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Integration of Ukraine to the Global Value Chains

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Abstract

The article considers the theoretical and methodological approaches to global value chains when measuring international trade. Global trends in the modern development of international trade are analysed, and the main challenges of international trade policy for Ukraine are characterised. It is established that the modern structure of the Ukrainian economy was formed under the influence of external factors. The authors propose that, over time, the influence of the global economy on the dynamics and structure of the Ukrainian economy will continually intensify. The prospects of Ukraine's integration into global value chains are examined, and the authors found that the structure of Ukrainian exports of goods coincides with the structure of world exports only partially. Ukrainian export of goods is characterised by a low share of highly processed industrial products and a high share of low value-added products, in particular, basic metals and agriculture and food industry products. The export of domestic high-tech goods is constantly decreasing compared to developed countries, and its share in the world export of high-tech goods is insignificant. To ensure the acceleration of GDP growth in Ukraine, it is important not only to increase exports, but also to increase the export of high-tech goods.

Keywords: international trade, integration, global value chains, export, import, high-tech goods

JEL: F15, F20, F29

Introduction

The characteristic feature of the stage of development of the current world economy is the existence of global production chains, which are the international trade in intermediate goods. A global value chain (GVC) is a sequence of interrelated types of activities on added value creation, located on at least two continents, or within two trading blocks, ensuring the production of a good or a service, from the idea for its creation to its delivery to the final consumer (Antras 2020; Yaroshuk and Ochrimenko 2020).

Global trade increasingly includes exports of parts, components, subsystems and services within the GVC and its associated production networks. This has led to a growing specialisation of companies related to specific tasks when producing final goods and services and an increase in international trade between different industry sectors. There has also been a dramatic increase in the international movement of goods between different structures of transnational corporations as a result of an active detailed, nodal distribution of labour. Consequently, this process has triggered rapid development in international production and supply chains. Undoubtedly, GVC is a positive product of globalisation, as it allows almost all countries to be included in the global economy, in turn, contributing to their socio-economic development.

As production systems become decentralised, fragmented and more specialised, new market opportunities arise for all types of companies, including small and medium-sized enterprises, to enter global markets and shift to export activity. It is more efficient through the specialisation.

GVCs provide significant opportunities for countries to expand exports. They allow enterprises to concentrate on specific components or activities where they have a competitive advantage, such as low cost or high quality. They can also develop and implement effective strategies for processing raw materials where they are already competitive. This could include processing cotton into textile yarn, fabric into clothing, round wood into furniture products, or supplying certain agricultural raw materials or semi-finished products. There are, therefore, many opportunities for co-operation – one has to know how to find them and occupy a niche in the market.

Within the GVC, higher-level buyers can provide access to know-how in technology, management, marketing, intermediate resources, and loans. However, to be competitive in the world of international business, enterprises must change the concept of their development and base it primarily on the efficiency of the entire GVC, i.e., the main goal of their activities should be to achieve systemic efficiency, not only their own.

Thus, the concept of a global value chain, based on the concept of value added,¹ allows us to research the different sectors of the world economy, studying their structure and the dynamics of participation of various economic entities involved in the production process. This approach is a useful tool for analysing global economic trends, as it allows us to track all the links between the different parts of geographically fragmented international production, determine the role of each participant and predict the consequences for a given country.

Both developed and developing countries participate in GVC. However, their level of involvement, positions in the stages of the production processes, the nature of activities and relationships with the other participants in GVC can differ significantly. A key role in organising fragmented international production is played by transnational corporations, whose countries of origin are mainly developed. When locating the distinct stages of the production process in different countries, they gain certain advantages due to the local differences in production costs, infrastructure, marketing, logistics, trade and investment regimes, and so on. Participating in GVCs can have both positive and negative effects for the recipient countries. It is of particular importance for the least developed countries, where effective involvement in global production processes is a prerequisite for national economic growth and overcoming unemployment and poverty. Therefore, it is vital for all countries to research the GVC and identify the prospects for participation in them. It is of particular importance for developing the countries' own economic strategy.

This article aims to provide a systematic analysis of trade activities and a rationale for promising areas to facilitate the integration of Ukraine's high-tech industries into global value chains.

The theoretical and methodological basis of the research consists of scientific work and methodological research of leading Ukrainian and foreign scientists. The research on scientific problems related to Ukraine's integration into global value chains was conducted using critical and scientific analysis, methods of scientific generalisation and systematisation, mathematical statistics and graphical tools, and analysis of the Ukrainian and international external economic activity dynamics. The results, conclusions and recommendations are substantiated based on an integrated approach.

Theoretical concepts for measuring global value chains in international trade

The concept of the value chain was introduced by Porter in the context of the competitive advantages research. His fundamental works (Porter 1985, 1990) provide two important principles for the value chain concept. First, it distinguishes between the stag-

¹ Value added is the value that the firm has added to the purchased raw materials and materials with its factors of production, i.e., it is the firm's net contribution to the creation of the commodity.

es of the production process, in particular, input logistics for supply, the activities of the firm, output logistics, and sales and auxiliary services. Secondly, he investigated how value is created in a multiple links system (Porter 1990). From these two perspectives, Porter lays down the basic theory, which explains why certain enterprises are efficient. In his view, the performance of enterprises depends on how they manage their delivery links, how they are included in the overall structure of the value chain, and how well they are organised and able to maintain competitiveness in the entire chain. Consequently, the development of an enterprise and an industry is determined by, among other factors, the industrial structure and organisation.

Based on empirical research in the garment, footwear and automotive industries, Gereffi et al. (2001) developed the concept of global value chains. They paid attention to the value chain governance structures and the conditions for suppliers to participate and modernise their industries as value chains become more open to trade and foreign direct investment. Modernisation methods include product modernisation, process modernisation, functional modernisation and cross-sectoral modernisation. One of the main arguments often put forward in discussions about the GVC is that certain global players are powerful enough to impose contractual terms. Suppliers whose products are easier to produce or whom major buyers can substitute, and producers who depend on suppliers of complex modern resources and technologies that are difficult to buy abroad, are generally forced to accept the imposed contractual terms. Consequently, the major players maintain a greater share of the value added through ownership of well-established brands, proprietary technologies, or access to exclusive information in various raw material and product markets.

Freeman (1987) and Nelson and Winter (1982) demonstrated that the competitiveness of a national industry is based on the structure and efficiency indicators of national innovation systems. Striking examples include the automotive and information technology industries in Japan (Freeman 1987). The approach based on innovation systems is not directly related to the study of value chains. Nevertheless, it assumes that access to knowledge and technology, and thus systemic competitiveness, depends on enterprises' access to innovation, and accordingly on the engagement of actors in value chains, which entails technological modernisation, research, development and training. Those who cannot keep up with the technological developments can benefit from the investments of previous innovators, copying, adapting and improving innovations for their own purposes.

A useful theoretical analysis of the formation of global value chains is considered in the works of Antràs, Garicano, and Rossi-Hansberg (2008), and others. Grossman and Rossi-Hansberg (2012) suggested the term "trade in tasks", which characterises the distribution of production functions into separate pieces. They created the model of a fragmented production where every country fulfils one function in the production and sale of the good.

An important problem in keeping track of economic statistics is assessing the contribution of each country's value added to the total value added in international trade

flows. As experts argue, international trade statistics today most often provide a distorted picture of trade's impact on the economy: "...what you see is not what you get". This is related to the globalisation of production and reflects that the value of products that cross borders several times for further processing is accordingly being accounted several times (Maurer and Degain 2010). UNCTAD estimates that about 28% of world exports are intermediate goods that have been included several times in the value of exports at different stages of production in different countries. This problem, in turn, generates new problems, namely that it is impossible to estimate real imbalances in trade between countries, real exchange rates, and to make a realistic assessment of other important international trade indicators and aspects of international economic relations. For this reason, research into the measurement of global value chains in international trade is being carried out today mainly in two directions: 1) "cleaning up" the trade statistics from double counting, isolating value added flows; 2) decomposing the aggregate trade flows into components according to the national origin and purpose of value added (Motorin and Prychodko 2015).

The fragmentation of production processes through international co-operation has led to the emergence of borderless production systems. They exist in the form of sequential chains or complex networks, which can be global, regional or involving only two countries. Because of this, an objective question arises, as to how to isolate the contribution of each country involved in the production of value-added products. There are three main approaches to address this task. The first is based on the fact that research is conducted either on specific products or on individual export-oriented enterprises. However, when using this approach in the research process, it is difficult to trace the entire chain of intermediate suppliers. The second approach is based on estimating the international trade in goods of intermediate demand. However, this approach leaves domestic transactions in these goods outside the scope of the study, which may significantly distort the results of the estimates. The third approach is based on developing "cost-output" tables and their international modification, where cross-border trade flows are decomposed into components similar to transactions between the industries and final consumers within the domestic economy. This is the most appropriate approach, but it also has disadvantages in terms of the quality of international statistics and the possibility to isolate the user's import by consuming industries (Daudin, Riffart, and Schweisguth 2011). According to the Organisation for Economic Co-operation and Development (OECD 2013), this issue is both relevant and requires the development of new trade statistics to complement existing ones. The very nature of the problem requires a coordinated international approach to build a database and methodology based on official statistics that are widely accepted and approved.

In general, studying GVC involves analysing the following elements: the structure of the "cost-output" system, which describes the process of converting raw materials into final products; geographical features of the processes distribution within the framework of GVC; management structure, which shows how the control and man-

agement of GVC is carried out; the institutional environment where the GVC is located (Maruschak 2017, p. 31).

Quantitative indicators that characterise the scale, depth and length of the chain, as well as the level of participation and relative positions of countries in the chain, are important when studying GVCs. One way of assessing such participation, which was developed earlier in the academic literature, is to calculate the share of vertical specialisation, which can be interpreted as the import component of export. At the same time, the value of imported components used in the production of export products and the value of export added abroad are different concepts, since imports may include the value added in the domestic economy. The international “cost-output” matrix developed by the OECD allows the calculation of the value added that is returned to the domestic economy as part of foreign components. Based on this matrix, a global “cost-output” database has been created. It includes annual international inter-industry “cost-output” matrices covering 55 countries – 34 OECD countries and 21 non-member countries, as well as a separate category of “other countries of the world” (Kravcova 2016, p. 41). Ukraine is not included in the list of countries. Thus, a synthesis of existing ideas, methodologies and approaches to analysing global value chains and forming a comprehensive theoretical approach to their study is relevant.

Global trends in the modern development of international trade and trade policy: challenges for Ukraine

The Ukrainian economy is quite open in terms of the goods and services export ratio to GDP, although it does not among the most open economies in the world. In general, the openness of Ukraine’s economy in terms of the foreign trade to GDP ratio exceeds the world average. Under such conditions, Ukraine’s economic development depends significantly on the state of the world economic situation, including the dynamics and scale of changes taking place.

In turn, the dynamics, content and scope of international economic interactions today are determined by global development trends, which reflect profound transformations in almost all the spheres of society, and the speed of the relevant changes is constantly increasing. In this context the following processes are particularly important (IER 2016, p. 11): the digitalisation of all spheres of life; technological innovations; increasing interdependence between firms, countries, markets and geographical regions; “rebalancing” the world economy; globalisation, which significantly changes the business environment, regardless of its size and degree of internationalisation; the intensive and dynamic development of international system to regulate economic relations, which includes international economic organisations, international agreements, consultations, etc.; the growing importance of healthcare in the economy. The COVID-19 crisis also raised the issue of international trade security, as restrictions on internation-

al value chains may have contributed to economic downturns during the crisis (Fortunato 2020; GTIPA 2021). In general, these processes affect the nature and features of international economic co-operation in one way or another.

As for the international trade in goods and services directly, today, experts highlight several important qualitative changes (IER 2016, p. 13–14): the increase in the number of regional agreements; the search for agreements on trade in goods that until recently were not allocated to a separate group (i.e., so-called environmentally friendly goods); the search for agreements to deepen or complement the acting agreements within the WTO framework; the rapid development of technology has significantly reduced transport, communication and the other costs; the liberalisation of cross-border movement of goods, services, capital and labour; the dynamic development of international trade in technologies and high-tech goods, which are the material embodiment of new technologies; the development of e-commerce is a factor that determines today the dynamics and structure of international trade in general and the peculiarities of export-import operations in particular.

The current structure of the Ukrainian economy has been shaped by external factors. This means that the government and businesses must react promptly and appropriately to new global economic and political challenges. At the same time, the development of the domestic market as an alternative to international markets is virtually impossible today without exploiting the opportunities offered by the global market for goods, services, capital and labour.

In fact, the main goal of export development should ultimately be to secure employment and income, and to increase the efficiency of national production. In a substantial sense, exports and export promotion policies should become a factor and a tool for modernising Ukraine's economy. In other words, it is a question of making the presence of Ukrainian producers and service providers a factor in the country's economic development.

Identifying the prospects for Ukraine's integration into global value chains

The leading long-term trend in the development of Ukrainian exports is a decrease in the share of CIS countries and a simultaneous increase in the share of EU countries (Figure 1).

This reorientation is primarily due to global economic processes and structural changes in international markets. The mode of goods or services supply and the particularities of the market structure also influence the geographical structure.

In 2019, the share of exports of goods and services to CIS countries decreased by 12.3 percentage points compared to the same period in 2010. At the same time, the share of exports of goods and services to the EU increased from 25.8% in 2010

to 37.3% in 2019. The share of exports of goods and services to other countries increased by 0.4 percentage points over the same period.

When analysing the exports of goods separately, a similar trend can be observed. In particular, the share of exports to CIS countries in 2019 was 13.5%, which was 22.9 percentage points less compared to 2010. The share of Ukrainian goods exports to the EU increased by almost 1.3 times over the period 2010–2019, and to other countries by 2.6 percentage points.

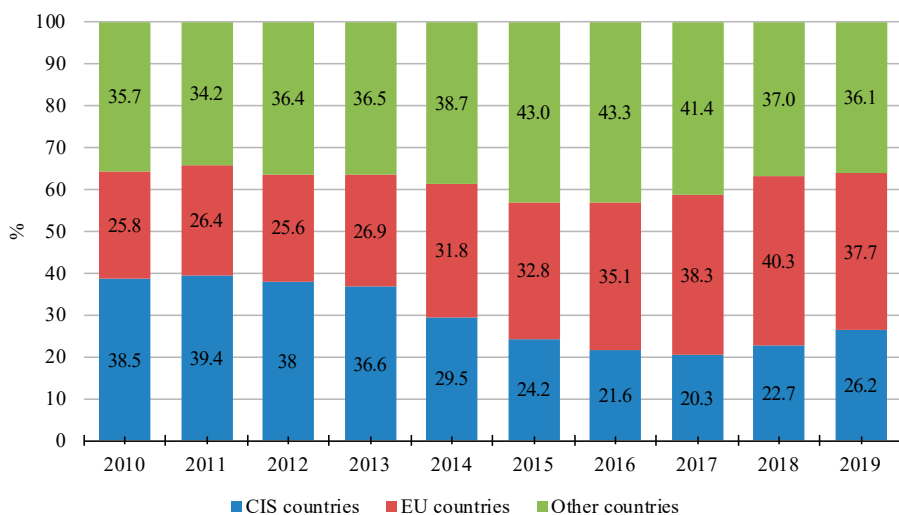


Figure 1. Geographical structure of exports of goods and services from Ukraine, 2010–2019 years, (%)
Source: calculated according to the data of State Statistics Service of Ukraine.²

In 2019, the share of services exports to CIS countries decreased by 5.9 percentage points compared to the same period in 2010. The share of services exports to EU countries increased from 27.4% to 28.6% during 2010–2019. The share of services exports to other countries increased by 4.7 percentage points over the same period.

The structure of exports of goods and services of any country is shaped both by the international demand for the corresponding goods and services and by the level and specifics of the national economic development. The structure of Ukrainian exports of goods partially coincides with the structure of world exports.

While electrical machinery (on average 13.3%), mechanical machines, nuclear boilers (on average 11.6%), and vehicles (on average 7.7%) dominated world exports in the period 2010–2019, the share of electrical machinery in Ukrainian exports during the same period was on average 5.3%, i.e., 2.5 times less than the world average. The share of mechanical machines and nuclear boilers (4.9% on average) is 2.4 times

² Ukraine's Foreign Trade in Goods and Services in 2014. State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>); Ukraine's Foreign Trade in Goods and Services in 2018. State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>). Geographical structure of Ukraine's foreign trade in goods in 2018–2019 (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 24.12.2021).

smaller, while the share of vehicles (0.6% on average) is 12.8 times smaller. At the same time, the share of Ukrainian exports of base metals and their products is high (18.3% on average in 2010–2019), which is 8.3 times more than the world total.

A significant share of Ukrainian exports during the period 2010–2019 was of products of plant origin, which ranged from 4.8% in 2010 to 19.3% in 2019, which is 20.8 times higher on average than the global indicator. Ukrainian fats and oils accounted for an average of 7.8% of domestic exports during 2010–2019. Overall, the growth rate of Ukrainian exports of agricultural, food and ore products outpaced the global rate, indicating fairly stable global demand and the resilience of these sectors to crises in the economy.

The above shows that Ukrainian exports are characterised by a low share of highly processed industrial products and a high share of low value-added products, in particular, metallurgical products, agriculture, and food industry products. At the same time, Ukraine holds leading positions in the world in terms of certain goods exports. In particular, the share of Ukrainian grain exports increased from 4.8% in 2010 to 19.3 in 2019, the share of fat and vegetable oil exports increased from 5.1% to 9.5%, and ore from 5.0% to 7.2%.

There were 20 main partner countries in 2010–2019, which accounted for between 68.5% in 2010 and 70% in 2019 of domestic exports (Table 1).

During 2010–2019, the structure of Ukrainian services exports was strongly dominated by transport services (62.5% on average), telecommunication, computer and information services (11.5% on average), services in the processing of material resources (10.5% on average) and business services (8.0% on average).

Table 1. The main partner countries in the export of goods, 2011–2019, (%)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019
Austria	0.9	0.8	0.9	1.0	0.9	1.0	1.2	1.2	1.2
Belarus	2.8	3.3	3.1	3.0	2.3	2.5	2.6	2.8	3.1
China	3.2	2.6	4.3	5.0	6.3	5.0	4.7	4.6	4.0
Czech Republic	1.2	1.0	1.3	1.4	1.4	1.5	1.7	1.9	1.8
Egypt	2.0	4.2	4.4	5.3	5.5	6.2	4.2	3.3	4.5
Germany	2.6	2.4	2.5	3.0	3.5	3.9	4.1	4.7	4.8
Hungary	2.0	2.2	2.5	2.8	2.4	2.9	3.1	3.5	3.1
India	3.3	3.3	3.1	3.4	3.8	5.2	5.1	4.6	4.0
Iran	1.6	1.7	1.3	1.3	1.4	1.9	1.3	0.9	1.2
Israel	0.7	1.2	1.1	1.1	1.6	1.3	1.4	1.2	1.2
Italy	4.4	3.6	3.7	4.6	5.2	5.3	5.7	5.6	4.8
Moldova	1.3	1.2	1.4	1.4	1.4	1.3	1.6	1.7	1.5
Netherlands	1.2	1.2	1.7	2.1	2.4	2.7	3.9	3.4	3.7
Poland	1.2	3.7	4.1	4.9	5.2	6.1	6.3	6.9	6.6
Romania	1.4	0.8	0.9	1.1	1.5	2.0	1.9	2.0	2.0
Russia	29.0	25.6	23.7	18.2	12.7	9.9	9.1	7.7	6.5
Slovakia	1.2	1.0	1.2	1.2	1.2	1.3	1.5	1.8	1.4

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019
Spain	1.4	2.2	1.6	2.2	2.7	2.8	2.9	2.9	3.0
Turkey	5.5	5.4	6.0	6.6	7.3	5.6	5.8	5.0	5.2
United States of America	1.6	1.5	1.4	1.2	1.3	1.2	1.9	2.3	2.0

Source: calculated according to the data of State Statistics Service of Ukraine.³

Although the average share of exports of domestic transport services is 3 times higher than the global average, their share in the global structure was only 0.7%. The share of domestic exports of telecommunication, computer and information services in the global structure of these services exports was 0.3% during 2010–2019. The share of domestic exports of services in the processing of material resources was on average 5.0 times higher than the global average. At the same time, the share of domestic exports of business services was on average 2.6 times lower than the global average. Also, the average share of domestic exports of travel-related services in the global structure of services exports is quite low – only 0.02% of their global exports.

Analysis of the domestic economy export orientation shows that between 2013 and 2019, on average, about 19.6% of goods and services produced in Ukraine were exported (Table 2). The metallurgy industry was the most export-oriented during this period – its export quota averaged 63.4%.

The following sectors of the domestic economy also have significant export shares: machinery and equipment production – 59.1%, on average; computer programming – 50.3%, on average; metal ore mining – 47.4%, on average; electrical equipment production – 45.6%, on average; transport and warehousing – 36.5%, on average; timber and paper production – 32.5%; postal and courier operations – 32.1%, on average; agriculture, forestry and fishing – 28.8%, on average. The lowest export quota between 2013 and 2019 was in the provision of public administration services and education – on average 0.1% and 0.4%, respectively, which are predominantly domestically oriented.

Table 2. Export orientation of the national economy sectors, 2013–2019, (%) (share of export in the total output of the industry)

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Total	19.9	22.9	21.0	19.6	19.3	18.1	16.7
Manufacture of basic metals	66.7	71.4	69.8	60.4	59.8	60.4	55.5
Mining of metal ores	44.5	50.4	53.5	45.6	47.5	44.7	45.4
Computer programming	41.6	50.7	58.6	53.3	52.8	51.1	44.3
Postal and courier activities	0.0	20.3	37.2	32.2	44.6	51.9	38.6
Manufacture of machinery and equipment, not elsewhere classified	71.7	86.8	70.8	54.0	48.8	43.7	38.1
Manufacture of electrical equipment	65.8	59.0	42.7	38.0	37.9	38.1	37.4
Agriculture, forestry and fishing	23.1	28.1	29.0	29.1	30.3	27.9	34.3

³ Ukraine's Foreign Trade in Goods and Services in 2014; 2016; 2018; 2019. State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 25.12.2021).

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Manufacture of wood, paper	31.9	35.0	33.5	32.2	33.5	32.4	28.7
Transport, warehousing	32.3	44.0	38.7	41.1	38.3	32.7	28.5
Manufacture of chemicals	57.9	59.9	33.8	26.8	27.3	29.0	22.3
Manufacture of food products	25.7	30.8	23.0	24.5	25.2	23.8	22.2
Research and development	27.5	28.6	34.7	31.1	29.7	19.2	21.8
Manufacture of other transport equipment	40.6	42.5	35.6	31.4	13.6	13.6	21.6
Manufacture of furniture	30.6	33.8	28.8	26.4	25.8	23.3	20.7
Manufacture of textiles	70.9	52.4	19.1	18.8	21.1	21.7	19.5
Manufacture of motor vehicles	65.3	49.8	18.8	17.6	15.6	17.0	16.0
Manufacture of computers	69.2	64.2	25.6	21.1	17.8	15.4	14.9
Manufacture of rubber and plastic products	19.0	19.4	14.3	13.2	14.4	14.7	14.2
Manufacture of fabricated metal products	25.4	33.7	24.3	18.9	18.4	16.5	14.1
Other services	16.6	14.9	16.3	14.8	12.1	13.9	12.8
Legal and accounting activities	13.1	18.1	20.0	15.8	13.7	15.9	11.4
Advertising	8.7	9.6	10.9	10.0	11.5	9.3	9.7
Accommodation and catering	54.4	22.0	14.2	13.5	14.3	12.4	9.4
Manufacture of refined petroleum products	28.6	24.5	7.0	6.2	7.1	7.7	8.4
Administrative services	6.6	11.8	12.3	10.3	10.7	9.5	8.0
Arts, sports, entertainment and recreation	13.1	7.5	8.6	8.9	10.8	8.4	7.5
Manufacture of other non-metallic mineral products	12.6	14.6	11.7	9.2	9.0	8.8	7.2
Manufacture of basic pharmaceutical products	19.0	19.9	7.6	7.5	7.7	7.5	6.5
Telecommunications	14.3	16.5	18.7	15.1	12.6	11.0	6.0
Water supply	3.5	3.6	4.0	4.0	4.2	3.9	3.4
Manufacture of coke and coke products	13.8	11.0	5.9	4.5	4.6	4.2	3.1
Oil and gas extraction	7.0	6.0	3.2	2.7	3.4	3.0	2.9
Electricity supply	4.1	4.6	4.2	2.2	2.8	3.0	2.9
Publishing	3.4	4.3	4.2	3.3	2.8	3.5	3.0
Financial and insurance activities	3.3	2.5	4.2	2.7	2.1	2.5	2.3
Construction	1.3	1.5	3.2	1.8	0.7	0.9	0.5
Real estate activities	1.8	0.6	0.3	0.6	0.6	0.5	0.5
Healthcare	0.7	0.4	0.4	0.5	0.4	0.4	0.4
Public administration and defence	0.3	0.3	0.6	0.5	0.5	0.2	0.2
Education	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mining of coal	11.7	20.3	2.7	1.9	3.2	0.2	0.0

Source: calculated according to the data of State Statistics Service of Ukraine.⁴

Analysing trade in terms of value added allows an assessment of exports in a dimension comparable to GDP, and hence a better understanding of the role of exports in the structure of the national economy.

Comparing exports in terms of gross output and value added shows that during 2013–2019, the share of services was traditionally lower (34.3% of output against

⁴ Input-Output table for 2013–2019 (at consumer prices). State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 26.12.2021).

37.8% of value added), while the share of manufacturing was on average higher (65.7% of output against 62.2% of value added) (see Table 3 & Table 4).

Table 3. Share in value added export by industry, 2013–2019, (%)

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Agriculture, forestry and fishing	15.8	18.9	24.7	25.5	24.1	23.7	26.8
Mining of coal and lignite	1.4	1.0	0.1	0.1	0.2	0.0	0.0
Extraction of crude petroleum and natural gas	0.7	0.6	0.5	0.6	0.7	0.7	0.6
Mining of metal ores	9.2	9.0	8.0	7.1	8.7	8.8	9.2
Manufacture of food products; beverages and tobacco products	6.1	7.3	6.1	7.0	6.9	6.2	5.8
Manufacture of textiles, wearing apparel, leather and related products	2.5	1.7	0.7	0.8	0.9	1.0	0.9
Manufacture of wood, paper, printing and reproduction	1.6	1.8	1.9	2.0	2.1	2.2	1.9
Manufacture of coke	0.2	0.1	0.1	0.1	0.1	0.1	0.0
Manufacture of refined petroleum products	0.4	0.4	0.1	0.1	0.1	0.1	0.1
Manufacture of chemicals and chemical products	1.7	1.5	1.0	0.7	0.6	0.7	0.5
Manufacture of basic pharmaceutical products and pharmaceuticals	0.3	0.4	0.2	0.2	0.2	0.2	0.2
Manufacture of rubber and plastic products	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Manufacture of other non-metallic mineral products	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Manufacture of basic metals	5.9	10.3	9.5	8.7	9.1	9.8	7.2
Manufacture of fabricated metal products, except machinery and equipment	0.8	0.8	0.7	0.6	0.6	0.7	0.6
Manufacture of computer, electronic and optical products	0.8	0.6	0.2	0.3	0.2	0.2	0.2
Manufacture of electrical equipment	2.2	1.7	1.1	1.0	1.1	1.3	1.1
Manufacture of machinery and equipment, not elsewhere classified	4.6	4.2	3.3	2.9	2.6	2.4	2.2
Manufacture of motor vehicles, trailers and semi-trailers	1.0	0.7	0.2	0.2	0.2	0.3	0.2
Manufacture of other transport equipment	4.3	2.1	1.4	1.2	0.7	0.6	1.0
Manufacture of furniture; other goods; repair and installation of machinery and equipment	1.9	1.8	1.6	1.6	1.8	1.7	1.8
Electricity, gas, steam and air conditioning supply	0.9	0.9	0.8	0.5	0.6	0.8	0.8
Water supply; sewerage, waste management and remediation activities	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Construction	0.3	0.2	0.4	0.3	0.1	0.2	0.1

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Transport, warehousing	17.9	18.1	18.1	19.7	18.8	17.2	16.3
Postal and courier activities	0.0	0.2	0.4	0.4	0.4	0.5	0.4
Accommodation and catering	3.3	0.9	0.6	0.7	0.7	0.7	0.7
Publishing	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Telecommunications	1.8	1.6	1.9	1.4	1.1	1.0	0.5
Computer programming, consultancy, and information service activities	3.8	5.0	7.8	8.5	9.3	10.7	12.2
Financial and insurance activities	1.2	0.8	1.0	0.6	0.5	0.6	0.6
Real estate operations	0.9	0.2	0.2	0.3	0.3	0.3	0.3
Legal and accounting activities	1.5	1.4	1.6	1.5	1.5	1.9	2.0
Research and development	1.6	1.5	1.7	1.3	1.3	1.0	0.9
Advertising and market research	0.7	0.6	0.8	0.8	0.8	0.9	0.9
Administrative and support service activities	0.6	0.9	0.9	1.0	1.0	1.1	1.1
Public administration and defence; compulsory social security	0.1	0.1	0.2	0.2	0.2	0.1	0.1
Education	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Healthcare and social work	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Arts, sports, entertainment and recreation	0.9	0.4	0.4	0.4	0.5	0.4	0.4
Other services	1.2	0.9	0.8	0.8	0.7	0.9	1.1
Total	41.9	41.2	33.9	33.6	33.9	33.9	34.8

Source: calculated according to the data of State Statistics Service of Ukraine.⁵

Table 4. Share in gross output export by industry, 2013–2019, (%)

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Agriculture, forestry and fishing	15.8	18.9	21.3	21.8	20.3	19.9	23.0
Mining of coal and lignite	1.4	1.0	0.1	0.1	0.2	0.0	0.0
Extraction of crude petroleum and natural gas	0.7	0.6	0.5	0.5	0.7	0.6	0.5
Mining of metal ores	9.2	9.0	6.8	6.0	7.1	7.3	7.7
Manufacture of food products; beverages and tobacco products	6.1	7.3	11.2	13.8	14.8	13.9	12.9
Manufacture of textiles, wearing apparel, leather and related products	2.5	1.7	1.3	1.4	1.5	1.6	1.5
Manufacture of wood, paper, printing and reproduction	1.6	1.8	2.0	2.1	2.2	2.3	2.0
Manufacture of coke	0.2	0.1	0.1	0.0	0.1	0.0	0.0
Manufacture of refined petroleum products	0.4	0.4	0.6	0.5	0.6	0.6	0.6

⁵ Input-Output table for 2013–2019 (at consumer prices). State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 26.12.2021).

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Manufacture of chemicals and chemical products	1.7	1.5	2.0	1.3	1.4	1.5	1.1
Manufacture of basic pharmaceutical products and pharmaceuticals	0.3	0.4	0.4	0.4	0.4	0.4	0.4
Manufacture of rubber and plastic products	0.4	0.3	0.4	0.4	0.4	0.4	0.3
Manufacture of other non-metallic mineral products	0.5	0.4	0.5	0.4	0.4	0.5	0.4
Manufacture of basic metals	5.9	10.3	8.2	7.7	7.6	8.2	6.2
Manufacture of fabricated metal products, except machinery and equipment	0.8	0.8	0.8	0.6	0.7	0.7	0.6
Manufacture of computer, electronic and optical products	0.8	0.6	0.6	0.6	0.6	0.5	0.5
Manufacture of electrical equipment	2.2	1.7	1.5	1.3	1.7	1.8	1.7
Manufacture of machinery and equipment, not elsewhere classified	4.6	4.2	3.7	3.1	3.0	2.8	2.6
Manufacture of motor vehicles, trailers and semi-trailers	1.0	0.7	1.0	1.1	0.7	0.9	0.8
Manufacture of other transport equipment	4.3	2.1	1.3	1.2	0.7	0.8	1.3
Manufacture of furniture; other goods; repair and installation of machinery and equipment	1.9	1.8	1.7	1.7	1.9	1.8	1.9
Electricity, gas, steam and air conditioning supply	0.9	0.9	0.8	0.5	0.6	0.7	0.7
Water supply; sewerage, waste management and remediation activities	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Construction	0.3	0.2	0.4	0.3	0.1	0.2	0.1
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.2	0.2	0.2	0.1	0.2	0.2	0.2
Transport, warehousing	17.9	18.1	16.3	17.2	16.2	15.0	14.3
Postal and courier activities	0.0	0.2	0.4	0.3	0.4	0.4	0.4
Accommodation and catering	3.3	0.9	0.6	0.6	0.6	0.7	0.6
Publishing	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Telecommunications	1.8	1.6	1.9	1.4	1.1	1.0	0.5
Computer programming, consultancy, and information service activities	3.8	5.0	6.6	7.2	7.8	9.0	10.4
Financial and insurance activities	1.2	0.8	0.9	0.5	0.4	0.5	0.5
Real estate operations	0.9	0.2	0.1	0.2	0.2	0.3	0.2
Legal and accounting activities	1.5	1.4	1.3	1.3	1.3	1.6	1.7
Research and development	1.6	1.5	1.5	1.1	1.1	0.9	0.8
Advertising and market research	0.7	0.6	0.7	0.7	0.7	0.8	0.8
Administrative and support service activities	0.6	0.9	0.9	0.9	0.9	1.0	1.0
Public administration and defence; compulsory social security	0.1	0.1	0.2	0.2	0.2	0.1	0.1

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Education	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Healthcare and social work	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Arts, sports, entertainment and recreation	0.9	0.4	0.3	0.3	0.4	0.3	0.3
Other services	1.2	0.9	0.7	0.7	0.6	0.8	0.9
Total	41.9	41.2	39.9	39.7	40.1	40.0	40.5

Source: calculated according to the data of State Statistics Service of Ukraine.⁶

Among the branches of the processing industry where the average share in exports of output prevailed over the average share in exports of value added during 2013–2019, we can see the following:

- manufacture of food products; beverages and tobacco products – 11.5% and 6.5% respectively;
- manufacture of machinery and equipment not included in other groups – 3.4 and 3.2%, respectively;
- manufacture of furniture, other products, and installation of machinery and equipment – 1.8 and 1.7% respectively;
- manufacture of electrical equipment – 1.7 and 1.4%, respectively;
- manufacture of textiles, clothing, leather and other materials – 1.6 and 1.2%, respectively;
- manufacture of chemicals and chemical products – 1.5 and 0.9%, respectively;
- manufacture of refined petroleum products 0.5 and 0.2%, respectively.

The processing industries where the average share in exports of value added prevailed over the average share in exports of gross output during the period include:

- agriculture, forestry and fisheries – 22.8% of value added against 20.2% of gross output;
- extractive industry – 8.6% of value added against 7.6% of gross output.

In the services sector, the sectors in which the average share of value added exports between 2013 and 2019 prevailed over the average share of gross output exports are: transport, warehousing (18.0% and 16.4%, respectively); computer programming, consulting and information services (8.2% and 7.1%, respectively); activities in the areas of law and accounting, head office activities, management consulting, architectural and engineering activities, technical testing and research (1.6% and 1.5%, respectively); research, scientific and technical activities (1.3% and 1.2%, respectively); temporary accommodation and catering (1.1% and 1.0%, respectively); administrative and support services activities (0.9% and 0.8%, respectively); provision of other services (0.9% and 0.8%, respectively); other services (0.9% and 0.8%, respectively); advertising and market research, veterinary activities (0.8% and 0.7%, respectively); financial and insurance activities (0.7% and 0.6%, respectively); art, sport, entertainment

⁶ Input-Output table for 2013–2019 (at consumer prices). State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 26.12.2021).

and recreation (0.5% and 0.4%, respectively); real estate transactions (0.3% and 0.2%, respectively).

Among these industries, the two sectors with the highest average share of value added exports were transport and warehousing (18.0%) and computer programming, consulting and information services (8.2%).

In order to ensure accelerated GDP growth, it is important not just to increase exports, but to increase exports of goods and services that provide higher value added growth. In terms of this indicator, the most important export sectors are agriculture, forestry and fisheries (on average 22.8% of exports in value added); transport and warehousing (on average 18% of exports in value added) and computer programming, consulting and information services (on average 8.2% of exports in value added). The products of the metallurgical industry (on average 8.6% in exports of value added) and food, beverage and tobacco production (on average 6.5% in exports of value added) should also be added to this list.

During 2013–2019, the content of imported raw materials in export products averaged 19.6% (Table 5). That is exactly the indicator that shows the level of the economy's integration into global value chains.

Table 5. The content of imported raw materials and components in export products by sector, 2013–2019, (%)

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Agriculture, forestry and fishing	23.1	28.1	29.0	29.1	30.3	27.9	34.3
Mining of coal and lignite	11.7	20.3	2.7	1.9	3.2	0.2	0.0
Extraction of crude petroleum and natural gas	7.0	6.0	3.2	2.7	3.4	3.0	2.9
Mining of metal ores	44.5	50.4	53.5	45.6	47.5	44.7	45.4
Manufacture of food products; beverages and tobacco products	25.7	30.8	23.0	24.5	25.2	23.8	22.2
Manufacture of textiles, wearing apparel, leather and related products	70.9	52.4	19.1	18.8	21.1	21.7	19.5
Manufacture of wood, paper, printing and reproduction	31.9	35.0	33.5	32.2	33.5	32.4	28.7
Manufacture of coke	13.8	11.0	5.9	4.5	4.6	4.2	3.1
Manufacture of refined petroleum products	28.6	24.5	7.0	6.2	7.1	7.7	8.4
Manufacture of chemicals and chemical products	57.9	59.9	33.8	26.8	27.3	29.0	22.3
Manufacture of basic pharmaceutical products and pharmaceuticals	19.0	19.9	7.6	7.5	7.7	7.5	6.5
Manufacture of rubber and plastic products	19.0	19.4	14.3	13.2	14.4	14.7	14.2
Manufacture of other non-metallic mineral products	12.6	14.6	11.7	9.2	9.0	8.8	7.2
Manufacture of basic metals	66.7	71.4	69.8	60.4	59.8	60.4	55.5
Manufacture of fabricated metal products, except machinery and equipment	25.4	33.7	24.3	18.9	18.4	16.5	14.1

Type of economic activity	2013	2014	2015	2016	2017	2018	2019
Manufacture of computer, electronic and optical products	69.2	64.2	25.6	21.1	17.8	15.4	14.9
Manufacture of electrical equipment	65.8	59.0	42.7	38.0	37.9	38.1	37.4
Manufacture of machinery and equipment, not elsewhere classified	71.7	86.8	70.8	54.0	48.8	43.7	38.1
Manufacture of motor vehicles, trailers and semi-trailers	65.3	49.8	18.8	17.6	15.6	17.0	16.0
Manufacture of other transport equipment	40.6	42.5	35.6	31.4	13.6	13.6	21.6
Manufacture of furniture; other goods; repair and installation of machinery and equipment	30.6	33.8	28.8	26.4	25.8	23.3	20.7
Electricity, gas, steam and air conditioning supply	4.1	4.6	4.2	2.2	2.8	3.0	2.9
Water supply; sewerage, waste management and remediation activities	3.5	3.6	4.0	4.0	4.2	3.9	3.4
Construction	1.3	1.5	3.2	1.8	0.7	0.9	0.5
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Transport, warehousing	32.3	44.0	38.7	41.1	38.3	32.7	28.5
Postal and courier activities	0.0	20.3	37.2	32.2	44.6	51.9	38.6
Accommodation and catering	54.4	22.0	14.2	13.5	14.3	12.4	9.4
Publishing	3.4	4.3	4.2	3.3	2.8	3.5	3.0
Telecommunications	14.3	16.5	18.7	15.1	12.6	11.0	6.0
Computer programming, consultancy, and information service activities	41.6	50.7	58.6	53.3	52.8	51.1	44.3
Financial and insurance activities	3.3	2.5	4.2	2.7	2.1	2.5	2.3
Real estate operations	1.8	0.6	0.3	0.6	0.6	0.5	0.5
Legal and accounting activities	13.1	18.1	20.0	15.8	13.7	15.9	11.4
Research and development	27.5	28.6	34.7	31.1	29.7	19.2	21.8
Advertising and market research	8.7	9.6	10.9	10.0	11.5	9.3	9.7
Administrative and support service activities	6.6	11.8	12.3	10.3	10.7	9.5	8.0
Public administration and defence; compulsory social security	0.3	0.3	0.6	0.5	0.5	0.2	0.2
Education	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Healthcare and social work	0.7	0.4	0.4	0.5	0.4	0.4	0.4
Arts, sports, entertainment and recreation	13.1	7.5	8.6	8.9	10.8	8.4	7.5
Other services	16.6	14.9	16.3	14.8	12.1	13.9	12.8
Total	19.9	22.9	21.0	19.6	19.3	18.1	16.7

Source: calculated according to the data of State Statistics Service of Ukraine.⁷

The reorientation of the Ukrainian economy is increasingly a question of reducing foreign trade in commodities and focusing on exports in high-tech goods. This trend

⁷ Input-Output table for 2013–2019 (at consumer prices). State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 26.12.2021).

will contribute to building Ukraine’s export capacity and ensuring an innovative model of national economic development.

Officially, Ukraine does not have a list of high-tech goods in accordance with the UCCFT. Consequently, there is a problem in calculating a single correct value for the volume of high-tech products export. This causes difficulties in determining this indicator and also generates different values for its share in the structure of exports in goods. This situation arises because the Ukrainian legislation equates knowledge-intensive technology with high technology, but not all of them are as such.

The Secretariat of the OECD developed the Standard International Trade Classification based on the product approach, according to which, the following groups of goods are classified as high-tech: aerospace products; computer and office equipment; electronics and telecommunications; pharmaceutical products; scientific instruments; electrical machinery and equipment; chemical products; non-electrical machinery and equipment.

Analysis of foreign trade in high-tech goods in Ukraine in 2010–2019 shows that the export of groups of goods that are partly or fully classified as high-tech is significantly lower than their import (Figure 2; Figure 3).

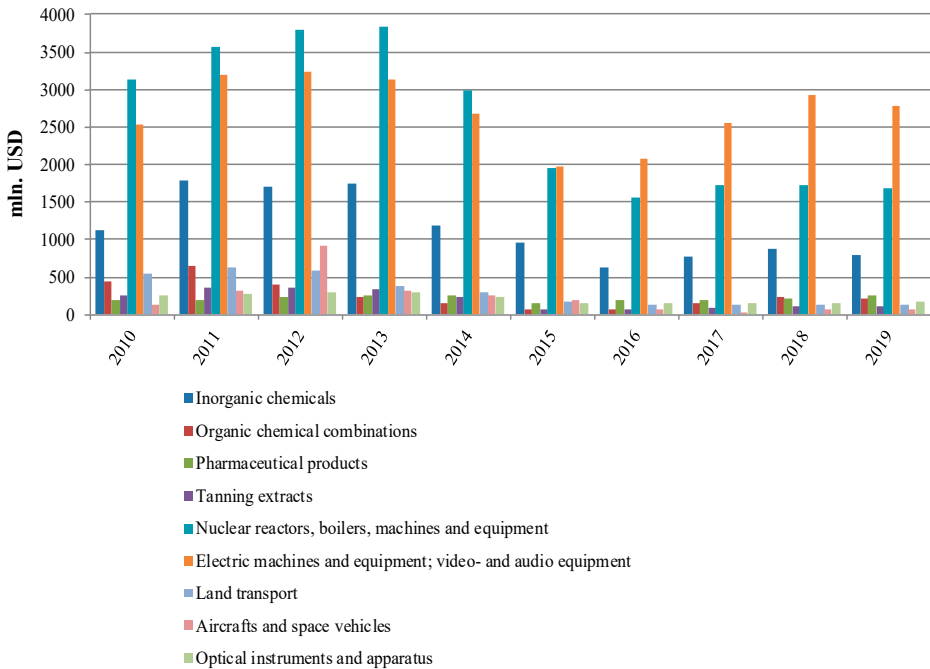


Figure 2. Volumes of certain groups of goods export, 2010–2019 years

Source: calculated according to the data of State Statistics Service of Ukraine.⁸

⁸ Ukraine’s Foreign Trade in Goods and Services in 2010–2019. State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 28.12.2021).

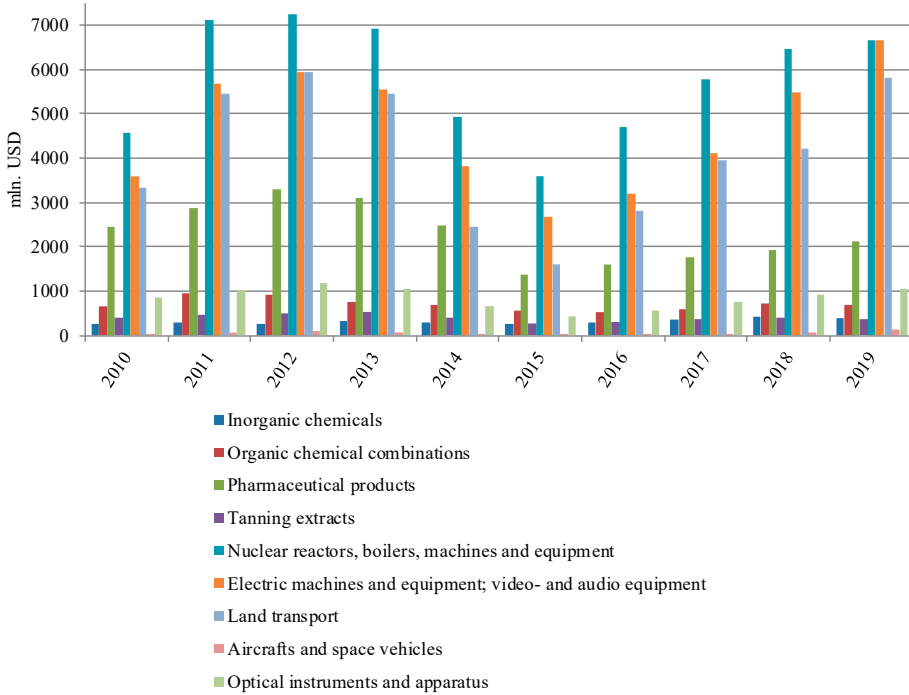


Figure 3. Volumes of certain groups of goods import, 2010–2019 years

Source: calculated according to the data of State Statistics Service of Ukraine.⁹

The balance of these groups of goods was negative from 2010–2019. The share of knowledge-intensive exports during this period averaged 15.4% of the total exports of goods, while the share of imports was almost 34.0%. A more detailed analysis of the structure of Ukrainian exports and imports of high-tech goods between 2010 and 2019 shows that only goods from the “Products of inorganic chemistry” group had a positive balance, and, prior to 2017, goods from the “Aircraft and space vehicles” group.

In the structure of exports, between 2010 and 2019, the largest share was taken by groups of domestic goods such as “Electrical machinery and equipment; video and audio equipment” – an average of 5.4% of total domestic goods exports; “Reactors, boilers, machinery, equipment” – an average of 4.9% of total domestic goods exports, and “Products of inorganic chemistry” – an average of 2.2% of total domestic goods exports.

In the structure of high-tech imports during 2010–2019, the largest share belonged to the group “Reactors, boilers, machinery, equipment” – on average 30.4% of total imports of high-tech goods. Also, a fairly high share of high-tech imports in the total structure of imports belongs to such groups as “Electrical machinery and equipment; video

⁹ Ukraine's Foreign Trade in Goods and Services in 2010–2019. State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 28.12.2021).

and audio equipment” – an average of 24.2% to the total imports of high-tech goods; “Land vehicles” – an average of 20.7% to the total imports of high-tech goods; “Pharmaceutical products” – an average of 12.1% to the total imports of high-tech goods; “Organic chemical compounds” – 3.8% to the total imports of high-tech goods.

Overall, as Figure 2 and Figure 3 show, from 2010–2019, foreign trade in high-tech goods was characterised by a low share in total exports and a significant negative balance.

Analysing the foreign trade in high-tech goods based on knowledge-intensive products in dynamics, one can see that by 2012, there was an increase in the volume of foreign trade in high-tech goods. However, from 2014–2015, the volume of foreign trade in high-tech goods decreased by more than 2.2 times. Only since 2016 has been an increase (Figure 4).

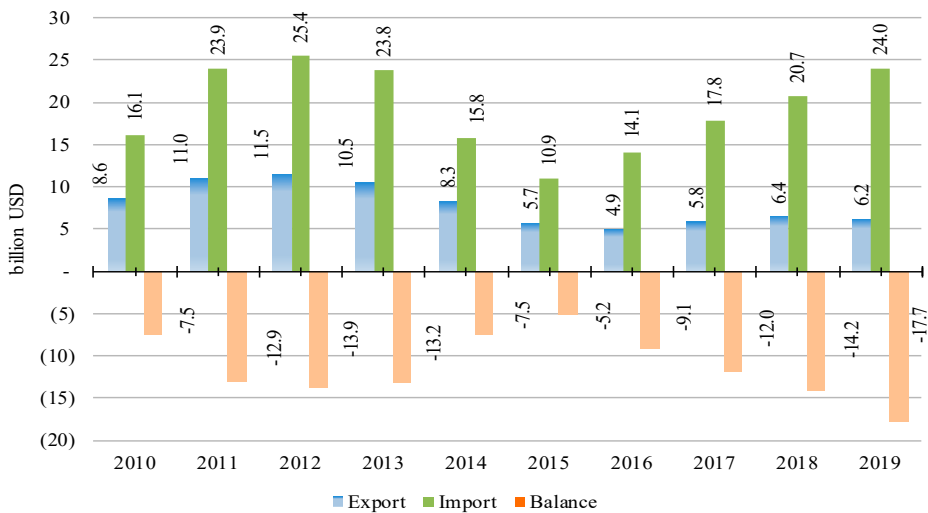


Figure 4. Dynamics of foreign trade in high-tech goods of Ukraine, 2010–2019 years, USD billion
Source: calculated according to the data of State Statistics Service of Ukraine.¹⁰

Compared to developed countries, the dynamics of Ukraine’s high-tech goods exports over the period 2010–2019 show an annual decrease in its share (Figure 5). In particular, the share of high-tech goods exports in the total structure of Ukraine’s exports decreased by 3.4 p.p. in 2019 compared to 2010, amounting to 13.4%. This is the lowest figure among the countries represented, as the share of high-tech goods exports in the total export structure of the USA, China, Japan and Germany exceeds 50%. Note that the US, China, Japan, Germany and Poland together accounted for between 33.4% and 60.1% of global exports of high-tech goods during 2010–2019.

¹⁰ Ukraine’s Foreign Trade in Goods and Services in 2010–2019. State Statistics Service of Ukraine (retrieved from <http://www.ukrstat.gov.ua>) (accessed: 28.12.2021).

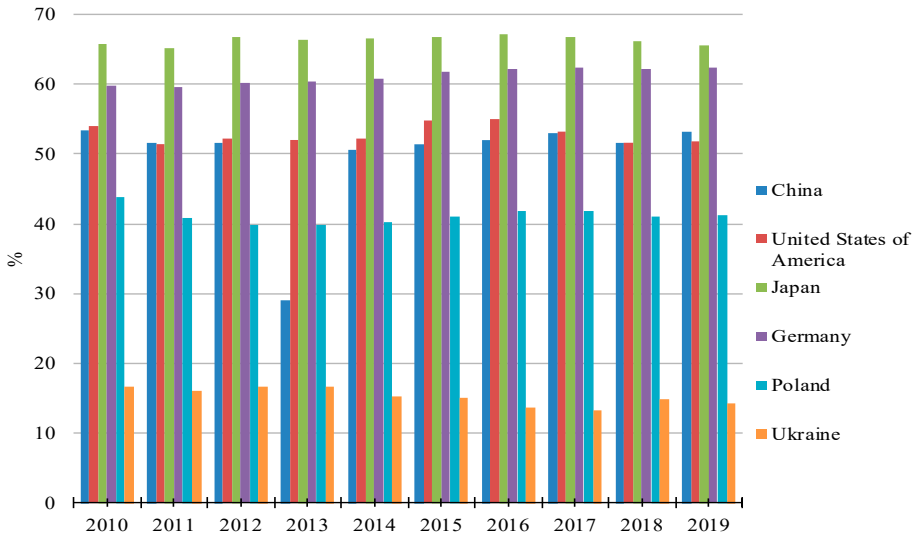


Figure 5. The share of high-tech goods exports in total exports of developed countries and Ukraine, 2010–2019 years %

Source: compiled and calculated according to the data.¹¹

This is primarily due to the social, political and economic situation in the country, as well as the shutdown of a number of strategic production facilities and the loss of control over the part of the state's territory as a result of military aggression by the Russian Federation.

Figure 5 also shows that, despite its potential in the high-tech sphere, Ukraine remains dependent on imported high-tech goods.

Compared to developed countries, the dynamics of Ukraine's export in high-tech goods in 2010–2019 shows an annual decrease in its share (Figure 6).

¹¹ Trade statistics for international business development. ITC. URL: https://www.trademap.org/tradestat/Product_SelProduct_TS.aspx (accessed: 4.01.2022).

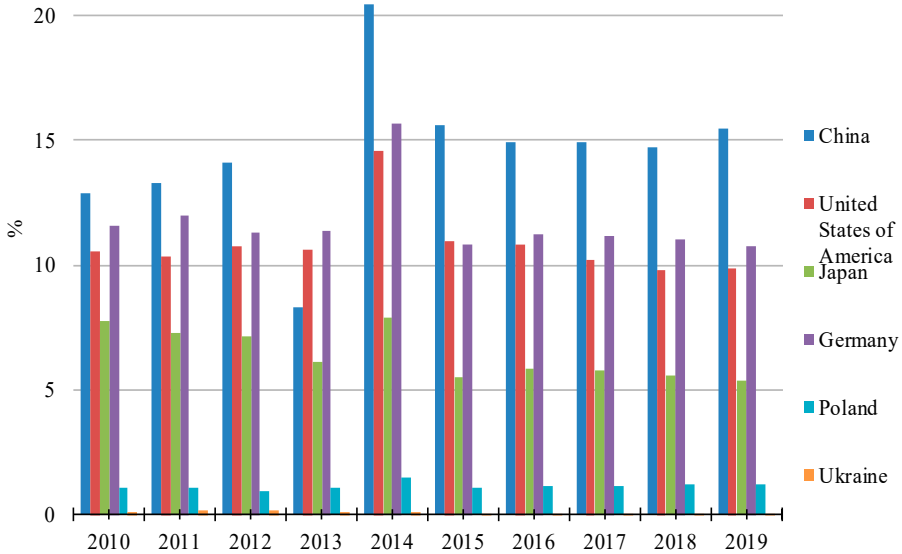


Figure 6. The share of high-tech goods exports in total exports of developed countries and Ukraine, 2010–2019 years %

Source: compiled and calculated according to the data.¹²

Conclusions

The concept of global value chains allows for a qualitatively new level of research into the functioning of the world economy, as well as the study of the essence and components of modern international commodity co-operation, production and technological potential of individual countries and their competitiveness. This concept is extremely important for Ukraine in the context of deepening the regional economic integration with the EU and other countries within the framework of bilateral and multilateral trade and economic agreements. Ukraine has held leading positions in the markets for non-precious metals and their products (an average of 18.3%), as well as in the markets for products of plant origin, whose share ranged from 4.8% in 2010 to 19.3% in 2019, an average of 20.8 times higher than the global indicator, etc. Overall, the growth rate of Ukrainian exports of agricultural, food and ore products is outpacing the global rate, which indicates fairly stable global demand and the resilience of these sectors to crises in the economy.

As the analysis shows, in order to ensure accelerated GDP growth, it is important for Ukraine to increase the exports of goods and services that provide higher value-added growth. In terms of this indicator, the most important export sectors are

¹² Trade statistics for international business development. ITC. URL: https://www.trademap.org/tradestat/Product_SelProduct_TS.aspx (accessed: 4.01.2022).

agriculture, forestry and fisheries (an average of 22.8% in exports of value added); transport, warehousing (an average of 18%) and computer programming, consulting and information services (an average of 8.2%). Also, the products of the metallurgical industry (on average 8.6% in exports of value added) and the food, beverage and tobacco industry (on average 6.5%) should be added to this list.

The content of imported raw materials in export output indicates the level of Ukrainian economic integration into the global value chains. Between 2013 and 2019, this indicator averaged 19.6%. By sector, the highest content of imported raw materials and components was in the metallurgical industry and services in the area of computer programming, consulting and information services. This indicator is also high for the machinery and equipment industries; postal and courier services; metal ore mining, etc. From 2013–2019 education, healthcare, public administration and defence were the least dependent on imported raw materials and components.

Overall, Ukraine's export is concentrated, which increases its sensitivity to shocks. Consequently, its quantities and values can fluctuate substantially, as shown by the analysis. At the same time, increasing the share of goods with a high level of processing will increase the stability of export earnings.

In order to facilitate Ukraine's economic integration into global value-added chains, it is necessary to: create favourable conditions to attract investments in projects that involve the production of final high-tech goods; strengthen the protection of intellectual property rights to encourage the implementation of patent-protected production facilities in Ukraine; foster collaboration between science and business to encourage the innovation process. This, in turn, requires: improving the legal and regulatory framework; the implementation and monitoring of programmes for research and technical activities; intensifying the international integration of science, production and education; a mechanism to coordinate research and technical activities; an effective system for foreign investment attraction; technological support and security; the harmonisation and standardisation of trade procedures; updating the technical regulation system; ensuring integration with the information exchange system; bringing customs law into line with international standards; the insurance of export credits, agreements, and direct investments from Ukraine; a commitment to locate technological production in the host country by providing supplies to companies; investing in high-tech goods; concluding free trade agreements with countries that are promising for the development of Ukrainian export in high-tech goods; the introduction of international experience in creating special investment zones with favourable conditions for doing business; assistance in promoting knowledge-intensive and high-tech products on the world markets, etc.

Overall, the implementation of the proposed measures will allow national producers to actively seek and take advantage of opportunities for inclusion in GVCs. In addition, for Ukrainian enterprises to become intermediate and even final links in global value chains, political stability, the unwavering rule of law, the establishment of quality logistics infrastructure and effective tariff and customs regulation are also needed.

In our view, the clear and consistent implementation of the measures outlined above will create serious competitive advantages and allow Ukrainian high-tech companies to occupy the relevant niches in many regional and global value chains.

References

- Antras, Pol. (2020), *Conceptual Aspects of Global Value Chains*, “Policy Research Working Paper”, World Bank, Washington, DC. World Bank. No. 9114, <https://doi.org/10.1596/1813-9450-9114>
- Antràs, P., Garicano, L., Rossi-Hansberg, E. (2008), *Organizing offshoring: Middle managers and communication costs*, *The Organization of Firms in a Global Economy*, Harvard University Press, Cambridge MA, p. 311, <https://doi.org/10.4159/9780674038547-010>
- Bila knyha. Yak realizuvaty eksportnyi potentsial Ukrainy za umov hlobalizatsii. Propozytsii shchodo polityky spryannia rozvytku ukrainskoho eksportu* (2016), Instytut ekonomichnykh doslidzhen ta politychnykh konsultatsii, Kyiv.
- Daudin, G., Riffart, Ch., Schweisguth, D. (2011), *Who Produces for Whom in the World Economy?*, “The Canadian Journal of Economics”, 44 (4), pp. 1403–1437. <https://doi.org/10.1111/j.1540-5982.2011.01679.x>
- Fortunato, P. (2020), *How COVID-19 is changing global value chains*, UNCTAD, <https://unctad.org/fr/node/27709> (accessed: 5.01.2022).
- Freeman, C. (1987), *Technology policy and economic performance; lessons from Japan*, Frances Printer Publishers, London–New York.
- Geref, G., Humphrey, J., Kaplinsky, R., Sturgeon, T.J. (2001), *Introduction: Globalization, Value Chains and Development*, *IDS Bulletin*, 32 (3), pp. 1–8, <https://doi.org/10.1111/j.1759-5436.2001.mp32003001.x>
- Global Value Chains After the COVID-19 Crisis (2021), *Global Trade and Innovation Policy Alliance*, <https://www2.itif.org/2021-gtipa-value-chains-covid.pdf> (accessed: 5.01.2022).
- Grossman, G., RossiHansberg, E. (2012), *Task trade between similar countries*, “Econometrica”, 80 (2), pp. 593–629, <https://doi.org/10.3982/ECTA8700>
- Kravtsova, I. (2016), *Metodyka doslidzhennia hlobalnykh lantsiuhiv stvorennia vartosti. Naukovyi visnyk Mizhnarodnoho humanitarnoho universytetu*, “Serii: Ekonomika i menedzhment”, Vyp. 16, pp. 39–45.
- Marushchak, N. (2017), *Hlobalni lantsiuihy dodanoi vartosti v konteksti ekonomichnoi intehratsii Ukrainy*, “Prychornomorski ekonomichni studii”, Vyp. 24, pp. 30–35.
- Maurer, A., Degain, C. (2010), *Globalization and trade flows: what you see is not what you get!* WTO, Staff Working paper, 10, <https://doi.org/10.2139/ssrn.1656826>
- Motoryn, R., Prykhodko, K. (2015), *Metodolohichni pidkhody shchodo vymyriuvannia hlobalnykh lantsiuhiv dodanoi vartosti v mizhnarodnii torhivli. Zovnishnia torhivlia: ekonomika, finansy, pravo*, “Serii: Ekonomichni nauky”, № 5–6, pp. 25–26.
- Nelson, R.R., Winter, S.G. (1982), *An evolutionary theory of economic change*, Belknap Press/Harvard University Press, Cambridge.

- OECD (2013), *Trade in value-added: concepts, methodologies and challenges (joint oecd-wto note)*, <http://www.oecd.org/sti/ind/49894138.pdf> (accessed: 6.01.2022).
- Porter, M.E. (1985), *The Competitive Advantage: Creating and Sustaining Superior Performance*, Free Press, New York.
- Porter, M.E. (1990), *The Competitive Advantage of Nations*, New York: Free Press.
- Yaroshchuk, O., Okhrimenko, O. (2020), *Intehratsiia vitchyznianskykh naukomistkykh vyrobnytstv u hlobalni lantsiuhy dodanoi vartosti. Aktualni problemy ekonomiky ta upravlinnia*, № 14, <http://ape.fmm.kpi.ua/article/view/190757> (accessed: 6.01.2022).

Integracja Ukrainy z globalnymi łańcuchami wartości

W artykule rozważono teoretyczne i metodologiczne podejście do globalnych łańcuchów wartości w procesie pomiaru handlu międzynarodowego. Analizowane są światowe trendy w obecnym rozwoju handlu międzynarodowego oraz scharakteryzowano główne wyzwania międzynarodowej polityki handlowej dla Ukrainy. Stwierdzono, że nowoczesna struktura gospodarki ukraińskiej ukształtowała się pod wpływem czynników zewnętrznych. Autorzy zakładają, że z biegiem czasu wpływ gospodarki światowej na dynamikę i strukturę gospodarki ukraińskiej będzie się nasilał. Badane są perspektywy integracji Ukrainy z globalnymi łańcuchami wartości, a autorzy stwierdzili, że struktura ukraińskiego eksportu towarów tylko częściowo pokrywa się ze strukturą eksportu światowego. Ukraiński eksport towarów charakteryzuje się niskim udziałem wysoko przetworzonych produktów przemysłowych oraz wysokim udziałem produktów o niskiej wartości dodanej, w szczególności metali podstawowych oraz produktów przemysłu rolno-spożywczego. Eksport krajowych towarów high-tech stale spada w porównaniu z krajami rozwiniętymi, a jego udział w światowym eksporcie towarów high-tech jest znikomy. Aby zapewnić przyspieszenie wzrostu PKB na Ukrainie, ważne jest nie tylko zwiększenie eksportu, ale także zwiększenie eksportu towarów high-tech.

Słowa kluczowe: handel międzynarodowy, integracja, globalne łańcuchy wartości, eksport, import, towary high-tech



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