ICT hardware segment has found it difficult to compete globally: (1) the transitional period from a centrally planned to a market-oriented economy; (2) the outdated communication networks, limited access to the Internet, and inadequate technological capabilities; (3) limited opportunities for investment and financing of the ICT sector development due to economic and political instability; (4) the migration of qualified IT professionals to other countries in search of better professional opportunities and higher salaries; (5) the overwhelming lack of export orientation of domestic IT companies and their non-compliance with international standards and industry practices; (6) the actual absence of comprehensive legislation to regulate Ukraine's ICT sector, specifically, in terms of investor protection, intellectual property protection, as well as the lack of a clear strategy for the country's digitalization and high-tech industries development.

In the structure of Ukraine's exports of ICT services in 2008-2022 (Figure 5), the most sold were computer services – 38 234 mln. USD (89,4% of total ICT services exports), telecommunications services – 3 887 mln. USD (9,1%), and information services – 630 mln. USD (1,5%). It should be noted that during the period under study, Ukraine's exports of ICT services continued to grow steadily by 22.4% annually (with the peak of 7 521 mln. USD in 2022), while imports grew by 5.7%. As for the import of ICT services, the structure is almost the same: the most imported categories were computer services – 6 008 mln. USD (68,5% of total ICT services exports), telecommunications services – 2 314 mln. USD (24,6%), and information services – 450 mln. USD (5,1%).

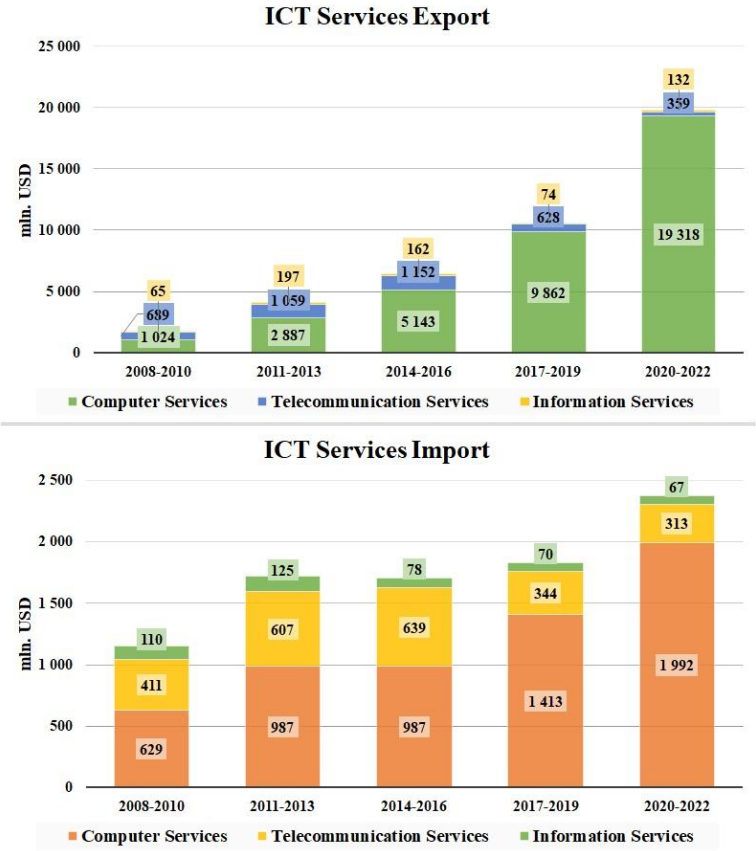

Figure 5. Dynamics in Ukraine's ICT Services Foreign Trade in 2008-2022.
Source: developed by authors based on UNCTADstat (2024)
* presented latest available data

Ukraine's ICT services exports have experienced an outstanding growth over the past decade, increasing from a share of only 2,3% in total services exports in 2008 to an impressive 46,5% in 2022 (Figure 6). It should be noted that the most popular forms of employment in the ICT sector of Ukraine are: contractor agreements (individual entrepreneurs) – 78.6%, employment agreements - 12.1%, gig contracts (Diia.City) – 7.6%, and hiring full-time employees (Diia.City) – 3.2%. In addition, according to the type of business model, most IT professionals are employed in outsourcing (43% of all professionals), product (30%), mixed (16%), and outstaffing (8%) IT companies. Generally, as a business partner, Ukraine has numerous competitive advantages among Eastern European countries, particularly [9; 17-19]:

1) Ukraine has a large pool of highly skilled IT professionals, which means foreign clients can easily find the right talent for their project needs (307 thousand IT professionals, as for 2023, distributed among 1 661 product companies and 553 service companies);

2) Ukrainian IT professionals have an excellent engineering education and skills, which ensures high-quality work and innovative solutions (181 universities, 133 colleges, 36 schools and 43 courses for tech professions);

3) Ukrainian IT professionals have a good command of English, which makes communication and collaboration with foreign clients easy and efficient (43% IT professionals have upper-intermediate skills, 32% – intermediate, 13% – advanced);

4) Ukraine is situated in a favourable time zone, which makes it easier for foreign clients to communicate and collaborate with their Ukrainian counterparts;

5) Ukrainian IT companies adhere to Western work ethics standards, ensuring that projects are completed on time and to a high standard;

6) Ukraine has good infrastructure for personnel mobility and relocation, making it easy for foreign clients to work with Ukrainian IT companies;

7) Ukraine has a favourable legal and taxation system, which makes it easy for foreign clients to do business with Ukrainian IT companies (e.g. Simplified Tax Regime for PE of 5% income tax);

8) Ukraine has a strong start-up spirit and culture, which fosters innovation and creativity in the IT sector (90 R&D centres and 12 accelerators);

9) Ukrainian IT companies offer high-quality services at a lower cost compared to their counterparts in Western countries, making them an attractive option for foreign clients who want to save on costs while still getting quality work done (developers' salaries range from 350 USD per month to 6 500 USD per month).

As for retaining and motivating IT professionals, even during the full-scale war, IT companies have the following employment advantages: 1) interesting projects; 2) developed corporate governance; 3) company values and mission that would match the beliefs of IT professionals; 4) interest groups and extracurricular activities within the company; 5) efficiency of the bureaucratic process; and 6) convenient location of a comfortable office.

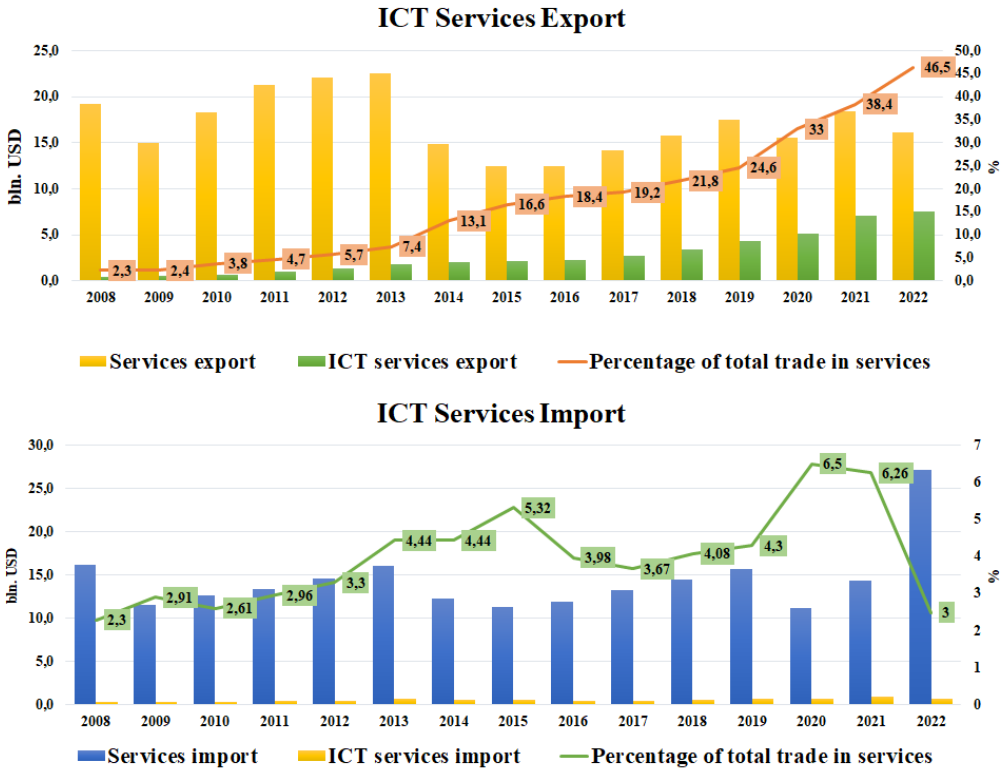

Figure 6. ICT Services Share in Ukraine's Foreign Trade in Services, 2008-2022.
Source: developed by authors based on UNCTADstat (2024)
* presented latest available data

Based on Table 3 data, Ukraine's specialization in the export of ICT services is relatively high, as:

1) the positive trade balance indicates that Ukraine is exporting more ICT services than it is importing;

2) the high export-to-GDP ratio and the high trade-to-GDP ratio suggest that the ICT services sector is a significant contributor to Ukraine's economy;

3) the terms of trade and the net export index indicate that Ukraine is getting favourable prices for its ICT services exports, and that it has a relatively high level of competitiveness in the global market for ICT services;

4) the export-import ratio index suggests that Ukraine's ICT services sector is highly specialized, as it is exporting a high proportion of the services it produces relative to the amount it imports.

Table 3. Ukraine's ICT Services Trade Openness Indicators

Trade Indicators	T_1	T_2	T_3	T_4	T_5	Absolute change
	2008-2010	2011-2013	2014-2016	2017-2019	2020-2022	T_5-T_1
Trade Balance, mln. USD	628	2 424	4 753	8 737	17 437	16 809
Import-to-GPD ratio, %	0,26	0,32	0,54	0,46	0,46	0,2
Export-to-GPD ratio, %	0,39	0,76	2,03	2,66	3,83	3,44
Trade-to-GDP ratio	0,65	1,08	2,57	3,12	4,29	3,64
Terms of Trade	1,5	2,4	3,8	5,8	8,4	6,81
Net Export Index	21	41	58	71	79	57,16
Export-Import Ratio Index	1,19	1,61	3,40	5,30	8,79	7,6

Source: developed by authors based on UNCTADstat (2024), Trade Map (2024), World Bank (2024), Mazur M. V. (2009), Balassa B. & Noland M. (1989) and BALASSA, B. (1977)

The biggest partners in Ukrainian exports of ICT services in 2014-2021 were (Figure 7): USA – 5 679,52 mln. USD (19% of total ICT services export), UK – 1 772,53 mln. USD (6%), Switzerland– 1 168,22 mln. USD (4%), Israel – 938,4 mln. USD (3,2%), Russia– 912,51 mln. USD (3,1%), Malta – 906,6 mln. USD (3,1%), Germany – 816,02 mln. USD (2,8%), Cyprus – 764,02 mln. USD (2,6%), Netherlands– 596,5 mln. USD (2%), Sweden – 475,01 mln. USD (1,6%) and Canada – 456,63 mln. USD (1.6%). As for the period of 2022-2023, the USA (40,3%) and the UK (7,9%) remain Ukraine's focus markets, with their companies often acting as tax residents of Malta and Cyprus, which are leading exporters of ICT services from Ukraine [20]. Moreover, Ukrainian IT is gaining interest in Central and Eastern Europe, the Middle East, particularly the UAE (1,64%), and East Asia, particularly Japan, China, and Hong Kong.

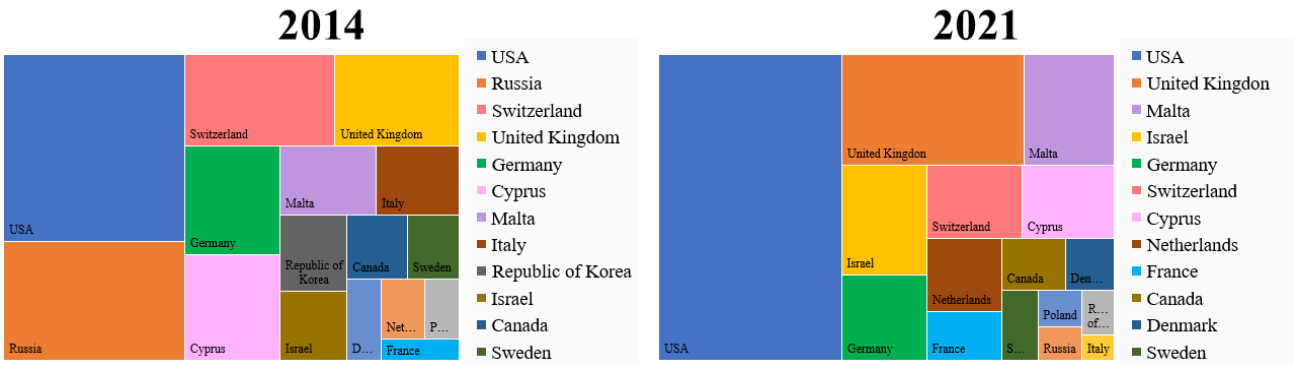

Figure 7. Main Importers of Ukraine's ICT Services, 2014-2021*.

Source: developed by authors based on Ukrstat (2024) and Govstat (2024)

* presented latest available data

It is worth noting that most of these countries have chosen Ukraine as a location for their own R&D centres, for example [17]: companies from the USA opened a total of 36 R&D centres (e.g., companies such as Boeing, Cisco, Dell Technologies, Netcracker, Oracle, and others), Germany – 8 R&D centres (Avenga, Bosch, Soft Xpansion etc.), the UK – 8 R&D centres (Adstream, Ivy Tech, DeHealth etc.), Denmark – 4 R&D centres (3Shape, Keel Solution etc.), Japan – 1 (Rakuten).

However, given the risks and problems associated with Russia's full-scale war in Ukraine, there are 3 scenarios for the further development of Ukraine's ICT sector, which are influenced by various internal and external factors.

The negative scenario sees the domestic IT sector gradually losing its leadership in the service IT business in Europe and reducing the potential for the emergence of global ICT products.

Accordingly, this scenario envisages a decrease in export revenues from the activities of IT companies due to the deterioration of the security situation in Ukraine, a possible new wave of relocation of IT specialists abroad and/or in case Ukraine's energy infrastructure fails to cope with new challenges, etc. In addition, the following factors will have a negative impact on the recovery of the ICT sector in Ukraine: refusal of foreign counterparties to cooperate with IT specialists based in Ukraine; loss of jobs and shortage of vacancies in the IT labour market; inclusion of general mobilization and increased military commitments in Ukraine's security strategy; strict government regulation of business conditions and taxation.

The neutral scenario envisages lifting the bans and allowing IT professionals and IT companies to work, accumulating and directing funds from risk diversification to halt the decline and ensure gradual recovery.

The positive scenario envisages a return of the ICT sector to its usual growth rate of 25% annually starting in 2025, due to the Government's rapid focus on preserving the ICT sector, supporting the digitalization of the economy, providing state guarantees to customers and forming mechanisms for insuring their risks, as well as supporting the ICT sector in the war-affected regions. In particular, the main favourable factors for the positive scenario of the recovery of the ICT sector in Ukraine include: loyalty of foreign customers to IT teams located in Ukraine; revival of the situation in the IT labour market in Ukraine; liberalization of the national economy and introduction of economic freedoms; development of comprehensive legislation on the departure of men on foreign business trips; ensuring safe working conditions by IT companies.

7. Prospects for further research development

Taking into account the results obtained, further research into the structure of Ukraine's foreign trade in ICT goods is necessary to find new promising markets for domestic ICT goods and diversify suppliers of ICT goods, taking into account the security interests of Ukraine in the digital environment.

In turn, further studies of Ukraine's foreign trade in ICT services should focus on the specifics of Ukraine's trade relations with major importers of ICT services, in particular with companies from the USA, as one of the most important national ICT markets in the world, in order to maintain and increase Ukraine's exports of ICT services and foreign exchange earnings to the Ukrainian economy.

Additional attention should be paid to the study of the prospects for using R&D centres as a format of cooperation between Ukrainian IT companies and global technology giants to further develop and deepen technological cooperation, advance and massively implement Ukraine's competitive technologies, as well as enhance exports of ICT goods and ICT services.

8. Conclusions

The research and detailed analysis of the structure and dynamics of foreign trade of the IT sector of Ukraine in 2008-2022 enabled to draw the following conclusions:

1. The commodity structure of ICT goods exports was dominated by communication goods and consumer electronic equipment, while the main buyers were Hungary and Russia. The commodity structure of ICT goods imports was dominated by communication equipment, as well as computers and peripheral equipment, mostly of Chinese origin. In addition, the use of the trade balance and international trade indices reflect*s* a limited level of Ukraine's specialization and competitiveness in the global ICT goods market during the specified period.

2. Computer services account for the largest share in the structure of ICT services exports, and Ukraine's main trading partners are technology companies from the United States and the United Kingdom. In addition, companies from these countries have been actively opening their own R&D centres, which has a positive impact on the development and maintenance of the international competitiveness of Ukraine's IT sector. Moreover, the trade balance and international trade indices reflect a significant level of specialization and competitiveness in ICT services exports, indicating a

solid position in the global market for ICT services and showcasing Ukraine's comparative advantage in ICT. Finally, domestic IT companies' main competitive advantages that have contributed to the significant growth of the ICT services segment in Ukraine's export structure include: large IT talent pool, high level of technical education and skills, good communication skills (particularly in English), time zone advantages, Western work ethics standards, good infrastructure for personnel mobility and relocation, favourable legal and taxation systems, strong start-up spirit and culture.

3. The further development and functioning of Ukraine's ICT sector may be affected by: the general state of the global economy, in particular the US economy; the state's settlement of employees' reservation issues and business trips abroad permits; the number of experienced professionals in the Ukrainian labour market and their employment in projects, as IT companies are now almost abandoning benching and are not always ready to hire newcomers who have insufficient experience; enrolment in IT specialties sufficient for ICT sector development in 3-4 years; preservation of the VAT benefit for the supply of software products and government support for product companies.

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