

Edited by  
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# IMPORT SUBSTITUTION POTENTIAL IN THE CONDITIONS OF DIGITAL TRANSFORMATION

Monograph



2021

**UDC 338.2**  
**156**

Published in 2021  
by PC TECHNOLOGY CENTER  
Shatylova dacha str., 4, Kharkiv, Ukraine, 61165

Approved by the Academic Council of Kyiv National University of Trade and Economics,  
Protocol No. 7 of 23.12.2021

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Import substitution potential in the conditions of digital transformation: monograph / A. Mazaraki and others. – Kharkiv: PC TECHNOLOGY CENTER, 2021. – 164 p.

The monograph examines the current problems of state policy of import substitution in the current conditions of the post-industrial economy. The essence and generalized theoretical approaches to the genesis of theories of import regulation in open economies have been revealed, the tools of state regulation in import substitution policy have been systematized and the content of the modern concept of neo-industrial import substitution has been characterized with a definition of institutional obstacles to its development. The preconditions for the implementation of import substitution policy in key sectors of the Ukrainian economy have been studied. The causes and consequences of the growing import dependence of the domestic economy have been established. Considerable attention is paid to the areas of realization of import substitution potential in the context of building a national innovation system. Based on the systematization of international experience, the risks and problems of neo-industrial development of countries that can affect the implementation of their import substitution strategies have been identified. Figures 27, Tables 32, References 198 items.

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**DOI: 10.15587/978-617-7319-51-0**  
**ISBN 978-617-7319-51-0 (online)**  
**ISBN 978-617-7319-52-7 (print)**



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## ABSTRACT

The monograph examines the current problems of state policy of import substitution in the current conditions of the post-industrial economy. The essence and generalized theoretical approaches to the genesis of theories of import regulation in open economies have been revealed, the tools of state regulation in import substitution policy have been systematized and the content of the modern concept of neo-industrial import substitution has been characterized with a definition of institutional obstacles to its development. The preconditions for the implementation of import substitution policy in key sectors of the Ukrainian economy have been studied. The current state of Ukraine's foreign trade has been analyzed and key problems of balancing the foreign trade balance have been identified. The causes and consequences of the growing import dependence of the domestic economy have been established. Considerable attention is paid to the areas of realization of import substitution potential in the context of building a national innovation system. The role of foreign direct investment in ensuring structural transformations in the economy of Ukraine has been studied and the factors of deterioration of the investment climate in Ukraine have been determined. Based on the systematization of international experience, the risks and problems of neo-industrial development of countries that can affect the implementation of their import substitution strategies have been identified.

### KEYWORDS

Trade balance, imports, state regulation, import regulation, import substitution, neo-industrial import substitution, import dependence, open economy, "circular" economy, global digital economy, global production networks.

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## CIRCLE OF READERS AND SCOPE OF APPLICATION

The monograph is intended for a wide range of readers interested in the regulation of foreign trade in an open economy, taking into account the possibility of protecting national economic interests. The research results, presented in the monograph, can be useful in particular for government officials, scientists, teachers, graduate students and students of higher education in economics, as well as for practical researchers in public administration, world economy and foreign economic relations within Ukraine, and beyond.

## INTRODUCTION

International economic activity in Ukraine is one of the priorities of the state policy, which creates the basis for the development of profitable trade and a favorable investment climate. Foreign trade creates significant opportunities for economic growth, the formation of the country's budget, maintaining the welfare of its citizens.

The lack of a strategic approach to solving the problem of domestic market saturation due to a corresponding increase in domestic production based on the development of import-substituting production in Ukraine leads to high dependence of the domestic market on imports and the urgent need to increase exports to cover current account deficits. The high openness of the national economy reinforces the vulnerability of the domestic market to fluctuations in external conditions and adverse global trends (volatility in energy prices, declining prices for basic Ukrainian exports (a significant part of which are raw materials), etc.).

Thus, there is a need to reduce the import dependence of the domestic commodity market, create conditions to eliminate dependence on foreign markets, ensure the positive impact of imports on production, strengthening the competitiveness of the domestic economy on this basis.

The degree of negative impact of imports is determined by the general economic situation in the country. If the economy illustrates growth at a high rate, the negative effect of import growth is not so significant. At the same time, in the conditions of slowing down of economic development the importance of measures of the state policy of regulation of import essentially grows. The scale of the strategic losses of the Ukrainian economy from the transfer of a significant part of the domestic market of high-tech and consumer products to foreign producers is difficult to overestimate. This is not only a huge loss of current and future income and a corresponding narrowing of investment opportunities, improving living standards and economic growth. The result of the development of these processes is the high vulnerability of the Ukrainian economy to external factors. The only real support for the development of the Ukrainian economy is the diversification of industrial production, aimed at strengthening ties with domestic end users (households and corporate investors), whose preferences currently have a significant vector towards imports.

With the globalization of world economic relations intensifying, one of the priority areas for increasing the competitiveness of the national economy is to ensure the transition from the use of static comparative advantages of national economies, naturally set for the country, to dynamic advantages due to significant breakthroughs in technology and information. Ukraine's technological lag behind developed and developing countries is accompanied by a weakening of its competitive position in the global economy. The practice of other countries and domestic experience convincingly show that the modernization of the economy in the catching-up countries without the active involvement of modern foreign equipment, technology and financial resources is essentially impossible.

World practice shows that the passive role of the state in the system of regulating the import of goods gradually leads to the loss of competitiveness of certain sectors of the economy, even in the domestic market. However, this does not mean that the state needs to support such industries at its own expense.

The role of the state in the process of import substitution is to provide organizational and administrative assistance to business in the development of those activities that will be commercially viable, especially in comparison with the profitability of similar European or other industries to form interest in business circles to diversify activities, to produce new or higher quality goods in Ukraine, creating an export-oriented market infrastructure.

*The first section* reveals the essence and generalizes theoretical approaches to the genesis of theories of import regulation in open economies, systematizes the tools of state regulation in import substitution policy, characterizes the content of the modern concept of neo-industrial import substitution with the definition of institutional barriers to its development.

*The second section* of the monograph is devoted to the study of Ukraine's international economic activity in measuring the problems of import dependence. In particular, the issue of assessing the preconditions for the implementation of import substitution policy in key sectors of the Ukrainian economy is considered. The analysis of the current state of Ukraine's foreign trade has been carried out and the key problems of balancing the trade balance have been identified. The causes and consequences of the growing import dependence of the domestic economy have been established. Considerable attention is paid to the areas of realization of the potential of import substitution by high-tech goods in the context of building a national innovation system. The role of foreign direct investment in ensuring structural transformations in the economy of Ukraine has been studied and the factors of deterioration of the investment climate in Ukraine have been determined.

*The third section* presents a study of risks and priorities of neo-industrial development of the XXI century, which can significantly affect the implementation of import substitution strategies in Ukraine and in the world as a whole. The analysis of the latest regulatory practices of states is carried out in the dimension of the policy of "circular" economy, which is designed to radically change the dominant model of resource consumption over the centuries, and thus overcome the high level of resource import dependence for many countries. The study was conducted by appealing to the international experience of both economically developed countries and individual developing countries.

Given the steady progress of neo-industrial development, questions also arise about the institutional capacity of countries to respond to new challenges and threats. In the context of digital economy development, the ability of national regulators to perceive the mechanisms of global coordination has been analyzed and the factors, limiting the effectiveness of such international institutional cooperation, have been identified. The possible consequences of plans of multinational companies of rich countries, initiated by national governments, for reshoring and import substitution have been estimated. Another focus in the section was on the potential for overcoming the resource import dependence of the world's economies through the modernization of their energy systems.

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## ABSTRACT

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The essence and generalized theoretical approaches to the genesis of theories of import regulation in open economies have been revealed, the tools of state regulation in import substitution policy have been systematized, the content of the modern concept of neoindustrial import substitution has been characterized with the definition of institutional obstacles to its development.

## KEYWORDS

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State regulation, import regulation, import substitution policy, import dependence, technological transformations.

### 1.1 EVOLUTION OF APPROACHES TO THE ISSUE OF STATE POLICY OF IMPORT SUBSTITUTION

Active participation of the economic complex of the country in the international division of labor by entering the world economic space is a necessary condition for the formation, development and rational use of the potential of the national economy. Economic interaction with the outside world in modern conditions is a catalyst for market transformations, forming an impetus to intensify the development of institutions and mechanisms that were underdeveloped, and the adaptation of the national economy to operate in a changing world commodity markets.

At the same time, it should be noted the ambiguity of the manifestations of foreign economic factors in the national economy development. Involvement in world economic relations and increasing the level of foreign trade quota as an indicator of economic openness contributes to the rationalization of consumption of all types of resources and structural optimization of the national economy, increasing competitiveness and transition to new technological levels. However, excessive and economically unjustified openness of the national economy (above the level that meets the national interests of the country), increasing dependence on the possibility of selling products exclusively in foreign markets and the supply of imported equipment, technology and service by foreign counterparties are evidence of negative foreign economic impact factors on the national economy, which leads to:

- gradual loss of competitiveness;
- significant dependence on world commodity markets;
- ignoring national economic interests;
- stagnation and return of the country to lower technological systems.

Contrary to the efforts of the institutions of the multilateral trading system and regional trade unions, the list of protectionist barriers to the movement of goods, services, capital and people across national borders is growing. It includes traditional tariffs and quotas, technical restrictions on imports (for example, through the introduction of safety standards or standards different from those, practiced by exporting countries), as well as fiscal, legislative and administrative barriers. In addition, freedom of movement is restricted through systems of state support, public procurement and state monopoly in certain sectors of the economy [1].

The growing level of protectionism under the current conditions is a paradox of modern consumer society, in which few people buy domestic goods if a cheap and high-quality imported analogue is offered. Authorities are often interested in protectionism, fearing that uncontrolled import receipts could lead to the bankruptcy of national enterprises, reduced employment, and tax revenues. Under such conditions, barriers make imports more expensive or unaffordable, which expand the demand for domestic goods, allow them to be sold at higher prices, and thus create preconditions for the growth of the domestic economy.

In many countries, protectionist barriers are the government's response to changes in the quality of imported goods and services, reduced public security and state control, and the unwelcome prospect of opening up strategic sectors of the economy. The state benefits from protectionism in the form of duties and taxes, as well as state monopolies in a number of sectors, and national enterprises in the form of profits, generated in conditions of limited competition.

Studies of the views on the place and necessity of regulating the import of goods have undergone a long stage of evolution in the framework of theories of international trade, but the lack of a scientific definition of the category of "import regulation" raises the problem of interpretation of this term. The economic encyclopedia defines the term "regulation" as a management function that ensures the functioning and development of phenomena and processes within the specified quantitative and qualitative parameters [2].

Instead, regulation of international trade is a set of forms, methods and levers of state and supranational regulation of exports and imports of goods and services in order to create favorable conditions for expanding reproduction within the country, especially for national and transnational companies to maximize profits [2]. However, the foreign trade of some countries in the world together forms international trade, and therefore for a clearer definition of the term "regulation of imports of goods" it is advisable to turn to the views of scholars who have dealt with this issue.

In the dictionary of modern economic terms, edited by B. Reisberg, state regulation of foreign trade is considered as a system of statutory methods of state influence on foreign trade operations of business entities, carried out in accordance with the objectives of economic policy of the state and aimed at achieving certain goals [3]. A. Komilov interprets regulation of foreign trade as a measure of state regulation, aimed at reducing imports and expanding exports in order to eliminate the balance of payments deficit [4].

However, such a definition does not fully reflect the needs of the national economy and the positive balance of payments should not be considered as the sole purpose of import regulation.

According to M. Cherekayev, state regulation of foreign trade is an integral part of the system of state regulation of the economy and is a continuation of its economic policy [5].

Thus, in view of the above, regulation of imports of goods should be considered a system of government and supranational institutions, aimed at creating favorable conditions for expanded reproduction on the basis of legality, non-discrimination, transparency, balance of state and society interests and harmonization of national development priorities with standards and rules of international regulatory institutions.

The countries that were the first to choose the path of intensifying foreign trade were skeptical about imports and their impact on the development of the domestic market, which was due to the ideas of the economic school of early capitalism – mercantilism. Its supporters saw imports as a threat to domestic producers, and their views were quite convincing, which contributed to the spread of mercantilist ideas in the scientific world. The main arguments for the negative impact of imports on the country's economy are:

- reduction of production due to the price competitiveness of imported products and redistribution of income of the national economy in favor of foreign producers;
- due to the growth of imports, the outflow of foreign currency from the country intensifies. In particular, in the early stages of international trade there was an outflow of gold and silver, which served as world money.

Given these arguments, mercantilists rightly saw imports as a determinant that inhibits economic growth, and therefore recommended measures to limit import flows into the country. In modern conditions, a number of countries to some extent regulate the entry of highly competitive imports into the national market. For example, the United States, which declares the idea of liberal international trade, is taking restrictive measures to prevent foreign sellers of metal from entering its market, which was initiated by American producers who faced problems in selling this type of product.

In the classical theory of international trade, the abolition of protectionist barriers is seen as a benefit, because by increasing the level of sales, it contributes to the growth of wealth. Governments need to maintain a free trade regime, but entrepreneurs should abandon the production of goods that are more profitable to buy abroad, and instead use the absolute benefits of the national economy (natural or acquired as a result of choosing the best production technology) and focus on what can be produced most effectively and better than others.

In the theory of comparative advantage, D. Ricardo developed the views of A. Smith, focusing on the factor of competition. According to his theory, a country can earn income without even having absolute advantages for the production of a product. It is enough to offer it in markets where the production of such goods is less competitive, ie requires relatively higher costs of capital and labor.

Thus, free trade does not limit countries in absolute preferences, but encourages the search for comparative advantages, ultimately increasing opportunities for income and expanding the overall supply of goods and services.

Liberal economists J. Mill and A. Marshall in the early twentieth century argued that the views of mercantilists on the nature of imports are one-sided, but they saw imports as a powerful resource for economic growth, which has a number of key advantages [6]:

- 1) expanding opportunities to meet the needs of a country;
- 2) increasing competition, which leads to the elimination of conservatism in production;
- 3) improving the structure of an economy by eliminating inefficient structures and directing resources to more efficient production;
- 4) formation of incentives for domestic producers to improve product quality;
- 5) activation of all sources and resources for the country's transition to a higher level of production efficiency.

Own attitude to free trade in the middle of the twentieth century was expressed by P. Samuelson, W. Stolper, R. Jones, T. Rybczynsky, who developed the ideas of the classics, identifying the positive and negative factors of an open economy and liberalization of international trade.

American scientists D. Dolar and A. Cray, based on research from 92 countries, confirmed that the openness of an economy promotes economic growth. The income level of developing countries increases in direct proportion to global growth [7].

Harvard University professors J. Sachs and E. Warner hold a similar view. After conducting a study of developing economies during the 1970s and 1980s, they found that the part of countries with a high level of openness grew on average 6 times faster than protectionist countries. In addition, at a ministerial conference in London on the problems of developing countries, the former head of the World Trade Organization M. Moore said: "Free trade has increased almost 17 times over the past 50 years, and despite the large gap in levels of economic development between rich and poor countries, both sides benefit... In particular, the standard of living in each of the groups of countries has tripled, life expectancy in developing countries has increased from 41 to 62 years, education among adults has increased from 40 % up to 70 %" [9].

According to a representative of neoliberalism J. Wiener, the mutual elimination of customs barriers to the movement of factors and results of economic activity is due to both the needs of producers to expand markets and the needs of consumers to expand the supply of goods at low prices. As a result, the concentration of trade flows increases (according to J. Wiener – trade creation), as well as more efficient allocation of resources within customs or other preferential unions. In addition, as noted by J. Wiener, liberalization can have a negative impact on countries outside trade unions, which is expressed in the exclusion of their members from trade with third countries (trade diversion) [10].

However, there is a belief among scholars and governmental and non-governmental organizations that free trade will not ensure economic growth for all countries, but will only further enrich economically developed countries [11]. Such discussions intensified after large-scale anti-globalization protests in Seattle, Washington, Brussels and Genoa in the early XXI century. In particular, a professor of international political economy of the school of public administration named after J. Kennedy D. Rodrik believes that as a result of concentrating efforts on international integration,

human and other strategic resources of developing countries are redirected from priority areas of development (education, health, industrial potential and social well-being) to less important [12]. In "Trade Policy Reform as an Institutional Reform", he formulated the thesis that no country is able to develop successfully, leveling international trade, however no country can develop solely through trade liberalization [13]. D. Rodrik, co-authored with F. Rodriguez, presented the results of joint work based on a review of empirical research on the relationship between the level of openness of the economy and its growth [14] and determined that trade policy liberalization alone cannot be a factor of economic growth, which is determined by many elements of public policy. That is, countries with a certain combination of factors, with the implementation of the systematic approach to public policy could achieve economic growth, even maintaining certain trade restrictions, and conversely, the liberalization of trade policy itself will not necessarily lead to economic growth.

In recent years, WTO liberalization policies have significantly reduced barriers to international flows of goods and services [15], but the organization's efforts to establish a non-discriminatory trade regime to ensure a level playing field for all world market participants are still ineffective. The current procedure for regulating international trade is in the interests of only a narrow circle of countries with a high level of capital intensity of the economy. As a result, the liberalization of the foreign trade regime in countries that do not have a competitive advantage in high-tech industries can lead to significant restrictions on economic development. It is obvious, that the preservation of the existing rules of the game in the world market leads to the asynchronous development of national economies and the widening gap between advanced and catching-up economies. Under such conditions, the most effective strategy of economic development in countries with insufficient technological level of national production is the formation of its own competitive innovation sector.

S. Evenett, a professor at the University of St. Gallen in Switzerland, who specializes in international trade and economic development, believes that breaches of protectionist agreements by the G20 are recorded on average "once every three days", and measures that lead to the deviation of trade from its development in the most optimal scenario (ie in the absence of artificial barriers) apply to 80 % of commodity items. At the same time, S. Evenett noted a certain passivity of the WTO in the face of threats of protectionism [15].

The results, which contradict the basic assumptions, underlying the GATT/WTO agreements, were discovered by E. Rose on the basis of the standard gravitational model of bilateral trade in goods for 175 countries for 1950–1999. In particular, it was noted, that the structure of trade does not differ from countries that are not members of the organization [16]. The growth of foreign trade in the countries that have joined the WTO has taken place, but not to the extent expected [17]. The existing assertion that the WTO helps to reduce instability and increase the predictability of international trade has been irrelevant [18]. There has been no solid evidence that WTO members have lower tariff and non-tariff barriers than non-members [18].

The research shows that E. Rose is not the only one who did not find an empirical confirmation of the positive results of the GATT/WTO, but became the first to question the validity of the foundations of this system of multilateral agreements.

The results, obtained by D. Irwin, A. Madison, A. Krueger, A. Tine and others on the degree of correlation between the development of international trade, the nature of trade policy and economic growth, are indicative. In particular, D. Irwin in the work "Long-term trends in world trade and income" [19], establishing a statistical relationship between the development of international trade and world income for three periods: pre-war – 1870–1913, interwar – 1920–1938, and postwar – 1950–2000, received the following results:

- the volume of international trade grew faster than the level of world income throughout the study period (except for the interwar period);
- the hypothesis that during 1973–1984 there was a qualitative change between the volume of international trade and the level of world income (compared to 1950–1973) and it was characterized by a decrease in the elasticity of world exports relative to income was confirmed;
- since 1985, the dependence of world exports on the level of world income has increased significantly, but the results of the study do not provide an answer as to what factors caused this.

The current system of regulating international trade relations is evolving towards reducing the role of certain instruments, such as quotas and duties, as a result of which member states are increasingly using latent measures to protect national markets from foreign competition, the application of which is difficult to control. In particular, WTO members make extensive use of strict sanitary and phytosanitary measures in relation to imports of agricultural products, as well as impose high technical standards for industrial goods. To change the existing situation, it is necessary to develop new rules that would regulate the use of sanitary and phytosanitary measures, as well as technical standards to ensure non-discriminatory treatment. Much attention is paid to these issues within the WTO, but the active work of members in this area has not yet yielded significant results, which negatively affects countries with low levels of development, which due to differences in internal standards have less opportunities to use sanitary and phytosanitary requirements in foreign trade policy compared to economically developed countries [20].

The WTO has made the greatest progress in implementing the principle of exceptional tariff protection and reducing the protectionist role of tariffs. Currently, having ensured a significant reduction in customs protection, the WTO is working to eliminate existing tariff peaks and reduce tariff escalation. Thus, the main obstacle to the liberalization of the agricultural sector remains the maintenance of high tariffs, imposed as a result of non-tariff barriers. In turn, tariff escalation remains a problem for international trade in industrial goods, as a result of which goods with a low degree of processing when imported into a country fall under the lowest customs tariff rates. The danger of this trend is the formation of less favorable trade conditions for countries that specialize in the production of low value-added products.

At the same time, when choosing economic policy, it is not so important whether openness affects the increase in economic growth. More important is whether it promotes sustainable growth to a greater extent than protectionism. A small number of scholars among free trade advocates argue that openness alone is a sufficient factor to ensure economic development. Leading scholars and economists who hold liberal views recognize that, in the absence of macroeconomic stability,

predictable government policies and sound compliance with contractual terms, it is unlikely that a country will be able to deliver significant growth over a long period of time [21].

According to surveys of economists from different countries in the late twentieth century, it has been found, that 95 % of US scientists and 88 % of Austria, France, Germany and Switzerland share (in full or with reservations) the claim that tariffs and import quotas reduce overall economic well-being [22]. The results of the study show that almost one-fifth of European economists consider the application of duties and quotas to be beneficial. Moreover, it remains unknown what proportion of respondents hold the view of the unconditional profitability of trade, and which – only with reservations. To what extent these ideas contrast with the conclusions of the classical theory of international trade is shown in **Table 1.1**.

● **Table 1.1** Key conclusions of international trade theory

<b>Classical theory</b>	<b>Modern theory</b>
Free trade allows each country to get the most out of the international division of labor (regardless of the policies, pursued by its trading partners)	The main argument in favor of free trade is that its conduct increases aggregate economic efficiency
Mutual benefits of trade (division of labor) will exist even if one country is more efficient than another in the production of goods	A country can benefit from free trade even if any production in its territory is less efficient than in other countries
It is advantageous for a country to leave more favorable domestic production conditions inactive and to buy goods that could be made at the bottom, in regions where production conditions are less favorable	A domestic producer can lose in international competition, even if it is the most efficient producer in the world
In a world, organized on the basis of the principle of division of labor, any change must to some extent affect the short-term interests of many groups. This is not exclusively related to international trade (and is not an excuse for protectionist measures)	The theory of international trade shows that in conditions of free trade, some parties may incur losses
Even if other countries adhere to protectionism, the interests of any country are best served by freedom of trade	Unilateral freedom of trade may not be the best policy when other countries create barriers
There are no conditions when protectionism can bring any benefits to the country	–
The benefits of foreign trade are entirely related to imports, as exports are only a means of paying for imports. If it were possible to import without exporting anything, an importing country would enjoy prosperity	–

*Source: generated by data [23, 24]*

Thus, in economics there have been some changes in the blurring of the unconditionality of judgments about the profitability of free trade. Most economists share the view that free trade may not be a "technically optimal" policy, but it remains "pragmatically optimal". In other words, in the

absence of information and the problems, inherent in any system of selective protectionism, free trade remains a policy that is most likely to achieve the highest possible level of economic efficiency.

Under modern conditions, it is obvious, that no country can do without significant and diversified imports. The needs of the modern economy are so complex and diverse that even the world's leading industrialized countries with efficient and multifaceted economies are forced to import large and growing volumes of goods from abroad.

There are three categories of imports:

1. Imports of goods that are not produced in the country, or are not produced in sufficient quantities, which may be associated with a shortage of certain factors of production (e.g. land, natural resources, labor), crises and structural problems in the economy, various emergencies circumstances, etc. (critical import).

2. Imports of high-quality goods with an order of magnitude higher technical characteristics, as well as advanced equipment and technologies to improve living standards and strengthen national competitiveness (investment imports).

3. Imports of products similar in quality and technical characteristics, which are an order of magnitude cheaper, and therefore more profitable for consumers, although it poses a potential threat to local production (it is these imported products are the main object of protectionist measures).

In world trade practice, significant and growing import flows are seen mainly not as a negative phenomenon, but mainly as a precautionary process that requires certain corrective measures by the state. It is no coincidence, therefore, that in the second half of the 1980s, leading foreign countries – the United States, Great Britain, France, and a number of others – developed and embarked on large-scale national programs to increase competitiveness and growth of export development. During this period, there was also a general strengthening of protectionist principles and practices of using various restrictions in international trade.

The effects of imports and the determinants that condition them have been studied by many modern economists. Thus, according to a Korean scientist S. Kim, the impact of imports on the economy depends on both the type of market environment and institutional factors. As proof, he argues that under conditions of perfect competition, the growth of imports of consumer goods forces domestic enterprises (which produce similar goods) to innovate, modernize and improve technology to produce competitive products compared to foreign counterparts. In turn, the import of capital and intermediate goods stimulates enterprises to diversify and specialize, which further increases domestic productivity. However, under imperfect competition, the capacity of the domestic market of import-substituting products decreases with increasing imports against the background of declining investment and productivity [25].

Similar views are shared by a Korean researcher J. Lee, who, after cross-analyzing 1960–1985 in 89 countries, found a positive relationship between the share of capital imports in investment and GDP per capita (especially in developing countries). Summing up the results, J. Lee noted that "by adding to the current capital of available imports, the growth rate of countries can increase significantly compared to other countries that are at the same stage of development" [26]. In his pa-

per "Capital Imports and Long-Term Growth", J. Lee also expressed the view that the use of import-resources is often more productive and cheaper than the use of domestic means of production.

It is the specifics of the imported goods that can play a key role in substantiating the phenomenon of economic growth. Analyzing the development of 132 countries during 1998–2010, a Turkish economist I. Iskan came to the conclusion that the type of imported goods (imports of capital, consumer goods or intermediate goods) affects the economy of an importing country. His calculations show that imports of capital and intermediate goods have a positive effect on the economy, while imports of consumer goods – negative [27].

The regional aspects of the relationship between economic growth and foreign trade were analyzed by American economists R. Lawrence and D. Weinstein on the example of Japan and South Korea. The scientists, having studied the time period of 9 years (1964–1973), found that the growth of imports and the openness of the national economy gave positive results for the development of the Japanese and partly Korean economy. At the same time, they noted that imports had a positive effect on economic efficiency mainly due to the effect of competition [28].

However, an American economist M. Mundler, based on a study of the experience of Brazil during 1989–1998, concluded about the importance of competitive effects in the national market due to imports and the negative relationship between imports of intermediate goods and labor productivity [29]. Positive effects from imports are given in the works of a scientist from Singapore M. Thangavel and Indian economist G. Rajaguru (for example, India, Indonesia, Malaysia, the Philippines, Singapore and Taiwan), as well as American economist J. Damay and Iranian scientist A. Tawakoli (on example of 47 industries in Mexico). However, a study, conducted by M. Blomström, R. Lips, and M. Zegen under the auspices of the American National Bureau of Economic Research in 78 middle-income countries during 1960–1985, yielded opposite results.

The important role of the import component in substantiating the processes of economic growth was pointed out by a Nigerian economist T. Avokus based on the analysis of the relationship between foreign trade and economic growth in Bulgaria (1994–2004), the Czech Republic (1993–2002), Poland (1995–2004) and three Latin American countries (Argentina, Peru and Colombia). In his view, the exclusion of imports from the research process and focusing only on the role of exports as an engine of economic growth is erroneous and incorrect [30].

His views are shared by an Iranian economist H. Esfahani, who used a three-stage model (economic growth, exports and imports) as a system of equations to reflect the importance of including imports in the research process. After analyzing 31 middle-income countries, he concluded that the main task of exports is to finance the import of intermediate goods [31]. This model was later supplemented by a Singapore economist R. Mahadevan and an Australian scientist S. Suardi, based on the inclusion of export-import price as a variable. His study, *Dynamic Analysis of the Uncertainty of Export and Import Growth*, analyzes the period between 1957–2005 for Japan, 1970–2005 for Korea, 1961–2005 for Taiwan, and 1973–2005 for Hong Kong, and concludes that the economic growth in Japan was achieved through imports, in Hong Kong – through exports and imports, and in Korea and Taiwan, no relationship between foreign trade and growth was recorded [32].

Ambiguous results were also obtained by a team of scientists, led by W. Mishra, who analyzed the growth strategy through imports and exports based on data for 1982–2004 for the Pacific island countries (Fiji, Papua New Guinea, Solomon Islands, Tonga and Vanuatu) and scientists, led by F. Islam, who analyzed the development of 40 world economies during 1971–2006.

Thus, the ambiguity of the results of identifying bilateral causal links between imports and economic growth indicates the need to take into account in empirical studies a number of determinants of impact on the effects of imports, which include: type of imported products, level of economic and technological development of an importing country; institutional factors, type of market environment, etc. It is also worth considering the urgency of the impact of imports on the national economy – short-term and long-term effects.

There are a number of empirical studies by foreign authors of the phenomenon of import substitution policy as a component of economic growth strategy (late XX – early XXI century). The issue of import dependence was first raised in the 1950s by the leader of the so-called "structuralist" direction of economic thought R. Prebisch and later supplemented by his British counterpart H. Singer, who formulated a long-term trend of deteriorating trade conditions for countries, exporting raw materials and importing industrial goods. R. Prebisch substantiated the thesis that unbalanced development and hypertrophied export orientation of less developed countries, tied to the economies of more developed countries in combination with distorted institutions and domestic economic structures, create dependence on the "first world" (developed countries with market systems). In his analysis, R. Prebisch used a terminology that corresponds to the relationship "center-periphery", which was later actively used in the theory of dependence and the theory of world systems [33]. In his opinion, the determinants of deteriorating trade conditions should include, in particular, the peculiarities of the international division of labor, discriminatory trade policies of developed countries and changes that occur as a result of scientific and technological progress [34]. The main idea in R. Prebisch's model is that import substitution as a form of selective protectionism can counteract the problem of deteriorating trade conditions and become an adequate policy of self-sufficient development. As a result, import-substituting industrialization became the leitmotif of economic development theory during the 1950s and 1960s.

The policy of import substitution is a component of the policy of protection of "young industries" – one of the most controversial arguments in favor of protectionism. Arguments in favor of the development of young industries (infant industry protection) were once substantiated by F. Liszt in the work "National System of Political Economy" [35] and became the basic principles of economic development in most Latin America and Southeast Asia (newly industrialized countries), which in the middle of the twentieth century began import-substituting industrialization.

The content of the argument for the protection of young industries is the imperfection of exclusively market mechanisms, which in conditions of institutional imperfection are not able to adequately accumulate and direct or redeploy resources towards potentially competitive industries. The economy falls into a circle of dependence on its current state, when the insufficient level of current competitiveness does not allow to invest resources in long-term projects, which, in turn,

further worsens the current state of competitiveness. However, it should be borne in mind, that the temporary protection of young industries carries the risk that the protected young industries will become "forever young" and will require indefinitely long protection from competition and will be deprived of incentives for technological improvement due to guaranteed profits [36].

The policy of protection of young industries, according to L. Shinkaruk [36], does not justify itself in the absence or insufficiency of such factors as:

- openness, impartiality and protection against corruption regarding the procedures for making state decisions on the granting of preferential regimes;
- high level of qualification and moral qualities of public administration personnel, able to correctly identify industries that have promising comparative and competitive advantages;
- availability of quality market information on relative production costs and their dynamics, which allows to make informed decisions about relative competitiveness;
- society's focus on the values of development, self-improvement, rather than material consumption.

Therefore, the policy of protection of young industries and the policy of import substitution cannot be considered as a panacea for long-term and sustainable economic growth. Their effectiveness significantly depends on a wide range of development conditions, including active policy of institutional and infrastructural development, active formation of human and intellectual capital, balanced macroeconomic policy, fight against corruption and creation of an effective state apparatus.

In the work "Did the state policy of import substitution promote economic growth at the end of the XIX century?" [37] D. Irwin tried to find out exactly how to explain the empirically proven positive correlation between economic growth and high tariffs among the countries of the world during the study period. As a result, according to his research of 27 countries from 1870 to 1913, the following conclusions can be drawn:

- a study based on a regression model of the dependence of economic growth on the level of tariff rate, one of the regressors in which was the initial level of income, establishes a positive correlation between these two variables, which was most characteristic of 1890–1913. In 1870–1890 the economic growth is also positively correlated with the indicator of democracy of public administration institutions;
- the rapid growth in the late nineteenth century occurred in those countries where was a decrease in the share of employment in agriculture;
- the impact of tariffs on reducing the share of employment in agriculture depends on the nature of country's comparative advantages. Thus, some countries have slowed the flow of employment from agriculture to industry by introducing tariffs on imports of agricultural products, others, on the contrary, have accelerated this process by imposing import duties on industrial goods;
- the accelerated economic growth in Argentina and Canada (both countries at that time were characterized by high import tariffs and GDP per capita) was due to export-oriented food production, rather than through import substitution-based industrialization.

Despite the fact that import-substituting industrialization in Latin America did not give the expected results, new sectors of economic activity appeared in the countries, their own technolog-

ical base was formed, additional jobs appeared, enterprises were able to compete internationally, enter new markets, using their own technology. Most economists considered the initiation of this substitution policy in Latin American countries to be in the light industry and basic industries and, unlike in Korea and Taiwan, not to take advantage of export opportunities, which led to a high level of autarky. However, it should be noted, that large-scale exports of light industry products were not possible until 1960 due to trade rules, established by developed countries (which were the only possible consumers) for this industry. Only the export of equipment, raw materials and agricultural products was economically profitable. Since equipment and machinery were not produced in Latin America, the course of import substitution until the 1960s can be called quite justified. The problem in the region was that governments failed to establish intra-regional integration, and after 1960 failed to change their import substitution strategy to an export orientation. Asian tigers began industrialization much later, but immediately adopted a more promising way of industrialization through export-oriented development.

According to many scholars on the problems of import dependence, the model of import substitution in the short term creates barriers to the movement of goods and services, reduces the level of motivation of business leaders to increase productivity and reduce production costs, limits enterprise specialization, leads to market monopolization and leads to inefficient use of budget funds, aimed at the development of import-substituting industries.

At the same time, since the 1970s, the policy of import-substituting industrialization has been the subject of sharp criticism, and in the late 1980s and 1990s most developing countries abandoned it in favor of restrictive unilateral trade liberalization (**Table 1.2**).

● **Table 1.2** Varieties and yield of parts of the investigated watermelons

Country	Reforms
1	2
Argentina	In 1988, tariffs were reduced; import licensing was abolished, with the exception of Article 22; in 1991 a three-tier tariff structure was introduced (0 %, 11 %, 22 %)
Bolivia	In 1985, the trade regime was revised and all quotas were lifted; in 1990, 2 main tariff rates were introduced: 5 % for industrial goods and 5 % for other goods
Brazil	In 1990, all quotas were replaced by tariffs; average tariff rates were reduced: from 37 % to 25 % in 1990 and to 14 % in 1994
Chile	Since 1973, all tariffs have been removed, a general tariff of 10 % has been introduced for all goods except cars; tariff increased to 15 % after the economic crisis of the early 1980s
Ghana	More liberal import licensing; a single tariff was set for most imported goods
Indonesia	In 1986, trade reforms began; by mid-1988, only 20 % of imports were subject to special licensing
Jamaica	Withdrawn quotas; reduced tariffs to 20 and 30 % for most goods

◆ Continuation of Table 1.2

1	2
Mexico	By 1988, tariffs were reduced to an average of 11 % with a maximum tariff rate of 20 %
Morocco	Significant weakening of protectionism since 1983: maximum tariffs have been reduced from 400 % to 45 %
Nigeria	Trade liberalization began in 1986: import licensing and tariffs significantly reduced
Pakistan	In 1986, non-tariff regulation was replaced by tariff regulation; reduced maximum tariffs from 225 % to 125 %
Peru	Since 1990, quotas have been lifted and tariffs up to three rates have been simplified (15 %, 25 %, 50 %); in 1991 the upper rate was reduced to 25 %
Senegal	In 1986–1988, most quotas were lifted and some tariffs were reduced
Tunisia	By mid-1990, import licensing were abolished for most import items
Turkey	Quotas and some non-tariff trade barriers have been significantly reduced since 1990
Venezuela	In 1989, a comprehensive liberalization of imports began; most import bans were lifted and tariffs were reduced from a maximum of 80 % to 50 %

When setting trade barriers, it should be borne in mind that, in accordance with WTO rules, unjustified protectionist measures may lead to sanctions. Affected WTO member countries may be allowed to take countermeasures or claim compensation. At the same time, if the use of tariff methods is transparent and strictly regulated by the WTO, the use of non-tariff methods is difficult to control, and thus creates a basis for abuse and persecution of national economies.

## 1.2 SYSTEMATIZATION OF INSTRUMENTS OF STATE REGULATION IN IMPORT SUBSTITUTION POLICY

Despite the fact that the world economic history has already accumulated considerable experience in the implementation of import substitution policy, its tools as a whole remain unchanged.

All instruments of import substitution policy can be divided into three major groups:

1. Active industrial policy is aimed at expanding the creation of state corporations and enterprises with a mixed form of ownership in the fields of heavy industry: steel, petrochemical, oil production, telecommunications, aircraft construction. Among the advantages of such corporations in conditions of underdevelopment are:

- access to state funds to finance investments and research, hiring the best specialists;
- enabling foreign loans to be financed for large projects and technology transfer;
- less sensitivity to longer payback periods.

The first group involves the use of tools to finance and subsidize key industries:

- 1) reduction of interest rates on loans and deposits;

2) public procurement, creation of joint ventures and branches of transnational corporations by attracting foreign direct investment;

3) creation of large state-owned investment banks that will be able not only to issue loans at reduced rates, but also to provide advisory support to borrowers on economic and technological development.

2. Protectionist measures are aimed at protecting the production of uncompetitive local goods from foreign counterparts, in order to develop underdeveloped industries in more favorable conditions.

To this end, instruments are used to quantitatively restrict imports and exports, the most common of which in international trade are:

- import quotas and licensing;
- regulation of import duties;
- revaluation of the exchange rate;
- trade embargo;
- establishment of technical barriers.

One of the directions of development of tariff methods of regulating foreign trade is the coordination of customs policy between countries by creating free trade zones or customs unions. When creating a free trade area, countries, participating in it, eliminate customs duties in trade with each other, but each maintains its own level of customs protection in relation to third countries. The customs union provides not only duty-free trade between the member countries of the union, but also the establishment of a common customs tariff.

3. The third group of instruments is aimed at stimulating exports. The system of regulation of foreign economic activity provides for state subsidies for exports, regulation of the national currency, support for key industries through tax benefits and concessional lending, subsidizing the cost of electricity, transportation costs. Among the instruments of import substitution policy are the regulation of nominal wages, which in turn can regulate domestic demand, but also negatively affect the value of locally produced goods, volume of GDP and exports.

Systematization of non-tariff instruments according to the level of import restrictions is given in **Table 1.3**. In particular, the ban on the import of hazardous waste is not entirely transparent due to the fact that the introduction of this non-tariff instrument requires a special examination to establish the presence of a prohibited substance in imported goods. Import statistics show that despite the presence of bans on the import of any substance or product, the volume of imports of relevant products is zero. This can be due to errors in statistical reporting, as well as to the overly complicated and non-transparent procedure for establishing the presence of a prohibited substance in the imported goods.

It should be noted, that many of the advantages of protectionist policies are abstract in nature and may be disadvantages under specific conditions. For example, the application of protectionist measures preserves or even increases the number of jobs in import-substituting industries, protected from foreign competition, but reduces it in export production. That is why large-scale import restrictions in the United States are generally supported by the American Fed-

eration of Labor and the Congress of Industrial Unions, whose members are primarily workers in import-substituting industries, such as steel and others, who are more competitive with imports than the economy as a whole.

**Table 1.3** Non-tariff instruments for regulating foreign trade by the level of import restrictions

Level of import restrictions	Free import with accompanying documents	Restrictions on the import of goods on a specific basis	Significant restriction on the import of goods	Complete ban on imports
Instruments	– labeling requirements	– technical regulation; – state regulation of hazardous waste import; – state regulation; – import of ozone-depleting substances; – phytosanitary control; – sanitary and epidemiological conclusions; – veterinary control	– import licenses; – certification; – import quota	– ban on the import of hazardous waste; – embargo on the import of goods into the country

*Source: systematized by data [38]*

The process of import substitution can be implemented through various mechanisms of state influence on the economy, the most important of which are investment, credit, innovation and technology, tax instruments that initiate regulated structural transformations. Thus, import substitution is functionally connected with the development of economic relations in the system of social reproduction, with the resuscitation of broken ties in it, with the initiation of positive structural changes, a radical change in the structure of imports and exports.

**Table 1.4** summarizes the instruments of state policy of import substitution depending on the concepts and approaches to the study of this issue.

The existing approaches to the analysis of import substitution do not reveal its connection with the structural transformations of the economy, and therefore do not take into account the connection between the problems of deindustrialization and import dependence of the economy. Therefore, it can be proposed to interpret import substitution as a process of reproduction in the economy of competitive production of goods in the process of regulated changes in the structure of national reproduction, whose drivers are domestic demand and innovative development of the real sector of the economy.

The following conditions must be taken into account when choosing tools for a successful import substitution policy:

1) in order for economic growth to have a positive dynamics, it is necessary to focus not only on import-substituting products, but also given the limited capacity of the domestic market, to expand it through exports of goods and services. The fact that industries that have not succumbed to protectionist measures are less competitive should also be considered;

- 2) with the saturation of the domestic market it is necessary to consider the application of the strategy of export orientation in connection with the impossibility of further import substitution;
- 3) a country that is a member of the WTO may not always use protectionist measures due to the fact that it must comply with certain obligations to liberalize foreign trade [39]. The consequence of using protectionist policies will be an inflated exchange rate.

● **Table 1.4** Instruments of state policy of import substitution

<b>Authors</b>	<b>Approach content</b>	<b>Regulation instruments</b>
D. Liszt, H. Singer, R. Prebisch, P. Lindert	Import substitution is a result of a policy of purposeful ousting of imports from the domestic market	Subsidies, government loans, protectionism
P. Clark, D. Log, R. Sweeney (model of perfect substitutes)	Import substitution is a result of the victory of domestic producers over foreign ones in free competition in the domestic market due to price advantage	Private investment in innovation and market incentives to increase productivity
R. Romberg, M. Goldstein, M. Kahn (model of imperfect substitutes)	Import substitution is a consequence of a complex consumer choice in favor of domestic products	Capital investment, resulting in an advantage in quality, service, ease of consumption
D. Zaitsev, P. Kadochnikov, A. Makarov	Import substitution is a process of gradual replacement of imported goods with domestic ones, which have higher consumer properties and a lower price	Combination of market (tax incentives for investment in expanding output, soft loans) and non-market (countering imports)
H. Chenery, M. Bruno. A. Strout, N. Carter (neo-Keynesian theory of import substitution)	Import substitution is a result of industrial policy within the existing structure of the economy	Tax benefits, subsidies, government orders
O. Berezinska, A. Vedeve, V. Baranov (connection with economic security)	Import substitution is a secondary, short-term goal of achieving economic security	Protectionism, public investment, tax incentives

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- 2) with the saturation of the domestic market it is necessary to consider the application of the strategy of export orientation in connection with the impossibility of further import substitution;
- 3) a country that is a member of the WTO may not always use protectionist measures due to the fact that it must comply with certain obligations to liberalize foreign trade [39]. The consequence of using protectionist policies will be an inflated exchange rate.

The trends of economic deglobalization are clearly visible in the world. Among the reasons for such processes, world experts single out two significant factors for its increase [40]. The first is due to reduced (marginal) benefits from foreign trade and direct investment due to the growth and increase in value of Asian (primarily Chinese) goods, as well as increased risks of inclusion of a wider range of countries in the value chain, as not all of them were reliable partners, which could maintain a competitive advantage. Another factor that has begun to emerge in recent years, especially in 2017–2019, is the intensification of trade and institutional confrontations between the world's two largest economies (the United States and China), [41] as well as the rise of protectionist tendencies in many countries around the world due to the requirements of protection of national markets, including the argument of "national security". In addition to world trade, financial markets were the first to feel this, with uncertainties in the direct investment and securities markets increasing.

Along with this, another factor of deglobalization trends can be identified, which is manifested in the slowdown of the world economy, and therefore the requirements to protect or support national economies can be seen as forms of contradictory responses to restraining global trends.

All the transformations in the world economy, the expansion of the scope of protectionist measures, the differentiated nature of the use of methods to protect the national economy suggest the formation of a new direction in economic theory – neoprotectionism.

"Neoprotectionism" is a policy of establishing administrative, financial, credit, technical and other barriers that significantly impede the free movement of goods across borders. The main instruments of "neoprotectionism" are tariff quotas, phyto-sanitary norms, state subsidies, technical barriers, countervailing duties, anti-dumping measures, standardization and certification of products, "voluntary" restriction of exports, export crediting. However, these instruments are not direct and open measures, so, on the one hand, they do not contradict the foreign policy interests of the government, and on the other – are effective measures to protect the national exporter. Thus, the main feature of "neoprotectionism" is secrecy.

For example, a "voluntary" export restriction is an agreement between an exporting country and an importing country, under which the exporting country restricts the export of certain goods, but the initiator is the importing country. This agreement is not voluntary, but only a disguised coercion of trading partners to commit to restricting the export of certain goods to a country in order to avoid more serious protection measures. They are usually used in their foreign economic policy by countries, such as the United States and Western Europe, ie developed countries actually transfer responsibility by coercion, and with it rather negative consequences, mostly to developing countries.

Thus, although both countries will have negative consequences for the current account balance, the importing country will still have some advantages, as domestic production increases as imports decline. Applying such a policy, the importing country protects the goods of those industries that are in crisis, or in the event of a sharp increase in the volume of goods from specific countries and a significant increase in their share in total. Thus, the importing country protects its domestic market by creating trade barriers that are introduced at the border of the exporting country.

Thus, a characteristic feature of neoclassical instruments of trade protection should be noted the expansion of the arsenal of such measures. In practice, this often looks like the protection of the environment or the protection of human ethics and morals.

However, there are even more sophisticated options for trade restrictions. For example, in the EU Public Procurement Directives, one can find provisions that indicate that goods with an innovative or energy-saving component are given priority in the selection of tenders. At first glance, this is a very objective and balanced requirement, but it is extremely difficult to fulfill it, and in fact it is a very serious limitation.

Analysts from the WTO and international research centers constantly monitor and evaluate trade measures, taken by countries around the world. The results of such monitoring show that even against the background of the gradual recovery of national economies after the global economic crisis of 2009 (**Table 1.1**), the tendency to apply protectionist measures not only does not decrease, but, on the contrary, increases. The number of protectionist measures in 2015 exceeded even the crisis of 2009 [42]. Most restrictive measures have not yet been lifted, so the total number of trade barriers in the world continues to grow cumulatively.

In 2020, 52 % of world trade fell under protectionist measures. In the same year, governments around the world intervened in global trade 2233 times, including 2054 protective measures and 358 – norms aimed at liberalization [43]. Consumer/producer support subsidies, export incentives and tariff barriers were the most common last year. At the same time, as can be seen (**Table 1.5**), in recent years there has been a steady increase along with a reduction in the number of tariff barriers.

Developed and fast-growing countries actively protect national producers. In particular, the G20 countries in 2020 introduced 1191 new protectionist acts and 312 measures, aimed at trade liberalization [44]. According to the Global Trade Alert [43], more than 50 % of the protection standards were introduced in 2009–2020 by 10 countries: the United States, Germany, India, the Russian Federation, Argentina, Brazil, the United Kingdom, China, Italy, Australia, and Canada. It should be noted, that during this period only 82 measures were introduced in Ukraine, which distort the conditions of international trade in goods. The United States (1812 measures), Germany (1054), India (834), the Russian Federation (562) and Brazil (531) were among the top five countries in terms of protectionist measures, introduced in 2020. At the same time, the vast majority of their own exports are also under threat due to export restrictions of other countries.

The steel industry is most prone to trade restrictions. It accounts for more than 7 % of all measures, implemented in the world. These are relatively homogeneous products that are produced worldwide. At the same time, there is an excess of capacity in the industry. The latter factor is particularly difficult, as it is the excessive, protectionist participation of the state in the work of the industry that has led to an increase in excess capacity. The situation is complicated by the fact that the industry is socially significant, as it provides employment for a large part of the population. Therefore, governments are trying in every way to keep uncompetitive enterprises, instead of helping in case of exit from the market.

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1 THEORETICAL FUNDAMENTALS OF STATE REGULATORY POLICY REGARDING IMPORTS IN THE CONDITIONS OF GLOBAL TECHNOLOGICAL TRANSFORMATIONS

● **Table 1.5** Implementation of protectionism measures in the world

Parameter	2009	2012	2015	2016	2017	2018	2019	2020
Number of protectionist measures in the world, in total, units	1,332	1,466	1,376	1,238	1,483	1,707	1,815	2,054
Including:								
Subsidies (excluding export subsidies), units	344	346	402	405	550	744	753	1,085
Share of subsidies, %	25.8	23.6	29.2	32.7	37.1	43.6	41.5	52.8
Export-related measures (including export subsidies), units	322	362	329	274	354	319	290	396
Share of export-related measures, %	24.2	24.7	23.9	22.1	23.9	18.7	16	19.3
Tariff barriers, units	230	263	246	200	210	198	232	146
Share of tariff barriers, %	17.3	17.9	17.9	16.2	14.2	11.6	12.8	7.1
Conditional trade protection measures, units	206	205	138	143	164	174	185	117
Share of conditional trade and protective measures, %	15.5	14	10	11.6	11.1	10.2	10.2	5.7
Restrictions on public procurement, units	79	66	62	64	70	103	140	80
Share of public procurement restrictions, %	5.9	4.5	4.5	5.2	4.7	6	7.7	3.9
Others, units	151	224	199	152	135	169	214	230
Share of other measures, %	11.3	15.3	14.5	12.3	9.1	9.9	11.8	11.2

Source: calculated by data [43]

For 10 years, from 2010 to 2019, 1302 measures to restrict imports were introduced against metallurgical products in the world. The most popular of them are: localization requirements in public procurement (454 measures), anti-dumping (288), import tariffs (230), anti-subsidiary (59).

As you can see, non-tariff measures (localization of public procurement) have become very popular now. Anti-dumping investigations, aimed at restoring fair competition, are also used as safeguards. An example is the investigation against imports of hot rolled coils into the EU, when the European Commission acted decisively, but safeguards were generally directed against completely honest imports.

Trade restrictions as well as "disguised" subsidies have penetrated the steel market and linked business and politics so deeply that there is no way out. The United States is an example. CEO Steel Dynamics during own speech at Steel Success Strategy 2020 said that section 232 helped restore fair rules of the game in the market. However, the rules for introducing a single 25 % duty for all exporters and for all products can hardly be considered fair. But in 2018, against the background of improving profitability, the United States began to actively invest in capacity building. Now there

is even more excess capacity, and market problems have intensified. If you open the US market for imports – it will be even worse than before section 232.

Developed countries are becoming more and more resourceful in their approaches to implementing protectionist measures. For example, the goal of the Green Deal in Europe is to "transform the EU into an honest, prosperous society with a modern resource-efficient economy". At the same time, tools, designed to promote green technologies, are used as a tool of protectionism. This applies to subsidies, tax breaks, and the recent Carbon Border Adjustment (CBA) initiative. In the form, in which the CBA is proposed, it will be discriminatory against the rolling industry, which operates on imported semi-finished products. In addition, the CBA will disrupt the production chains of companies, whose assets are located outside the EU. According to the calculations of the Polish think-tank KOBIZE, steel imports to the EU will be reduced by 11 % as a result of the introduction of the CBA.

Initially, it was assumed, that CBA will be introduced no earlier than 2023. Now it is expected that in June 2021 the European Commission will make a decision. By a strange coincidence, on June 30, 2021, the protective import quotas in the EU also expire. At the same time, there is a dialogue that in case of adoption of CBA protective measures may not continue. In other words, the process of protecting the steel market is mixed with the issue of "transformation of the EU into an honest, prosperous society, etc.", which cannot be called correct.

There is little faith in the EU's failure to maintain safeguards. After all, every six months since their introduction, the system has been constantly strengthened under the pressure of EUROFER. Rather, both quotas and CBAs will apply. European lawyers warn that even if safeguard measures are not extended, it will be accompanied by intensified anti-dumping investigations. The system of individual quotas fixed the Ukrainian status quo, and the anti-dumping duty will give preference to other producers.

As for anti-dumping in the EU, there are also innovations. A few months ago, an anti-dumping investigation was launched against hot rolled products from Turkey. At the same time, imports are "registered" for the retrospective introduction of customs tariffs. Of course, this reduces interest in products from Turkey.

According to the WTO, as of 2019, the United States was the country with the largest number of protectionist measures against trading partners, and against which a set of similar actions is applied [45]. In February this year, WTO representatives said that the growth of world trade in goods will slow down compared to previous years to 3.7 % in 2019 due to protectionist measures.

However, as the analysis shows [46], despite high-profile protectionist measures, the United States has one of the lowest import tariffs among the most developed countries in the world. The average US import tariff in 2019 was about 3.4 % (the highest – in South Korea (13.6 %), Argentina (13.5 %) and Brazil (13.4 %), the lowest – in Australia (2.4 %)). The country mainly applies non-tariff measures.

According to the analysis of data, provided by the WTO, which shows the frequency of implementation of non-tariff barriers (sanitary and phytosanitary measures, technical barriers, an-

ti-dumping, countervailing measures, safeguard measures, special safeguards, quantitative restrictions, quotas and export subsidies) that the integration structure turned out to be the least protectionist power in the EU-US-China triad. At the end of 2019, the European authorities supported or implemented a total of 2 318 non-tariff measures, most of which consisted of technical barriers (1133), sanitary and phytosanitary barriers (698) [47].

On the contrary, the United States has imposed itself as the most protectionist trade entity, taking into account that 5 393 non-tariff barriers have been introduced in the last ten years, 2.3 times higher than those registered in the EU [47]. Most barriers to trade were sanitary and phytosanitary barriers (2929) and technical barriers (1585). China ranks second in the implementation of non-tariff measures – 3014, most of which were technical barriers (1386) [47]. Given the data analyzed, it can be argued, that although the EU continues to implement non-tariff measures, affecting free trade with third countries, it cannot be considered a promoter of this trend.

An important issue is the consequences of the introduction of protectionist measures for business and the economy as a whole. According to surveys of more than 2000 business owners, conducted by the Global Innovation Barometer in 2018 [48] on the positive effects of government protectionist measures on business, it can be concluded, that business is divided into two camps and "disputes" about protectionism and free trade only gaining momentum. For example, in France and Britain, two-thirds of business owners approve of protectionist measures, while in Germany there are far fewer, and in the United States exactly half.

Summarizing the results of scientific research, it can be noted, that protectionism in the short term, especially for developing countries, can be a tool for developing national producers and stimulating domestic demand by: temporarily protecting new industries and new products for the world market; maintaining competition in the domestic market; significant investment in education (industrial policy stimulates demand for education); active cooperation between producers and local suppliers; dissemination of technologies in order to maximize the amount of knowledge transferred.

### 1.3 FOREIGN EXPERIENCE IN IMPLEMENTING AN IMPORT-SUBSTITUTING MODEL OF ECONOMIC DEVELOPMENT

Import substitution is an economic strategy of a state, as well as the stage of industrialization, which was primarily characteristic of countries of catching up, agrarian or agrarian-industrial type. The history of import substitution is a form of liberation from colonial dependence or overcoming overtaking development in the conditions of domination of the world market of foreign states. The main characteristic of import substitution policy is the industrialization of the economy through restrictions and discrimination against imports.

In practice, the import substitution strategy was implemented in two stages [49]:

1. In the first stage, due to the policy of restricting imports, the domestic market is "closed from the rest of the world". There is no competition with foreign producers, so the government

understands that this will negatively affect the economic and quality characteristics of production. As a result, the state is forced to apply certain corrective measures of an administrative nature, which prove to be ineffective in practice. The implementation of this strategy also has negative consequences for the national industry, which does not feel the need to take into account trends in scientific and technological progress, due to the fact that domestic production is protected by import customs tariffs and quotas, and the domestic market is not affected by new trends in production. Due to the restrictions on the operation of foreign companies, operating in the local market, and importers of foreign products, foreign firms try to solve the problem by organizing production within the country, thus achieving the goal of import substitution policy. This is the simplest way to implement the policy, as no barriers to the import of components and nodes are usually set. Thus, foreign companies can produce their products domestically, implementing an import substitution policy without any quotas. This process is the implementation of foreign investment, but their importance for the country's economy is not significant enough. Countries that have decided to implement an import substitution strategy have focused on the development of industrialization. Moreover, the implementation of the strategy, first of all, began with the organization of production of consumer goods that did not require the most advanced technologies.

2. At the next stage, public authorities demanded the accelerated development of such industries as steel production, heavy engineering, and the automotive industry. These efforts are among the main priorities of public policy, for the implementation of which various measures have been developed to protect and stimulate the growth of relevant industries, which included: direct subsidies in the form of tax benefits, direct public investment in new industries, benefits in bank loans, and benefits in implementation of import contracts. There was a steady increase in real GDP due to lower unemployment. Implementing this policy, it was possible to achieve the successful operation of existing and newly created enterprises through government intervention in the development of certain industries. To support the growth rate of the economy, funds were allocated for the development of the necessary infrastructure (roads, dams, electrification, communication systems, energy, etc.).

Patterns of implementation of the principles of catching-up development in practice can be traced to the example of countries that by their position in the international division of labor took the place of "semi-periphery". Countries, such as Japan, Spain, Taiwan, South Korea, China, Singapore. The experience of catching-up development in Latin America can be considered less successful, but meaningful.

The study of foreign experience identified the following three types of import substitution strategy [50]:

1. Incentives for weak industries, whose products were uncompetitive, compared with imported counterparts, even in the domestic market. The tools for implementing this type of policy were: restricting imports and setting much higher prices for imported goods, compared with domestically produced goods (USSR, People's Republic of China, Latin America).

2. Creation of new industries and productions, the policy of "self-reliance". The tools of such a

policy are a combination of high import duties and tax preferences for local producers, as well as public investment in the development of production infrastructure (East Asian countries).

3. Stimulation of developed industries that have sufficient potential to expand exports of their products. The tool of this type of strategy was state export support (Singapore, People's Republic of China, Hong Kong, South Korea).

An example of the first type of import substitution policy is the experience of Brazil. There are four stages in the evolution and structural changes of the industrial sector of the economy. In the middle of the twentieth century in Latin America, a key area of public policy became to protect the domestic market from foreign competition through high import duties [51].

The first stage (1946–1962) was characterized by intensive import substitution of consumer goods. The strategy of import substitution in Brazil in its development has gone through two phases: "easy" and "difficult". In the first phase – "light" – mainly stimulated domestic production of consumer goods. In the second phase – "heavy" – was the sale of industrial goods, especially equipment. The first phase of import substitution in Brazil began with the replacement of imports of short-term goods (clothing, footwear, food), and then there was an acceleration of the development of those industries that produced means of production and household durables. During this period, investment projects were implemented for the emergence of new and young industries and the construction of processing facilities. The Brazilian government has maintained a steady demand for durable goods through low rates on consumer credit for the middle class. As a result, in 1969–1973 there was a boom in the industries that produce durable goods and in the individual construction of luxury housing. The average annual economic growth rate during this period was 10 %, and in production they reached 22 %. Production of machinery and equipment grew by 22.5 % per year, intermediate goods – by 15.5 %. The output of short-term goods also increased at a fairly high rate (by 12.3 % annually). The rate of investment in the Brazilian economy increased from 17.6 % in 1967 to 24.45 % of GDP in 1972 [52].

The main instruments of state policy at this stage were: control over the national currency and the use of a differentiated rate to limit imports of goods that have substitutes for domestic production, support for imports of strategically important goods. In the late 1950s, tariff restrictions were imposed on imports of certain goods, a policy of attracting foreign direct investment and vertical integration of key industries, such as automotive, cement, steel, aluminum, pulp, heavy engineering, and the chemical industry. Due to the first stage of the policy of import substitution, rapid economic growth and diversification of the economy were observed. In the period 1951–1960, the average annual growth rate of industry was 9 %, compared with 4.5 % in agriculture. The structure of the economy has changed: the share of traditional industries (light and food industries) has decreased, the share of mechanical engineering, electrical equipment, instrument making and chemical industry has increased. However, there were also negative consequences for the first stage: first, an increase in imports of equipment for the development of industries, and secondly – an increase in foreign debt due to increased foreign investment and lack of vertical integration in most key industries.

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As a result, in Latin America, which was the leader in import-substituting industrialization between the mid-1950s and 1960s, when the second phase of import substitution was already in full swing, "real economic efficiency growth was virtually zero".

The second stage (1968–1973) was characterized by rapid modernization and industrial development. The country began to invest in the development of industries, such as the automotive industry and the transport network. This allowed the inclusion of remote areas in agricultural turnover and led Brazil to second place in terms of agricultural production in the world. Exports of goods with high added value grew. However, the country experienced some problems, related to income stratification, rising inflation, weak national currency and rising external debt.

At the third stage (1974–1985), imports of equipment and essential raw materials (steel, aluminum, fertilizers, petrochemicals) were replaced, and exports of industrial goods were expanded. At this stage, significant funds were directed to the modernization of the country's infrastructure – transport network, nuclear energy, construction of plants and hydroelectric power plants. Despite this, there was an obvious increase in external borrowing, an increase in the negative balance of foreign trade balance and an acceleration of inflation.

During the fourth stage (since 1987), effects were obtained from import substitution efforts at the previous stage:

- from the foreign trade deficit in 1974 of \$ 3.4 billion. The country went to a surplus of 10.7 billion dollars USA;
- imports decreased and exports of highly processed products increased.

In the late 1980s and early 1990s, the situation in the country deteriorated, accompanied by declining public investment, rising domestic debt, rising inflation, and partial deindustrialization.

However, we can highlight and summarize the positive aspects that were characteristic of the implementation of state policy of import substitution in Latin America:

- high rates of economic growth (for the period 1950–1970 on average by 5.5 % annually). GDP exceeded population growth;
- the beginning of successful development of production of consumer goods, as well as heavy industry;
- the ratio of the share of imports to GDP in many countries remained unchanged. Brazil has shown much greater progress in this regard, reducing the share of imports from 19 % in 1949 to 4.2 % in 1964;
- formation of a national middle class, which significantly contributed to the policy of industrialization.

Among the negative effects of the first type of import substitution policy are:

- growth of imports of equipment and semi-finished products;
- excessive state regulation;
- bureaucratization of the economy and reduction of private initiative;
- weakening of the national currency;
- formation of an inefficient cost structure and reduction of internal competition;
- insufficient participation of the country in the world division of labor;

- stratification of the population;
- formation of inefficient industry, which was protected from external competition and relied on broad government support.

These negative consequences are still relevant for Latin American countries. That is why in the period 1970–1990, many countries abandoned the initial stages of import substitution, which were based on protectionist policies. As already mentioned, some countries have gone for a radical reduction of duties (from 200 to 100 %). Countries that have abandoned the policy of active import substitution include Argentina, Brazil, Bolivia, Indonesia, Uganda, Jamaica, Mexico, Turkey, Tunisia, Chile and others.

Among the reasons for the negative consequences of import substitution policy of the first type are: insufficient domestic market; low competitiveness of products in the foreign market; weak export opportunities due to unfavorable exchange rates; violation of the principles of international economic integration, as in the long run it should create a basis for the formation of a sustainable export-oriented economy.

Thus, the results of import-substituting industrialization in Latin America are quite contradictory, although the success of some elements of this strategy should be acknowledged. National economies have been diversified and new industries have been created, with consistently high GDP growth, albeit in the short to medium term. The transition to an industrial economy has formed the basis for increasing exports of raw materials rather than raw materials. This phenomenon is pronounced in a country like Argentina. For it, the results of the policy of import-substituting industrialization in the 1970s and 1980s proved unsuccessful. Because the domestic market was small, there were strict restrictions on exports, and therefore exports were extremely small. Restrictions on foreign investment, which blocked the inflow of capital from abroad, resulted in reduced competition in the domestic market and increased monopolization, which was promising for certain financial-industrial groups but did not affect the efficient development of industry. Financial tensions in the country, along with balance of payments deficits and low economic growth, were the result of low exports and the need to subsidize domestic production. Thus, creating the initial conditions for industrial development and economic diversification, import-substituting policies in Argentina have exacerbated financial problems and technological backwardness. The economy reached a lower growth rate in 2001 with real GDP being 18 % lower than in 1998 and almost 60 % of Argentines living below the poverty line. The first import-substituting strategy used methods of direct state intervention in economic processes.

First of all, this was expressed in the creation of a number of regulatory bodies that determined the basic prices for main agricultural products, finished products were purchased and then sold on the foreign and domestic markets. Privileged industries stood out, only their subsidies were supported. The second wave of import substitution began with the modernization of energy. The country was able to reach full self-sufficiency in energy through the activities of new industries, which required a sharp increase in energy supply and gave a powerful impetus to the growth of oil and gas production. By the beginning of the XXI century, Argentina had become the most effi-

cient energy producer in Latin America. Thus, the policy of import-substituting industrialization has shown excellent results [53].

An example of the second type of policy is the experience of India, which in the 1950s proclaimed the construction of a "self-sufficient" economy. The country identified priority industries, the development of which was to ensure sustainable economic growth. The import substitution policy was based on the creation of a large public sector of the economy in the fields of heavy industry and indicative planning. By the end of the 1960s, the share of the public sector in production was almost 25 %, including in the mining industry – almost 90 %, and in processing – more than 15 %. State-owned enterprises accounted for 75 % of steelmaking, 100 % of oil production and refining, 95 % of electricity production and 80 % of heavy engineering output. At the same time, small forms of production were preserved, which helped reduce the critically dangerous level of unemployment and provided relatively cheap consumer goods to the poor [54]. In the first five years, import substitution was carried out in the production of consumer goods, and in subsequent years – in the production of industrial goods and intermediate goods. The policy included protectionism in relation to key industries, attracting foreign investment, focusing on borrowing advanced technologies, changing the structure of savings and consumption of the population.

In the first stage (1950–1965), import substitution led to a 33 % increase in GDP, mainly due to equipment and intermediate goods. Over the next 10 years, the output increased by an average of 23 % (paper, oil refining, electrical equipment). A significant result of import substitution policy was the multi-layered nature of industrialization in the country:

- industrial facilities, owned by the state, were capital-intensive production using modern technologies and labor organization;
- such indicators as professional training of labor force, quality of work, modernization of industry grew;
- at Indian enterprises, especially state-owned, there was excess employment, high production costs, inflated production cost prices;
- public investment in economic infrastructure contributed to the expansion of the economic space;
- for a large country, the development of transport networks and other means of communication facilitated the movement of goods and services, creating the opportunity to develop new areas that were previously inaccessible to weak local businesses;
- due to the private sector there was an increase in the mass of industrial goods, protected from foreign competition, which met domestic consumer demand.

The share of imports to India in the mid-1960s for consumer goods did not exceed 4 %, for goods of intermediate demand – 8 %, equipment – 21 %. The combination of protectionist policy and private sector support policy has created objective conditions for expanding the range of products, including industrial purposes (for agriculture). However, India's export potential remained low, which was due to the low quality of products, its insufficient scientific and technical level. Since 1975, import substitution policy has reached a critical point, and many industries have shown a reversal of increasing imports, including steel, non-electrical equipment, sugar and canned fruit,

tobacco, and others. It was clear, that import substitution could not be a long-term strategy in these areas. At the same time, the expansion of free trade with technologically developed countries, the availability of highly skilled cheap labor and the underdevelopment of the domestic market have created "areas of competitiveness" – new export-oriented industries.

The result of the purposeful policy to expand the base of national industry in India was to achieve significant results in the development of the pharmaceutical industry, the so-called "pharmaceutical miracle". If before 1970 the Indian market was dominated by multinational companies, which accounted for 85 % of the pharmaceutical market, now the volume of exports from the country is more than 4 times higher than the scale of purchases of pharmaceutical products from other countries.

The policy of import substitution of the third type in the economic literature is better known as the "new economic policy" and is often opposed to the policy of industrialization based on import substitution (first and second type). Historically, the new economic policy is associated with the countries of East Asia. There are three models of such a policy:

1. The first model is the strategy of autonomy, which was implemented in countries, such as South Korea and Taiwan. Its main goal was to develop local industry by limiting foreign direct investment and increasing the export potential of priority industries by stimulating industrial development in them. Combined with the free trade regime, this has created highly competitive industries – semiconductor, electronics, automotive and others.

2. The second model is strategic dependence on foreign direct investment. An example of such a model is Singapore. Due to the small size of the country, the focus was on attracting foreign capital to the industries with the highest added value.

3. The third model is passive dependence on foreign direct investment. Foreign direct investment is the main source of industrial development, but the state relied on market forces to determine the points of development. In addition, tools, such as infrastructure development, export support, and cheap labor, were used. This model has been implemented in Malaysia, the Philippines, Indonesia and Thailand.

Among the advantages of an export-oriented economy is that, firstly, exports allow more efficient use of the country's resources, secondly, exports allow you to use the effect of scale, thirdly, exports provides the balance of payments, fourthly, exports allow firms to compete on international market. Thus, the main purpose of exports in terms of development goals, is that it makes a significant contribution to the technology transfer from the most developed countries, which, above all, entails increased productivity in a highly competitive environment. This is especially important for the development of exports in non-traditional industries. An example of this is the experience of South Korea and Taiwan. If in India and China the expansion of exports provides 5–8 % GDP growth, in Thailand – 14–16 %, in South Korea – 40–42 %, in Taiwan import substitution provides 43–45 %, and an increase in exports – 55–57 % of GDP growth [39].

If we summarize foreign experience in the implementation of import substitution policy, we can identify the most common models, used by states depending on the goals of economic development (**Table 1.6**).

The generalization of foreign publications on the problems of import substitution indicates that the strategy of import substitution production does not always justify itself [55]. In particular, as noted by M. Torado, we can identify four adverse effects that were observed in practice in the process of import substitution:

- if we do not define a clear time of transition from protectionism to free trade, then under the guise of protective customs barriers and without the pressure of competition, many import-substituting industries (both public and private) will remain inefficient and expensive to operate;
- as practice shows, the process of import substitution is most profitable for foreign firms, which are able to operate under the guise of customs barriers, enjoy the benefits of liberal taxation and investment benefits;
- import substitution policies in fact often lead to a redistribution of income in favor of industry, but to the detriment of the agricultural sector;
- a number of young industries under the guise of customs barriers never reach maturity, and governments tend to lower tariffs to make them more competitive. Consequently, inefficient import-substituting enterprises block hopes for self-sustaining integrated industrialization.

● **Table 1.6** Models of import substitution in the countries with different levels of economic development

Country groups	Countries	Import substitution model	Import substitution goal
Developed countries	EU <sup>1</sup>	Import protectionism	Increasing the level of agricultural production
	USA	Import protectionism	Expansion protection (Asian and European competitors)
	Japan	Import substitution	Self-sufficiency
Developing countries	BRICS <sup>2</sup>	Domestically and externally oriented, combined import substitution	Self-sufficiency, access to foreign markets, balance of payments, reduction of unemployment and inflation
	NIC <sup>3</sup>	Externally oriented import substitution	
	CEE <sup>4</sup>	Import protectionism	Increasing the level of agricultural production
	CIS <sup>5</sup>	Combined import substitution	Self-sufficiency, protection of domestic producers from foreign competition in the domestic market

*Notes: 1 – EU countries (European Union); 2 – BRICS countries – a group of countries: Brazil, Russia, India, China, South Africa; 3 – NIC countries (Newly Industrialized Countries); 4 – CEE countries (Central and Eastern European countries); 5 – CIS countries (Commonwealth of Independent States)*

Professor J. Helleiner, considering the reality of import substitution in practice, came to the conclusion of a kind of consensus among economists, specializing in economic development. In particular, in his opinion, “it is difficult to find any justification for the model of import-substituting industrialization, which is consciously or unconsciously stimulated. In most countries, this

model places too much emphasis on consumer goods, paying little attention to potential long-term comparative advantages – resource provision and learning opportunities. If the policy of selective import substitution is accompanied by attempts to generalize it, the experience of recent years has shown a clear ineffectiveness of such a policy. As a result, too often an inefficient industrial sector has been created with significant underutilization, limited employment, and narrow prospects for increased productivity. The task of import substitution policy is to gradually create incentive systems that will balance the relative efficiency of different types of industrial production and thus support domestic production of intermediate investment goods by reducing imports of consumer goods, and subsequently stimulate their industrial production for export” [56].

Thus, necessary conditions of successful realization of policy of import substitution can be separated:

- the presence of a capacious domestic market;
- significant financial resources are needed for the organization of import-substituting production, in order to finance the import of production equipment at the initial stage;
- introduction of reasonable tariff and non-tariff measures to protect new industries from global competition.

In the face of the crisis in the world market system, developing countries and industrialized nations tend to increase the role of the state apparatus in regulating the productive sector of the economy as a whole and “industries that are most under pressure from imported substitutes”. In such conditions, the strategy of import substitution often becomes the most justified and by stimulating the consumption of goods, produced domestically, allows to create an effectively functioning system of the national economy.

Thus, the reduction of dependence on foreign markets in the implementation of import substitution policy is carried out by different countries on different models, but ultimately the main positive result of targeted actions of the government of such countries is to ensure industrial development and a stable base for self-sufficiency.

#### 1.4 CONCEPTUAL PRINCIPLES OF NEO-INDUSTRIAL IMPORT SUBSTITUTION

According to foreign studies, protectionism without stimulating innovative industrial development leads to long-term reduction of national competitiveness and growth of import dependence, while increasing productivity in basic export-oriented industries through import substitution allows to form a trend of self-support growth [57]. And the transition to the export of products of processing industries is impossible without the innovative development of production for the domestic market. These theories were confirmed in the industrial development of Argentina in the 1970s and 1980s, South Korea in the 1990s, and China in the 2000s, where the growth of public-private investment in education and innovation contributed to a change in technological patterns and the spillover effect – transition from the growth of domestic competitiveness to international [58].

Thus, import substitution should be interpreted as the key to the recovery of processing industries, focused on the domestic market, on a new technological basis. However, the chain form of import dependence of the Ukrainian economy, underdeveloped institutions and unfavorable macro-economic situation make the end result of this process invariant – from autarkic to neo-industrial.

For countries with economies in transition, the general imperative of structural change is neo-industrialization, associated with structural changes in the economies of developed countries due to the development of the latest VI technological system and "Industry 4.0" and the promotion of repatriation of material production, enriched with new technologies.

According to A. Chukhno, the technological way of life is a technical-technological complex that operates on the basis of technology, which is special within the unity of the technological method of production. That is, it is a set of industries, connected by common technological principles [59]. The technological structure of the economy clearly characterizes the level of its development, technical and technological compliance of modernity. It is a reliable basis for ensuring the development of the economy through progressive changes, determining the direction of investment, the consistent growth of scientific and technical level of the economy, the gradual increase in the components of the information economy, the knowledge economy.

As can be seen (**Table 1.7**) in the works of leading scientists, the structure of the VI technological system is associated with the development of innovative breakthrough industries – space technology, biotechnology, nanomaterials and more. At present, experts assess the technological structure of Ukraine's economy as follows: the share of the fifth system (military and space equipment, communications) is 4.7 %; the fourth – almost 42.4 %; the third – 52.8 %. In addition, the Ukrainian economy is also characterized by components of relict systems (first and second) [59]. According to V. Sidenko, the country is in the process of structural simplification of the economy and its approximation to the structural characteristics of less developed countries [60].

At the same time, in developed countries, the knowledge economy, which corresponds to the branches of the 5th and 6th technological systems, is the core of the economy and contributes to the qualitative transformation of society as a whole. It provides up to 30 % of GDP growth, job creation, growth of export potential and reduction of production costs. Along with this, the economies of developing countries are characterized by the dominance of the 3rd and 4th technological systems [61]. Thus, experts of the Institute of Economic Forecasting of the National Academy of Sciences of Ukraine [62] determined that about 60 % of the volume of industrial production of Ukraine is the 3rd technological system, 38 % – the 4th system. Higher technological systems – the 5th and 6th – account for about 4 %, while the 6th system, which determines the prospects for high-tech development in the future, is virtually absent in Ukraine (less than 0.1 %).

Deterioration, "burdening" of the structure of the economy in transition led to increased inertial processes in technological development. This is of particular concern against the background of global trends. At a time when the transition to a new sixth technological mode is beginning in the technological leaders, Ukraine has not yet overcome the initial stages of building the potential of progressive technological modes (**Table 1.8**).

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**1 THEORETICAL FUNDAMENTALS OF STATE REGULATORY POLICY REGARDING IMPORTS IN THE CONDITIONS OF GLOBAL TECHNOLOGICAL TRANSFORMATIONS**

**Table 1.7** Structural components of the VI technological system

<b>Authors</b>	<b>Y. Yakovets</b>	<b>S. Glaziev</b>	<b>B. Kuzyk</b>	<b>M. Kzyk, I. Matyushenko</b>
Key factors	–	Nano-, bio-, ICT	–	Convergence of NBIC-technologies
Core	Nanoelectronics, genetic engineering of animals and humans, level II informatization, Internet networks	Nanoelectronics, nanophotonics, nanomaterials, nanopowders, genetic engineering, cell technologies, scanning microscopes, nanometrology, nanofactory, nanosystem technology, LEDs	Nanoelectronics, photonics, genetic engineering of animals and humans, information networks, multilingual internet	Nanotechnologies, biotechnologies, information and communication technologies, cognitive technologies
Production technologies and leading industries	Production technologies: Flexible systems, unmanned production Waste-free environmentally friendly technologies Unconventional energy resources, hydrogen energy A new generation of materials Transport Revolution Global Systems Communication Space technology, mariculture	Leading manufacturing industries: Aircraft construction Shipbuilding Automotive Instrument making Machine tool construction Nuclear industry Solar energy Electronics, electrical engineering Nuclear energy Telecommunications Chemical and metallurgical complex Rocket and space complex	Production technologies: Flexible systems, unmanned productions Waste-free, cost-effective technologies Unconventional energy resources, hydrogen energy A new generation of materials Transport revolution Global communication systems and space technology	Production technologies and leading industries: Nanomaterials and nanoelectronics Nuclear energy Unconventional and renewable energy sources Genetics and selection of highly productive crops and animals Biotechnology for healthcare, pharmacology and agro-industrial complex Production of modern rocket-space and aviation equipment, ships and electric locomotives of new generation

**Table 1.8** Technological systems of the world and of Ukraine

<b>Country</b>	<b>III system</b>	<b>IV system</b>	<b>V system</b>	<b>VI system</b>
USA	–	20 %	60 %	5 %
Russian Federation	30 %	50 %	10 %	–
Ukraine	57.9 %	38 %	4 %	0.1 %

Source: generated based on [63]

The methodological identity of neo-industrialization is associated with accelerated vertical integration and departure from the market mechanism in favor of the planned one (S. Gubanov [64], V. Naimushin [65]), with the accelerated change of technological systems (V. Inozemtsev [66]), with the development of institutes of industrial policy (V. Polterovych [67], Y. Yakovets [68]).

Among the qualitative signs of neo-industrialization for countries with economies in transition are:

- raising the technological identity of industry to the level of the 4th and in the future the 5th technological system;
- accelerated innovative development of the mining and processing sectors by stimulating the advanced import of technologies;
- use of investment and material resources of the raw materials sector (including state corporations) and state banks in partnership with business to reproduce a competitive industry on the world market.

Neo-industrialization and import substitution are in a functional causal relationship that unites them in the system of structural transformations of the economy. A positive structural shift (consequence) can be provided by transformations in the system of national reproduction, which are caused by the development of economic relations in the field of investment, lending, property (reason). Despite the global nature of the neo-industrial path, for the Ukrainian economy, the deindustrialization of which has complicated the accelerated development of non-commodity exports, import substitution is the main source of neo-industrialization.

*Autarkic import substitution*, which was implemented during the Soviet era, involved the rejection of integration into global technological chains and an attempt to partially reproduce them within the country, the preservation of the 3rd technological system, typical of the early twentieth century, exclusion from participation in the international movement of capital and the transfer of innovation. The low efficiency of such a model is confirmed by the non-fulfillment of the five-year plans in the post-war period. From the beginning of the Tenth Five-Year Plan (1976–1980) there was an aging material base of industry and technological lag in electronics and science-intensive industries from the world's leading countries, rising military spending and the shadow economy. All this has led to an increase in the economy's import dependence. The negative experience of implementing such a model in the USSR, North Korea and Cuba has shown the impossibility of entering a positive macroeconomic trend and reducing the technological gap. Therefore, autarkic import substitution cannot be considered for the purpose of structural transformations.

*Catching up import substitution* – involves the creation, for example, assembly plants of large global automotive, electronic, chemical, food corporations. Despite the fact that these productions mainly meet the domestic demand for industrial products, the technological lag of the entire processing complex, as well as the dependence of public finances on the extraction and export of raw materials, is only increasing. As a result, the economy becomes completely dependent on imports of modern equipment.

*Neo-industrial import substitution* acts as an objective process, determined by the necessary and essential links between supply and demand, production and consumption, and reflects the prevailing trends in the modern world economy, such as structural changes under the influence of scientific and technological progress, globalization.

To restore the processing industry on a new technological basis and saturate the domestic market requires, the import of technology on the one hand, significant investment – on the other,

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is necessary. Technological cooperation between national and foreign companies is also necessary for the implementation of the policy of neo-industrial import substitution. The use of the accumulated potential of applied science, in particular in Ukraine, requires vertical integration of producers of resources, intermediate and end products, R&D organizations, financial companies and banks.

To this end, neo-industrial import substitution should be mediated by the development of types of economic ties:

- b2b (business-to-business): creation of a technological platform and a network cluster of import substitution, which unite different forms of interaction between universities, research institutes and design bureaus, R&D customer enterprises and innovation clusters on a cross-platform and intercluster basis;

- b2g (business-to-government): formation of a public-private partnership of neo-industrial import substitution, which in the future can be transformed into import-substituting holdings with state participation;

- b2s (business-to-society): innovative development of the processing sector within the "Quadruple Helix", which implements the demand for innovation and competitive domestic goods from civil society.

Thus, the difference between neo-industrial import substitution from catching up and autarkic is manifested at the level of goals that shift from short-term market to long-term reproductive ones – creating conditions for sustainable economic growth in the process of deep production and technological diversification, increasing processing of raw materials, creating new jobs industries, expanding the tax base (**Table 1.9**).

● **Table 1.9** Conceptual differences of neo-industrial import substitution

	<b>Autarkic import substitution</b>	<b>Catching up import substitution</b>	<b>Neo-industrial import substitution</b>
<b>Content</b>	Politically motivated, due to the rejection of globalization and the market model. Associated with an attempt to reproduce one hundred percent domestic production of goods. The main source of new technologies is the defense industry	Transfer of elements of production chains to a country from abroad for the domestic market, without the development of its own R&D, transfer of innovations and research and production cooperation with world technology leaders	Deployment in the country's economy of global chains of competitive processing industries, initiated during the neo-industrialization of the economy, with the characteristic innovative development of mining and reproduction of processing industries during the regulated change in the investment structure, clustering of innovative activity
<b>Result</b>	Critical level of technological backwardness and conservation of old (2nd and 3rd) technological systems, shortage of modern goods, maximum susceptibility to external shocks when opening the market	Maintaining the chain of import dependence, increasing susceptibility to external shocks, increasing technological backwardness, income gap, the risk of continued recession with the transition to stagnation	Exit from the recession due to structural changes in the economy: with the growing share of the 4th and 5th technological systems, the formation of a new quality of economic growth (less sensitive to external shocks, with increasing high-tech employment), the transition to high-tech exports

Therefore, the basic principles of neo-industrial import substitution include: conditionality of structural transformations and the development of economic relations in the reproductive sphere; strategic planning that combines short-term protectionism and stimulating innovative industrial development; priority replacement of imports of means of production and outstripping imports of technologies within the framework of public-private partnership. These principles determine the difference between the set of tools of neo-industrial import substitution from the autarkic and catching up, due to its inseparability from the structural transformations of the economy, including the formation of the necessary institutional environment, strategic planning for investing in competitive processing industries, stimulating cross-platform intercluster interactions within import-substituting business groups.

In contrast to the autarkic and catching up import substitution, the key subject of which is the state, the subjects of neo-industrial import substitution also include business groups of raw materials, processing and high-tech enterprises, network clusters of processing enterprises that form technological production chains. In this case, the role of the state is transformed from a regulator to a co-investor and a partner of industrial enterprises.

Thus, the main provisions of the concept of neo-industrial import substitution, which is based on the development of economic relations in the reproductive system, are:

1. The economic basis of neo-industrial import substitution is the modification of economic relations in the reproduction system, which is associated with the creation of new entities, links between government and business.
2. Neo-industrial import substitution involves an emphasis on domestic demand for means of production in business investment decisions and the formation of industrial policy.
3. Successful import substitution requires a combination of innovative activities of technological platforms into a single technological platform for neo-industrial import substitution.
4. Neo-industrial import substitution requires the reproduction of large sectoral structures – business groups, created on the basis of public-private partnerships in the form of strategic alliances, as well as the formation of a special social group.
5. Stimulating the innovative development of enterprises that are united in a pro-production chain and are located in different industrial clusters requires the formation of network import-substituting clusters.

A key condition for providing import substitution of a neo-industrial nature is the reproduction of national intellectual capital. This, in turn, requires the formation of a technological platform for its investment – a modern form of integration of universities, innovative firms, the state and non-state companies – customers of R&D. In accordance with the implementation of the policy of neo-industrial import substitution, the technological platform should ensure the interaction of previously established platforms in the country, research institutes and universities, consumer enterprises of innovation and the state within the targeted programs to support import substitution.

The tasks to be solved by the technological platform for investing in neo-industrial import substitution include the following:

1. Acceleration of the transfer of innovations into production in the process of joint design, experimental and serial production of products competitive in the domestic market.

2. Development of cross-platform interactions and reduction of costs for generation of new technologies by distribution of orders of the enterprises-manufacturers by developers from various technological platforms.

3. Acceleration of the adaptation of new technologies in the framework of their advanced imports to the specifics of the market.

4. Achievement of the effect of "Spillover" from the investment of import substitution in the transition to the export of competitive products in the entry of national companies to the international level of competitiveness.

Forms of effective implementation of the technological platform for investment in neo-industrial import substitution include:

- creation of venture consortia of industrial enterprises – centers of collective investment of innovations and their joint use by groups of enterprises, on the basis of the technological platform;
- involvement of enterprises in the activities of the technological platform as investors of innovations, as a prerequisite for obtaining public funding, guarantees, subsidies in the framework of import substitution;

- development of franchising of advanced innovative developments for the purpose of rent of research centers with the equipment and employees by enterprises;

- formation of a cross-platform integrator – a center for the accumulation of import-substituting technologies, developed within various technological platforms, in order to accelerate the transfer of innovations capable of extending the chain of production of competitive goods in the national economy.

The development of economic relations of investment innovations, generated by the technological platform of neo-industrial import substitution, should be accompanied by the formation of their new subjects – import-substituting business groups. Given the characteristics of large holdings – the main national investors, such as vertical and classic type, a high degree of connection with the state and the recombined type of ownership, it is advisable to develop such business groups based on public-private partnership of neo-industrial import substitution.

Import-substituting business groups should integrate production, research and innovation, logistics companies, the joint activities of which are able to reproduce competitive links of production and economic chains in the economy. The subjects of import-substituting business groups can be both private and joint-stock companies, including with the participation of the state.

Unlike a public-private partnership, the formation of which will inevitably be sectoral in nature, import-substituting business groups must unite existing holdings and independent companies of several related industries on the basis of a strategic alliance. This mechanism provides for mutual parity investment of its members in order to prevent the loss of control of owners over their assets and, at the same time, to ensure coordination of investment, innovation and production activities.

The interests of industrial companies in integration into import-substituting business groups are to obtain tax benefits, investment financing and access to new technologies. Therefore, the role of the state in stimulating such integration processes is in guaranteeing the property rights of members of import-substituting business groups, in their long-term credit support and tax benefits for investment in the development and mass production of innovations for the domestic market, in technology transfer from defense industry, and also in joint investment in the creation of new import-substituting industries.

Foreign experience of state support of holdings – leaders of the national market shows that it is most fully implemented in Japan and South Korea. Based on the generalization of the experience of these countries, the following forms of state stimulation of innovation and production activities of import-substituting business groups can be proposed:

- preferential long-term lending for innovative import-substituting projects in the industries with the greatest foreign competition (radio electronics, machine tool building, pharmaceutical industry);
- state joint investment of basic research in the framework of innovative projects, which will commercialize the results of the technological platform of neo-industrial import substitution;
- anti-crisis support for companies that produce products for the national market, provided they enter import-substituting business groups.

However, it should be noted, that with regard to the concept of "national leaders" in general, there are also doubts about the feasibility of a complete focus on it. Many experts note that with the development of international competition, neither the size of capital nor government support guarantees competitive advantages and protection against bankruptcy. Innovation is essential for success. Capital cannot automatically ensure the emergence of innovation, and the government does not know exactly where, by whom and when it will be produced. Therefore, it can support inefficient projects. This is evidenced, in particular, by the experience of the above-mentioned Asian countries, where in the process of forming "national leaders" state support was provided to many companies and projects, which eventually proved ineffective [69].

In addition, it is difficult to expect a significant intensification of innovation activity from most large companies in Ukraine. Many of them operate in old, traditional industries, are accustomed to doing business in a non-competitive environment, increase income by finding rent, rather than by increasing production efficiency, have specific human capital and low motivation to innovate. In particular, their owners and top managers usually do not have the necessary qualifications and experience to invest in research and development. And employees who can be involved in creative activities are unlikely to be provided with favorable conditions and strong incentives for innovation, as labor and economic relations in these enterprises are largely based on ineffective informal rules. In addition, representatives of large companies significantly influence decisions, made by the government. In this regard, the bulk of government preferences can be obtained just by them.

Along with the formation of import-substituting business groups, another reproductive mechanism of neo-industrial import substitution is the development of a target social group that unites scientists and inventors, managers of innovative firms and high-tech enterprises.

Among the ways of accelerated development of the target social group of neo-industrial import substitution are the following:

- organization of a state-corporate educational order for the training of specialists for modernized enterprises of processing industries, with the involvement of all participants of import-substituting business groups. Its mechanism should include a nationwide selection of applicants, a one-hundred-percent employment program, a set of internships in the world's leading industrial centers and innovation clusters;
- formation of a national personnel reserve for processing and high-tech industries, with a gradual improvement of their skills;
- application of tax exemptions for the fund of wages and salaries of employees of enterprises of the 5th and 6th technological systems, involved in import substitution, as well as for the property of educational organizations that fulfill the state-corporate educational order;
- guaranteed redemption by the state of patents and copyrights for inventions necessary for the production of competitive import-substituting products.

Thus, neo-industrial import substitution means the deployment in the economy of competitive elements of global production chains, aimed at overcoming its deindustrialization and is based on controlled structural changes, associated with the innovative development of raw materials and the reproduction of modern processing industries.

## 1.5 INSTITUTIONAL BARRIERS TO THE DEVELOPMENT OF NEO-INDUSTRIAL IMPORT SUBSTITUTION

Neo-industrialization is a global trend in the post-crisis (2009) period [70]. In the new conditions, modern industrial policy is implemented in the context of increasing competition for industrial activities that have the greatest potential in terms of value creation [71].

According to the analysis of works on this problem, the main distinguishing feature of neo-industrial development is that most of the gross national product (GNP) is formed by production based on technological and institutional innovations and embedded in global value chains [72].

The presence of innovations allows businesses to participate in the international division of labor, occupy their niches in value chains and compete successfully in international markets for goods, services, capital (including intellectual property), labor. As a result, businesses, registered in a country, and the country as a whole can receive higher incomes and increase the welfare of society.

"Neo-industrial economy" is usually understood as an economy, in which "high" industrial technologies are mainly used, regardless of whether they are based on borrowed innovations or generated in the country [73]. But if innovations are not mainly produced in the country itself, its economy will not be competitive, and the level of welfare of citizens will not approach the best world standards. In any case, the development of Ukraine's economy should not be aimed at conforming to

a certain abstract model of neo-industrial or post-industrial economy, but at ensuring a comparable quality of life and the possibility of stable growth in a globalized and changing world.

At present, the participation of Ukrainian economic entities in global value chains is mainly related to the export of raw materials and products of its primary processing, ie products with a low share of value added. Most of them are not competitive in the world markets of products with a high share of added value (high-tech, innovative) and capital markets, because the country does not sufficiently generate and use innovations.

In terms of import substitution, neo-industrialization means the restoration of lost in the 1990s links of production chains in mechanical engineering, radio electronics, instrumentation, light, food industry on a new technological basis on the one hand, and on the resource base of the developed raw materials complex on the other. Thus, the initiation of neo-industrial import substitution means a balance of participation of the Ukrainian economy in the global system of division of labor on the one hand, and the realization of national innovation potential in domestic industry on the other.

It is needed, purposefully and in the shortest possible time, to start forming the institutions necessary for neo-industrial import substitution, both the state and business are hindered by the deinstitutionalization of structural policy. It is manifested in the distortion of long-term economic interests of the state and the lack of effective strategies for industrial development, which combine the interests of the state, raw materials and processing business, large, medium and small businesses, financial firms and industrial enterprises. At the same time, the deinstitutionalization of the state's economic policy is exacerbated by subjective factors – the commodity lobby, the political interests of preserving the rent-raw material model, the government's lack of understanding of the consequences of technological degradation and loss of competitiveness in the domestic market.

The main problem is not that the state or economic entities themselves have incorrectly chosen strategic directions of production development, but that the country lacks institutional conditions for the transition to a neo-industrial model of development, has not created the necessary institutions. Institution is understood as a set of stable formal and informal rules of conduct that govern socio-economic relations and which are actually followed by most of the subjects of these relations. The institutes, operating in Ukraine (legislation, moral norms, organizational routines, etc.), stimulate economic entities to generate income not by increasing business efficiency and providing competitive advantages by modernizing production and using innovations, but by finding rent, participating in the shadow economic activity, political and bureaucratic corruption, committing other offenses. The established institutions do not create conditions for successful competition in world markets also because they significantly increase the costs and risks of economic activity.

The source and, at the same time, the force that destroys the institutional environment of neo-industrial import substitution in the Ukrainian economy are its institutional barriers. In general, they are ineffective, but stable rules, regulations, target settings. They consistently worsen the situation in the economy for most groups of its subjects to the liking of some, but are not eliminated for a long time, as the mechanisms of coercion to implement ineffective norms (formal or informal) persist. The founders of the theory of institutional barriers identify two of their root causes.

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The first is the effect of hysteresis (preservation of inefficient norms after the "shock" of the system, "attenuation" of disturbances in it). It can be traced to the preservation of old inefficient institutions after economic reforms, as these institutions are linked to the deep interests of key actors – the state, big business, political parties. The second reason is the "Nash equilibrium" (strategies of individual economic entities that are ineffective for the majority and that give them the only opportunity to maximize their income in response to the actions of others). It is manifested, for example, in the conservation of outdated technologies and the growth of raw material production in the Ukrainian economy, despite the extremely unfavorable dynamics of the global raw materials market.

Specific institutional barriers that hinder the effectiveness of government efforts to develop import substitution include the following.

The first specific institutional barrier to neo-industrial import substitution is the low efficiency of public investment expenditures, despite the reduction of the share of the public sector in recent years – up to 11.5 % (**Table 1.10**). At the same time, the share of the state in the formation of GDP of such countries as Canada, England, Italy is about 15 %, the United States, Germany – up to 20 %, Poland – about 25 %.

The sectoral breakdown of capital expenditures of the consolidated budget of Ukraine indicates that a significant part of capital expenditures does not have even the least satisfactory justification. Thus, more than half of the capital expenditures of the budget are directed to only 2 out of 10 areas of financing, namely economic activity and housing and communal services. More than half of the capital expenditures of the consolidated budget are capital transfers (subsidies) to enterprises. As mentioned above, in theory, support for the real sector can be justified if it is temporary. In addition, theory is theory, and practice makes its adjustments, and most other countries also support their businesses. However, there is a significant difference between "other countries" and "us". It consists in the absence of a mechanism that guarantees the effectiveness of state subsidies to enterprises, including capital ones<sup>6</sup> in Ukraine. This mechanism should ensure the transparency of state support, its limited scope and time, analysis of support tools, effectiveness and appropriateness of support in general, minimizing the negative impact on competition and control. In addition, Ukraine differs from other countries both in the forms of assistance and in the distribution of economic sectors. If, for example, in the EU countries most of the aid is provided to the infrastructure sectors (transport and communications), in Ukraine half of all funds (in the form of direct and indirect subsidies) go to industry, energy, construction and agriculture.

Thus, import substitution in the Ukrainian economy, which faces a barrier of inefficiency in public investment, cannot be neo-industrial. The main reason for this – investment – the dominance of investments with short-term effect, focused on the situation of commodity and financial markets. As a result, investments that would allow the start of production of competitive products for the domestic market in the country are made point by point, without taking into account the real need of industry to upgrade the means of production, to finance R&D.

The second specific institutional barrier to neo-industrial import substitution is the preservation of the low level of development of market institutions in the rent-and-commodity model of the

economy. Underdeveloped market institutions restrain the growth of entrepreneurial activity and deprive the processing and high-tech industries, in which public investment has proved ineffective, of effective state support. The market institutions, formed in Ukraine, – external (public administration bodies, laws and regulations, courts), as well as internal (contracts, property rights, competition, pricing mechanisms), are at the low level of development, and do not provide full cooperation between business and government, nor its necessary support. However, the functioning of these institutions satisfies the conditions of the raw materials economy, in which primitive, by the standards of the XXI century, technology and large-scale enterprises facilitate state control and administration of their activities. Thus, the persistence of weak market institutions in the economy is due to the low technological level of the majority of industries. And the very technological backwardness of Ukraine's economy is largely caused by weak market institutions.

The third specific barrier to neo-industrial import substitution is negative institutional effects (externalities). They represent undesirable for the subjects of import substitution consequences of the functioning of institutions, specially created to initiate this process. And to overcome these consequences, in turn, requires the creation of new institutions; in the future, such a cycle of "institution-building" can be repeated many times.

The reason for the emergence of institutional externalities is a complex and ambiguous effect of the state's creation of new formal institutions, in the "breaking" of primary goals through the prism of the diversity of economic interests, the lobbying of different groups of agents. As a result, the same efforts of the state to change the system of institutions in the field of industrial policy, regulation of investment in manufacturing and innovation can give both desirable and undesirable results for import substitution. We have identified the following institutional externalities of neo-industrial import substitution:

- low demand for innovation and, as a result, the market of innovative products and the necessary infrastructure are practically in its infancy. The level of commercialization of research and development results is low. There is no system of information support for the innovation market, as well as a system for exchanging information between developers and potential investors. The network of modern innovation structures (venture funds, technology parks, business incubators, etc.) is developing rather slowly;
- deterioration of the investment climate in the processing industries as a result of bureaucratization of investment decisions of the state as the development of legislative support for industrial policy, along with the translation of external shocks;
- growing uncertainty of investors in the prospects of domestic demand for final consumption products that meet international technological standards;
- priorities, related to national competitive advantages, are often implemented under targeted programs without sufficient state funding, without the provision of soft loans and state guarantees for investments for the purchase of capital-intensive domestic equipment, etc.

The reality of such a paradoxical danger of positive structural changes can be explained by the fact that all attempts to modernize Ukrainian industry (creation of technology parks and innovation

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## 1 THEORETICAL FUNDAMENTALS OF STATE REGULATORY POLICY REGARDING IMPORTS IN THE CONDITIONS OF GLOBAL TECHNOLOGICAL TRANSFORMATIONS

clusters) are caused not by a technological breakthrough, but by the "spillover" effect. It is to benefit not so much from the introduction of innovations, but from its side effects – improving the image, increasing creditworthiness, creating new jobs, improving relations with the authorities and more. Given the existing institutional barriers, the effect of the "spillover" effect leads to the fact that import substitution in Ukrainian industry occurs in the form of imitation of technologies, already established and outdated abroad, and in an attempt to reproduce them in domestic enterprises. Thus, compared to 2015, in 2017, with a significant decrease in the number of purchased Ukrainian technologies, the number of technologies, purchased outside of Ukraine, increased almost 2 times.

● **Table 1.10** Share of the public sector in the economy (first half of 2020)

Economic activity types	Share of the number of economic entities in the public sector of the economy, %	Share of net income (revenue) from sales of products (goods, works, services) of economic entities of the public sector of the economy, %	Share of the average value of non-current and current assets of economic entities of the public sector of the economy, %	Share of the public sector of the economy, %
Total including	4.2	9.8	20.6	11.5
Industry	5.9	12.2	16.6	11.6
Mining and quarrying	10.9	4.0	3.7	6.2
Processing industry	4.6	2.0	5.1	3.9
Electricity supply, gas, steam and air conditioning	10.0	35.6	50.5	32.0
Water supply, sewerage, waste management	6.8	1.5	6.5	4.9
Construction	0.6	0.1	0.2	0.3
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.5	0.7	1.2	0.8
Transport, warehousing, postal and courier activities	7.1	34.5	47.5	29.7
Temporary accommodation and catering organization	7.4	0.4	7.4	5.1
Information and telecommunications	10	1.9	5.7	5.9
Financial and insurance activities	0.9	0.3	0.3	0.5
Real estate transactions	3.3	1.0	1.5	1.9
Professional, scientific and technical activities	20	73.1	78.5	57.2
Activities in the field of administrative and support services	2.9	0.4	1.0	1.4
Education	–	–	–	–
Healthcare and social assistance	2.2	0.3	2.0	1.5
Art, sport, entertainment and recreation	48.3	13.2	45.7	35.7

Thus, the emergence of institutional externalities of neo-industrial import substitution can significantly increase the existing barriers, resulting in a significant deviation from the initial goals of the development of competitive industries for the domestic market.

All institutional barriers to neo-industrial import substitution, both general and specific, are closely linked to the problem of the technological backwardness of the Ukrainian economy. The result is a special barrier – technology. It is a stable self-sustaining situation, in which the development of competitive high-tech industries in the country to replace imports is constrained by an unfavorable institutional environment. In turn, such an environment with a set of institutional barriers is supported by the conditions, in which the rental and raw materials model of the country's economy is implemented.

In the domestic economy, the technological trap is manifested in an increase in the share of imports as technology levels in production chains increase. In particular, for the products of industries that produce mainly investment goods and ensure the production of means for production (machinery, equipment, vehicles, appliances) in 2020, the share of imports amounted to 40 % of domestic consumption. The result of increasing technological dependence of the Ukrainian economy on imports is almost complete (up to 98 %) dominance of high-tech products, imported from abroad – biochemical, nano-material, satellite, industrial-digital, unmanned technological products, which determines the standards of future technologies.

Overcoming the technological barrier actually means "launching" a technological multiplier, the effect of which is manifested in the "catalysis" of the production of less technological industries by more high-tech ones. This requires the smooth transfer of technology from science-intensive and high-tech sectors to manufacturing industries. In fact, overcoming the technological barrier should be marked by institutional support for the formation of new technological and research and production platforms for intensive saturation of the domestic market with competitive goods. In order for import substitution to help restore a competitive processing industry and "launch" a technological multiplier, systemic institutional transformations are needed. Therefore, the institutional support of neo-industrial import substitution can be considered dependent on the implementation of the following set of conditions.

The first condition is the formation of a favorable institutional regime for the development of import-substituting industries. The institutional regime provides for a certain procedure for the adoption and application of norms, rules, traditions, ethics, lobbying (the whole complex of formal and informal institutions). This procedure determines the legitimacy (legal and public recognition) of institutions. The institutional regime necessary for the development of neo-industrial import substitution must meet the following requirements: flexible and transparent government that stimulates the development of institutions of a competitive environment; availability of effective public-private partnerships in the field of innovation, which allow to implement projects of import-substituting productions; effective protection of intellectual property rights, required for mass import of technologies; development of industrial personnel, scientists and innovative entrepreneurs with modern competencies.

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Another condition for overcoming the institutional barriers to import substitution is a purposeful entry into the institutional trajectory of neo-industrial development, which is a description of the process of development of the necessary institutions over time. This process is defined by "intermediate" or "auxiliary" institutions, which "connect" the current rules and regulations with the most popular. By creating "intermediate" norms, it is possible to initiate overcoming the institutional barrier. The experience of leading technologically advanced countries can be used as guidelines, in particular:

- US experience in the formation of targeted programs to attract investment in technical re-equipment of energy, communications, transport;
- the experience of Japan and Singapore in creating a special system of public administration, embodied in the Ministries of Technological Development and Innovation;
- the experience in developing contractual relations between firms in high-tech clusters ("Silicon Valley" in the USA, bio-chemical cluster of Manchester (Great Britain), aerospace cluster Genet (France));
- the experience of Japan, the USA, Germany, Great Britain and other countries in the development of legislation in the field of innovation, related to the protection of intellectual property rights, investment in intellectual capital, etc.

Finally, the third condition for overcoming institutional barriers is the formation of the necessary institutional environment – a set of formal and informal institutions. The most popular formal institutions of the state include the following:

- targeted programs for joint attraction of state funds and private investors in processing industries;
- general economic program of neo-industrial import substitution, aimed at the deployment of fragments of global production chains in the economy over the next 2–3 years (industrial components, electronic components, software);
- state program of technology transfer from foreign companies to Ukrainian enterprises within the framework of foreign direct investment;
- agreements on mutual investment of innovations by the state and private companies.

It is also necessary to legislate publicly available technologies and to create support groups in the regions for technology platforms that would unite leading scientists, officials and businessmen.

The most popular business institutions, which are an alternative to the state and are necessary to overcome these barriers, include unions and associations of high-tech companies, long-term agreements on technology transfer by foreign investors, agreements on mutual investment of innovations by public and private companies. Also an important business institution is innovative intrapreneurship – the involvement of highly qualified employees of enterprises and scientists in innovative start-ups of technological development. Thus, the exit of the import substitution process from the existing institutional traps requires the formation of market and state institutions, related to the targeted programming of this process, with the development of legislation, contractual framework of relations of producers of raw materials, intermediate and end products, R&D, able to reduce transaction costs of the start of neo-industrial import substitution.

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**ABSTRACT**

The section of the monograph is devoted to the study of Ukraine's international economic activity in measuring the problems of import dependence. In particular, the issue of assessing the preconditions for the implementation of import substitution policy in key sectors of the Ukrainian economy was considered. The analysis of the current state of Ukraine's foreign trade has been carried out and the key problems of balancing the trade balance have been identified. The causes and consequences of the growing import dependence of the domestic economy have been established. Considerable attention is paid to the areas of realization of the potential of import substitution by high-tech goods in the context of building a national innovation system. The role of foreign direct investment in ensuring structural transformations in the economy of Ukraine has been studied and the factors of deterioration of the investment climate in Ukraine have been determined.

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**KEYWORDS**

Trade balance, import substitution policy, national innovation system, structural transformation, foreign direct investment.

## 2.1 PREREQUISITES FOR THE IMPLEMENTATION OF IMPORT SUBSTITUTION POLICY IN KEY INDUSTRIES

A developed domestic market is the basis of long-term economic development and economic security. In Ukraine, on the other hand, the domestic market played a secondary role throughout the period of independence. National producers and consumers tended to focus on more attractive foreign markets and more competitive imported products. In such a model of economic development, macroeconomic imbalances and devaluation potential have accumulated chronically.

During the years of Ukraine's independence, the command-administrative model of unequal rights and opportunities, discriminatory access to resources, wasteful management has not been transformed into a modern competitive market economic system that generates investment incentives and innovative entrepreneurial spirit. Instead, there was a small commodity economy with a depressed business climate, excessive external debt (**Fig. 2.1**), a high level of dollarization, shadowing and criminalization of economic activity. Exports are mainly raw materials and consist of low-tech goods (agricultural and metallurgical products), which makes the national economy sensitive to fluctuations in world prices, pushes it to the sidelines of scientific, technological and economic development.

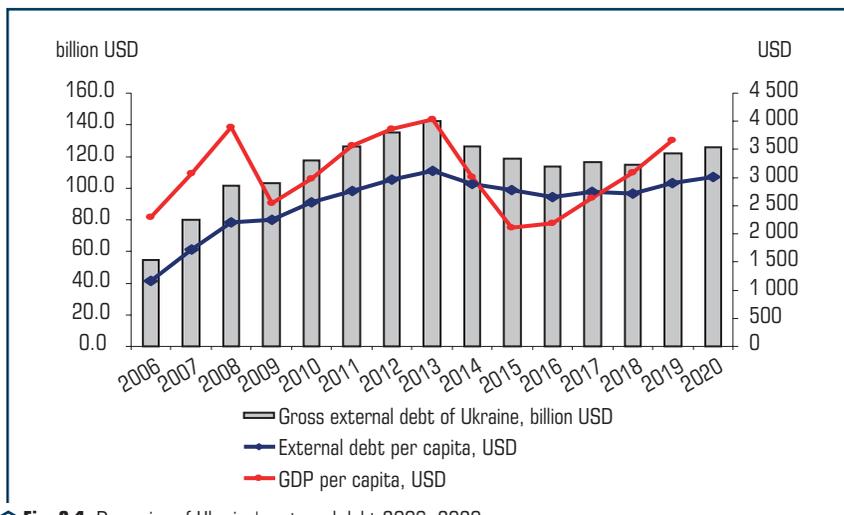


Fig. 2.1 Dynamics of Ukraine's external debt 2006–2020

Comparisons of key macroeconomic indicators of Ukraine and some neighboring countries are given in **Table 2.1**.

Table 2.1 Comparison of macroeconomic indicators of Ukraine and other countries in 2019

Macroindicators	RF	Belarus	Turkey	Poland	Ukraine
GDP (by PPP), billion USD	4,281.8	188.8	2,325.6	1,299.3	560.7
GDP per capita (by PPP), USD	29,181	19,943	27,875	34,218	13,341
State budget revenues, billion USD	311.8	11.6	154.2	104.3	38.6
State budget expenditures, billion USD	281.3	10.1	176.0	107.9	41.5
Science expenditures, % of GDP	0.99	0.61	0.96	1.21	0.47
Health expenditure, % of GDP	5.34	5.93	4.22	6.54	7
Health expenditure per capita, USD	585.9	342.5	444.7	906.8	177.4
Exports of goods, billion USD	422.8	22.5	171.1	251.9	50.1
Exports of services, billion USD	62.7	9.6	54.9	72.0	15.6
Imports of goods, billion USD	243.8	31.7	200.7	246.7	60.8
Imports of services, billion USD	98.8	5.8	28.0	43.9	6.9

Monopolization limits the possibilities of increasing the efficiency of the national economy. The decisive role of monopolies has influenced the development of political and social institutions and

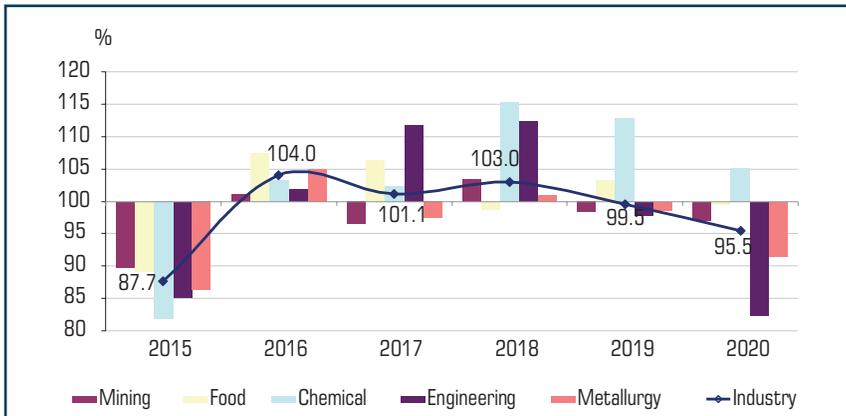
social ethics, causing their primitivization and the spread of corruption. The result was the "eating" of national wealth, depletion of national resources, obsolete infrastructure and industrial complex, in general, Ukraine's backwardness from other countries, including neighboring countries. Keeping labor costs low as a competitive advantage hinders the formation of the middle class and stimulates labor migration.

Labor productivity in Ukraine lags almost twice the world average. In terms of GDP per capita (purchasing power parity – PPP), Ukraine is 3.5 times lower than the EU average, 2.6 times lower than Poland, and 2.2 times lower than the Russian Federation.

The agricultural sector, which has an export orientation, came in the first place among the drivers of the domestic economy. Ukraine ranks first in the world market in terms of exports of sunflower oil, fourth – corn and barley, sixth – wheat.

Agriculture retains specialization in the production of grain and oilseeds, mainly by large agricultural holdings. At the same time, the livestock industry is in crisis, small forms of management are not developing, and farming is in decline, which in general has a negative impact on the socio-economic situation of the village.

Industry has lost its role as a driver of growth. Recent years have been characterized by stagnation in industrial production, with a reduction inherent in the vast majority of sectors (**Fig. 2.2**).



**Fig. 2.2** Indices of industrial production by type of activity  
*Notes: the data are given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, Sevastopol, as well as without taking into account part of the temporarily occupied territories in Donetsk and Luhansk regions*

- During these years, the development of industrial production had the following features:
- instability of the rate of recovery of growth after the crisis;
  - intersectoral uneven growth;

- annual fluctuations by individual types of production;
- different development trends within one type of activity (for example, in food production in 2020 there was an increase in the groups: "processing and canning of fruits and vegetables" and "production of oil and animal fats" with a reduction of all others, and in mining – at the general reduction of this type of activity, the group "extraction of stone, sand and clay" increased by 107.5 %; in the manufacture of electrical equipment, the group "manufacture of electrical distribution and control equipment" increased by 146.7 %).

Accordingly, in terms of key industrial activities, the following changes have taken place:

- continued growth in recent years and in 2020 in the pharmaceutical market (by 103 %) in the face of the devaluation of the hryvnia, rising cost of imported raw materials and falling purchasing power of the population. Despite the inability of domestic companies to compete with global manufacturers of original drugs and the production of mostly generic drugs, leading Ukrainian firms are increasing their combined market share. In general, the annual growth of the drug market in physical terms over the past two years amounted to 14 %, and the value of the market increased to UAH 61.2 billion. The growth was supported by the reform of the mechanism of public procurement in medicine, the introduction of reimbursement, external demand, which was facilitated by the receipt of GMP certificates by enterprises;

- **in the market of woodworking products** there was an unstable growth in 2017–2018, but in 2019 and 2020 the industry began to lose pace. Among the subtypes of activity there is an imbalance: sawmilling and planing production is growing more rapidly – by an average of 4.3 % annually, and production with significant processing – the manufacture of wood products, cork and others – 1.7 % per year. This market is one of the most promising, but for domestic production is determined by external demand, which formed the export orientation of production at 2.8 % in 2020. At the same time, the development of this market is characterized by significant import dependence of production in raw materials (pulp, waste paper) and components;

- **in the furniture market**, where after losing almost 20 % of sales in 2014–2015, manufacturers reoriented to new markets, and also due to the growth of domestic demand exceeded the level of production in 2017 by 11.2 % compared to 2012. However, since 2018 this group has been reduced and in 2020 amounted to 4.6 %;

- **in mechanical engineering**, the decline in production volumes was replaced by a small increase since 2016, due to individual production of electrical equipment by 4.5 % and the production of components and parts for vehicles by 23.1 %. But the industry has not resumed pre-crisis production – the last two years there has been a reduction in the industry and in 2020 it amounted to 17.6 %;

- **in food production**, unstable positive dynamics was observed. Ukrainian producers provide a larger share of food needs in the domestic market and contribute to the formation of the country's export potential (22.3 % of industrial exports). In 2019, the volume of products, sold by enterprises in the industry, amounted to 79.8 billion USD, but in 2020 the growth rate of production decreased (5.1 %, in 2019 – 12.9 %, in 2018 – 15.3 %).

According to the results of recent years, the industry has seen an increase in those types of industrial activities that were supported by investment, external and domestic consumer demand, as well as provided with agriculture and mining raw materials for processing. Local positive changes in 2020 were recorded among the subspecies of processing industries (**Table 2.2**):

- in the production of meat and meat products;
- production of oil and animal fats;
- processing and canning of fruits and vegetables;
- tanning of hides and skins, production of travel goods, bags, tinsmiths, dressing and dyeing of fur;
- production of paper and paper products;
- production of basic chemical products, fertilizers and nitrogen compounds, plastics and synthetic rubber in primary forms;
- production of pesticides and other agrochemical products;
- manufacture of paints, varnishes and similar products, printing ink and mastic;
- production of basic pharmaceutical products and pharmaceuticals;
- production of cement, lime and gypsum mixtures;
- production of abrasive products and non-metallic mineral products, other;
- production of other products of primary steel processing;
- production of instruments and equipment for measurement, research and navigation;
- watch production;
- production of radiological, electromedical and electrotherapeutic equipment;
- production of electrical distribution and control equipment;
- production of batteries and accumulators;
- production of electric lighting equipment;
- production of household appliances.

The current state of the domestic market shows a significant import dependence, which is manifested both in the dependence on imports of raw materials and semi-finished products for production, and on imports of final goods: equipment for industry and consumer goods. Production of industrial goods by 37.5 % is provided by imports of industrial products. The sensitivity to fluctuations in world conditions and a significant export orientation of production, which in 2019 amounted to 16.7 % of production, increased. A clear idea of the development of such processes is given by the structure of formation and use of commodity resources of Ukrainian industry, which is given in **Table 2.3**. The share of domestic production in the structure of domestic consumption decreased in 2019 in the groups: food products; chemical industry products, wood pulp; vehicles and road equipment; devices and apparatus.

Ukrainian industry has structural problems of foreign economic relations that have reached a critical level, in particular the predominance of exports of raw materials and intermediate goods (74.7 % in 2017). Over five years, the share of raw material exports in total exports of goods has increased significantly (from 21.6 % in 2012 to 31.2 % in 2017) and together with intermediate goods (43.5 % in 2017) they became the main goods, exported by Ukraine.

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## 2 INTERNATIONAL ECONOMIC ACTIVITY OF UKRAINE IN MEASURING THE PROBLEMS OF IMPORT DEPENDENCE

● **Table 2.2** Types of economic activity that showed growth in 2020

	Code by NACE-2010	2013	2014	2015	2016	2017	2018	2019	2020
<b>Processing industry</b>	<b>C</b>	<b>92.7</b>	<b>90.7</b>	<b>86.9</b>	<b>105.6</b>	<b>105.2</b>	<b>102.9</b>	<b>100.9</b>	<b>94.1</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Production of meat and meat products	10.1	110.5	100.5	100.2	104.1	104.3	99.9	102.0	100.0
Processing and canning of fruits and vegetables	10.3	99.8	102.9	84.7	106.0	101.6	109.9	99.4	105.6
Production of oil and animal fats	10.4	92.6	121.5	85.9	118.4	117.5	97.9	113.7	104.8
Production of milk products	10.5	100.5	100.1	91.7	99.7	100.8	101.7	95.1	100.2
Production of spices and seasonings	10.84	98.6	93.1	84.2	100.8	103.3	100.0	101.6	104.4
Production of ready-made animal feed	10.9	–	–	92.1	102.8	99.5	106.5	104.2	100.0
Distillation, rectification and mixing of alcoholic beverages	11.01	84.3	93.7	91.8	86.4	88.7	93.3	95.6	100.4
Production of tobacco products	12	91.8	104.5	108.2	102.2	95.3	91.4	87.6	100.2
Tanning of skins and finishing of leather; production of travel goods, bags, tinsmiths; tanning and dyeing of fur	15.1	113.2	81.4	99.8	119.0	120.5	95.7	95.5	121.7
Production of paper and paper products	17	105.2	94.3	70.5	95.5	108.4	97.8	92.9	101.7
Production of pulp, paper and cardboard	17.1	102.1	93.3	95.9	103.2	110.4	103.9	96.7	101.2
Production of paper and cardboard products	17.2	105.7	94.5	69.3	95.0	108.2	97.3	92.6	101.7
Production of chemicals and chemical products	20	80.7	85.8	81.9	103.2	102.3	115.3	112.9	105.1
Production of basic chemical products, fertilizers and nitrogen compounds, plastics and synthetic rubber in primary forms	20.1	69.4	76.3	82.0	101.3	98.6	123.7	124.6	106.4
Production of pesticides and other agrochemical products	20.2	–	–	133.9	106.7	137.6	129.2	86.5	140.7
Production of paints, varnishes and similar products, printing ink and mastics	20.3	94.6	92.7	88.8	113.2	103.4	102.9	115.8	115.8

## IMPORT SUBSTITUTION POTENTIAL IN THE CONDITIONS OF DIGITAL TRANSFORMATION

## Continuation of Table 2.2

1	2	3	4	5	6	7	8	9	10
Production of soap and detergents, cleaning and polishing preparations, perfumes and cosmetics	20.4	109.2	97.8	77.9	99.0	100.3	104.8	89.4	101.9
Production of basic pharmaceutical products and preparations	21	111.8	101.9	91.9	110.4	103.6	95.0	103.7	103.0
Production of rubber and plastic products, other non-metallic mineral products	22.23	97.4	91.2	95.0	111.1	105.3	100.8	106.7	100.1
Production of other non-metallic mineral products	23	96.3	91.5	97.0	111.1	104.8	98.6	109.4	101.2
Production of cement, lime and gypsum mixtures	23.5	94.9	92.3	97.4	105.7	101.4	99.2	99.2	107.1
Cutting, processing and finishing of decorative and building stone	23.7	–	–	58.4	108.0	129.0	94.3	94.6	103.7
Production of abrasive products and non-metallic mineral products	23.9	103.4	77.9	118.5	121.2	117.4	100.7	99.3	143.5
Production of other products of primary steel processing	24.3	85.4	85.2	85.3	120.5	105.4	92.9	100.5	111.2
Metal processing and coating of metals; machining of metal products	25.6	101.0	90.8	86.3	124.9	104.7	108.9	124.4	100.0
Production of other fabricated metal products	25.9	100.4	91.3	88.6	105.1	109.9	103.1	91.0	105.2
Production of instruments and equipment for measurement, research and navigation; production of watches	26.5	–	–	76.0	131.4	108.0	119.6	75.6	116.6
Production of radiological, electromedical and electrotherapeutic equipment	26.6	35.0	44.2	132.4	141.0	84.0	90.4	102.8	289.6
Production of electrical distribution and control equipment	27.12	85.8	120.9	95.6	106.6	115.6	102.8	87.2	146.7
Production of batteries and accumulators	27.2	93.0	55.8	79.9	106.5	93.4	77.4	97.0	118.1
Production of electric lighting equipment	27.4	97.4	87.8	89.3	108.4	69.4	91.0	86.3	108.1
Production of household appliances	27.5	91.0	84.4	89.3	118.9	113.8	108.5	90.3	117.2

◆ **Table 2.3** Structure of formation and use of commodity resources of industry, %

Parameter	Commodity resource formation		Commodity resource use		Export orientation of production	Import dependence of production
	Domestic production	Import	Domestic consumption	Export		
1	2	3	4	5	6	7
<b>Agricultural products</b>						
2010	88.2	11.8	100	85.4	14.6	5.3
2013	84.2	15.8	79.8	20.2	21.2	6.5
2017	87.3	12.7	69.7	30.3	34.5	4.8
2019	86.7	13.3	65.7	34.3	37.9	5.2
<b>Finished food products</b>						
2010	88.2	11.8	87.9	12.1	5.0	4.1
2013	89.4	10.6	88.3	11.7	5.6	4.2
2017	89.8	10.2	85	15	6.5	3.9
2019	88.8	11.2	77.8	22.2	6.4	4.3
<b>Mineral products</b>						
2010	51.7	48.3	84.6	15.4	13.1	34.8
2013	51.7	48.3	83.8	16.2	11.8	29.1
2017	54.4	45.6	85.6	14.4	9.1	25.2
2019	41.8	58.2	93.2	6.8	9.7	21.4
<b>Chemical industry products</b>						
2010	43.8	56.2	69.6	30.4	6.8	10.6
2013	47.5	52.5	73.1	26.9	6.8	11.0
2017	33.6	66.4	83.2	16.8	3.8	13.2
2019	28.8	71.2	77.7	22.3	3.9	12.3
<b>Polymeric materials, plastics</b>						
2010	54.3	45.7	89.1	10.9	1.3	6.0
2013	50.1	49.9	88.4	11.6	1.2	6.0
2017	51.0	49.0	87.3	12.7	1.3	6.5
2019	38.3	61.7	85.8	14.2	1.4	5.9
<b>Wood and wooden products</b>						
2010	68.6	31.4	23.9	76.1	1.6	0.6
2013	73.7	26.3	27.5	72.5	1.8	0.5
2017	80.4	19.6	5.7	94.3	2.8	0.5
2019	66.9	33.1	8.8	91.2	2.8	0.5

## IMPORT SUBSTITUTION POTENTIAL IN THE CONDITIONS OF DIGITAL TRANSFORMATION

◆ Continuation of Table 2.3						
1	2	3	4	5	6	7
<b>Textiles and textile products</b>						
2010	19.5	80.5	70.3	29.7	1.4	3.3
2013	19.1	80.9	74.7	25.3	1.3	3.2
2017	23.3	76.7	64.0	36.0	1.8	3.5
2019	17.7	82.3	80.5	19.5	1.7	3.9
<b>Base metals and products of them</b>						
2010	85.9	14.1	40.9	59.1	33.7	6.8
2013	83.1	16.9	40.7	59.3	27.8	6.5
2017	83.0	17.0	42.9	57.1	23.4	6.1
2019	78.1	21.9	44.5	55.5	20.5	6.0
<b>Mechanical equipment</b>						
2010	41.7	58.3	59.5	40.5	11.0	13.4
2013	33.9	66.1	63.0	37.0	11.0	16.2
2017	22.3	77.7	66.4	33.6	9.9	20.0
2019	18.8	81.2	62.2	37.8	8.9	21.9
<b>Vehicles and road equipment</b>						
2010	60.2	39.8	64.6	35.4	6.3	6
2013	51.0	49.0	72.2	27.8	5.3	7.7
2017	34.9	65.1	90.3	9.7	1.4	8.4
2019	26.6	73.4	81.3	18.7	1.8	10.1
<b>Optical and photographic devices and apparatus</b>						
2010	48.8	51.2	85.4	14.6	0.5	1.5
2013	50.2	49.8	86.5	13.5	0.5	1.4
2017	42.3	57.7	88.8	11.2	0.4	1.6
2019	24.9	75.1	85.1	14.9	0.4	1.8
<b>TOTALLY</b>						
2010	62.1	37.9	71	29	–	–
2013	60.5	39.5	72.9	27.1	–	–
2017	57.7	42.3	74.9	25.1	–	–
2019	62.5	37.5	83.3	16.7	–	–

Notes: export orientation and import dependence – the share of exports (imports) in total foreign trade.

Source: calculated according to the data: "Expenditure-Output" tables for the respective years and "Commodity structure of foreign trade" [74]

In general, Ukraine's economy is quite import-dependent. For 30 years of independence the country has not managed to reduce dependence on imports (**Fig. 2.3**).

According to the results of 2020, imports of food products in retail trade amounted to 20.6 %, and non-food products – 67.1 %.

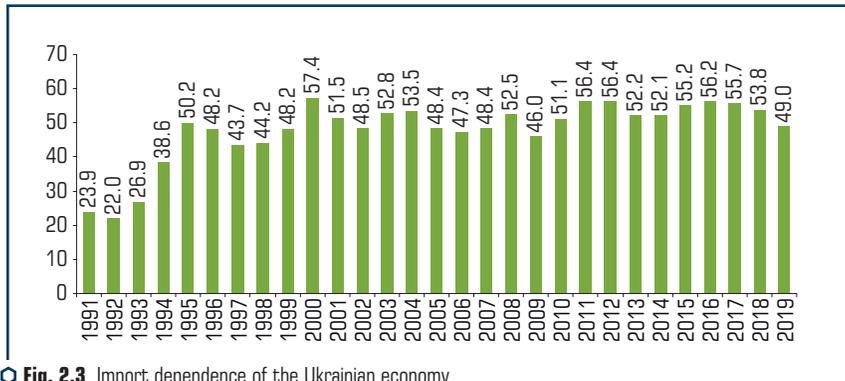


Fig. 2.3 Import dependence of the Ukrainian economy

The activity of industrial enterprises is a confirmation that the industry in Ukraine has ceased to be a driver of economic growth. Thus, according to the State Statistics Service of Ukraine, as of the end of 2019, 12.5 % of all enterprises in Ukraine operated in industry (47,679 units). This is 2.5 thousand units less than in agriculture, forestry and fisheries; more than twice less than in the wholesale and retail trade and repair of motor vehicles.

As before, Ukrainian industry relies mainly on raw materials production with a low degree of technological processing of products, which, however, has a certain demand in domestic and foreign markets. Among the industries of mainly domestic orientation, those that meet the vital (and therefore relatively "inflexible") needs of the population in basic foodstuffs have relative stability. Also not inferior are the types of activity, the high volumes of consumption of which usually testify negatively to the general state of socio-cultural preferences of the population (tobacco, alcohol).

Investments are needed to overcome the economic backwardness. However, despite the 23 % average annual growth of capital investment in 2016–2019, the share of gross fixed capital formation in Ukraine's GDP over the past 10 years did not exceed 19 % (Fig. 2.4), while for the modernization of the economy this figure should be at least 25 % GDP.

The crisis in domestic investment shows the negative dynamics of capital investment indices (Table 2.4). If in 2019 the growth was demonstrated by many activities, then in 2020 – only two: postal and courier activities – due to the development of delivery and online trade services, as well as telecommunications, as the crisis in the economy was intensified by the COVID-19 crisis.

In addition to the spread of morbidity and uncertainty with the development of the pandemic, which manifested itself in the weak business expectations of enterprises, investment was also negatively affected by unresolved issues in alternative energy. As a result, in 2020, despite the

improvement in the financial results of enterprises, there was a large-scale decline in investment in almost all activities.



**Fig. 2.4** Gross fixed capital formation (% of GDP and billion USD)

Own funds of enterprises remain the main source of capital investment (65.4 % in 2019), while banks are almost excluded from the investment process, the share of credit funds was only 10.8 % in 2019 (in 2018 – 7.8 %).

The growth of domestic investment is constrained by an unfavorable investment climate, low confidence of citizens and entrepreneurs in financial institutions, insufficient protection of property rights, inconsistency of state policy on financial market development and underdeveloped financial intermediation.

Sources of domestic investment financing are limited due to the inefficient system of attracting investment resources: household deposits are mostly short-term, and more than 70 % of individuals' savings are accumulated outside banks. The active acquisition of government securities by commercial banks diverts a significant amount of funds from lending to the real sector of the economy.

Thus, given the above crisis trends in Ukrainian industry as a prerequisite for the development of import substitution, it is necessary to focus on ensuring a positive vector of influence of the commodity structure of imports on domestic production, and thus increase international competitiveness. Thus, we will note that among the priorities of the state in this aspect, determined by the President of Ukraine for the next years, are:

- development of the domestic market as a basis for sustainable growth. This includes: reducing the import dependence of the national economy; promoting the development of small and medium-sized businesses; improving the conditions for the realization of human potential; strengthening the institutional basis of the national economy, its decriminalization and de-shadowing;
- active export policy based on: improving the structure of exports, developing new foreign markets and expanding the range of Ukraine's foreign trade partners; promoting the entry of new participants in foreign economic activity into foreign markets.

● **Table 2.4** Indices of capital investment by type of economic activity

<b>Economic activity type</b>	<b>Code by NACE-2010</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
<b>Totally</b>		<b>118.0</b>	<b>122.1</b>	<b>116.4</b>	<b>115.5</b>	<b>61.8</b>
Agriculture, forestry and fisheries	A	149.5	130.7	108.5	90.0	54.7
Industry	B+C+D+E	118.7	123.4	122.2	134.7	56.4
Construction	F	91.3	110.5	86.1	109.8	60.3
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	125.0	113.0	149.1	100.3	60.8
Transport, warehousing, postal and courier activities	H	135.2	142.2	121.9	96.6	56.8
Postal and courier activities	53	124.5	336.7	94.4	16.8	734.7
Temporary accommodation and catering	I	136.3	102.9	106.7	148.7	55.2
Information and telecommunications	J	63.1	102.0	141.9	83.4	87.3
Publishing, production of motion picture and video films, television programs, publishing of sound recordings, activity in the field of radio and television broadcasting	58–60	107.8	103.5	134.0	124.8	68.9
Telecommunications	61	53.8	102.5	142.5	67.3	102.7
Computer programming and provision of other information services	62, 63	160.2	97.1	149.0	140.5	60.7
Financial and insurance activities	K	108.3	102.4	130.4	102.8	76.6
Real estate transactions	L	175.2	84.1	114.4	111.7	67.1
Professional, scientific and technical activities	M	127.4	132.4	107.5	131.4	77.3
Activities in the field of administrative and support services	N	145.9	118.7	77.8	137.2	61.1
Public administration and defense; compulsory social insurance	O	139.4	144.9	115.3	129.9	92.6
Education	P	143.8	168.4	108.4	131.6	54.3
Health care and social assistance	Q	198.5	189.5	105.8	146.6	52.5
Arts, sports, entertainment and recreation	R	77.8	165.9	185.8	117.1	28.9
Provision of other types of services	S	119.4	166.6	78.6	114.7	78.1

## 2.2 PROBLEMS OF PROVIDING THE TRADE BALANCE OF UKRAINE

International economic activity in Ukraine is one of the key vectors of state policy, which forms the preconditions for the development of trade and maintaining a favorable investment climate. Foreign trade provides significant potential for economic growth, budgeting and welfare of its

citizens. At the same time, the economy of Ukraine remains structurally deformed and is characterized mainly by the raw material orientation of production and exports against the background of high dependence on world markets for goods and services. According to the Ministry of Economy of Ukraine in 2018, imports amounted to 62.9 billion USD, which is 14.3 % more than in 2017, in addition, the volume of imports of goods increased by 15.2 %. The results of 2019 showed an increase in imports of goods by 6.3 % and imports of services by 3.5 % compared to 2018 [75]. At the same time, it is worth noting the gradual loss of competitiveness of certain sectors of the economy in the domestic market under the passive role of the state in matters, relating to regulatory policy in foreign trade.

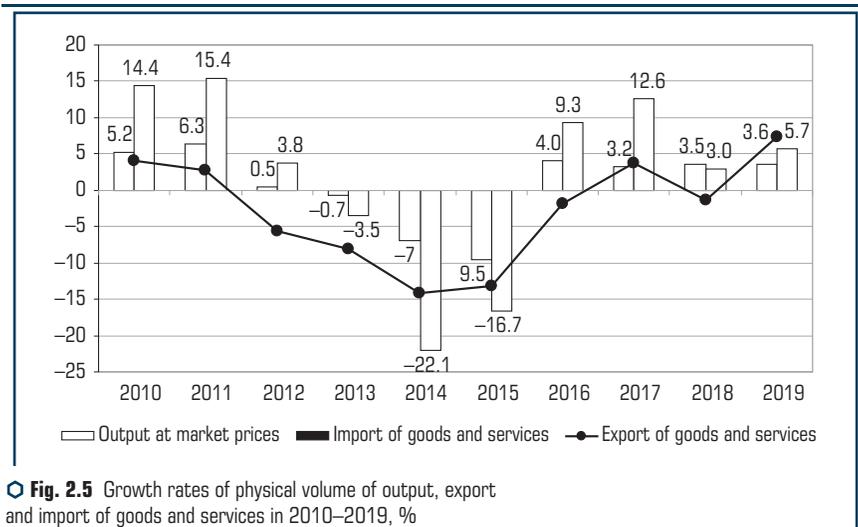
The lack of a strategic approach to solving the problem of saturation of the domestic market by increasing the potential of domestic production leads to an increase in the level of import dependence of the domestic market, and necessitates diversification of commodity and geographical structure of exports to cover the current account deficit.

The extremely high level of openness of Ukraine's economy only increases the sensitivity of the domestic market to conjuncture fluctuations in the world market of goods and services, as well as to global trends, in particular, volatility in energy prices, declining prices for key domestic exports and more. Under such conditions, there is a need to find reserves to reduce the level of import dependence of the Ukrainian economy, to ensure a positive vector of influence of the commodity structure of imports on domestic production, and thus increase the international competitiveness of the economy.

Theory and world practice show conflicting views on the effects of imports on the national economy. Imports meet the country's needs in goods that are either not produced by domestic entrepreneurs, or the volume of their production is insufficient. As a result, it provides active saturation of the domestic market and social labor savings, increasing employment in trade and related activities, increasing standards of industrial and personal consumption through the purchase of goods and technologies, expanding revenues to the state budget. However, as practice shows, at a certain stage of economic development in conditions of low competitiveness of domestic production, imports cause an irrational increase in the share of foreign products in domestic consumption against the background of declining employment in material production, deteriorating financial condition of local enterprises and their bankruptcy [76].

The tendency to increase the share of imports in the domestic market of Ukraine does not meet national economic interests and inhibits the potential for national production. Comparing the dynamics of domestic production and physical volumes of imports (**Fig. 2.5**), it can be stated, that the development of the domestic market was mainly supported by imports, rather than domestic production. With the emergence of positive dynamics of economic development in 2016, the outstripping dynamics of imports of goods and services compared to the development of domestic production resumed. Thus, in 2016, the growth rate of imports was 2.3 times higher than the dynamics of domestic production, and in 2017 – 3.9 times. And despite the excess of the growth rate of import volumes in 2018, in 2019 the dynamics of previous years resumed, due to the growth of imports over the output of goods and services.

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**Fig. 2.5** Growth rates of physical volume of output, export and import of goods and services in 2010–2019, %

Source: calculated by the author according to the National Accounts of Ukraine for the respective years [74]

The dominance of the outpacing growth rates of imports in relation to exports in the economy of Ukraine during 2013–2019 formed a steady upward trend in the negative balance of foreign trade (up to UAH 302.4 billion in 2019), which amounted to 7.6 % of Ukraine's GDP (**Table 2.5**). The outstripping dynamics of growth of imports in comparison with exports indicates the presence of significant imbalances in the structure of foreign trade turnover and in the total output of goods and services. The negative trend of accelerated growth of imports and its advance as to the dynamics of domestic production is due in part to the low competitiveness of Ukrainian goods on world markets, which, in turn, is the result of structural imbalances in the economy against low production and manufacturability [77].

Exports of goods and services in 2020 decreased by 7.8 % (by USD 5.0 billion) compared to 2019 and amounted to USD 59.0 billion. Exports of goods in 2020 decreased compared to 2019 by 1.7 % (by USD 841.7 million) and amounted to USD 49.2 billion.

The decrease in exports of goods occurred in the following product groups:

- 1) products of the metallurgical complex – by USD 1.2 billion (by 11.9 %), including:
  - ferrous metals – by USD 1.0 billion (by 12.0 %);
  - ferrous metal products – by USD 163.7 million (by 15.7 %);
  - other base metals – by USD 46.1 million (by 42.2 %);
- 2) engineering products – by USD 121.8 million (by 2.2 %), including:
  - electrical machinery and equipment – by USD 199.2 million (by 7.2 %);
  - railway or tram locomotives – by USD 127.4 million (by 23.3 %);

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- land vehicles, except rail – by USD 20.5 million (by 15.0 %);
- devices and apparatus – by USD 17.5 million (by 9.8 %);
- 3) light industry products – by USD 106.3 million (by 9.0 %), including:
  - textile clothing – by USD 53.2 million (by 13.6 %);
  - footwear – by USD 21.9 million (by 12.5 %);
  - knitted clothing – by USD 14.4 million (by 11.6 %);
  - hides and skins, untreated – by USD 9.1 million (by 11.0 %);
  - leather goods – by USD 7.8 million (by 16.5 %);
- 4) wood, paper pulp and products from it – by USD 23.4 million (by 1.3 %), including:
  - printed products – by USD 18.0 million (by 29.0 %);
  - paper and cardboard – by USD 16.8 million (by 4.5 %).

● **Table 2.5** Dynamics of Ukraine's foreign trade activity indicators in 2013–2019

Indicator	2013	2014	2015	2016	2017	2018	2019
Export, UAH mln, including:	616,283	539,763	669,608	1,026,918	1,220,171	1,414,235	1,727,335
goods	503,166	444,711	533,394	807,716	977,978	1,135,144	1,350,954
services	113,117	95,052	136,214	219,202	242,193	279,091	376,381
Import, UAH mln, including:	764,240	595,682	688,926	1,199,964	1,510,022	1,711,874	2,029,722
goods	696,189	533,244	600,520	1,056,578	1,359,902	1,541,787	1,822,857
services	68,051	62,438	88,406	143,386	150,120	170,087	206,865
Import-export coverage ratio	0.81	0.91	0.97	0.86	0.81	0.83	0.85
Foreign trade balance, UAH mln	-147,957	-55,919	-19,318	-173,046	-289,851	-297,639	-302,387
Foreign trade balance, UAH mln, in % of GDP	-10.10	-3.52	-0.97	-7.25	-9.71	-8.36	-7.60
Export, in % of GDP	43.0	48.6	52.6	49.3	48.0	45.2	41.2
Import, in % of GDP	52.2	52.1	55.2	56.2	55.7	53.9	49.2

Source: calculated according to the National Accounts of Ukraine for the respective years [74]

By the same time, there was an increase in exports of goods by the following product groups:

- 1) mineral products – by USD 465.5 million (by 9.6 %), in particular by the group “ores, slags and ashes” – by USD 830.5 million (by 23.1 %);
- 2) various industrial goods – by USD 64.2 million (by 4.1 %), including:

- furniture – by USD 75.7 million (by 11.2 %);
- various end products – by USD 67.2 million (by 86.4 %);
- glass and glass products – by USD 25.7 million (by 14.0 %);
- precious or semi-precious stones – by USD 24.5 million (by 27.3 %);

3) products of the agro-industrial complex and food industry – by USD 55.0 million (by 0.2 %), including:

- fats and oils of animal or vegetable origin – by USD 1.0 billion (by 21.7 %);
- residues and waste from the food industry – by USD 90.3 million (by 6.1 %);
- grain products – by USD 43.7 million (by 16.2 %);
- various food products – by USD 16.9 million (by 11.9 %);
- alcoholic and soft drinks and vinegar – by USD 12.9 million (by 6.1 %);

4) products of the chemical and related industries – by USD 50.5 million (1.9 %), including:

- fertilizers – by USD 152.5 million (by 67.8 %);
- pharmaceutical products – by USD 17.4 million (by 7.0 %);
- other products of the chemical industry – by USD 10.1 million (by 7.1 %).

According to the results of 2020, the largest share in Ukrainian exports belonged to:

- products of the agro-industrial complex and food industry (45.1 %);
- products of the metallurgical complex (18.3 %);
- engineering products (11.0 %);
- mineral products (10.8 %);
- products of the chemical industry (5.5 %).

The current commodity structure of Ukraine's foreign trade causes the chronic nature of the trade deficit. According to statistics, Ukraine's exports are mainly raw materials and consist of products of the first technological redistributions. Compared to 2010, in 2019 the share of agricultural products (from 8 % to 23 %), mining (from 7.1 % to 8.1 %), as well as low-tech industries (from 17.8 % to 29.4 %) increased. Along with this, as shown in **Fig. 2.6**, the share of medium-high-tech and high-tech industries in Ukrainian exports is declining (from 22 % to 10.7 and from 3.2 % to 2.6 %, respectively).

The main trade partners of Ukraine in the export of goods in 2018–2020 were: EU countries, the Russian Federation, Turkey, China, the United States and Egypt (**Fig. 2.7**).

In 2020, the increase in exports of goods took place in the following regions: Asia – by 20.0 %; Australia and Oceania – by 13.8 %; America – by 5.5 %. In particular, a significant increase in the share of Ukrainian exports to China was noted. The structure of Ukrainian exports to China is dominated by agricultural and food products (mainly grain – corn, barley and others, sunflower and other vegetable oils; oilcake and residues of vegetable fats and oils, wheat flour, dairy products), which account for about half of all exports to this country. In particular, Ukraine is the main supplier of corn and sunflower oil to China.

In addition, ores occupy an important place – 35 % of all exports to China, metallurgical products (ferroalloys, cast iron, etc.) – 9 %, as well as some products of the machine-building industry

(gas turbines, etc.) – 3.6 %. However, in general, Ukrainian exports to China are still characterized by a high level of concentration (for example, when one commodity item "iron ore and concentrates" is 35 % of total exports). The high dependence of exports on individual commodity items increases its volatility and sensitivity to changes in market conditions.

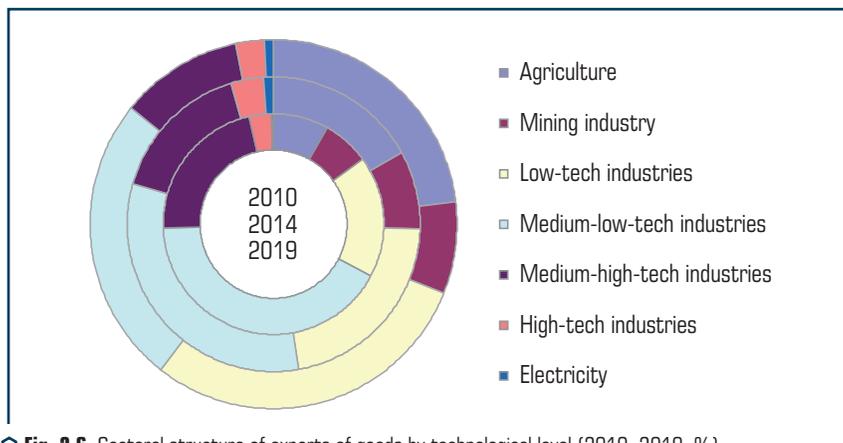


Fig. 2.6 Sectoral structure of exports of goods by technological level (2010–2019, %)

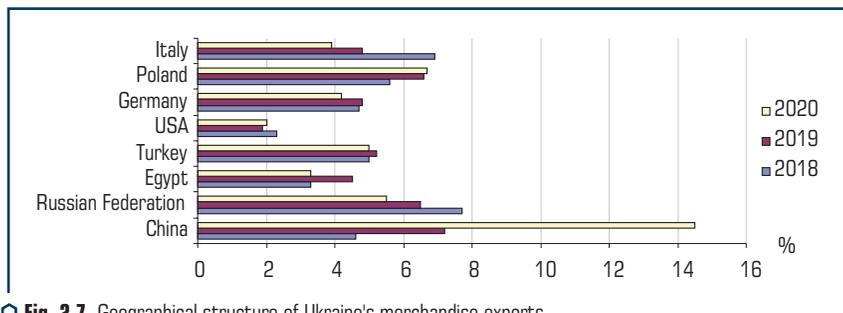


Fig. 2.7 Geographical structure of Ukraine's merchandise exports

Along with this, there was a decrease in merchandise exports to Africa (by 18.6 %), the CIS (by 12.1 %) and Europe (by 10.4 %).

At the same time, for the first time in several years, exports to the EU decreased by 10.3 %. At the same time, the EU had the largest negative balance in trade – USD 4.8 billion (3.26 of which are in Germany).

Imports of goods and services in 2020 decreased by 12.5 % (by USD 8.4 billion) compared to 2019 and amounted to USD 59.3 billion due to a decrease in merchandise imports, which compared to 2019 decreased by 11.0 % (by USD 6.7 billion) and amounted to USD 54.1 billion.

The decrease in import revenues in 2020 was due to the following product groups:

1) mineral products – by USD 4.6 billion (by 35.3 %), including:

- energy materials, oil – by USD 4.4 billion (by 36.3 %);
- ores, slags and ashes – by USD 132.6 million (by 25.1 %);
- salt; sulfur; plaster materials, cement – by USD 29.9 million (by 10.5 %);

2) engineering products – by USD 2.0 billion (by 9.7 %), in particular

- electrical machinery and equipment – by USD 1.2 billion (by 17.8 %);
- boilers, machines, apparatus and mechanical devices – by USD 583.9 million (by 8.8 %);
- land vehicles, except rail – by USD 292.7 million (by 5.0 %);
- railway or tram locomotives – by USD 100.3 million (by 49.8 %);
- aeronautical or spacecraft – by USD 40.7 million (by 26.3 %);

3) products of the metallurgical complex – by USD 523.1 million (by 14.3 %), including:

- ferrous metal products – by USD 279.4 million (by 25.4 %);
- ferrous metals – by USD 213.0 million (by 17.0 %);
- aluminum and aluminum products – by USD 25.5 million (by 6.3 %);
- zinc and zinc products – by USD 18.2 million (by 24.0 %);

4) products of chemical and related industries – by USD 307.4 million (by 2.8 %), including:

- fertilizers – by USD 356.2 million (by 29.7 %);
- polymeric materials, plastics – by USD 157.4 million (by 6.0 %);
- products of inorganic chemistry – by USD 116.3 million (by 28.2 %);
- organic chemical compounds – by USD 94.9 million (by 13.4 %);
- essential oils, cosmetics – by USD 58.8 million (by 7.5 %);

5) light industry products – by USD 164.9 million (by 5.3 %), including:

- synthetic and artificial threads – by USD 59.8 million (by 25.5 %);
- knitted clothes – by USD 40.3 million (by 10.1 %);
- footwear – by USD 35.1 million (by 8.0 %);
- leather goods – by USD 24.2 million (by 20.0 %);
- textile clothing – by USD 21.3 million (by 5.7 %).
- wool – by USD 13.3 million (by 28.4 %);
- cotton (fabrics) – by USD 12.9 million (by 8.9 %);
- hides and skins, untreated – by USD 11.3 million (by 7.4 %);

6) various industrial goods – by USD 0.2 million (by 0.01 %), including:

- ceramic products – by USD 18.7 million (by 7.8 %);
- products from stone, plaster, cement – by USD 13.2 million (by 5.8 %);
- glass and glass products – by USD 12.9 million (by 4.0 %).

At the same time, there was an increase in imports of goods by the following product groups:  
1) products of agro-industrial complex and food industry – by USD 759.4 million (by 13.2 %), including:

- milk and dairy products; eggs, honey – by USD 138.9 million (by 82.0 %);
- edible fruits and nuts, citrus – by USD 121.7 million (by 18.1 %);
- tobacco – by USD 60.9 million (by 12.3 %);
- alcoholic and non-alcoholic beverages and vinegar – by USD 54.4 million (by 10.2 %);
- vegetables, roots – by USD 50.1 million (by 23.6 %);
- cocoa and cocoa products – by USD 48.8 million (by 14.9 %);
- residues and waste from the food industry – by USD 46.5 million (by 20.1 %);
- various food products – by USD 45.2 million (by 10.3 %);
- grain products – by USD 40.7 million (by 20.3 %);
- fish and crustaceans, mollusks – by USD 35.7 million (by 5.5 %);
- meat and fish products – by USD 33.2 million (by 26.1 %);
- coffee, tea, spices – by USD 28.9 million (by 13.0 %);
- fats and oils of animal or vegetable origin – by USD 27.1 million (by 10.7 %);
- products of processing of vegetables, fruits – by USD 19.0 million (by 10.0 %);
- 2) wood, paper pulp and wood products – by USD 104.1 million (by 7.9 %), including:
  - printed products – by USD 157.9 million (by 445.1 %).

The structure of Ukrainian imports, in contrast to exports, consists of high-tech products, energy and final consumption goods. In the structure of domestic imports in 2020, a significant share was made by machine-building products (34.3 %). Almost half of imported machinery and equipment are consumer durables (cars, household appliances and electronics). At the same time, raw materials account for 44.5 % of total imports, in the structure of which a significant share is the products of the chemical industry (**Table 2.6**).

According to the results of 2020, the largest share in total imports fell on mechanical engineering products (34.3 %), chemical products (19.9 %), mineral products (15.5 %), agricultural products and food industry (12.0 %), products of the metallurgical complex (5.8 %) and products of light industry (5.5 %).

In recent years, the leading foreign partners in Ukraine's imports were: China, the Russian Federation, Germany, Poland, Belarus, the United States and Turkey (**Fig. 2.8**), but all these countries, except Poland, saw a decline in imports.

Imports of goods from the EU-28 in 2020 decreased by 6.2 % (by USD 1.6 billion) and amounted to USD 23.5 billion. The reduction in imports of goods and services from the Customs Union (Russian Federation, Belarus, Kazakhstan, Armenia, Kyrgyzstan) was 30.3 % (by USD 3.5 billion). Imports of goods and services from the CIS countries decreased by 29.3 % (by USD 3.6 billion) and amounted to USD 8.8 billion.

Unlike previous crises, Ukrainian exports in 2020 have shown sufficient resilience to crises. This was due to a number of external and internal factors. In particular, the share of food products

in the structure of exports has increased in recent years, the demand for which is stable even during the crisis.

● **Table 2.6** Structure of imports of goods in Ukraine (in % to the total)

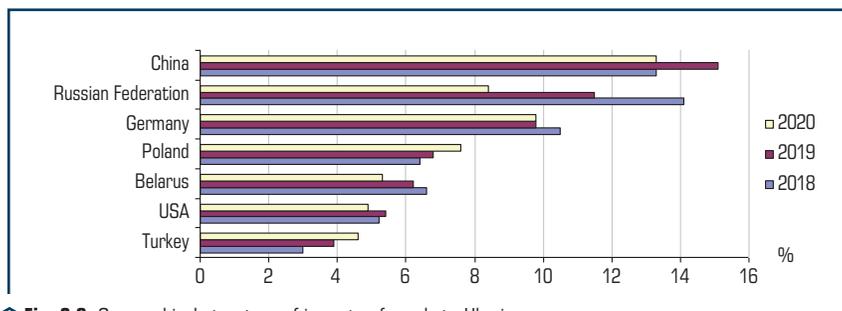
Groups of goods	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
I. Mostly raw materials	59.2	52.8	60.1	58.3	55.8	55.6	58.1	59.5	51.5	52.1	50.2	46.9	44.5
Agricultural raw materials	2.3	3.4	5.3	4.1	5.4	6.5	6.4	5.1	5.5	4.8	4.8	5.2	6.5
Mineral products	43	32	34.8	36.4	32.5	29.1	29.6	31.2	21.6	25.2	24.8	21.4	15.5
Products of the chemical industry	11	14	16.7	15.1	15.4	17.0	19.2	20.5	21.6	19.7	18.5	18.2	19.9
Wood and wood products (except furniture)	2.9	3.4	3.3	2.7	2.5	3.0	2.9	2.7	2.8	2.4	2.4	2.1	2.6
II. Mostly investment goods	22.2	34.8	27.8	31.2	32.6	31.8	28.2	27.8	35	36.1	36.8	39.8	40.1
Ferrous and non-ferrous metals and products	4.6	7.4	6.8	6.9	6.2	6.5	6.1	5.3	5.9	6.1	6.3	6.0	5.8
Machinery, equipment, vehicles, devices	17.6	27.4	21	24.3	26.4	25.3	22.1	22.5	29.1	30.0	30.5	33.8	34.3
III. Mostly consumer goods	8.7	9	8.5	6.7	7.7	8.7	9.5	9.2	9.5	8.4	8.7	9.5	10.9
Ready-made food	3.8	4	4.1	3.7	3.5	4.2	4.8	4.3	4.4	3.9	4.1	4.3	5.5
Leather and fur raw materials and products from it	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.4
Textiles and articles thereof, footwear	4.6	4.7	4.1	2.8	3.9	4.2	4.3	4.5	4.6	4.0	4.1	4.7	5.0
IV. Other goods	9.9	3.4	3.6	3.8	3.9	3.9	4.2	3.5	4.0	3.4	4.3	3.8	4.5

Source: calculated on the basis of data [74]

The strengthening of trade relations with China also played an important role in the context of its trade confrontation with the United States. Last year, for the first time in history, China became Ukraine's second largest trading partner after the EU and remained so in 2020. In addition, the Chinese economy quickly returned to growth after the beginning of the corona crisis. Ukrainian

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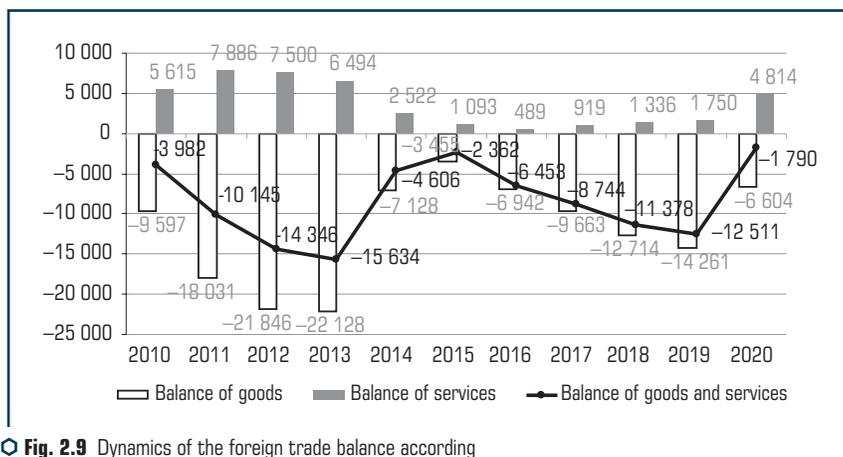
exporters responded promptly by reorienting part of their supplies to the Chinese market, thus compensating for the narrowing of demand in other markets.



**Fig. 2.8** Geographical structure of imports of goods to Ukraine

The negative balance on trade in goods and services in 2020 decreased compared to 2019 to USD 255.5 million. The rate of reduction was 93.1 % from USD 3 689.1 million.

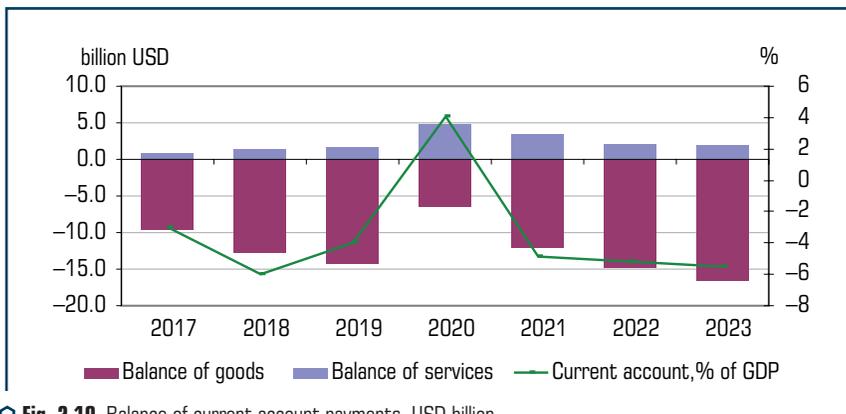
According to the NBU [78], as can be seen from the dynamics of the foreign trade balance (Fig. 2.9), Ukraine maintains a stable dynamics of its deficit in goods, and during the crisis its importance is declining. This is how it decreased in 2020 in response to the stagnation of foreign trade both in the world and in Ukraine. The balance of services is positive, it should be noted its growth in 2020 – its value is close to the results of 2020 and amounted to USD 4.8 billion.



**Fig. 2.9** Dynamics of the foreign trade balance according to the payments balance methodology (million USD)

According to experts of the National Bank, from 2021 the current account will return to the deficit, which will expand in the coming years due to growing domestic demand and the gradual deterioration of trade conditions [75]. After the current account returns to the deficit in 2021, it will continue to expand (to 4.9 % of GDP in 2023) due to growing consumer demand and the resumption of investment projects (**Fig. 2.10**). Additional factors will be the deterioration of trade conditions, the resumption of international tourism, reduced gas transit and increased payments on reinvested earnings.

After the decline in trade in 2020 due to the introduction of anti-epidemic restrictions in 2021, exports and imports are expected to return to pre-crisis levels, and in 2022–2023 – their gradual growth.



**Fig. 2.10** Balance of current account payments, USD billion

In 2021–2023, exports will grow against the background of significant demand for metallurgical and mechanical engineering products among trading partner countries due to economic stimulus programs, as well as further productivity growth in agriculture.

Imports will grow in 2021–2023 due to both energy and non-energy components. The growth of non-energy imports will be provided primarily by consumer demand through increasing real incomes and investment against the background of economic growth. The growth of the energy component will be determined by both rising prices and demand for energy resources.

After a record surplus in trade in services in 2020 due to declining travel imports, it will gradually decline over the forecast horizon due to the resumption of tourism and the reduction in gas transit. Travel imports will only partially recover in 2021, and the pre-crisis level is expected to be reached only in 2022.

The gradual increase in exports of services will be ensured primarily by further growth of the IT sector, which has shown steady growth even in 2020.

### 2.3 DETERMINANTS AND RISKS OF IMPORT DEPENDENCE OF UKRAINE'S ECONOMY

International economic activity in Ukraine is one of the priorities of state policy, which creates the basis for the development of profitable trade and a favorable investment climate. Foreign trade creates significant opportunities for economic growth, shaping the country's budget, maintaining the welfare of its citizens. The lack of a strategic approach to the problem of saturation of the domestic market by increasing domestic production through the development of import-substituting production in Ukraine leads to the formation of high dependence of the domestic market on imports, as well as the urgent need to increase exports to cover current account deficits.

High openness of the national economy reinforces the vulnerability of the domestic market from fluctuations in external conditions and adverse global trends (volatility of energy prices, lower prices for basic goods of Ukrainian exports (a significant share of which are raw material commodities), etc.) [79]. Thus, there is a need to reduce the import dependence of the domestic commodity market, create conditions to eliminate dependence on foreign markets, ensure the positive impact of imports on production, strengthen on this basis the competitiveness of the domestic economy.

World practice shows that the passive role of the state in the system of regulating the import of goods gradually leads to the loss of competitiveness of certain sectors of the economy, even in the domestic market. However, this does not mean that the state needs to support such industries at its own expense.

The role of the state in the process of import substitution is to provide organizational and administrative assistance to business in the development of those activities that will be commercially viable, especially in comparison with the profitability of similar European or other industries to form interest in activity diversification or better quality goods in business circles, creating an export-oriented market infrastructure.

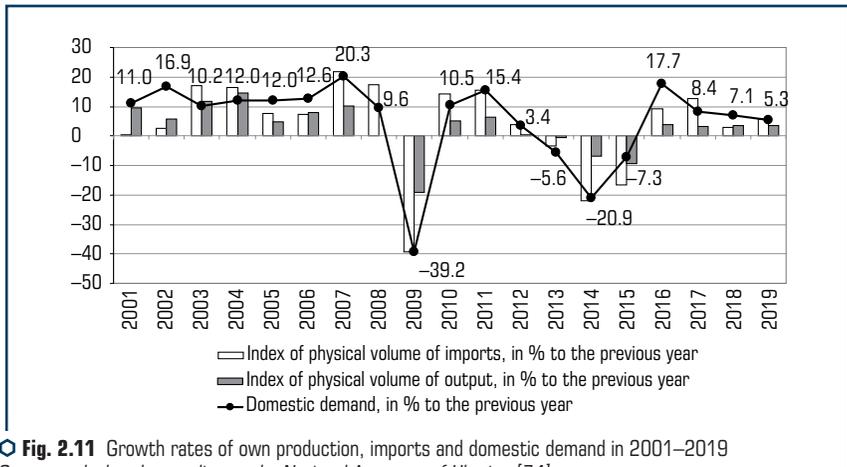
The key problem of the external sector of the Ukrainian economy remains the disproportionate and irrational distribution of resources, which are mainly aimed at short-term income, and, consequently, inefficient international specialization, which led to dangerous and extremely high dependence of the economy on world commodity and financial markets. high level of vulnerability to macroeconomic stability [80].

The positive impact of expanding domestic demand on general economic dynamics is largely constrained by its propensity to import. Thus, if we compare the dynamics of domestic demand, domestic production and imports, we can state that the development of the domestic market was mainly supported by imports, rather than domestic production (**Fig. 2.11**). Since 2003, the dynamics of imports exceeded (except in 2006) the growth rate of domestic production. The largest gap in these indicators was observed in 2007 and especially in 2008, when the growth of gross output decreased to 0.5 %, and the growth rate of imports and the high dynamics of previous years increased by another 17 %. In 2009, there was a sharp decline in Ukrainian production and an even stronger contraction in imports. With the resumption of the positive dynamics of economic

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development, the outstripping dynamics of imports of goods and services compared to the development of domestic production reappeared.

Also in 2011 the growth rate of imports was 2.8 times higher than the dynamics of domestic production, and in 2012 – 7.8 times. Only in 2018 and 2019 there was a trend of lower rates of imports relative to production. Despite exceeding the growth rate of domestic demand for imports in 2016 and 2018 due mainly to the growth of final consumer spending, in 2019 imports again began to grow faster than domestic demand.



**Fig. 2.11** Growth rates of own production, imports and domestic demand in 2001–2019  
Source: calculated according to the National Accounts of Ukraine [74]

As noted earlier, the dominance of Ukraine's economy advanced growth rate of imports (compared to exports) has formed a steady trend towards a negative foreign trade balance. The outpacing dynamics of growth of imports compared to exports indicates the presence of significant imbalances in the structure of foreign trade and in the total output of goods and services. The negative trend of accelerated growth of imports and its outpacing over the dynamics of domestic production is due, inter alia, to low competitiveness of Ukrainian goods on world markets, which, in turn, is the result of structural imbalances in the economy against the background of low level of production development and its long-term technological backwardness.

The consequences of scientific and technological progress and socio-economic trends give rise to new social development needs, as evidenced by the growing demand for high-tech and innovative products. However, the backward sectoral and technological structure of Ukrainian industry is unable to meet the needs of the domestic market, which leads to a high level of import dependence [81]. If in the first stages of market transformation of the economy the growth of imports could be explained by the lack of quality domestic products, the scale of imports in recent years is

radically changing views on industry, assessing its mission in economic development and become the basis for import expansion as an extremely dangerous trend of national development [82].

According to the State Statistics Service, the share of intermediate goods in the structure of imports in 2005–2020 ranged on average from 49 % (2020) to 64.6 % (2009), which indicates a significant level of import dependence of Ukrainian industry from imported goods, in particular in the fuel and energy sector. However, it should be noted the reduction in the share of imported intermediate goods in recent years since 2015 (**Table 2.7**).

The structure of imports of intermediate consumption by industry is also changing, in particular, the share of mineral products is significantly reduced (from 47.2 % in 2015 to 27.4 % in 2020). Instead, the shares in intermediate consumption of imports of food products and raw materials for their production are growing (from 5.1 % in 2015 to 7.6 % in 2020), chemical products (from 23.2 % in 2015 to 27 %) – in 2020 (mechanical engineering) (from 7.8 % in 2015 to 14.2 % in 2020), metallurgical products (from 7.7 % in 2015 to 10.6 % in 2020), wood and wood products (from 3.5 % in 2015 to 5.1 % in 2020) and industrial products (from 5 % in 2015 to 6.3 % in 2020). The share of goods for final consumption, where the lion's share is occupied by household consumption, increased from 16.7 % to 30.2 % during the study period, which is an indicator of the import vector in the consumption structure. At the same time, the share of food products has been steadily growing in recent years (from 27.9 % in 2015 to 29.4 % in 2020).

The reduction of imports in final consumption was observed in the groups: mineral products (from 9.5 % in 2015 to 5.2 % in 2020), chemical products (from 30.8 % in 2015 to 25.2 % in 2020) and wood products (from 1.9 % in 2015 to 0.5 % in 2020). Instead, the share of imports in gross accumulation (from 21.4 % to 11.6 %), which is the basis of innovative development and a determinant of modernization shifts in the Ukrainian economy, is significantly reduced (**Table 2.8**).

The low share of imports of goods in the gross accumulation against the background of the inability of domestic science to produce innovative and technologically advanced goods indicates conservatism in industrial policy and involvement of obsolete equipment that does not meet the requirements of scientific and technological progress in the production.

If we consider the structure of the use of imports by broader categories of goods (**Table 2.9**), we can say that in 2020, imported means of production accounted for a significant share and prevailed in the group "Machinery, equipment, vehicles and appliances". The lion's share of imported intermediate goods falls into the groups: "Mineral products", "Chemical products", "Wood and wood products" and "Metallurgical products". The largest share of consumer goods belongs only to the group "Food".

According to the State Statistics Service, in 2020 the share of imported goods in the retail network increased significantly, reaching the highest figures since 2005 (46.6 %). The share of imported food products increased in 2005–2020 from 9.1 % to 20.6 %, and non-food products, from 42.4 % to 67.1 %, respectively (**Fig. 2.12**).

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● **Table 2.7** Dynamics and structure of imports by economic categories of use

<b>Categories</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
VOLUMES, USD millions																
TOTALLY	34,375	43,148	57,996	82,960	43,683	57,538	77,822	81,256	73,198	51,211	35,087	36,713	46,607	53,924	57,646	51,180
Means of pro-duction	5,699	7,456	10,447	14,451	5,205	7,054	11,665	12,475	10,278	6,463	4,785	6,710	8,907	9,697	11,134	10,404
Intermediate goods	21,886	26,884	36,117	50,640	28,213	36,723	49,457	48,674	42,973	31,024	22,126	20,802	26,828	30,885	30,983	25,098
Consumer goods	5,751	7,493	9,868	17,137	9,944	13,460	16,261	19,675	19,577	13,114	7,822	8,859	10,632	12,599	15,028	15,455
Other categories of goods	1,039	1,315	1,584	732	321	301	439	432	370	610	354	342	240	543	501	223
STRUCTURE, %																
TOTALLY	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Means of pro-duction	16.6	17.3	18.0	17.4	11.9	12.3	15.0	15.4	14.0	12.6	13.6	18.3	19.1	18.4	19.3	20.3
Intermediate goods	63.7	62.3	62.3	61.0	64.6	63.8	63.6	59.9	58.7	60.6	63.1	56.7	57.6	57.3	53.7	49.0
Consumer goods	16.7	17.4	17.0	20.7	22.8	23.4	20.9	24.2	26.7	25.6	22.3	24.1	22.8	23.4	26.1	30.2
Other categories of goods	3.0	3.0	2.7	0.9	0.7	0.5	0.6	0.5	0.5	1.2	1.0	0.9	0.5	1.0	0.9	0.4
GROWTH RATES COMPARED TO THE PREVIOUS YEAR, %																
TOTALLY	-	125.5	134.4	143.0	52.7	131.7	135.3	104.4	90.1	70.0	68.5	104.6	126.9	115.7	106.9	88.8
Means of pro-duction	-	130.8	140.1	138.3	36.0	135.5	165.4	106.9	82.4	62.9	74.0	140.2	132.7	111.1	112.5	93.4
Intermediate goods	-	122.8	134.3	140.2	55.7	130.2	134.7	98.4	88.3	72.2	71.3	94.0	129.0	115.1	100.3	81.0
Consumer goods	-	130.3	131.7	173.7	58.0	135.4	120.8	121.0	99.5	67.0	59.6	113.3	120.0	118.5	119.3	102.8

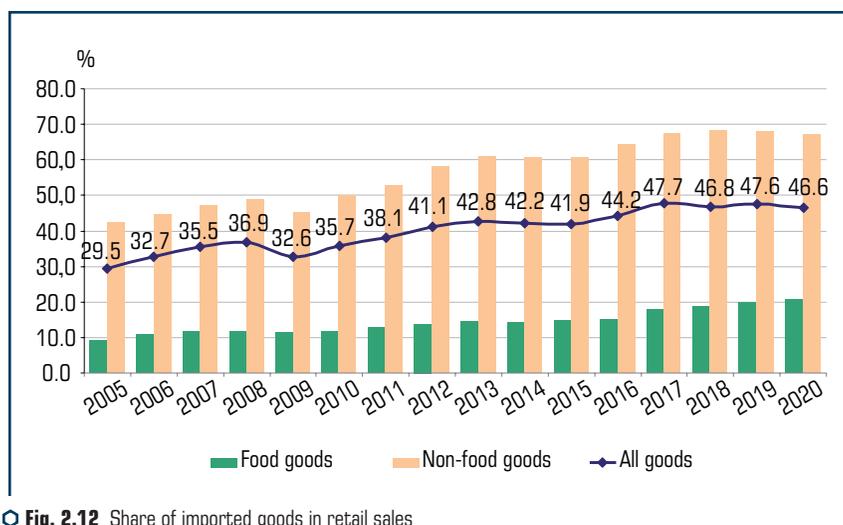
Source: based on data [83]

## IMPORT SUBSTITUTION POTENTIAL IN THE CONDITIONS OF DIGITAL TRANSFORMATION

**Table 2.8** Structure of the use of imports in the economy of Ukraine in 2007–2019

Year	Intermediate consumption		Final consumption		Gross accumulation		Total import UAH mln
	UAH mln	%	UAH mln	%	UAH mln	%	
2007	223,217	61.3	63,153	17.3	78,003	21.4	364,373
2008	325,990	62.6	94,578	18.2	100,020	19.2	520,588
2009	271,425	61.9	92,365	21.0	75,043	17.1	438,860
2010	395,418	68.1	121,662	20.9	63,864	11.0	580,944
2011	530,879	67.3	148,306	18.8	109,716	13.9	788,901
2012	533,125	66.2	164,735	20.5	108,144	13.3	806,004
2013	505,675	65.0	191,463	24.6	81,005	10.4	778,143
2014	556,688	67.3	205,774	24.9	64,302	7.8	826,764
2015	705,090	65.1	278,120	25.7	100,228	9.2	1,083,438
2016	827,161	61.7	351,391	26.2	162,563	12.1	1,341,115
2017	989,691	59.5	475,432	28.6	197,005	11.9	1,662,128
2018	1,134,649	59.1	547,102	28.5	238,111	12.4	1,919,862
2019	1,073,990	54.9	656,168	33.5	227,612	11.6	1,957,770

Source: calculated according to [74]


**Fig. 2.12** Share of imported goods in retail sales

Source: based on data [74]

● **Table 2.9** Sectoral structure of import use (USD million)

Name of product groups	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Food products and raw materials for their production	2,635	3,094	3,905	6,203	4,936	5,764	6,347	7,513	8,181	6,025	3,413	3,863	4,265	5,020	5,656	6,482
Means of production	4	7	14	15	11	7	12	15	14	4	2	3	3	5	8	8
Intermediate goods	901	919	1,211	2,039	1,594	1,893	2,162	2,205	2,163	1,828	1,127	1,423	1,579	1,759	1,806	1,903
Consumer goods	1,660	2,069	2,545	4,148	3,331	3,864	4,183	5,294	6,003	3,952	2,186	2,309	2,683	3,256	3,882	4,541
Mineral products	10,784	12,795	16,444	24,676	15,339	19,247	27,133	26,440	21,180	15,254	11,186	8,075	11,971	13,587	12,635	7,667
Intermediate goods	10,783	12,795	16,443	23,215	14,813	18,293	25,407	24,538	19,950	14,096	10,444	7,431	10,935	12,213	10,879	6,868
Consumer goods	—	—	—	1,461	526	954	1,726	1,902	1,590	1,157	742	643	1,036	1,373	1,278	799
Products of the chemical and allied industries	5,085	6,464	8,757	11,604	7,969	10,166	12,505	13,155	13,042	10,310	7,540	8,297	9,575	10,439	10,871	10,671
Intermediate goods	3,337	4,214	5,650	7,733	4,804	6,375	8,141	8,231	8,314	6,577	5,131	5,483	6,409	7,013	7,209	6,771
Consumer goods	1,632	2,105	2,930	3,829	3,165	3,791	4,365	4,924	4,728	3,732	2,409	2,814	3,165	3,426	3,662	3,898
Wood and wood products	1,132	1,356	1,791	2,264	1,545	1,889	2,094	2,071	2,199	1,466	935	1,033	1,148	1,321	1,253	1,348
Intermediate goods	605	721	981	1,856	1,221	1,512	1,554	1,514	1,587	1,221	785	858	1,089	1,254	1,178	1,273
Consumer goods	151	191	258	401	323	378	539	556	613	241	148	170	58	66	75	74
Industrial products	1,650	1,838	2,129	3,370	1,894	2,893	2,951	3,982	3,881	2,615	1,750	1,957	2,128	2,575	3,108	3,005
Intermediate goods	926	1,123	1,441	1,865	1,081	1,551	1,906	1,902	1,981	1,508	1,097	1,264	1,374	1,567	1,656	1,589
Consumer goods	675	638	627	1,501	812	1,342	1,044	2,080	1,900	1,093	646	685	753	1,008	1,451	1,416
Ferrous and non-ferrous metals and articles thereof	2,407	3,260	4,662	6,280	2,587	3,994	5,522	5,079	4,552	3,208	1,898	2,192	2,878	3,430	3,516	3,008
Means of production	71	105	133	229	117	188	277	282	216	174	120	142	251	199	243	186
Intermediate goods	2,241	3,038	4,366	5,849	2,345	3,643	5,035	4,573	4,124	2,891	1,693	1,958	2,515	3,094	3,116	2,649
Consumer goods	85	106	138	200	125	164	210	224	212	142	84	90	111	137	154	172
Machinery, equipment, vehicles	9,903	13,402	19,079	25,863	8,463	12,223	19,208	21,012	18,154	10,724	7,502	10,353	13,569	15,991	19,361	17,397
Means of production	5,551	7,243	10,157	13,966	5,017	6,779	11,274	12,057	9,950	6,214	4,629	6,505	8,600	9,625	10,793	10,086
Intermediate goods	2,876	3,897	5,768	7,002	2,167	3,063	4,394	5,115	4,455	2,518	1,719	2,217	2,733	3,739	4,876	3,574
Consumer goods	1,348	2,106	2,981	4,852	1,245	2,378	3,519	3,837	3,748	1,990	1,152	1,628	2,236	2,622	3,685	3,725
Other	779	939	1,229	2,700	960	1,362	2,062	2,004	2,009	1,609	863	943	1,073	1,561	1,206	1,622

Source: based on data (83)

In the food markets it is worth noting a strong increase in 2020 compared to 2017 import component in such product groups as: edible oils and fats (more than 2 times for the period), sugar confectionery (78 for the period), and bakery and flour confectionery (61 for the period). Along with this, the growth in 2017–2020 (albeit at a slower pace) was observed by groups: dairy products (by 37.5 for the period), soft drinks (by 34.9 for the period), fresh fruits and vegetables (by 20.8 for the period) and other food products (by 22.1 for the period). It should be noted, that the growth of demand in the Ukrainian food market for some categories of goods, including fresh fruits and vegetables, is already met mainly by imports (almost 53 % in 2020). Therefore, there is a threatening trend, in which the domestic food industry no longer meets the growing demand of the population.

The growth of imports by food categories in 2020 and early 2021 is largely due to last year's worse harvest. However, in some segments the deterioration has become a trend, and therefore government intervention is needed to prevent their further stagnation. This primarily applies to the production of milk and dairy products.

Over the past five years, the population of Ukraine has been increasing the consumption of goods and services after the forced reduction of spending on them in the crisis of 2014–2015. According to the State Statistics Service [74], real (ie adjusted for inflation) consumer spending has increased by 39 % since 2016 and now exceeds the pre-crisis level. Demand for clothing and footwear, as well as household items (88 % and 75 % respectively) over the past five years, which are mainly imported, has increased the most. The total real expenditure of the population on food increased by a third. According to retail sales statistics, households have increased their purchases of almost all food in recent years. This is definitely a positive trend for domestic food producers – against the background of growing demand, they have increased production (**Table 2.10**). However, they still lost part of the domestic market.

The harvest of most crops in 2020 was lower than last year (**Fig. 2.13**), which is primarily due to adverse weather conditions, including prolonged droughts. For example, the yield of fruit and berry crops was 8.3 % lower than last year. Against the background of growing population demand, this contributed to higher imports of fruits and berries from abroad.

For the domestic sugar industry, the crisis is protracted. Sugar beet has long been unable to compete for sown areas with more profitable crops, and in 2020 the factor of low yield was added. A similar situation is observed for many other food crops. Thus, the decrease in the supply of domestic vegetables and fruits, as well as some agricultural raw materials for the food industry was one of the reasons for the increase in the share of imported food in the Ukrainian market.

The crisis in the domestic dairy industry is deep, due to the problem of dairy farming and rapidly growing imports of dairy products. The decrease in the number of cows in Ukraine (**Fig. 2.14**) has been going on since our country gained independence and is due to reduced demand and low efficiency of former farms. Thus, as of the end of 2020, the number of cows in Ukraine was five times smaller than thirty years ago. Today, only highly efficient, modernly equipped farms have acceptable profitability.

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Table 2.10 Change in the share of imported food products

Commodity group name	2017	2018	2019	2020
Groceries	17.8	18.6	20.0	20.6
Meat	4.4	3.5	2.9	3.5
Meat products	6.3	5.9	6.8	6.1
Fish, crustaceans and molluscs (including fish products)	38.2	39.4	27.1	26.8
Dairy products	9.6	10.4	10.6	13.2
Eggs	1.5	0.8	0.9	0.9
Edible oils and fats	7.1	7.1	13.5	15.5
Bakery and flour confectionery	4.9	4.7	7.1	7.9
Sugar confectionery including fresh vegetables	14.1	14.9	23.9	25.1
Processed fruits and vegetables	32.8	34.5	30.2	30.0
Alcohol	22.5	24.7	26.6	28.9
Other beverages (non-alcoholic)	8.3	8.3	10.2	11.2
Coffee, tea, cocoa and spices	44.8	45.4	30.8	28.0
Homogenized food and dietary products (including baby food)	57.2	57.4	40.1	38.4
Other food products	14.5	15.7	18.2	17.7
Tobacco products (including related products)	11.9	13.0	14.3	13.0

Notes: Color highlights groups of products with increasing share

Source: [74]

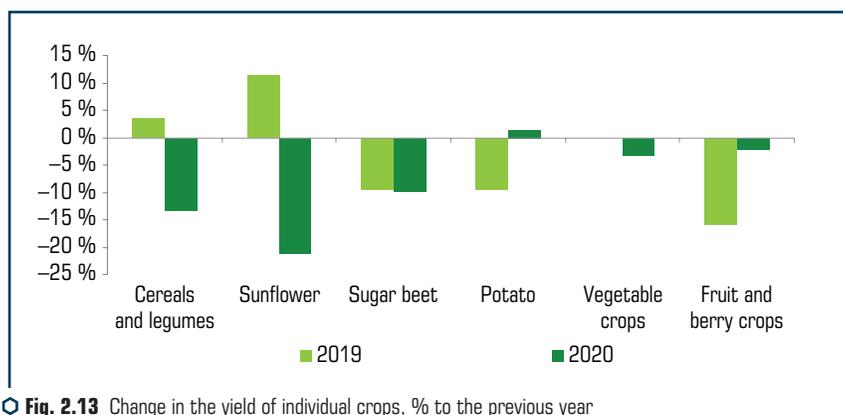
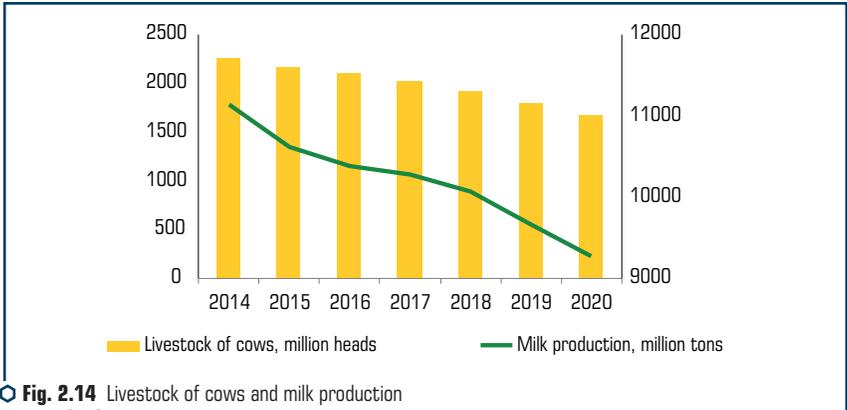


Fig. 2.13 Change in the yield of individual crops, % to the previous year

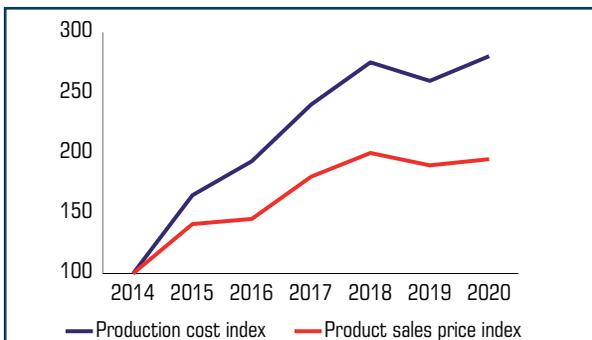
Source: [74]



**Fig. 2.14** Livestock of cows and milk production  
 Source: [74]

In recent years, the crisis situation has been exacerbated by the rapidly rising costs of raising animals (**Fig. 2.15**). The increase in such costs accelerated significantly at the end of 2020 due to the low yield of forage crops in Ukraine and at the same time high volumes of exports of such crops to China. As a result, the fodder base began to rise in price, which made animal husbandry completely unprofitable.

Support for Ukrainian dairy farming is much lower than in the EU, which accounts for the largest share of dairy imports to Ukraine. In 2021, the government of Ukraine plans to allocate about UAH 1.35 billion for farming, animal husbandry development and processing of agricultural products. This is less than 0.1 % of total domestic budget expenditures. With such support, it is impossible for Ukrainian farmers to compete with European ones, where only at the level of the EU budget 35 % of expenditures are allocated for farming. The lion's share of such expenditures in the EU is direct subsidies to farmers.



**Fig. 2.15** Indices of production costs and sales prices of animal husbandry products (2014=100 %)  
 Source: calculated according to [74]

The problem of ousting domestic producers by imports worsened in 2020. For example, imports of milk and cream (not condensed) increased 3.6 times last year, while exports of the same products decreased by a quarter. Imports of cheeses almost doubled, while exports fell by 11 % (Figs. 2.16 and 2.17).

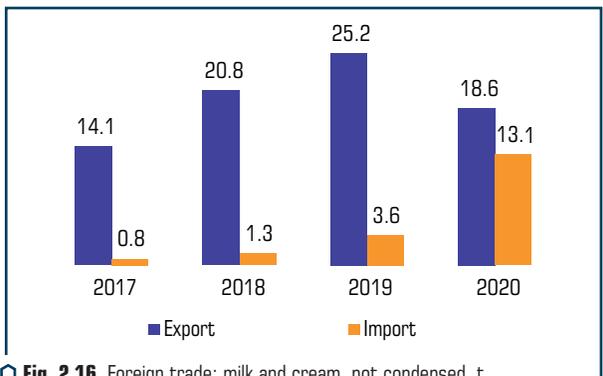


Fig. 2.16 Foreign trade: milk and cream, not condensed, t

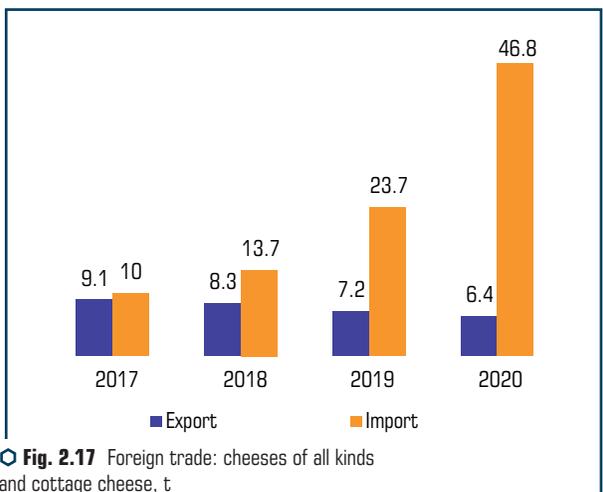


Fig. 2.17 Foreign trade: cheeses of all kinds and cottage cheese, t  
 Source: based on data [74]

Recently, dairy companies have tried to initiate a special investigation by the Ministry of Economic Development, Trade and Agriculture to protect the Ukrainian market from uncontrolled imports of dairy products. The Ministry refused to conduct an investigation, issuing a report and

conclusions on this issue. The trend of increasing imports of dairy products from European countries can only intensify when next year zero customs rates on imports of dairy products from the EU will be fixed.

The growth of citizens' incomes leads to an increase in imports not only of non-food products, but also of food products. Last year's low harvest helped importers increase market share. However, for fruit and vegetable growers, the situation may improve this year if Ukraine reaps a high harvest. Instead, for sugar and dairy producers, the situation requires government intervention, as growing imports threaten to take away even more share of the domestic food market.

The situation on the non-food market is even more disappointing. In this segment of the consumer market, the trend of increasing imported products is observed for most items of not only high-tech, but also for almost all types of light industry products (**Table 2.11**). Domestic production is mostly unable to produce products that are competitive in quality, and therefore, there is a situation when imported products meet 92.8 % of domestic demand in clothing and linen from fabrics, 92.5 % – in footwear. At the same time, the growing demand of the population in everyday consumer goods is an objective phenomenon and should work for the development of one's own country, and not for the development of others.

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Domestic and foreign scholars differently explain the inability of domestic commodity production to meet demand. For example, the reports of the World Economic Forum on the competitiveness of national economies in 2018–2019 highlight the following reasons: corruption, burdensome tax legislation, high levels of external borrowing and inflation. To these factors, domestic scientists add: the high exchange rate of the hryvnia and unfavorable conditions for accession to the WTO, which stimulates the entry of imported products into the domestic market and restrains domestic production. According to V. Tochilin, self-reinforcing growth of commodity production in the domestic market is mostly blocked by institutional barriers that slow down the change in the structure of aggregate demand in favor of innovative and better products and a corresponding change in the supply structure of domestic products [84].

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● **Table 2.11** Change in the share of imported non-food products

<b>Name of product group</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Non-food items	67.4	68.3	68.0	67.1
Textiles, curtains, drapes and tulle	74.1	71.3	65.4	64.5
Clothes	91.8	91.2	92.3	92.8
Shoes	96.3	95.8	94.0	92.5
Leather goods and road accessories	97.4	97.0	94.3	93.7
Cosmetics and products for toilets	82.4	81.1	76.3	74.0
Watches and jewelry	85.1	95.2	96.7	96.0
Books, newspapers and magazines	20.2	20.3	16.0	20.1
Stationery	49.6	48.8	45.0	44.5
Computers, peripherals, software	99.0	98.1	96.9	96.3
Household equipment for receiving, recording, reproducing sound and images	99.6	99.6	99.5	98.7
Telecommunication equipment	99.9	99.9	99.8	99.7
including mobile phones	100.0	100.0	99.9	99.8
Games and toys	86.8	86.9	84.3	80.5
Motorcycles, parts and accessories for them	98.6	97.8	98.0	99.1
Cars, parts and accessories for them	94.7	95.6	95.9	96.0
including cars	96.8	96.4	97.7	98.2
Sports, tourist equipment and gear	78.3	78.4	72.9	74.7
including bicycles	89.6	–	–	–
Furniture	56.4	51.7	48.6	51.1
Wallpapers, floor coverings, carpets and rugs	55.4	54.7	53.7	51.0
Household electrical appliances	92.0	91.7	91.5	91.6
Lighting accessories	62.6	61.8	61.4	57.6
Ceramic and glassware, wood, cork, wicker, knife, non-electric household appliances and equipment	67.4	69.2	53.4	52.5
Paints, varnishes and enamels	40.9	37.6	36.8	35.1
Sanitary, plumbing and heating equipment and supplies	57.3	56.2	60.1	61.2
Other building materials	42.4	41.6	40.5	43.1
including timber and wooden products	37.6	39.6	38.2	46.1
Fertilizers and agrochemical products	58.6	60.1	53.8	53.1

## IMPORT SUBSTITUTION POTENTIAL IN THE CONDITIONS OF DIGITAL TRANSFORMATION

Continuation of Table 2.11

1	2	3	4	5
Gardening equipment and inventory, hand tools	58.6	60.9	61.8	65.8
Pharmaceutical products	50.2	49.8	50.0	50.2
Medical and orthopedic goods	57.4	56.2	53.5	53.4
Photographic, optical and precision equipment	81.5	79.5	84.4	82.8
including spectacle optics	76.8	77.9	80.0	79.6
Gasoline	41.4	41.9	39.5	35.6
Gas oil (diesel fuel)	47.3	47.7	42.2	34.4
Propane, butane and methane for cars	39.5	46.3	42.1	32.8
Lubricants	44.0	44.6	52.3	29.1
Detergents, cleaners, polishes and car care products	49.4	46.9	42.4	40.0
Flowers, plants and seeds	51.5	49.6	48.2	49.1
Animals – pets and food for them	76.1	78.8	69.3	69.9
Household liquid boiler fuel, gas in cylinders, coal and wood for heating	5.9	11.9	5.7	9.6
Other non-food consumer and non-consumer goods	70.8	69.1	71.7	69.5
including household detergents, cleaners and care products	67.6	68.6	67.7	66.7

Notes: color highlights groups with increasing share  
Source: [74]

In order to change the current situation, it is necessary to restructure production, stimulate the inflow of investment and apply effective methods of regulating the access of goods to the domestic market. Existing trends and problems require intensification of state policy not only to curb them, but also to innovatively restructure the industrial apparatus, stimulate the inflow of foreign investment, the use of specific methods of converting savings into accumulation.

A number of problems in the field of industrial production:

- inconsistency of the general trend of development of the industry with the directions of development of the world industry in structural-industrial and technological dimensions, which led to the growth of the gap between Ukraine and the advanced countries;
- continuation of structural and organizational degradation of production with strengthening of its export-raw material orientation and, accordingly, dependence on external conditions; internal openness of technological cycles of production and a small chain of value added within the country;
- the growing dominance of imports in the domestic industrial market, the domestic industrial market falling into the "trap" of structural backwardness and raw material burdens due to the lack of effective demand for high-tech goods both from economic entities due to increasing their losses, and from the population due to its progressive impoverishment and reduced fastidiousness in consumption;

– high depreciation of fixed assets and low level of investment attractiveness.

These issues are especially relevant given the signing in March 2014 of the political part, and in June 2014 – the economic part of the Association Agreement with the European Union, which will require Ukrainian producers to improve the quality and competitiveness of domestic goods in order to reach new European markets.

According to Annex I-A of the Association Agreement between Ukraine and the EU [85], the timetable for the abolition of import duties by Ukraine provides for the establishment of transitional periods for many product nomenclature codes. In addition, certain codes 02 and 17 of the product nomenclature groups, including pork, poultry and sugar, are subject to tariff quotas, ie they can be imported into Ukraine at a reduced rate of import duty within these quotas.

Changes in the trade regime as a result of the Association Agreement will be reflected in the gradual reduction of import duties on goods, produced in the EU. The largest reduction in import duties will take place in light industry, in particular, in the manufacture of clothing, manufacture of other non-metallic mineral products, food industry, furniture. At the same time, Ukraine will maintain non-zero, although low import duty rates on certain engineering goods.

Of course, there is a danger of weakening the competitive position of domestic producers, in particular, meat and meat products, dairy products, vegetables and fruits as a result of growing imports from the EU. The Institute of Economics and Forecasting estimates that the total cost of modernizing livestock and vegetable production in line with EU standards is estimated at € 900 million over 10 years of implementing the Association Agreement [85]. There is a growing likelihood of increasing domestic imports of competing imports, including cars, tractors and combine harvesters. However, the Agreement provides for the gradual abolition of tariff measures for the import of cars into Ukraine. In particular, Annex I-A to the Tariff Schedule of Ukraine provides for the application of a 10 % rate of import duty with a transition period of 7–10 years for the vast majority of commodity items 8 703. However, Art. 44 of this Agreement also provides for the application of a special additional duty, related to imports, if necessary, within 15 years from the date of entry into force. At the same time, the total rate of import and special duty on car imports should not exceed 10 % during this period. The possibility of introducing a special duty is dependent on the share of EU cars in the domestic market of Ukraine and subject to significant damage to the national industry that produces such goods. Of course, from the point of view of households, the imposition of an additional import duty on cars in practice will mean a narrowing of the range and an increase in prices for the period of these measures. For the state, on the other hand, setting such a duty at a level equal to the current import duty may lead to a reduction in imports, which in turn will reduce potential budget revenues. At the same time, the elasticity of demand for European-made cars compared to domestic cars and cars from other countries should be taken into account. Given the low elasticity of demand, it is likely to maintain the current dynamics of imports without acceleration, which would be caused by trade liberalization [85].

To confirm the ineffectiveness of state policy in the field of stimulation and protection of domestic producers, we can cite the example of continued import of Russian cars to Ukraine,

despite the Cabinet of Ministers in May 2019 Resolution № 535, banning the import of second-hand cars from Russia. Thus, in recent years, 20 000 wagons, which have exhausted their service life, written off in the Russian Federation, have been imported into Ukraine. Imports of used cars from Russia led to a threefold decrease in production by Ukrainian car companies. At the same time, the number of car-building plants in Ukraine decreased from 12 in 2019 to 7 in 2020. Earlier, in 2011–2012, Ukraine produced about 50 000 cars a year, some of which were exported to Russia.

Given Ukraine's rather strong railway transportation sector, the second largest among the countries of the former USSR, the domestic market could become a powerful source for the development of domestic car building. In 2018 and 2019, mainly for the domestic market, 11.5 and 10.6 thousand cars were produced, respectively. But instead of implementing a comprehensive model of providing Ukraine with rail transport using the capabilities of domestic enterprises, cars from the Russian Federation are imported into Ukraine. About a thousand cars were imported to Ukraine after the embargo in 2019.

In this regard, it is urgent to adopt the Program for the renewal of freight rolling stock, which was announced by the Ministry of Infrastructure in March 2020. This program should provide for the annual decommissioning of old cars in the amount of at least 12–15 thousand units with the simultaneous replacement by new, including innovative, rolling stock (at least 25 % from 2021 annually, with a gradual increase in the share of innovative cars in total). According to the calculations of the Federation of Employers of Ukraine [86], the implementation of such a program should provide:

- revenues to the budgets of all levels in the amount of UAH 31 billion;
- GDP growth by 2.3 %, taking into account the multiplier effect – by 8 %;
- about 15 thousand jobs in car building and more than 30 thousand jobs in related industries.

The textile industry also needs special attention, as immediately after the entry into force of the Agreement, the import duty on textiles and clothing was zeroed by the EU, and Ukraine is given a transition period to reduce the customs value to 0.1 % for textile imports and to 0.2 % for clothing imports. According to experts, such a transition period will allow Ukrainian producers to prepare for foreign competition. However, the risk lies in the significant volume of used clothing imports (second-hand), which accounts for more than 80 % of imports from the EU. These risks are planned to be eliminated by introducing special entry prices in euros per kilogram of net weight. The entry price will be determined as 30 % of the average for the previous year customs value of clothing in accordance with the codes UKTZED (Ukrainian classification of foreignn economics goods), listed in the Agreement. Ukraine has committed to publish the relevant annual prices. The proposed mechanisms for the import of used clothing are generally favorable for the development of domestic producers by protecting the position of the national light industry and reducing the price competitiveness of used clothing. However, the results of ERI investigations show that the biggest competitors of Ukrainian clothing manufacturers are not importers of used clothing, but companies that import cheap clothing from Asia, as well as smuggling [85].

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This suggests that government measures to regulate the import of used clothing will not have a significant impact on the development of domestic clothing production. On the other hand, the abolition of the duty on footwear is not likely to have a negative impact on domestic footwear companies, as in recent years up to 90 % of footwear from the EU has been imported into Ukraine under shady schemes [85].

The automobile industry is a kind of indicator of the economic development of the state. And this applies to both industrialized and developing countries. Obtaining the status of a car manufacturer is extremely difficult, because the development of the industry requires huge financial, intellectual, scientific and managerial resources. The automotive industry is one of the main generators of jobs: the world production of cars and their components employs more than 9 million people, and taking into account indirect jobs, the automotive industry has more than 50 million employees. The automotive industry uses products from many other industries that produce metal, polymers, textiles, software and much more [87].

It is equally important, that the automotive industry is one of the engines of technological progress. The annual investment of automakers in research and development reaches USD 85 billion and plays a key role in raising the technological level of the country. The fact that three of the world's ten most powerful innovative companies are automotive speaks for itself. The consolidated contribution from the production and operation of cars to national budgets is estimated at more than half a trillion dollars [87].

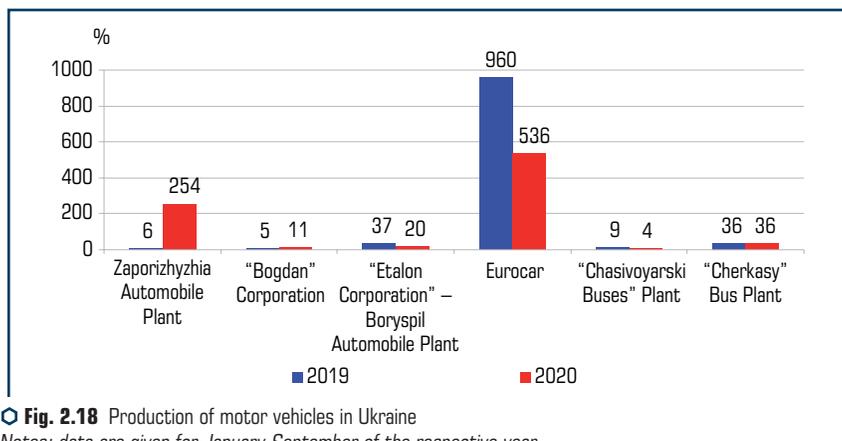
In Ukraine, car production is in crisis. Despite the fact that the production capacity available in Ukraine allows to produce more than 30 thousand units of vehicles per month, in 2020, according to the association Ukrautoprom, Ukrainian plants produced only 4 952 units of vehicles. At the same time, this is 32 % less than in 2019: 4 202 cars (–33 %); commercial – 51 units (–63 %); buses – 699 units (–20 %). According to the results of 2020, all enterprises of the automotive industry except ZAZ reduced production. In September, ZAZ began assembling Group Renault passenger cars, thus ending the year with a 10-fold increase compared to 2019 (**Fig. 2.18**).

Bus production fell by 21 %. During the month, 73 buses were built at five companies. More than others, as a year earlier, the Cherkasy Bus Plant produced 32 buses. The Chernihiv Automobile Plant ended the month with a figure of 20 units. Bogdan reported on the production of 11 buses. ZAZ released 6 units and 4 buses were assembled by the Chasivoyarsk plant.

The increase in imports of passenger cars from the EU coincided with a decrease in domestic production, which gives grounds to apply protective measures in accordance with Art. 44 UA. In December 2016, the Cabinet of Ministers of Ukraine approved the procedure, proposed by the Ministry of Economic Development for the application of special measures for the import of cars of EU origin into Ukraine.

According to item 1 of Art. 44 UA, Ukraine has formal grounds for the introduction of protective measures in the form of increasing import duties. Imports of cars from the EU are growing both in absolute terms and relative to domestic production. The total volume of imports in physical units during 2016–2017 exceeded the level, specified in Annex II to the UA (45 thousand units

per year). The volume of new registrations of cars from the EU also exceeded the threshold, specified in Annex II to the UA (20 % in 2017) [89].



**Fig. 2.18** Production of motor vehicles in Ukraine

Notes: data are given for January-September of the respective year

Source: [88]

Ukraine and the EU have confirmed the possibility of applying anti-dumping and countervailing measures in mutual trade, which will allow Ukrainian producers to initiate appropriate investigations in the event of unfair competition from EU producers [77]. However, a similar law applies to the EU market by Ukrainian producers. The study of the impact of imports on the development of the domestic market has identified the following main problems: exceeding the growth rate of imports of goods over domestic production, which is inferior to foreign counterparts in price, quality and competitiveness; ousting domestic producers from the domestic market of Ukraine; growing dependence of Ukrainian industry on imported components, materials and raw materials in such industries as energy extraction, light industry, mechanical engineering, chemical and petrochemical industries; reduction of the share of imports in gross accumulation to 11.6 % in 2019, which indicates a reduction in supplies of new and advanced equipment and tools from abroad and attempts to renew technological capacity mainly through domestic equipment, which is not advanced, which leads to innovation regression in imports of goods to Ukraine.

The dependence of domestic market saturation on foreign trade currently raises the issue of state regulation of export-import flows. The structure of the formation of the commodity supply of the domestic commodity market of Ukraine as a whole indicates significant disparities in the industrial potential and needs of the domestic market, and also reflects significant pressure from imports. The basis for the effective functioning and development of the domestic market should be competitive domestic products that can be provided as a result of the implementation of a strategy of selective import substitution. However, this strategy should be accompanied by a simultaneous

increase in the export orientation of industrial production in combination with effective export promotion of Ukraine in foreign markets.

### 2.4 THE POTENTIAL OF IMPORT SUBSTITUTION BY HIGH-TECH GOODS

The formation of a post-industrial society, focused on new technologies, the development of new approaches, the use of scientific potential are a major trend in the world. The urgency of this issue is confirmed by strategic documents, developed in EU countries, in particular Horizon Europe 2020 [90] and Horizon Europe 2021–2027 [91], which outline global technological trends in industry and the economy as a whole, including advanced digital production technologies, advanced and new materials, biotechnology and nanotechnology, etc. The global nature of such changes dictates the need to understand the possibilities of their development and identify tasks for building the national economy. Any country can be post-industrial, regardless of the type of government, and the main emphasis is on a developed market economy and active trade in knowledge-intensive products between countries.

The main driver of Ukraine's development should be an innovative economy, the existence of a national innovation system (NIS), the functioning of which is determined by the peculiarities of the state economy. As a result of coordination of efforts and interests of business and the state, it is the basis for the formation of competitive advantages of national economies. In this aspect, the task of the state to form an effective NIS by identifying clear priorities and creating effective mechanisms for its functioning, which will promote the emergence of new forms of international cooperation between participants in the innovation process, is actualized. The high-tech sector should become a locomotive and catalyst for the technological transformation of Ukrainian industry. Industrial high-tech can be a factor in the competitiveness of industrial enterprises, and the mass introduction of 4.0 technologies can stop the trend of deindustrialization of the country and give a powerful impetus to processing and high value-added industries.

Currently, Ukraine's economy is focused on the production of traditional industrial products with low gross value added, which is sold in saturated, unpromising markets for further development. Studies of domestic research institutions are mainly focused on meeting the needs of the raw materials economy. The technological gap between Ukraine and developed countries is widening every year. Elimination of the backlog requires systemic changes in the methods of state regulation of economic development, education, the formation of an innovative model of high-tech development. Import substitution, which is considered a transitional stage for the accelerated modernization of production, may further create the basic conditions for the development of high-tech export-oriented development.

A significant amount of research by both scientists and practitioners in the fields of international economics and business is devoted to the formation of national innovation systems and the study of domestic scientific and technological potential. In particular, domestic scientists, such

as T. Pisarenko and T. Kvasha [92], A. Chukhno, P. Yukhimenko and P. Leonenko [59], V. Sidenko [60], G. Lagutin [61], V. Vasylenko [62], etc. have made a significant scientific contribution to the elaboration of the national innovation system and its development in the context of global technological trends.

A number of contemporary foreign authors, such as F. Todtling and M. Triple [93], M. Fritsch and A. Stephan [94], K. Hauser [95] and co-authors, D. Doss [96], A. Isaacson [97] studied the characteristics of NIS in different countries, as well as identified models of NIS development (G. Etzkovits and L. Leidersdorf [98], O. Afonso [99] and co-authors, J. Kimatu [100]).

Numerous works of domestic scientists, in particular O. Vlasyuk, V. Heitz and L. Deineko [101, 102] are devoted to the problems of formation of preconditions for development and evaluation of innovation component in Ukraine's foreign trade. They studied the state of demand for technology-intensive goods in foreign trade of the Central and Eastern European countries, the national technological level of production, opportunities for the development of the external sector of Ukraine's economy in view of the implementation of STP achievements.

At the same time, it should be noted, that the innovative model of economic growth is one of the strategic goals of Ukraine's development, as evidenced by the adopted in 2019 Strategy for Innovation Development until 2030 [103], Sustainable Development Strategy "Ukraine 2020" [104] etc. However, questions remain about the compliance of domestic scientific and technological potential with the goals and objectives of Ukraine's national innovation system, which is still being formed. In developed countries, the understanding has already been established that a holistic national innovation system (NIS) is important for the transition to an innovative economy, which transforms new knowledge into products and services, needed by the economy and society. In essence, NIS is the foundation of building a knowledge-based economy. Therefore, the most important priorities of scientific and technological development are increasingly associated not with grand, expensive breakthrough projects, but with continuous daily work on the formation of national innovation systems and their links.

The formation and development of the concept of national innovation systems has appeared relatively recently. By the end of the twentieth century, three leading schools were formed, which dealt with issues of national and regional competitiveness [105]. In particular: American (M. Porter, M. Enright, etc.), British (C. Freeman, J. Dunning, H. Schmitz, J. Humphrey, R. Kaplinsky) and Scandinavian (B.O. Lundval, B. Johnson, B. Asheim, A. Isaacson). It was the Scandinavian school that made a great contribution to the development of the concept of the National Innovation System (NIS) [106].

The concept of "national innovation system" was introduced by C. Freeman and further developed by B. O. Lundval, B. Johnson, and R. Nelson [107].

Within the national innovation system in developed countries it is customary to understand the many interconnected organizations (structures), engaged in the production and commercialization of scientific knowledge and technology within national borders [108]. The national innovation system is also understood as a set of institutions (economic, financial, legal) that provide

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innovation processes [98]. The analysis of classical and modern concepts of NIS showed the lack of a single final definition of the concept of "national innovation system", as well as the fact that approaches to interpretation are mainly divided into two categories. The first defines NIS as a set of interconnected organizations, institutions, economic entities that interact in the production, distribution and use of new knowledge, and according to the second approach, some authors interpret NIS as a holistic, advanced system, which in turn combines various elements of innovation, turning knowledge into technology.

A number of leading foreign studies (J. Alvedalen and R. Boschma) present innovations as a result of a complex process of constant interaction between private and public agents, involved in the creation, dissemination and use of new technological knowledge at the national level [109]. In general, the innovation system is formed by the interaction between a production system, consisting of a wide range of companies, a research system, consisting of technology centers and research institutions, an education system, consisting of universities and official training centers, and intermediary institutions for employees – such as official employment centers and other intermediaries between labor and companies [110]. Interactions between these systems and agents take place in a certain institutional-regulatory and socio-cultural environment and are formed by the characteristics of this structure.

According to the results of the analysis of foreign experience in the functioning of national innovation systems, the constituent elements of NIS are summarized:

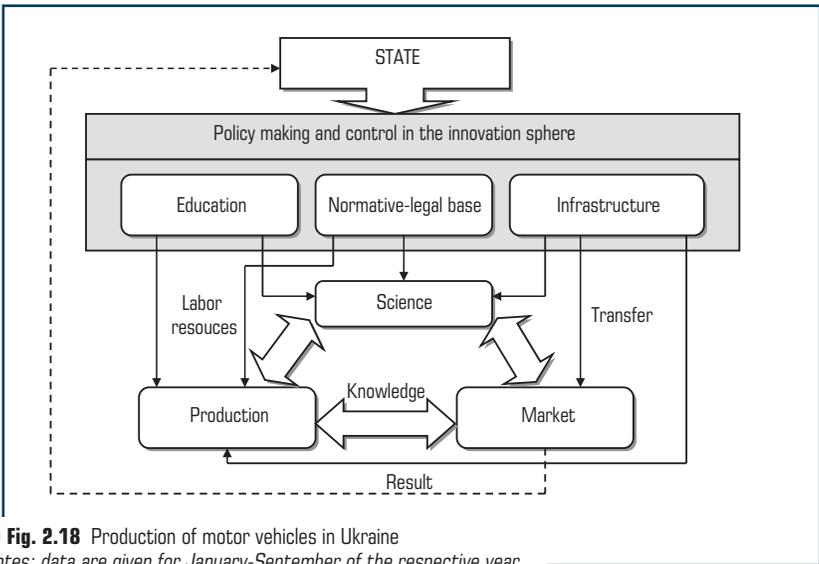
- financial institutions (venture funds, investment banks, insurance companies, public finance institutions);
- educational institutions (institutions of higher education, postgraduate training, vocational training, advanced training institutions);
- research institutions (universities, laboratories);
- innovative enterprises (small and medium enterprises, research centers of TNCs, corporations-manufacturers of high-tech goods);
- innovation intermediaries (business incubators, technology parks, accelerators, technology transfer centers, online information exchange portals);
- state institutions in the field of innovation (institutions, regulating the state's innovation policy, institutions of state financing of innovations);
- marketing institutions (marketing agencies, marketing departments of innovative enterprises, research institutions, innovation intermediaries).

The main problem in solving this problem is the lack or underdevelopment of relationships between participants in the innovation process. Therefore, developing the previous concept, we can cite the components of the innovation system, which carry out coordinated joint actions aimed at achieving the common goal of creating and implementing innovations (**Fig. 2.19**).

As a result of the interaction of these elements, different models of NIS are formed. In particular, in the operation of the Triple Helix (TH) model [98], industry (business) receives information on research from universities, taking into account market requirements for specialists in this field

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and has stable licensing agreements. The state manages to initiate new industries and products that increase the number of jobs for citizens. Another advantage for the state is the consequent increase in taxes and fees, which in turn leads to higher living standards and economic development. Universities benefit from the operation of science parks, which allows them to obtain reliable sources of funding from business and government and improve quality in industry research. They also have the opportunity to conduct research based on national and global needs. In general, all this increases the efficiency of the national innovation system.



**Fig. 2.18** Production of motor vehicles in Ukraine  
 Notes: data are given for January-September of the respective year  
 Source: [88]

Due to the rapid development of information and communication technologies, in particular the spread of the Internet, which strengthens the role of civil society and citizens in assessing the sustainability of some technological advances and monitoring their impact on economic, social and environmental conditions, a new paradigm of innovation Quadruple Helix (QH), which is the result of the previous model of the triple helix, where government, business, science and citizens work together to bring about structural change, appears [100].

Thus, based on the peculiarities of different interpretations of the concept of *national innovation system*, it can be argued, that it is a set of economic entities (research institutes, enterprises, consumers) and institutions (legislative, financial, social) that interact in production, use and dissemination of advanced knowledge and technologies within the innovation ecosystem on the basis of

models (TH or QH), whose activities are aimed at implementing the priority areas of the country's economic system and help to increase its competitiveness.

The study of theoretical concepts of the functioning of national innovation systems allows us to summarize that today the following basic patterns can be identified in the development of NIS:

- the state plays a leading role in the formation and functioning of the national innovation system of the country, determining the goals and priorities of its development. At the same time, as the NIS strengthens, the state is increasingly focusing not on direct methods of state management of innovation, but on creating favorable conditions for innovation activity of all elements, included in the NIS;
- accelerated development of information and telecommunication technologies promotes the creation of network interactions between NIS participants, which provides a solution to a large number of tasks within the system, allows you to quickly adapt to changing external operating conditions;
- regions are becoming increasingly important in the development of innovation processes, as the functioning of the chains "creation – application – dissemination" of innovations is most effectively carried out at the regional level; at the same time, the innovation system is one of the tools of territorial development;
- globalization of the world economy promotes the integration of national innovation systems into larger (supranational or global) innovation systems.

The strategy of development of the national system of each country is determined by the state policy in the field of industrial and innovative development, regulatory and legal support, mechanisms of direct and indirect state support, scientific and technical potential, development of domestic commodity markets, labor and capital markets, and cultural and historical traditions and features. The study of current trends in the development of national innovation systems around the world has identified four models of NIS in the world:

1. Euro-Atlantic (USA, Germany, France, Sweden, Switzerland), which has the characteristics of an extensive network of innovation institutes and organizations, active participation of free economic development in innovation (one of the main components of NIS), full coverage of innovative economic developments, state dominance in innovative developments, focusing on basic research, a wide range of sources of funding for innovation (public funds, funds of economic entities, loans, venture capital), production of innovations, concentration of innovation in a given area in order to achieve synergies.

2. East Asia (Japan, South Korea, China, Hong Kong, Taiwan), which also has an extensive network of innovation institutions and organizations, full coverage of innovation in the economy, a wide range of sources of funding for innovation, but based on the predominance of private structures in innovation, weak participation of HEIs in the development of innovations, attention is focused on applied research and the purchase of innovations and has signs of dispersal of innovative developments.

3. Third world (Thailand, Vietnam, Cambodia, Argentina, Uruguay, Tunisia, Oman), characterized by a limited network of innovation institutions and organizations, participation of individual HEIs in innovation development, coverage of only few economic sectors by innovative

developments, state predominance in innovative developments, emphasis on applied research, a narrow range of sources of funding for innovative developments (public funds, funds of economic entities), receiving innovations free of charge (free transfer or "piracy"), the dispersal of innovative developments.

4. Transitional (Brazil, India, Russia, Ukraine, Kazakhstan), which provides for the existence of a limited network of innovation institutions and organizations, which is growing and transforming; active participation of individual HEIs in the development of innovations; partial coverage of innovative developments in the economy; the predominance of the state in innovative developments, the emphasis on basic and applied research, a small range of sources of funding for innovative developments (public funds, funds of economic entities, credit funds); production, purchase or free receipt of innovations, as well as the dispersal of innovative developments.

Currently, Ukraine is one of the countries with a transitional model of the national innovation system. Countries with this NIS model include either ones with fast-growing economies (Brazil, India, etc.) or countries that are transforming their own national innovation system in the transition from a command-and-control to a market economy (Russia, Kazakhstan, etc.). The key problem of this NIS model is its transformation into any of the three models (Euro-Atlantic, East Asian, Third World), which requires considered steps to reform it in order to avoid approaching the model that is typical of third world countries.

Due to the wave-like dynamics of Ukraine's indicators in international indices, characterizing the country's economic situation and, accordingly, the state of innovation development (global competitiveness index, global innovation index, business index, economic freedom index, investment attractiveness index), it is impossible to say about positive changes in the innovation environment. Recent declines in the country's innovation rankings indicate not so much the current state of technology, but the deteriorating situation in the economy, education and science. Prolonged stagnation of socio-economic development and renewal of the production and technological base of economic activity of the national economy, as well as the lack of relationship: "science – production – state" affect the national innovation system, which is reflected in deteriorating qualitative and quantitative indicators of innovation (**Table 2.12**): the number of innovation-active enterprises is reduced (more than twice since 2001); along with a slight increase in the number of implemented new technological processes (63 %), there is a reduction in the production of innovative products (more than 9 times), which led to a significant reduction in the share of sold innovative products (goods, services) in total sales (in 5.2 times); the dynamics of knowledge intensity of GDP is deteriorating (from 1.09 % in 2005 to a critical level of 0.43 % in 2019).

If we analyze the innovation activity of Ukrainian industry by technological sectors, we can note the deformation of the national innovation system, built on the medium– and low-tech basis. Changes in the technological composition of the industry show a tendency to deteriorate its structure and areas of funding, due to the lack of a comprehensive mechanism to stimulate innovation, primarily through the mobilization of domestic resources and attracting foreign investors. At the same time, support for innovation activities at the expense of state funds is extremely insufficient, and the mechanism of bank long-term lending to industrial enterprises is not fully used.

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## 2 INTERNATIONAL ECONOMIC ACTIVITY OF UKRAINE IN MEASURING THE PROBLEMS OF IMPORT DEPENDENCE

● **Table 2.12** Indicators of innovation activity of Ukrainian enterprises in 2001–2019

Indicator	2001	2010	2011	2014*	2017	2019	Change from 2019 to 2001, %
Number of innovation-active industrial enterprises	1,697	1,462	1,679	1,609	759	782	46.08
% of the total number of industrial enterprises	16.5	13.8	16.2	16.1	16.2	15.8	–
Number of industrial enterprises that implemented innovations (products and/or technological processes)	1,491	1,217	1,327	1,208	672	687	46.08
% of the total number of industrial enterprises	14.3	11.5	12.8	12.1	14.3	13.8	–
Introduced new technological processes, units including:	1,421	2,043	2,510	1,743	1,831	2,318	163.12
low-waste, resource-saving, units	469	479	517	447	611	857	182.73
Introduced production of innovative products (goods, services), units	19,484	2,408	3,238	3,661	2,387	2,148	11.02
New types of equipment, units	610	663	897	1,314	751	760	124.59
Volume of sold innovative products (goods, services), total, UAH million	12,148.3	33,697.6	42,386.7	25,669.0	17,714.2	34,264.9	282.06
Share of the volume of sold innovative products (goods, services) in the total volume of sold products (goods, services) of industrial enterprises, %	6.8	3.8	3.8	2.5	0.7	1.3	–
Exported of the total amount, UAH million	3,023.6	13,713.0	12,630.6	7,486.4	5,518.8	18,558.6	613.79
Share of exports in the total volume of sold innovative products, %	24.9	40.7	29.8	29.2	31.2	54.2	–

Note: \* data for 2014–2015 are given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and part of the anti-terrorist operation zone  
Source: generated by the authors according to [74]

The crisis situation in the country's innovation system is due to the manifestations of a number of factors: external and internal imbalances of economic development; imperfection of the legal framework in terms of stimulating innovation activity; lack of proper innovation infrastructure and mechanisms for commercialization of scientific and technical developments; spontaneous initiation of innovations; inconsistency and inefficiency of the state innovation policy; insufficient level and unstable financing of innovation activities.

Restricting investment in the economy reduces opportunities for economic growth, both in the direction of extensive development and creating barriers to the development of innovative potential of enterprises and achievement of intensive growth. The results of scientific research in this area prove that foreign investment in Ukraine in no way affects the development of innovation due to the development of domestic research institutions. Given the sufficiently developed and inexpensive scientific potential of emerging markets, opportunities for Ukraine to attract such investments are limited regardless of favorable macroeconomic conditions in the country.

The study of innovation activity in Ukraine has identified a number of problematic issues, related to the threatening trends of loss of scientific and innovative potential of the country, accumulated during the years of the Soviet Union. The margin of safety in this area is almost exhausted. Indicators of the number of international scientific publications, ones of the highest international level and public-private joint ones are at a fairly low level compared to European countries. The crisis of most academic and branch research institutes, caused by the prolonged economic downturn, is already affecting the level and results of research in many areas. In addition, education and science policies are ineffective in ensuring real positive change that is commensurate with the pace of development of European economies. The task of preserving the human resources of science has not yet become a state priority. Particularly worrying is the decline in education, which further impairs the ability of the Ukrainian economy to absorb and create innovations.

Prerequisites for import substitution of high-tech goods in Ukraine. Current research by world leaders shows that a necessary condition for technological progress is the transition from raw materials specialization to an export-oriented economy with predominance of high-tech goods and services. In particular, such export goods should be extremely popular with consumers in international markets and produced by national innovation enterprises that cooperate with the subjects of the innovation process both inside and outside the national innovation system of the country.

With this in mind, Ukrainian enterprises must use technological solutions in the production of high-tech goods and solve current consumer problems by offering competitive innovative products, such as e-books, waterproof touch monitors and tablets, nanotechnology products or SaaS (software as a service).

According to the OECD classification [111], there are seventeen groups of high-tech goods: radioactive substances and related materials; medicinal and pharmaceutical products; medicines; rotating power plants and their parts; other machines and parts that produce energy; office machines; machines for automatic data processing; parts, accessories for machines; telecommunica-

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tion equipment; electric power machines and their parts; electrodiagnostic apparatus for medical sciences; cathode valves and tubes; aviation and related equipment, spacecraft; optical instruments and apparatus; apparatus for measuring, analyzing and monitoring; cameras and equipment; weapons and ammunition.

The creation, production and export of high-tech goods play an important role for the country on the path of import substitution, economic growth and its competitiveness in the international market. In order to adequately assess the export-import flows of high-tech goods in Ukraine, it is necessary to calculate the share of exports and imports of high-tech goods in total foreign trade.

Based on the fact that currently in Ukrainian statistics there is no official definition of the list of trade in high-tech goods, the task is to harmonize their list according to UKTZED codes with the list of high-tech goods according to SITC Rev 4 [111].

In this regard, six-digit UKTZED codes were selected, which are harmonized with the codes of high-tech product groups SITC Rev.4 and on the basis of these data, a general transitional code table was created, which contains extended statistics on foreign trade in high-tech goods for 2008–2019. As a result of the comparison, the shares of exports and imports of high-tech goods in 2019 were calculated (**Table 2.13**).

**Table 2.13** shows that as of 2019, foreign trade in high-tech goods in Ukraine was characterized by a relatively low share of exports of high-tech goods (2.27 %) in total exports of Ukrainian goods. Exports of high-tech goods in 2019 amounted to USD 1 137 million: telecommunication equipment, not included in other categories; parts and accessories of equipment, not included in other categories – 0.6 % of total exports of goods, medicines – 0.4 %, radioactive substances and related materials – 0.17 %. Ukraine imported \$ 8,151 million worth of high-tech goods, most of which were medicines (including veterinary ones), telecommunications equipment and other energy-generating equipment. The positive balance of foreign trade in high-tech goods in 2019 was observed only in the group "Radioactive substances and related materials" (USD 77 million). All other high-tech goods are dominated by imports.

In this context, it should be noted, that in the recent years in Ukraine there is a trend when the share of so-called critical imports (energy and raw materials) decreases every year, while consumer goods, produced abroad, especially high-tech, confidently strengthen their position in Ukraine's domestic market.

Thus, it can be stated, that the deformed domestic economic model, built on the low-medium-tech basis, high import dependence on high-tech goods requires radical changes. Increasing innovation activity means improving the conditions for the commercialization of innovations, development of the IT sphere and knowledge-intensive production, expansion of research and production cooperation, development of technology parks and business incubators. This requires the development of a modern research base and infrastructure for technology transfer, the creation of centers for the commercialization of innovation, intensification of the "knowledge economy" and the implementation of the NIS model based on close cooperation between science, business and government.

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## IMPORT SUBSTITUTION POTENTIAL IN THE CONDITIONS OF DIGITAL TRANSFORMATION

● **Table 2.13** Volume of exports and imports of high-tech goods of Ukraine according to SITC Rev.4 classification in 2019

Group of high-tech goods by SITC Rev. 4	Export		Import		Balance, USD thousand
	USD thousand	Share, %	USD thousand	Share, %	
525 Radioactive substances and related materials	87,025.3	0.17	9,461.8	0.02	77,563.5
541 Medical and pharmaceutical products	34,941.0	0.07	520,216.9	0.86	-485,275.9
542 Medicines (including veterinary medicines)	216,673.9	0.43	1,716,738.6	2.82	-1,500,064.8
716 Rotary power plants and their parts, not included in other categories	88,451.0	0.18	574,279.8	0.94	-485,828.8
718 Other generating sets and parts thereof, not included in other categories	60,106.7	0.12	469,965.6	0.77	-409,859.0
751 Stationery machines	27,090.7	0.05	146,539.9	0.24	-119,449.3
752 Automatic data processing machines and their components; magnetic or optical readers	11,857.3	0.02	610,107.1	1.00	-598,249.7
759 Parts and accessories	4,947.2	0.01	91,378.3	0.15	-86,431.1
764 Telecommunication equipment, not included in other categories; parts and accessories of equipment, not included in other categories	299,038.7	0.60	1,251,525.7	2.06	-952,486.9
771 Power machines (excluding rotary power plants, included in group 716) and parts thereof	71,793.4	0.14	389,411.4	0.64	-317,618.0
774 Electrodiagnostic equipment for medical, surgical, dental or veterinary purposes and X-ray equipment	9,144.7	0.02	172,329.3	0.28	-163,184.6
776 Cathode valves and tubes	22,941.0	0.05	1,497,355.8	2.46	-1,474,414.8
792 Aircraft and related equipment; spacecraft (including satellites) and launchers for spacecraft; their details	68,072.9	0.14	150,154.0	0.25	-82,081.1
871 Optical instruments and apparatus, not included in other categories	24,499.9	0.05	185,789.2	0.31	-161,289.3
874 Measuring, checking, instruments and appliances not included in other categories	109,258.4	0.22	360,829.9	0.59	-251,571.5
881 Photographic apparatus and equipment, not included in other categories	1,185.3	0.00	4,982.8	0.01	-3,797.5
891 Weapons and ammunition	0.0	0.00	0.0	0.00	0.0
<b>TOTALLY</b>	<b>1,137,027.3</b>	<b>2.27</b>	<b>8,151,066.0</b>	<b>13.41</b>	<b>-7,014,038.8</b>

Source: calculated by the authors according to data [74]

Prospects for the development of the domestic NIS in the implementation of technological systems. The technological structure of the economy clearly characterizes the level of its development, technical and technological compliance with modernity. It is a reliable basis for ensuring the development of the economy through progressive changes, determining the direction of investment, consistent growth of scientific and technical level of the economy, the gradual increase in the components of the information economy, the knowledge economy.

Today, experts assess the technological structure of Ukraine's economy as follows: the share of the fifth system (military and space equipment, communications) is 4.7 %; the fourth – almost 42.4 %, the third – 52.8 %. In addition, the Ukrainian economy is also characterized by components of relict systems (first and second) [59]. The country is in the process of structural simplification of the economy and its approximation to the structural characteristics of less developed countries.

At the same time, in developed countries, the knowledge economy, which corresponds to the branches of the 5th and 6th technological systems, is the core of the economy and contributes to the qualitative transformation of society as a whole. It provides up to 30 % GDP growth, job creation, export potential growth and reduced production costs.

In general, Ukraine has some prerequisites for the transition of the national economy to new technological systems. At the same time, it should be expected, that the transition of the economy to a new technological system may be complicated by a number of factors: lack of technological potential, underdeveloped technological infrastructure, weak integration with global technology leaders, anti-innovation economic structure.

Ukraine has accumulated significant technological potential, but the weak point is the low technological level of the economy, the imperfection of the technological structure. The technical level of most industries lags behind developed countries by at least 50 years, which is a threatening trend in terms of competitiveness. Productive assets are quite significantly physically and especially morally worn out.

In this regard, in the implementation of the second phase of industrialization in Ukraine, priority should be given not just to expanding the production apparatus, but to improving its quality through technological modernization and the emergence of a number of new industries. Otherwise, it will be quite difficult to break the trap of the downward trajectory of technological development.

Thus, not all investments are needed for a simple economic recovery – they will only lead to the restoration of the existing structure of the economy. Investments of other content are desirable, which will ensure economic growth of the highest quality. The process of including the economy of Ukraine in the global technological dynamics, the development of new technological systems, is largely determined by the course of general structural and technological transformations, including progress in the field of industrial modernization. In this regard, we can consider four possible scenarios for the development of new technological systems in the national economy (**Table 2.14**).

The scenario of "technological stagnation" is implemented in the event of curtailment of the industrialization program. Under this scenario, the trends of technological and economic development of the 2000s will be manifested again, where the main technologies will remain ones from the

metallurgical and mining sectors, primary processing. The role of III and IV technological systems will be strengthened, and the emergence of new technological systems will be impossible. If the situation on the world commodity markets worsens and export revenues continue to decline, this scenario of economic development will be the most likely.

● **Table 2.14** Scenarios of technological development of Ukraine

Conditions and results	Scenarios			
	Technological stagnation	Technological inertia	New technological niches	Technological breakthrough
Participation in the global technological space	Passive	Technology recipient	Inclusion in value added chains	Participation in global innovation networks
The level of technological development of the economy	Predominance of low- and medium-tech industries	Predominance of medium-tech industries	Combination of high-tech enclaves with medium ones	Creation of the potential for new system technologies
Dominant technological system	III	III–IV	IV and widening i V	V, preconditions of VI
Technology activities	Purchase of end products and equipment in leading countries	Purchase of ready-made technologies abroad	Purchase and development of licenses, use of domestic scientific and technical potential	Point creation of immaterialized new technologies
Technological infrastructure	Technological and design subdivisions of enterprises	Industrial zones, business incubators	National and regional technology parks, SEZ	Innovation clusters
Human resources	Low-skilled workers	High-skilled workers	Engineers and designers	High-qualified scientists, including foreign ones
Technological capabilities	Ability to passively use foreign technologies	Ability to modify imported equipment and produce some components independently	Development of own technology with foreign know-how	Ability to independently produce innovative technologies
Type of exports	Export of raw materials	Export of raw materials and products of medium technologies	Export of high-tech products, manufactured under license and using imported technologies	Export not only of end products but also of technologies

Source: generated by the authors

The scenario of "technological inertia" is considered in the continuation of industrialization in a country without changing priorities, strengthening the innovation component of implemented investment projects. This scenario is characterized by the export of raw materials and products of medium technology.

For Ukraine, "technological inertia" involves consolidating the trends that emerged during the implementation of the July 2010 Economic Reform Program for 2010–2014 "Wealthy Society, Competitive Economy, Efficient State" [112], which laid down the principles and stages of long-term economic growth on the basis of reforming and modernizing economic policy in the state and the functioning and development of its system. One of the main organizational and economic measures for these reforms should be the modernization and technological renewal of the machine-building industry of Ukraine. According to statistics, in economically developed countries the share of mechanical engineering is from 30 % to 50 % of total industrial output, in particular in Germany – 53.6 %, Japan – 51.5 %, Great Britain – 39.6 %, Italy – 36.4 %, China – 35.2 %, the United States – 10 %, in Russia – 18 %. This provides technical re-equipment of the entire industry every 8–10 years.

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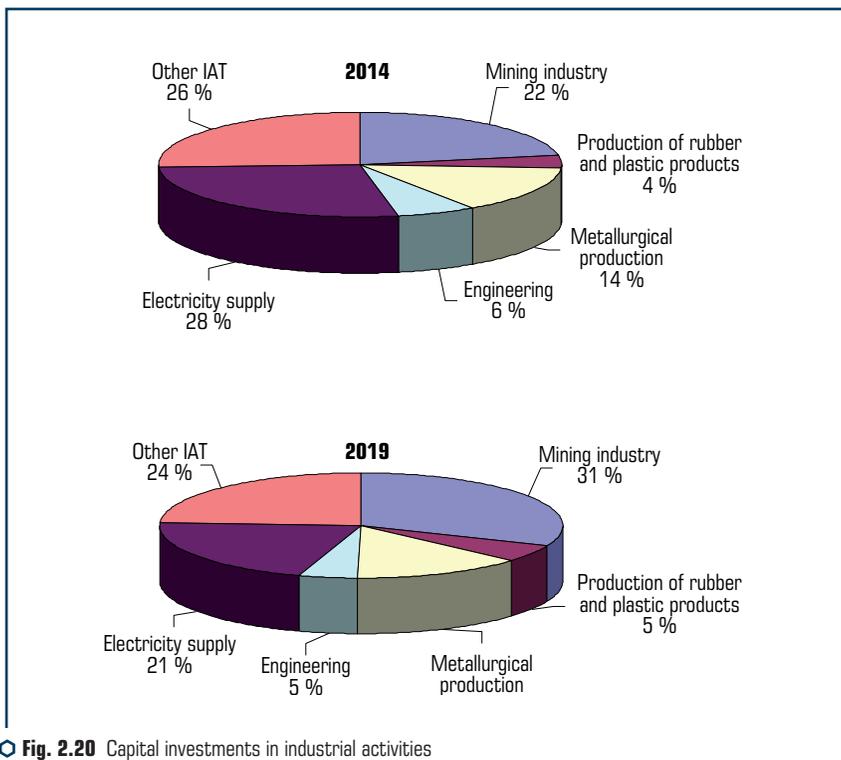
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In addition, despite attempts to intensify innovation activity, they were not implemented in full. Thus, the State Target Economic Program "Creation of Innovation Infrastructure in Ukraine" for 2009–2013 [113] was not financed from the state budget, as a result of which the measures, provided by the program, were not implemented, and the tasks and measures, provided by the State Target Program, analytical support for the implementation of state innovation policy and monitoring of the state of innovative development of the economy was only partially funded. The measures, envisaged by the Action Plan for the Implementation of the Concept of Reforming Public Policy in the Innovation Sphere for 2015–2019 [114] were not implemented due to their unsystematic nature and disregard for the need to involve a wide range of stakeholders – business, civil society and academia.

In total, more than 100 normative documents (laws, presidential decrees, bylaws in the form of government regulations, orders of central executive bodies and other normative documents), devoted to the implementation and development of innovation, have been and still are in force in

Ukraine. But it should be noted, that in terms of quality and quantity, these regulations are inferior to similar systems in the developed world primarily due to inconsistencies. Therefore, in our opinion, it is necessary to streamline and develop legal norms to define innovation as an important part of national policy.

As technical modernization of the machine-building industry has not taken place in Ukraine, the III system with the technologies of building materials industry, ferrous metallurgy, shipbuilding, metalworking, light, woodworking, pulp and paper industries remains predominant, which will not increase the technological dynamics of Ukraine's economy. In such a scenario, the role of the IV technological system can be expected to grow. This scenario seems the most probable, given the invariability of the structure of capital investments in industrial activities since 2014 (Fig. 2.20).



**Fig. 2.20** Capital investments in industrial activities  
 Source: generated by the authors according to [74]

From the point of view of formation of new technological systems for the economy of Ukraine, the scenario of "new technological niches" looks the best, which implies the need to strengthen

the actual technological competencies by including them in global technological chains. The country exports high-tech products, manufactured under license and using imported technologies.

This scenario focuses on the latest trends in global technological development, such as the gradual completion of the technology leaders in the life cycle of the now dominant V system and its transfer to developing countries. In backward countries, there are "windows of opportunity" for the use of V-style technologies, which have already passed the peak of profitability in the markets of leading countries, which are losing interest in this. However, these technologies retain the potential for global profits. In this way, in 10 years, China has achieved that more than half of industrial enterprises have mastered the technologies of the V technological system [115].

This scenario is possible if active measures are taken to integrate Ukraine into the global technological space by cooperating with foreign partners, the arrival of non-raw TNCs in the country, the location of their production and technological units in the country [116]. In this aspect, as V. Sidenko notes: "The state should actively influence innovation processes, accelerate the acquisition of new technologies that will provide global and regional competitive advantages in the field of high technology. And such properties are lacking in the state economic policy of Ukraine throughout the period from the early 1990s to the present" [60].

One of the promising areas of development of the machine-building industry and stimulating the development of its production is the need to provide domestic producers with government orders, including for innovative products. Scientists also have to stimulate the development of mechanical engineering. In this direction, it is necessary to increase funding for domestic science and research in the field of mechanical engineering. These directions and perspective vectors should ensure the competitiveness of the machine-building complex of Ukraine, the transition of the country's industry to the introduction of a new industrial policy – neo-industrialization.

Attracting national scientific potential will allow to implement high-tech projects in such new "technological niches" as biotechnology, pharmaceuticals, space technology, nuclear technology, new materials and more. Favorable preconditions for the implementation of this scenario in Ukraine already exist.

Thus, today there are: 40 industrial parks (of which 31 are available in the Register of Industrial Parks), 26 science parks, 16 technology parks, 24 centers of innovation and technology transfer, 22 innovation centers, 38 commercialization centers, 24 innovative businesses-incubators, one investment and technology cluster, more than 30 clusters, one innovation and production association, other startup schools (business entities that provide theoretical knowledge and practical skills in the field of creation and operation of startups), incubation programs for startups, aimed at startup development), intellectual property centers (business entities that ensure the implementation of educational-professional, educational-scientific and research programs, as well as training of employees in the field of intellectual property), venture and investment funds, centers of scientific, technical and economic activities, etc. All this creates the preconditions for the rapid development of innovation in Ukraine and the rapid transition to the next stage of the technological structure and implementation of the above scenario.

The last scenario is the one of "*technological breakthrough*", which orients the country to the maximum possible synchronization with global technological dynamics, characterized by the export of not only end products but also technologies. For Ukraine, it can be considered not as the immediate economic perspective, but only in terms of creating the conditions for the formation of the VI technological system. In light of this, the tasks of strengthening scientific potential, training highly qualified personnel, and developing innovation infrastructure are becoming urgent.

*Proposals for building the potential of the national innovation system.*

According to the study, the national innovation system needs radical changes in connection with the unified strategy of state development. In other words, it is not a question of improving and focusing on a specific component of NIS, but of a consistent comprehensive state policy on Ukraine's innovation path, formation of a national innovation ecosystem (set of institutions, relations, and various types of resources, involved in creating and application of scientific knowledge and technologies), which would promote its implementation and development of innovation culture in the country, using, in addition to financial, other mechanisms for the development of innovation.

The structural elements of the national innovation ecosystem and the legal field of their functioning in Ukraine are not built into a single structure, so the results of these elements are isolated, resulting in a lack of synergistic effect, which should increase the efficiency of national production of goods and services and their competitiveness through the large-scale implementation of research results and scientific and technical (experimental) developments.

The current requirements for any plans and programs in the field of innovation are not taken into account when setting the tasks for the NIS that is being formed: their effectiveness should be fully determined by the country's ability to enter specific markets of high-tech and science-intensive products. This fundamental moment has almost completely fallen out of sight of the developers of the previous innovation policy and the developers of the Strategy-2030 [103]. But the formation of demand for innovation should be fundamental in the formation of NIS. Therefore, the vector of innovation policy should be determined by assessing potential markets according to the criteria of favorable prospects for Ukrainian business. In turn, the process of NIS formation should be closely linked to the plans of Ukrainian expansion in specific markets and adapt to these plans.

It is within the framework of selected strategies for entering a specific market that innovation infrastructure should be selected and formed, which should be doubly goal-oriented, aimed not only at producing innovative products, but also at entering a specific market. At the stage of goal setting, it is necessary to decide which and to what extent research laboratories, engineering firms, engineering parks, technology parks, business incubators, etc. are needed (or whether they are needed at all, if cheaper, more reliable and easier to buy everything needed abroad), the assistance of which development institutions is necessary for business success, which forms of public-private partnership are most suitable for solving the set tasks, the lack of which economic incentives and regulators hinder the achievement of ultimate goals, etc.

In times of crisis, long-term goals and decisions tend to be relegated to the background. But we must not allow less attention to be paid to the development of science and innovation. Scien-

tific, technological and innovation backwardness tends to increase at a much faster rate than any other. The crisis is a time to reconsider management decisions and optimize economic processes, but there is no reason to abandon the long-term course, election promises and overdue reforms.

Thus, in order to transition to an innovative economy, an integrated national innovation system (NIS) is important, which transforms new knowledge into products and services, needed by the economy and society. It can be defined as a set of business entities (research institutes, enterprises, consumers) and institutions (legislative, financial, social) that interact in the production, use and dissemination of advanced knowledge and technologies within the innovation ecosystem on the basis of models (TH or QH), whose activities are aimed at implementing the priority areas of economic development of the country and helps to increase its competitiveness.

Today, the following are natural in the development and functioning of NIS: the leading role of the state, which focuses on creating favorable conditions for innovation activity of all elements, included in NIS; accelerated development of information and telecommunication technologies, which contributes to the creation of network interactions between NIS participants; effective functioning of chains "creation – application – dissemination" of innovations is carried out at the regional level; integration of national innovation systems into larger (supranational or global) innovation systems.

Four models of NIS functioning in the world have been identified – Euro-Atlantic, East Asian, Third World and Transitional, to which Ukraine belongs. According to the qualitative and quantitative indicators of Ukraine's innovation activity, there is a deterioration in the dynamics, in particular a reduction in the number of innovation-active enterprises; slight increase in the number of introduced new technological processes; reduction of production of innovative types of products; reduction of the share of sold innovative products (goods, services) in the total volume of sold products; falling science-intensive GDP. The decline in the level of education was noted and it was noted, that the preservation of the human resources potential of science has not yet become a state priority.

A necessary condition for technological progress is the transition from the raw material specialization to an export-oriented economy with predominance in trade of high-tech goods and services, produced by national innovative enterprises. Because the export of high-tech products is an important indicator of the development of the knowledge economy of a particular country or region, the development of high-tech industry, a factor in the development of new knowledge, their transformation into new products. The development of high-tech exports, and thus the high-tech sector, encourages investment in research and development, strengthening the level of innovation and skills of the workforce.

The analysis of foreign trade in high-tech goods is based on the harmonization of domestic statistics of foreign trade with the standards of the world classification of trade in high-tech goods. This involves the development of a common transitional table of six-digit codes, which contains advanced statistics on foreign trade in high-tech goods. This approach allowed us to establish disappointing trends in strengthening the position of high-tech imports in the domestic market of Ukraine. There are four possible scenarios for the development of the Ukrainian innovation sphere, depending on technological modes:

1) "technological stagnation", which is implemented in the event of curtailment of the industrialization program;

2) "technological inertia", which is possible as a continuation of industrialization in its current version, without changing priorities and strengthening the innovation component of implemented investment projects;

3) "new technological niches", which implies the need to strengthen the actual technological competencies by including them in global technological chains;

4) "technological breakthrough", which focuses on the maximum possible synchronization with the global technological dynamics.

Based on the analysis of the preconditions and weaknesses of Ukraine's economic development, it has been concluded, that the scenario of "technological inertia" is most likely to be realized. However, given the potential of Ukraine and the need to form new technological systems for Ukraine's economy, it is less likely but necessary to implement the scenario of "*new technological niches*", which involves opening "innovation windows" for innovation-backward countries using technologies of the 5th system that have already passed the peak of profitability in the markets of leading countries, but retain the potential for profit in the global market.

The innovative way of economic development is unalterable for Ukraine, but modernization of the economy and ensuring long-term sustainable development cannot be achieved without improving the system of financing and stimulating innovation processes in the country. Therefore, a consistent comprehensive state policy is needed to transfer Ukraine to an innovative path of development, the formation of a national innovation ecosystem (a set of institutions, relationships, and various types of resources, involved in the creation and application of scientific knowledge and technology), which would promote its implementation and development of innovation culture in the country, using, in addition to financial, other mechanisms for the development of innovation.

**ABSTRACT**

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The section presents a study of risks and priorities of neo-industrial development of the XXI century, which can significantly affect the implementation of import substitution strategies in Ukraine and in the world as a whole. The analysis of the latest regulatory practices of states has been carried out in the dimension of the policy of "circular" economy, which is designed to radically change the dominant model of resource consumption over the centuries, and thus overcome the high level of resource import dependence for many countries. The study has been conducted by appealing to the international experience of both economically developed countries and individual developing ones.

**KEYWORDS**

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Neo-industrial development, import strategy, "circular economy", resource consumption.

**3.1 THE POLICY OF "CIRCULAR" ECONOMY IN THE LATEST REGULATORY PRACTICES OF STATES**

In the conditions of neo-industrial development of the XXI century new approaches to the organization of administrative practices of the state level and business models, taking into account new challenges and tasks, are formed. On the one hand, the crisis processes, experienced by each state and the integration groups under the influence of COVID-19, push neo-protectionism and economic nationalism to the forefront. At the same time, a completely logical component of this new reality is the strategy of import substitution and increasing the share of value added, created by businesses and households in the countries' own economic territory. However, on the other hand, everyone understands that the mechanical approach to import substitution on the old technological basis with the existing approaches to resource consumption will be extremely destructive and will soon lead to increased destructive processes in economic and social spheres of states, and thus weaken competitive positions of such countries on the geopolitical map of the world.

It is therefore a question of striking a balance between efficiency, which is usually associated with open domestic markets and international competition, and social responsibility of governments, which is about preserving jobs, supporting national business, the environmental well-being of territories, and so on. Of course, trade, financial, migration, etc. restrictions, caused by the pandemic, will eventually be a thing of the past. At the same time, they accelerated the transition to new management approaches that had been established in previous years and the demand for which was particularly pronounced in the context of COVID-19.

In this sense, in our opinion, the proposal of the countries that represent the Golden Billion and, at first glance, have the least reason to worry about maintaining their competitive status in the global economic system, is interesting. This is a new paradigm and philosophy of public administration, better known as the closed-loop economy ("circular" economy), proposed by the European Commission in the framework of the Green Deal strategy. This is a new model of the economy, designed to move from mass consumption to the responsible reuse of primarily national resources.

Despite numerous appeals from experts in the field of globalization and ecology, representatives of civil society, the world economy as a model of global production, distribution and consumption of resources remains largely linear. The principle of "linearity": "take – make – use – dispose", which had been used by most businesses, already with the beginning of the industrial revolution began to lose its value, in recent times the problem of depletion of resources, sustainable use and environmental protection has become of greater significance.

Requests for the introduction of closed-loop economies are on the agenda of governments, international organizations, funds and financial institutions, which predict the emergence of new promising markets. Ukraine needs to transform the very philosophy of the production and management model at all levels of its implementation: from the state as a manager to an enterprise and a company.

Therefore, it seems important to assess the basic provisions of the Circular Economy Action Plan as part of the European Green Course strategy agenda. It is also important for Ukraine to understand the possibilities of using new approaches and to identify the difficulties that will accompany this process.

The concept of a closed-loop economy is currently seen as a priority of regulatory policies that achieve the goals of the Paris Agreement. Is the term "circular" economy an achievement of the latest developments? In fact, the first ideas and approaches within this great idea date back to the end of the twentieth century [117]. Undoubtedly, it began to gain special popularity after the decision of the European Commission [118]. New management practices have gained global recognition after the heads of states and their governments, one by one, spoke more and more about the need to change the paradigm of economic development for the sake of the future [119].

In 2020, the European Commission adopted a Circular Economy Action Plan [120]. It has become part of the European Green Deal's agenda. The priority and tasks of the Plan are to bring the volume and structure of consumption in line with the requirements of resource provision of the world and European economies, the introduction of technologies to increase the scale of resource reuse. The outlined measures are directly related to economic growth, as according to the preliminary expectations of the European Commission, the implementation of the Plan can increase EU GDP by 0.5 % by 2030 and contribute to the creation of 700 thousand new jobs [121].

The action plan contains new initiatives that demonstrate gradual changes throughout the product life cycle: from the design phase to production, consumption, repair, reuse, recycling and possible return of resources to the economy.

The problem with the current culture of production and consumption is that the cycle time is short, there is currently no or almost no adequate infrastructure that can include the stages of repair, recycling and eventually re-consumption.

The decades-old linear structure of production and consumption ("take – make – use – dispose") does not offer a system of support and incentives for either producers or consumers to extend the life cycle of products [122].

The directions of implementation of the Action Plan on the "circular" economy are as follows:

1. Support for the production of "durable" products.

As part of this initiative and, where appropriate, with the help of separate instruments, the European Commission will consider establishing the principles of sustainability. The new rules, in particular, will address the need to improve durability, reuse, upgrade and maintainability, address the problem of hazardous chemicals in products and increase the content of recycled products. The European Commission also aims to limit single use and counteract the premature obsolescence of manufactured products. The introduction of a ban on utilization of unsold durable goods will also be part of the measures.

In order to adapt production to a climate-neutral, resource-efficient and circular economy, reduce waste and ensure high productivity of sustainable development actors, the European Commission will propose a legislative initiative on sustainable product policy. The initiative will be based on the extension of Directive 2009/125/EU, which sets the framework for defining ecodesign requirements for energy products. The scope of the Directive will be extended to as many product types as possible.

As part of this initiative, the European Commission is identifying priority value chains and products, such as electronics, ICT, textiles, furniture and "high-impact intermediates", including steel, cement and chemicals. The list is open and can be updated over time.

At the same time, methods of promotion in value chains are possible for both individual companies [123] and industries [124]. Experts are currently talking about the following main levels of such promotion: technological (improvement of the production process), product (improving product properties), functional (reorientation of a company's specialization to more expensive stages of production of a final product) and intersectoral (transition from one chain to another within clusters or related sectors).

To ensure that product requirements meet the above-mentioned principles of sustainability, the European Commission proposes to:

- adopt and implement a new Ecodesign and Energy Labeling Working Plan for 2020–2024;
- revise Directive 2009/125/EU and product group requirements on the basis of criteria and rules, established in accordance with Regulation (EU) N° 66/2010 (EU Ecolabel Regulation), environmental footprint approaches and "green" public procurement;
  - create further sustainability criteria not only for products but also for services, including social ones;
  - create a European Dataspace for Smart Circular Applications);

– improve the implementation of sustainable development requirements together with national governments.

### 2. Empowering consumers and public procurement.

The European Commission will work to strengthen the maintainability of products. The aim of this initiative is to introduce the right to repair into the EU's consumer and product policy in 2021. The plan also postulates measures to provide consumers with more reliable information about products at the point of sale, including the shelf life of goods and other indicators.

The European Commission will ask companies to justify the environmental friendliness of their products using environmental footprint assessment methods. Stricter rules will be proposed to combat greenwashing and premature obsolescence. In this way, consumers will have access to reliable information on the maintainability and durability of products, which will help direct the vector of consumer choice to more environmentally friendly products.

EU initiatives and legislation already have some impact on product sustainability and consumer opportunities. In particular, Directive 2009/125/EU on ecodesign successfully regulates energy efficiency requirements and certain circulation issues. At the same time, instruments, such as Regulation (EU) N° 66/2010 and the criteria for green public procurement are broader in scope but have less impact due to the voluntary nature of the use of these instruments. Although green procurement is a voluntary tool, it is recognized by the European Commission as a powerful stimulus for environmental innovation [125].

Among other things, Brussels will propose minimum mandatory criteria and targets for green procurement in sectoral legislation and at the mandatory reporting stage. These measures will be aimed at preventing unjustified administrative burdens for buyers. In addition, the European Commission will continue to support through training and dissemination of best practices, as well as encouraging public sector buyers to participate in the Public Buyers for Climate and Environment initiative [126, 127].

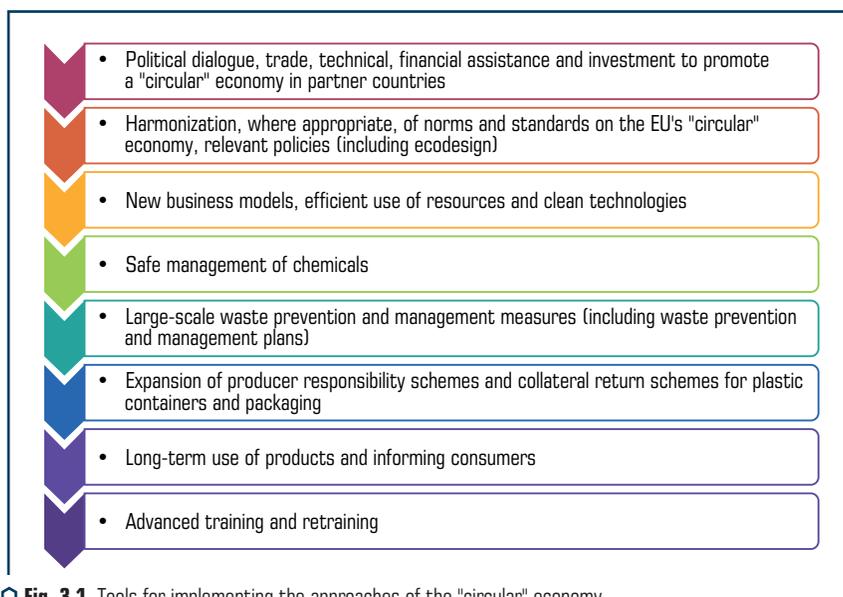
### 3. Increasing the share of resource reuse in industry.

The transition to "circularity" plays an important role in the transformation of industries. This transition can create significant resource savings within production processes, create added value and expand the economic opportunities of industrial enterprises. In combination with the goals, set out in the Industrial Strategy, the European Commission plans to ensure greater "circularity" in the industry by:

- assessment of options in the context of the revision of Industrial Emissions Directive 2010/75/EU;
  - promoting intersectoral cooperation through the development of reporting and certification systems by industrialists themselves;
  - implementation of the Bioeconomy Action Plan;
  - promoting the use of digital technologies to track, plan and record the movement of resources;
  - promoting the use of green technologies through the registration of the EU Environmental Technology Verification scheme as an EU certification mark.
-

Most environmental problems are transboundary in nature and have a global impact, so they can only be effectively addressed through international cooperation. For this reason, the Lisbon Treaty states that one of the key objectives of EU environmental policy is to promote actions at the international level to address regional or global environmental problems, including the fight against climate change. Thus, the EU is actively involved in the development, ratification and implementation of multilateral environmental agreements.

In this respect, the Action Plan requires systematic work on the transition to a global circular economy, including multilateral dialogue. The EU's expanded external relations network and its global strength offer great potential for promoting key policies and approaches towards a "circular" economy at the international level. According to the Commission Staff Working Document, the following tools and levers of international dimension can be used to implement approaches to the "circular" economy (**Fig. 3.1**).



**Fig. 3.1** Tools for implementing the approaches of the "circular" economy

An important component in the implementation of circular economy approaches is to solve the problem of waste. Statistics show that increasing welfare as a positive macroeconomic effect of production development has the side effect of increasing waste (**Table 3.1**).

Thus, in particular, in terms of plastic waste, the largest producers in Europe and the world are the United Kingdom and the United States. The United Kingdom produces about 30 000 tons

of household waste in total as of 2019 and 99 kg of plastic waste per person per year [129]. But the problem for the world and the environment is that about two-thirds of this waste is exported to poorer countries, such as Malaysia, Pakistan and Vietnam. The EU has banned the shipment of unsorted plastic waste from the European Union to non-OECD countries since January 2021. But the UK continues to export plastic waste to developing countries under new post-Brexit rules. Most plastic waste is sold to these countries, as the UK currently lacks the capacity to process it in the country.

However, the countries, exporting household waste themselves, also lack the infrastructure and capacity to process imported waste. And waste that cannot be recycled is often dumped in landfills or ponds or even incinerated, releasing toxic fumes into the environment. Indeed, most of the waste, sent to these countries, is unsorted and dirty plastic, which in any case can hardly be recycled.

Thus, Britain's approach cannot be called responsible from the standpoint of the basic approaches of the circular economy, because the problem of improving the environmental situation in the country in terms of waste is reoriented to other countries, without solving it as a whole.

● **Table 3.1** Dynamics of household waste in OECD countries and individual non-OECD countries, m tons

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
United Kingdom	31.9	31.1	30.4	30.9	31.1	31.5	31.7	30.9	30.8	30.7
United States	227.7	228.5	228.8	231.4	234.4	237.7	243.2	243.7	265.2	–
OECD Asia Oceania	83.9	83.9	84.0	83.9	84.2	84.9	85.0	85.0	86.2	86.4
OECD America	284.2	287.1	288.0	290.9	294.2	298.9	305.1	306.0	329.0	328.9
OECD – Europe	278.8	278.3	273.3	270.9	272.0	274.2	283.1	285.2	286.2	289.7
OECD – Total	647.0	649.5	645.4	645.8	650.5	658.1	673.3	676.3	701.6	705.0
Non-OECD Economies	Brazil	53.0	53.0	57.9	–	–	–	–	–	–
	China	158.0	163.9	170.8	172.3	178.6	191.4	203.6	215.2	–

Source: generated by the author based on [128]

As for the rest of the country's waste, the UK has chosen the path that most EU countries condemn, as waste energy (EfW) is dominant – incineration of waste materials for electricity generation. This has to some extent replaced landfills as the main method of household waste treatment in the UK. About 11 million tons are sent to EfW each year, and three million tons end up in landfills [130]. EfW uses three to six times more plastic, food and textile waste than recycled.

The choice of such a vector of waste treatment at the level of territories and the government as a whole is largely due to favorable institutional conditions for investors. However, this approach

requires virtually no change in supply chains or in how goods are consumed and disposed of. The UK is practically moving in the direction of a pseudo-closed economy, which is no different from the linear model of "take – make – use – dispose", focusing on short-term interests rather than long-term thinking.

Although it is currently the countries with developed economies that are showing a desire to implement circular economy approaches, at the same time some of the developing countries are already taking very real steps to reorient their own economy on the same principles. For example, Indonesia, one of the five most populous countries in the world, is also one of the largest consumers of electronics in the world.

As a result, a significant proportion of used electronics and electrical equipment is later converted into electronic waste. This electronic waste ranges from used mobile phones, tablets, laptops, personal computers and batteries to TVs and appliances, such as refrigerators and washing machines.

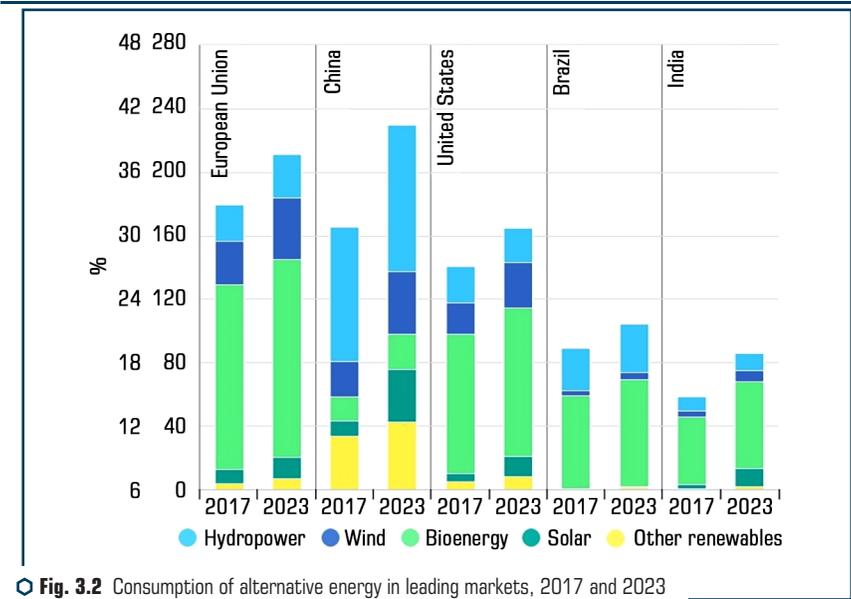
According to expert estimates, Indonesia will produce about 2 million tons of e-waste in 2021, and this figure is the largest in Southeast Asia. The traditional economy approach – this part of the waste is incinerated or replenished in industrial waste dumps. The circular economy approach is to find opportunities to give a second life to spent resources, while gaining economic benefits. And in this sense, Indonesia's plans are really ambitious: by 2040, the economic potential of e-waste will reach 14 billion US dollars [131].

Quite logical, the question arises, in what way is the country going to achieve these goals? We are talking primarily about the recycling of electronic waste.

Studies have shown that although they contain a number of hazardous elements that need to be treated and localized, waste also contains valuable metals, such as copper, gold, silver, platinum, palladium and other strategically important metals. It is noteworthy, that the concentration of individual metals in e-waste is in some cases higher than in their primary minerals/ores underground. In particular, the production of gold in a wedding ring requires about 0.5–1 tons of gold ore (about 2 grams). The same amount of gold can be obtained from only 15–30 kg of mobile phones with expired service life. Therefore, electronic waste can be considered as an alternative source for the production of metals.

Efficient use of resources and clean technologies as one of the above priorities and tools of the policy of "circular" economy corresponds to the growing needs of mankind for energy.

Currently, not only the EU but also other countries are trying to change their energy supply programs by highlighting alternative fuels and energy efficiency issues. Renewable energy sources, according to the International Energy Agency (IEA), will become the fastest growing energy resource, their consumption will grow by an average of 7.6 % per year and quadruple in total over the next 20 years due to increasing competitiveness of both solar and wind energy. In particular, focusing on the dynamics of RES development (**Fig. 3.2**), China is expected to achieve the largest increase in renewable energy production by 2023, surpassing the European Union (EU) and the United States [132].



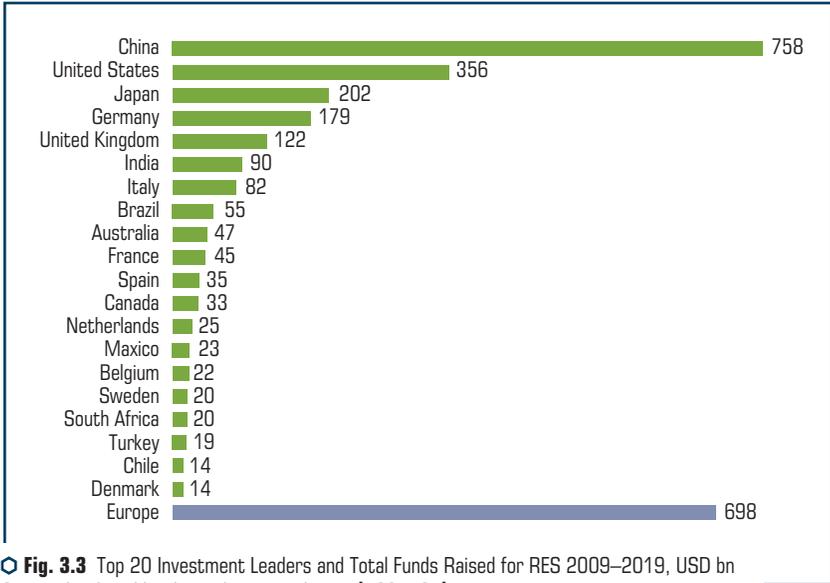
**Fig. 3.2** Consumption of alternative energy in leading markets, 2017 and 2023  
 Source: developed by the author according to [132]

Development priorities in the dimension of "circular" economy are mostly determined by economically justified areas of use of fuel and energy resources. In the period of 2009–2019 there was a significant increase in the number of programs in the field of alternative energy. Today, more than 160 countries focus on the development of RES, increasing investment every year. It is necessary to monitor the inflow of investments in green energy projects over the last decade and identify the leading countries in attracting investment (**Fig. 3.3**).

**Fig. 3.3** shows the top 20 countries in terms of total investment in the renewable energy sector. China became the leader among the countries, with attracted investments of USD 758 billion, which is almost 31 % of the total world investment in RES. The second position in the ranking is occupied by the United States – \$ 356 billion (14 % of the world volume). The top 20 also includes eight European countries, led by Germany (\$ 179 billion) and the United Kingdom (\$ 122 billion). Although the circular economy project owes its origins to the European Commission, the total investment of European countries in the period from 2009 to 2019 is estimated at less than in China and the United States as 698 billion US dollars, about 28 % of total investment in the world.

The issue of the transition of states, claiming the role of global leaders, to the principles of circular economy concerns not only governments and the territorial community. Increasingly, the rules of the circular economy are being implemented in the business processes of the world's most successful companies. And in this sense, there are interesting aspects in terms of the conse-

quences of such a transition, which require an institutional response from both the state and civil society. For example, Volkswagen and Amazon Web Services have recently collaborated on cloud technology to connect all of Volkswagen's own plants and businesses in its global supply chain. The goal is data exchange. This allows the company to track all the components that make up a car, throughout the production process and optimize all business operations, including in terms of resource consumption.



**Fig. 3.3** Top 20 Investment Leaders and Total Funds Raised for RES 2009–2019, USD bn  
*Source: developed by the author according to [133, 134]*

For example, Volkswagen and Amazon Web Services have recently collaborated on cloud technology to connect all of Volkswagen's own plants and businesses in its global supply chain. The goal is data exchange. This allows the company to track all the components that make up a car, throughout the production process and optimize all business operations, including in terms of resource consumption.

Another collaboration is that Microsoft and BMW have launched an open production platform that similarly allows BMW to integrate data throughout its supply chain, track components as they are produced and assembled in a car, thus increasing process efficiency. Microsoft has also partnered with Volkswagen and the Renault-Nissan-Mitsubishi alliance.

All of this provides a unique opportunity for the global automotive sector to create a true ecosystem of a closed-loop economy with clear environmental benefits in terms of reduced re-

source and energy use and waste generation. It will also help put an end to the overexploitation of valuable resources.

However, a number of experts see in this transition to "cloud" technology other priorities that follow the desire to make the closed-loop economy profitable. It is a question of monitoring the use of vehicles after they have been purchased, and all this certainly raises questions about the possession of personal data of consumers, their security and confidentiality [135].

It is in this context that challenges can be seen for both regulators and civil society itself. Certainly important in the light of progressive development, technology can lead to the consolidation and even increase in the level of power in the hands of leading technology companies through their monopoly on personal data of consumers and their ability to monetize them. And there is every reason to predict that the closed-loop economy model will only increase this level of capacity, as cloud platforms of technology companies will be used to collect, store, manage and analyze data.

In fact, it must be acknowledged that the situation in Ukraine is somewhat different from general trends in both the EU and international best practices.

So far, the only important policy documents in the field of climate policy in Ukraine are the National Waste Management Strategy until 2030 and the National Waste Management Plan until 2030, the Strategy of State Environmental Policy of Ukraine until 2030, the Concept of State Climate Change Policy for the period until 2030 and the plan for its implementation, the Low-Carbon Development Strategy of Ukraine until 2050. At present, we can only talk about certain institutional preconditions for change.

The National Waste Management Strategy, approved in 2017, is a document that initiates waste management reform to approximate EU directives in the field of waste management and provides a number of measures, including the preparation and adoption of relevant legislation, the introduction of extended producer responsibility for certain types of waste, development of technical regulations on waste management and ending with the development of regional plans for waste management and construction of waste treatment facilities [136].

The National Waste Management Plan until 2030 [137], approved in 2019, is a detailed "road map" for the implementation of the National Strategy, which aims to build a waste management system in Ukraine based on EU standards and closed-loop economy. This document contains a package of tasks for each type of waste – from the adoption of the necessary legal framework to specific measures for the collection, processing and disposal.

The Strategy of State Environmental Policy of Ukraine for the period up to 2030 [138], approved in 2019, is an updated document that aims not only to help overcome the consequences of environmental problems, but also to eliminate the causes of their occurrence. This strategy and the system of measures, underlying its creation, are successfully operating in the EU and are the doctrine of the formation of a new environmental policy with a vector on resource-efficient, cyclical and low-carbon economies.

The Concept of Implementing State Policy in the Field of Climate Change until 2030 [139], approved in 2016, was created to improve state policy in the field of climate change to achieve

sustainable development of the state, create legal and institutional prerequisites to ensure a gradual transition to low-carbon development under conditions of economic, energy and environmental security and improving the welfare of citizens. The Action Plan for the implementation of the Concept [140] was approved in 2017, it provides for measures to formulate, ensure and implement public policy in the field of climate change and the gradual transition to low-carbon development.

Ukraine's 2050 Low-Carbon Development Strategy [141] was designed to meet Ukraine's international obligations under the Paris Agreement, the decision of the Conference of the Parties of the UN Framework Convention on Climate Change, and also instructions of the Cabinet of Ministers. This strategy envisages reduction of emissions and increase of greenhouse gas absorption, introduction of environmentally friendly production with the use of green technologies in all sectors of the economy.

Despite the important policy documents that are in force in Ukraine, in our opinion, a holistic policy to support the "circular" economy has not yet crystallized. We agree with experts that the state of development of the "circular" economy in Ukraine is very low or absent. Given that waste management is a priority for the closed-loop economy, "circularity" is currently only in the plans. The National Waste Management Strategy of Ukraine until 2030 never mentions the Paris Agreement, climate change, greenhouse gases or emissions, while the Concept for the implementation of State Policy on Climate Change until 2030 and its implementation plan do not mention any waste [142].

The relationship is manifested only in the Low-Carbon Development Strategy of Ukraine until 2050, where waste from the oil refining industry is planned to be removed and re-introduced as soon as possible as secondary resources (one of the steps towards "circularity").

Therefore, these strategic documents provide for minimal interaction and cooperation of relevant agencies. It should be noted, that a similar situation is observed in the policies of many other countries [143].

An important issue is to encourage the Government of Ukraine to make wider use of targeted economic instruments, namely the environmental tax, to support "circular" measures. Revenues from the payment of environmental tax in Ukraine are lower than in its European neighbors [144], and in terms of the euro are significantly reduced in dynamics. This is due to the fact that the different types of environmental taxes that may be levied in EU countries partly coincide with the components of the environmental tax in Ukraine, and yet EU environmental taxes include those types of taxes that exist in Ukraine separately from environmental taxes: eg transport taxes and rents payment for special use of forest resources, water, subsoil use, etc. There is also a problematic issue in the ratio of environmental tax revenues and state expenditures on environmental protection.

In all European countries, except Ukraine, revenues from environmental taxes are much higher than government spending on environmental measures. As an example of European countries, France, the United Kingdom, Spain and Italy spend a significant part of their environmental expenditures on waste management. In Germany and Poland, this area of environmental protection accounts for up to 20 % of expenditures [145]. It should also be borne in mind, that European

environmental taxation is not only the implementation of tax payments, regulation of emissions trading, but also a whole list of both tax and non-tax incentives.

For a typical European industrial producer, most environmental taxes are paid through the price of energy and electricity, used in the production process. A company can receive tax benefits for the introduction of "environmentally friendly" technologies or processes. Thus, manufacturers in Italy, companies that use the latest technology to reduce the negative impact on the environment, can claim the so-called "hyperamortization" of these assets: up to 270 % of the value of such an asset instead of 100 %. In Belgium, the state can reimburse a significant part of tax costs (up to 80 %) if a company is a party to contracts for the introduction of new energy saving technologies (for example, in accordance with ISO 50 001). A variety of tax incentives is R&D (tax credit or so-called Patent Boxes) [146].

Consideration of the main approaches to the concept of circular economy as part of the latest management practices of economically developed countries, allows us to outline some generalizations:

- the implementation of the principles of closed-loop economy to increase the level of efficient energy consumption sets new trends in the formation of strategic priorities of national development not only in the EU but also other representatives of the so-called Golden Billion. At the same time, ambitious strategic plans are being developed in a number of developing countries to transform the problem of industrial waste into a source of additional financial income and resources;
- the transition to a circular economy involves transformations not only in the system of production and consumption, it requires major changes in the institutional matrix of modern society, which still reflects the values of development on the basis of a linear economy;
- in Ukraine, the process of transition to a circular economy has so far been declared in the whole list of legislative initiatives, however, there is a lack of an effective mechanism for its implementation. Circular transformation of economic sectors and the introduction of a circular economy in general require further steps to develop state economic policy, study the most promising sectors of the economy in terms of including waste processing in production chains, as well as to identify possible sources of investment to finance projects using best practices of waste disposal.

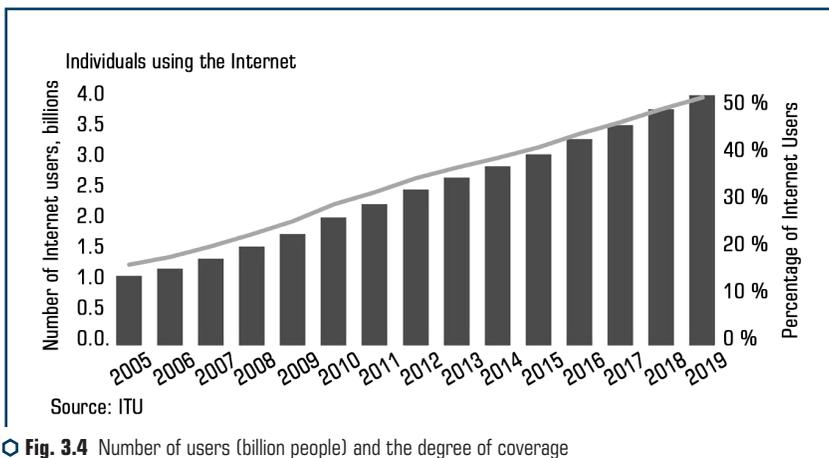
### 3.2 INSTITUTIONAL CHALLENGES IN THE FORMATION OF THE GLOBAL DIGITAL ECONOMY

In the conditions of 4.0 Industrial Revolution, the world is undergoing significant changes and transformations both in the models of organization of business and public life, and in the institutional mechanisms of their provision. This latest stage in the development of the global economy is increasingly being identified with the concepts of "digital" economy and "digital" transformation. Although common approaches to quantifying the digital economy have not yet been established, it is currently estimated at 4.5 to 15.5 % of global GDP [147]. The digital transformation of the economy is such a powerful and at the same time revolutionary trend of economic development of the

XXI century that without it, states can not count on maintaining or strengthening their competitive positions on the geospatial map of the world.

We are all witnessing a steady increase in the role of services in the public life of the population and economies of individual countries and the world as a whole, and primarily due to the contribution of its subsectors, related to information and communication technologies (ICT) and so-called digital technologies. ICT technologies are a powerful and effective communication channel for business and the majority of the world's population, in particular, the Internet is currently used by about 4 billion people, respectively, the coverage rate is already more than 50 % (Fig. 3.4).

As for the scale of digital trade as one of the most important components of the digital economy, using official UNCTAD statistics, we can at least point out that the share of ICT goods in total world trade in 2019 reached 12.49 %, and world exports of services, provided with the use of digital information and communication technologies in recent decades, has shown a faster pace than all exports of services in general and as of 2019 amounted to about half of it, equivalent to USD 3.2 trillion [148].



○ Fig. 3.4 Number of users (billion people) and the degree of coverage of the world's population (in %) by the Internet in 2005–2019 [149]

Transformational shifts, according to experts, determine the creation of new business models, digitization processes and digital transformations, which are becoming necessary elements in the competition at the level of business practices [150]. Thus, these statistics and expert assessments show the importance of the digital ICT sector in world production and trade, which gives grounds to talk about the gradual and probably irreversible digitalization of the world economy.

The issues of basic definitions and classifications of digital trade as the latest phenomenon of the world economy are reflected in the publication of E. Molchanova and K. Kovtonyuk [151]. The problems of the digital economy in measuring the demands for international coordination of

regulatory systems are revealed in the works of Usman Ahmed [152], Shamel Azmeh, Christopher Foster, Jaime Echavarrri [153]. Current trends in the digital economy in terms of cross-border transfer of intellectual property are analyzed in the studies of Adam B. Thimmesch [154], V. Haustov [155], Wei Cui [156], J. Gantz, D. Reinsel [157]. A number of both domestic and foreign scientists, including Z. Varnaliy [158, 159], E. Redziuk [160], V. Marchenko [161], Y. Oliynyk [162] G. Umantsiv, I. Shushakova [163] have directly addressed the issues of fiscal regulatory risks and their individual aspects (state investment security, offshoring, implementation of the BEPS plan). At the same time, given the intensification of digitalization processes at both national and global levels, further research requires the institutional capacity of national regulatory systems to relevant transformations, taking into account the challenges of today. Accordingly, the purpose of the study of this section is to analyze the latest regulatory practices of states in view of the processes of digitalization of the world economy.

Information and communication technologies give a new impetus to the development of world trade. At the same time, the widespread introduction of cross-border ICT-based trade in the context of capital liberalization and transnationalization of production, in addition to obvious benefits and positive consequences, is a challenge, and in a sense a serious problem for regulatory systems, integrated into world economic processes. We are talking about distorting competition and increasing the dominance of companies that actively appeal to digital technologies, and about optimizing taxation and attacking the civil liberties of citizens due to the loss of confidentiality of personal data, collected by companies. Multinational companies that form international production and distribution networks gain through the use of ICT additional opportunities to minimize costs through transfer pricing mechanisms and in the implementation of controlled international transactions with intangible assets. Therefore, given the expansion of internationalization of business and digitalization of global trade and the economy as a whole in recent times, we can see increased competition between countries for more effective models of modernization of regulatory mechanisms relevant to new challenges. This issue has become especially relevant in the context of the global COVID-19 pandemic: the unprecedented growth of international digital trade and the growing demands of national governments to effectively regulate the operations of international companies in e-commerce, support national business and combat falling incomes under quarantine restrictions.

The question of a new understanding of the role of the state in the new post-industrial world in the plane: state-citizen is reflected in the paradigm of New Public Management (NPM), which considers the state as a system of service functions, respectively, the activities of civil servants to provide services. And later – "Good Governance" (GG), which proposes the transition from the understanding of governance as the performance of functions to governance as a network of relationships between state and citizens: citizens participate in management decisions, their organizations and associations are presented in the control system [164].

Defining the concept of boundaries and tools of national public management in the plane: state – international business is carried out rather empirically. At the same time, the responses of nation states to the challenges of global digitalization are not always consolidated. In this sense, it will be

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interesting to appeal to the latest practice of state reflection on the example of fiscal measures against international companies in the field of e-commerce. To some extent, it may be a matter of establishing new regulatory policies for internal and especially external entities.

The rapid growth and share of digital services in the structure of global GDP and trade is largely due to digital platforms – business models, which are based on the use of data and transform existing industries and activities. According to P. Whale and S. Warner, the process of transforming business models under the influence of new technologies is a digital transformation [150]. Platforms are divided into specialized and hybrid. According to the review of the functions they perform, they are divided into:

- social, enabling social communication between people;
- trade (commercial) – carry out e-commerce;
- sharing – to ensure the sharing of assets;
- educational – those that facilitate the transfer of knowledge and educational information;
- transactional – enable transactions between different groups of individuals and institutions/organizations;
- innovative – formed from technological blocks, thanks to which companies/individuals – innovators form secondary products and services;
- integration – combine technologies, products and services that perform the functions and services of innovative platforms;
- investment – consist of organizations, developing investment instruments and which are either holding companies or investors [165].

Their extraordinary efficiency is evidenced by the fact that seven of the world's eight largest market capitalization companies use platform business models. In 2017, the total value of platform-based companies with a market capitalization of over \$ 100 million exceeded an estimated \$ 7 trillion, which is 67 % more than in 2015. If we look at the dynamics of market capitalization by sectors/industries of the world economy in the long run, according to the consulting company PwC (PricewaterhouseCoopers International Limited), just the TOP-100 companies in the IT sector from 2009 to 2020 showed an increase in market capitalization more than no other sector (+5,261 billion US dollars), and the number of companies in the sector increased in the leading hundred from 11 to 20 (**Table 3.2**) [166].

PwC's Strategy & report [166] presents the results of a survey of more than 1 155 companies around the world on the experience of using digital technologies. It is noteworthy, that the most successful are identified as Digital Champions. At least two-thirds of the most significant digitization technologies have been implemented by "champions".

These include:

- comprehensive end-to-end supply chain planning (among 87 % of "digital champions");
- industrial Internet of Things (78 %);
- production management systems (75 %);
- cobots (collective robots) and intellectual robots (72 %);

– solutions for predictive diagnostic services (70 %) [166].

If you appeal to the practice, then about 90 % of the market for search engines for the Internet belongs to the company "Google". Facebook accounts for two-thirds of the global social media market, and its platform is the most popular among social networks in more than 90 % of countries.

● **Table 3.2** Dynamics of market capitalization of the TOP-100 global companies by sector

Indicators of market capitalization of the TOP-100 global companies by sector							
2020				2009			
Sector	Change of market capitalization of the TOP-100 (USD billion)	Rating place	Market capitalization of the TOP-100 (USD billion)	Number of companies	Rating place	Market capitalization of the TOP-100 (USD billion)	Number of companies
IT sector	5.261	1	6.258	20	5	997	11
Finances	1.898	2	3.224	18	2	1.326	17
Health	1.884	3	2.968	19	4	1.084	14
Domestic services	2.571	4	2.876	10	7	305	3
Oil and gas	499	5	2.428	8	1	1.929	18
Consumer goods	1.119	6	2.222	13	3	1.103	15
Telecommunications	-89	7	782	5	6	871	10
Industry	255	8	504	5	9	249	4
Utilities	-125	9	118	1	10	243	4
Mining industry	-203	10	92	1	8	295	4
Totally	13.070	21.472	100	8.402	100		

Source: developed by the author by [166]

Almost 40 % of the world's online retail sales are through Amazon's network, and its subsidiary Amazon Web Services accounts for about the same share of the global cloud infrastructure market. In China, Tencent's WeChat network has more than a billion active users, and its payment system, along with Alipay's Alipay group, covers virtually the entire Chinese payment market by cellular communication. At the same time, Alibaba Group accounts for an estimated 60 % of China's e-commerce market [147].

These statistics show that the digital economy is now increasingly becoming a driver of growth that affects the world economy as a whole, with the prospect of becoming decisive.

Despite the obvious positive effects, the specifics of the new industry have created new opportunities for companies, in particular in terms of tax optimization techniques, which are generally legal, but at the same time reduce the tax base and, as a result, distort competition with traditional sectors. Such actions of companies have become possible due to the fact that the value of companies, related to the new industry, is increasingly shifting to intangible assets (brands, patents, copyrights, trademarks), as exemplified by a group of companies, labeled FAANG (Facebook, Apple, Amazon, Netflix and Google).

Multinational companies carry out remote international operations with goods and services – without the need for significant physical resources in countries with large consumer markets. The production of intangible assets is free from the traditional connection with the means of production, so it can be easily transferred from countries with high fiscal burdens to jurisdictions with low or zero levels. These actions, combined with other cloud computing, remote software as a service (SAAS) and monetization of personal data, collected from social networks, have threatened the ability of specific governments to collect revenue from cross-border income tax.

The logical consequence of these problems, which have manifested themselves since the beginning of the XXI century, was the inclusion of governments, integrated into global trade – production and financial processes, in confrontation with each other, which resulted in the spread of overt economic nationalism and neoprotectionism.

Part of this process was "offshoring" – the actions of some governments to radically reduce taxes to attract financial flows to their countries (this article does not consider the practice of "domestic offshore", as the creation of such jurisdictions within the country solves tasks of domestic fiscal policy). And although this phenomenon in any case can not be considered new in international economics and politics, because for decades this term has been used to reflect the asymmetry in the distribution of global financial resources through the mechanism of offshore and low-tax jurisdictions, however, the total transition of international business to high-tech solutions and the removal of barriers to cross-border trade, increasing the share of services (which in themselves are more mobile) in total GDP of both the world and any country, gave the classic fiscal "wars" new signs and manifestations.

Such actions (creation of the offshore regime on the economic territory of the states) should not be identified, in our opinion, as fiscal "wars". The arguments in favor of this thesis are as follows:

- a limited number of states joined this practice, just those, whose economies had neither decisive nor significant impact on the global economy and the states of the companies – counterparties);
- there was a limited number of actors at the business level (offshore jurisdictions did not include MNC parent companies, which ensured the preservation of profit centers in the countries of origin and, as a result, the lack of aggressive reactions from governments).

Subsequently, a number of joint intergovernmental measures to limit the outflow of capital abroad (BEPS (Base Erosion and Profit Shifting), the Cyprus Crisis (2012–2013)), and a num-

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ber of discredits on the secrecy of deposit protection (the so-called Paradise Papers, Panama documents), in general, led to the stabilization of capital flows to offshore jurisdictions and the development of mechanisms for their tracking and taxation. Therefore, despite the existence of certain problems with offshore and leaching of national investment resources from states, the global nature of the confrontation would be premature.

We propose to use the cases of individual states on the basis of open information in the media to assess the further regulatory practices of states, which can be described as new fiscal "wars", which testify to the scale of this process and are reflected in specific examples.

Apple and Google were the first international digital companies to raise concerns with national fiscal authorities, restructuring their global assets through focused and permanent aggressive tax planning over the past five years. This has obviously contributed to the loss of income in countries with high taxes. So, in 2016 Google saved (and the US federal budget lost) \$ 3.7 billion in taxes through tax planning. Similarly, Amazon did not pay any federal income tax in the United States, despite the fact that profits doubled in 2018 to \$ 11.2 billion. Netflix, with approximately 6 million Canadian subscribers, does not pay federal taxes on income or consumption in Canada.

And while the struggle to increase tax revenues existed long before the digital economy (first coined in Don Tapscott's 1995 bestseller "The Digital Economy: Promises and Dangers in the Age of Network Intelligence", considered the question of how the Internet will change the way we do business), just new peculiarities caused global shifts in both the understanding of fiscal competition and the need to create new approaches to taxation.

The initial reaction of governments was not long in coming, and 2000–2021 was a year of unilateral fiscal decisions to tax foreign technology companies. It should be noted, that immediately with the introduction of such regulatory innovations, the ineffectiveness of established tax practices for the taxation of cross-border digital trade transactions became apparent. One of the first significant "bells" about the need for new approaches was the same "Apple" case and the huge fine, imposed by the European Commission for tax optimization in Irish jurisdiction. The decision of the European Court of General Jurisdiction in 2020 annulled the decision of the European Commission, which in 2016 ordered the American corporation Apple to pay Ireland 13 billion euros (\$ 14.8 billion) in taxes. This precedent is probably not an isolated fact, but only an illustration of further conflicts between governments and other transnational actors in the process of developing a new picture of their relationship.

This event, which was the first step in the confrontation by all indications, did not develop due to the global pandemic of COVID-19. At the same time, the likelihood of further conflict is extremely high, as the problem has not been resolved, and for the first time in history, not only governments but governments against the MNC that have achieved significant scale and influence are involved in the fiscal confrontation.

Given that the lion's share of the largest technology companies is concentrated in one country (USA), their support is likely from the country of origin (which is itself the world's largest economy), leading to complete uncertainty in the outcome of such a confrontation with another government

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(or a union of governments, as in the case of the EU). Thus, this uncertainty actualizes any predictions about the development of both this conflict and the probable actions of governments, aimed at solving the outlined tasks.

Considering the issue raised, one cannot but dwell on the largest and most widespread attempt to prevent fiscal "wars", namely the BEPS Plan, as an attempt to unify tax requirements and a tool for coordinating the fight against tax base erosion and tax evasion.

The latter is an international project of the Organization for Economic Co-operation and Development (OECD) and the G20 in 2012–2013. It currently covers about 140 countries (jurisdictions) worldwide and exists as recommendations for artificial transfer of profits to low-tax jurisdictions. BEPS covers 15 steps to prevent aggressive tax planning (**Table 3.3**).

● **Table 3.3** Components of the BERS Plan

Component number	Content and focus of activities in the relevant direction
STEP 1	solving of tax problems and features of taxation in the era of "digital economy"
STEP 2	neutralization of so-called "hybrid schemes"
STEP 3	Improvement of the effectiveness of rules on controlled foreign companies
STEP 4	combating of the erosion of the tax base through the payment of interest and other financial transactions
STEP 5	general opposition to "unfair tax practices"
STEP 6	prevention of abuse of the provisions of agreements on the elimination of double taxation
STEP 7	prevention of the use of schemes to artificially avoid the status of "permanent representation"
STEP 8	development of transfer pricing rules for intangible assets
STEP 9	development of transfer pricing rules in terms of risks and capital
STEP 10	development of transfer pricing rules for other high-risk transactions
STEP 11	development of methods for collecting and analyzing information on the erosion of the tax base and tax evasion
STEP 12	implementation of rules, requiring the disclosure of "aggressive tax planning techniques"
STEP 13	optimization of requirements for documentation of transfer pricing and national reporting
STEP 14	development and improvement of the effectiveness of mechanisms for resolving disputes between countries on tax issues
STEP 15	development of a comprehensive multilateral convention on international taxation in order to modify existing tax treaties between countries

Source: [167]

The principles of BEPS are: ensuring the coherence of local regulation in terms of its impact on cross-border (foreign economic) activities; strengthening the requirements for existing international standards in order to align taxation with the place of economic activity and value creation; increasing transparency and certainty for businesses and states.

On January 1, 2017, Ukraine also joined the BEPS Action Plan (**Table 3.4**). The actual implementation of the Plan for Ukraine was the adoption of Law № 466-IX 2020, which almost immediately received the designation "Tax Revolution" due to the introduction of the mechanism of taxation of controlled foreign companies "CFC". This law implemented 3, 4, 6–10, 13, 14 steps and BEPS, and it immediately provoked wide discussion and even opposition among experts from the public administration, on the one hand, and business representatives, especially the IT industry, on the other.

● **Table 3.4** Periodization of measures for implementation of the BEPS action plan in Ukraine

Year	Content of measures
2013	The OECD presented the BEPS Action Plan
2014	Ukraine has joined BEPS in terms of minimum standard commitments (STEPS 5, 6, 13, 14)
23.07. 2018	Signing of the Multilateral MLI Convention (basis for the implementation of STEPs 6, 7, 14, 15)
16.01.2020	Adoption of the Law of Ukraine № 466 (norms for implementation of STEPs 3, 4, 6–10, 13–14)
23.05.2020	Entry into force of the Law of Ukraine № 466
Second half of 2020	Roadmap for the development of more than 10 bylaws
01.01.2021	Introduction of CFC rules and new criteria for fine-tuning rules (STEPS 3 and 4)
2022	First submission of CbCR reports for 2021, but not earlier than the year in which the MCCA CbC agreement was concluded (STEP 13)

Source: [168]

These discussions are still ongoing. Recognition of the correctness of the voices of opponents of the implementation of the BEPS mechanism for Ukraine was extremely hasty action by the state to mitigate the practices, which led to anti-BEPS steps – the creation of "internal offshore" Action City – a special legal regime for the IT industry that includes a radical reduction in tax rates, the introduction of a tax on withdrawn capital, etc. [169]. Indirect evidence of the premature implementation of BEPS for our country is the behavior of some highly developed countries, whose actions offset the G20's efforts to implement a single control plan for tax agents.

If we summarize the logic of the BEPS plan and the actual actions of a number of states, they come down to tax evasion in low-tax jurisdictions, by companies that are physically located or operating in another jurisdiction and consume public services at the expense of local taxpayers. Are

these actions unanimous among the world community? Can it be argued that global coordination keeps weak manifestations of economic nationalism on a controlled scale? In fact, there are no clear answers to these questions yet. A number of countries in the last few years (whose "cases" will be listed below) have refused to withdraw claims against companies that pay taxes honestly (or mostly honestly) in the country of registration/stay, and have taken a number of measures to re-tax their profits or even income.

Just these steps have given rise to new institutional interstate conflicts, namely the avoidance of acceding to intergovernmental agreements (including BEPS) to establish general principles of cross-border fiscalization, or attempts to levy taxes contrary to agreements reached. Here are some such eloquent examples.

The state of Israel has introduced a "significant economic presence test", the Slovak Republic has expanded the definition of "fixed place of business" in tax treaties for certain digital platforms, while India has also introduced the concept of "significant economic presence" [170]. Saudi Arabia and India specifically interpret the term "permanent representative" in a way that does not require any physical presence. "Permanent Representation of Services" is interpreted as services, used or consumed in the source's jurisdiction, including services, performed remotely if other requirements for the definition of permanent representation are met.

A number of countries, including Greece, the Philippines, and Malaysia, have introduced royalty levies according to their own internal definitions, including in income items those that are traditionally classified as operating income. Such extensions include, for example, payments for software (in Greece and the Philippines) and payments for "visual images or sounds", transmitted via information and communication technologies (Malaysia). France, Hungary and a number of other countries have introduced advertising fees, provided by non-resident digital companies (such as Facebook, which monetizes user data by selling it to third-party marketing companies) [154]. Such fees apply regardless of the physical presence in the source state.

For example, the French sales tax regulates taxable transactions primarily on the basis of their final destination, such as the location of a "public audience" (ie viewers) for the online delivery of digital content. In 2016, the collection covered online video services, provided "for free" to consumers, such as YouTube (which generates revenue mainly from advertising, related to video content). The tax rate is 2 %, up to 10 % for content, containing "pornography" or "incitement to violence". The report notes that the amount of advertising tax in Hungary also ultimately depends on the location of the target audience (considered Hungary when it is displayed on the Internet mainly in Hungarian).

The United Kingdom has developed a separate procedure for taxing large non-resident technology companies (with a total revenue of at least £ 500 million per year) in digital services tax [171]. Namely, the tax rate of 2 % will be applied to the gross income of non-residents who have social media platforms, Internet markets and search engines. The proposed EU and UK digital tax measures apply a tax rate to gross income as opposed to "normal" income taxes, which are applied to net income (ie gross income less business expenses). France, Italy and other countries are considering

similar measures, despite the fact that this approach does not comply with accepted international tax standards and may violate the rules of non-discrimination of the World Trade Organization [156].

On January 1, 2017, a tax was introduced in the Russian Federation, which obliged non-residents to pay value added tax on the sale of electronic services in Russia: digital content, storage and information processing services, domain registration and hosting, etc., and they must be registered for tax purposes. Among the technology giants in the regulatory body were registered Apple Distribution International, Google Commerce, Microsoft Ireland, Netflix International B.V., Wargaming Group, Bloomberg, Alibaba, Booking.com and others. In total, since the introduction of the tax 1580 companies have registered on tax accounting. According to official data, such companies (B2C) paid 9.4 billion rubles to the budget in 2017, in 2018 – 12 billion rubles, in the first quarter of 2019 – 12 billion rubles (70 % of the amount falls on the largest IT companies). Similar tax rules were introduced in the Republic of Belarus in 2018 [172].

It should be emphasized, that the controversial actions on the BEPS plan did not bypass Ukraine. Despite the active position on unification of tax requirements by implementing the BEPS plan the Verkhovna Rada of Ukraine simultaneously adopted in the first reading the Draft Law №4184 of 02.10.2020 "On Amendments to the Tax Code of Ukraine on Abolition of Taxation of Income, Received by Non-residents as payments for the production and/or distribution of advertising and improvement of the procedure for value added tax on transactions for the supply of electronic services to individuals by non-residents", which in the media is referred to as "Google Tax". The adoption of this law provides for an increase in revenues to UAH 3 billion annually in the state budget from technology giants Facebook, Google, Apple, Microsoft, Netflix and others in the form of taxes. Such forecasts were given by the chairman of the parliamentary committee on tax policy D. Getmantsev [173].

The said Draft Law by excluding paragraphs 141.4.6 § 141.4 art. 141 of the Tax Code proposes to tax the income of a non-resident with its source of origin from Ukraine from the production and/or distribution of advertising by income tax in a general way, and not during such payment at a rate of 20 % in the source of payment – residents, including individuals – entrepreneurs, natural persons, engaged in independent professional activity, or business entities (legal entities or natural persons – entrepreneurs) who have chosen a simplified taxation system, which make such payments to non-residents. To this end, the TC includes art. 2081.6 reads as follows: "The base of taxation of transactions on supply of electronic services by a non-resident, registered as a taxpayer, is determined based on the cost of such services. The tax is 20 percent of the tax base and is added to the cost of electronic services, except for transactions, exempt from value added tax. The tax base and the amount of tax are determined in foreign currency (euro or USD)".

In general, these examples and other tax innovations undermine the principle of neutrality, according to which there is no difference between ordinary and digital trade. The negative impact of this phenomenon is also reflected in the report of the European Commission, which states that there should be no special tax regime for digital trade [174]. Violation of this principle, in addition to distorting the market for cross-border goods and services, will sooner or later lead to more sophisticated methods of counteraction by TNCs, inefficient tax planning, and as a result – loss of

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economic growth, lower national and global incomes. The new rules also violate the principles of fairness and efficiency, certainty and simplicity.

In addition, uncoordinated measures pose a greater risk of international double taxation as they seek to expand their tax jurisdiction over profits of a non-resident firm: the resident country may declare that it already has legal powers under its national tax law or tax treaty to tax these profits, which will lead to double taxation. For example, the new US GILTI (Global Intangible Low-Taxed Income) policy aims to expand US requirements for foreign income, generated by intangible assets, which may contradict US claims that do not tax this income (especially when the US GILTI determines intangible income without references to the return on tangible assets). International double taxation and high compliance costs are holding back world trade, exacerbating relations between its members. Despite the declarative statements of the governments of the states about the need to support global trade in the conditions of COVID-19 recessions, de facto we are dealing with the strengthening of neo-protectionist approaches and the priority of the local over the general.

The latest fiscal "wars" in view of the structural changes in the world economy should be interpreted as an obviously negative phenomenon, which is based on multifactorial disagreement between the member states of the world community, caused by economic, political, organizational and even diplomatic obstacles. As a result, preconditions are created to counteract the accession of all participants in transnational trade, including digital, to a comprehensive regulatory act to establish uniform rules for the taxation of such trade.

As a result, there are manifestations of new economic nationalism, when governments try to get out of a state, in which a certain sector of the economy is "under-taxed". The result of these efforts leads to the exact opposite consequences, namely – excessive fiscalization of the digital economy, distortion of competition in this area, creating an anti-competitive environment. These distortions, being individual to each country, initiate further efforts by governments to rectify the situation through new restrictions or penalties. This feeds the groundwork for new fiscal "wars."

### 3.3 INTERNATIONAL INVESTMENT IN MEASURING THE PRIORITIES OF RENEWABLE ENERGY DEVELOPMENT

Pointing to the sectoral priorities in the latest regulatory practices, presented in subsection 3.1, the problem of finding resources for large-scale transformations in the energy sector cannot be overlooked. The struggle for energy resources has been, is, in fact, and will be one of the major trends in inter-country controversy. For some of them, which do not have sufficient natural resources, these are unprecedented risks of import dependence on strategically important product groups. For others with rich natural potential, these are favorable, at first glance, economic conditions, however, often in practice it is the excess resource base that leads to the preservation of the existing structure of production, which in the medium and long term exhausts the potential for modernization in face of new millennium challenges. In the theory of

international economics, this phenomenon has several interpretations: both the "resource curse" and the "Dutch disease", however, some countries manage to diversify production and trade, developing new industries and services. Others, even in the XXI century, continue to exploit the old model of production and have extremely high levels of import dependence on a number of strategically important economic activities.

One of the sectors that is crucial for each country is energy. It affects the course of economic processes throughout the economy, so the high level of import dependence in the energy sector actually determines the international competitiveness of the state [175].

For many countries, the desire to overcome this problem has been embodied in projects to ensure the sustainable development and use of non-traditional energy sources. The issue of the use of renewable energy sources is a defining goal of UN Sustainable Development Goals and has a positive impact on solving global problems of mankind, including: energy, environment, food. At the same time, the question of motivation and financial support for the development of new segments of the energy sector arises quite naturally. Are there enough internal resources to make such strategic changes? Is it possible to attract international investment and what is the cost of admitting non-resident companies to infrastructure sectors that were until recently closed to foreigners? And is it a dilemma: expensive renewable energy development projects or import dependence on "cheap" energy resources? Probably not one government has similar questions, and each of them is looking for own answers.

Given the importance of the development of renewable energy sources in the context of economics, ecology and energy security, in the scientific and expert communities, the development of renewable energy sources is given the most attention. The following Ukrainian scientists were engaged in research of economic development of alternative energy: A. Zaverbny [176], V. Lavrenchuk [177], S. Kudrya [178], M. Kuzmina [179]. Foreign investigators of the problems of using alternative sources: M. Huber, D. Dimkova, T. Hamacher [180] and D. Spencer [181]. At the same time, quite reasonable questions arise: how real are the opportunities for foreign investors to make the economy of a country – the recipient of investments – effective? After all, we are talking about strengthening specific countries on the economic map of the world and attracting them to the global share of value added. These issues need to be addressed. Using the statistics of analytical services and international organizations, we will try to determine the scale and regional priorities of foreign direct investment (FDI) in renewable energy projects.

In modern conditions of development of world economic processes, the sphere of energy supply is characterized by a high level of efficiency, diversification of the production structure and more efficient location of energy facilities.

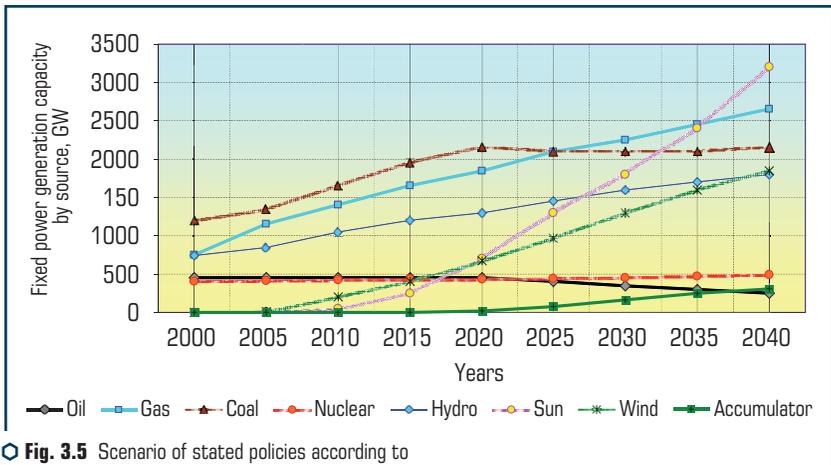
However, despite the rapid development and improvement of energy production processes, it is still characterized by insufficient progress to achieve the Sustainable Development Goal [182], according to the UN Sustainable Development Goals. Universal access to energy, energy efficiency and the promotion of renewable energy by 2030 will increase economic opportunities and provide protection against climate change [182].

In 2019, the International Energy Agency published the World Energy Forecast and the World Energy Model [183] – a large-scale simulation model that simulates the functioning of global energy markets through a set of scenarios that explore different variations in these markets.

Forecast models are developed, taking into account the effectiveness or ineffectiveness of institutional changes through government policies towards positive transformations in energy markets. Three possible scenarios are proposed:

- first, the current policy scenario is inertial, possible under the conditions of maintaining the existing status quo in energy production and marketing systems, with no significant changes in regulatory policies for the sector;

- second, the scenario of stated policies (**Fig. 3.5**), is based on specific policy initiatives in individual market operators, which have already been announced. In this scenario, energy demand is growing by 1 % annually until 2040, low-carbon sources with a predominant share of solar photovoltaics provide two-thirds of this increase, and natural gas – another third.



**Fig. 3.5** Scenario of stated policies according to the IEA forecast [184]

Demand for oil and coal is declining, and demand for energy is increasing. Emissions growth is slowing but not yet in line with the Sustainable Development Goals; third, the sustainable development scenario is based on the idea of achieving energy goals through the transformation of all sectors of energy production and consumption.

This scenario is in line with the Sustainable Development Goals on Energy Access (Goal 7), Air Purification (Goal 3) and Responding to Climate Change (Goal 13), limiting global warming in the 21st century up to 1.5 °C (ie below 2 °C as set out in the Paris Agreement). In this scenario, the share of nuclear energy is increasing and the share of coal is significantly decreasing. Due to

the gas-powered capacity, flexibility in the power supply of CCUS (Carbon Capture, Utilization, and Storage) systems is achieved.

What unites the second and third scenarios? Each of them assumes that due to the widespread use of innovations they have in common:

- electricity becomes the main energy source, on which energy and environmental security is based;
- energy efficiency and increased efficiency of materials use;
- setting stricter emission requirements that prevent the recovery of old inefficient plants:
  - a) a gradual increase in CO<sub>2</sub> prices (more significant for the sustainable development scenario – up to 100–140 USD per ton of CO<sub>2</sub>);
  - b) setting stricter emission standards for pollutants (SO<sub>2</sub> and NO) for industrial facilities using solid fuels;
  - c) restrictions on the maximum sulfur content in petroleum products (more stringent for the sustainable development scenario: 1 % for heavy fuel oil and 10 mg/kg for petrol and diesel).

If we move from scenarios to the assessment of the current state of regulatory practices and the corresponding transformational changes in economically developed countries, the actual results differ significantly (**Table 3.5**).

● **Table 3.5** Share of renewable energy in gross final energy consumption by selected countries for the period 2009–2018 with a deviation from the 2020 target, %

Country	2 009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 target	Percent of deviation from the target
Germany	10.87	11.69	12.47	13.56	13.77	14.39	14.90	14.89	15.47	16.48	18	8.44
Great Britain	3.34	3.78	4.32	4.41	5.50	6.74	8.34	8.98	9.73	11.02	15	26.55
Italy	12.78	13.02	12.88	15.44	16.74	17.08	17.53	17.42	18.27	17.78	17	-4.56
France	12.22	12.67	11.02	13.44	14.04	14.58	15.01	15.68	16.01	16.59	23	27.86
Spain	12.96	13.81	13.22	14.29	15.32	16.13	16.23	17.43	17.56	17.45	20	12.74
Netherlands	4.27	3.92	4.52	4.66	4.69	5.42	5.66	5.83	6.46	7.39	14	47.25
Belgium	4.72	5.64	6.29	7.18	7.52	8.03	8.00	8.71	9.06	9.42	13	27.52
Denmark	19.95	21.89	23.39	25.47	27.17	29.31	30.84	31.84	34.72	35.71	30	-19.03
Norway	65.13	61.52	64.70	65.55	66.75	69.19	69.19	70.16	71.65	72.75	67.5	-7.78
Ukraine	2.20	2.00	2.00	2.00	2.70	2.60	3.00	3.80	4.40	4.60	11	58.18
EU-27 countries from 2020)	13.88	14.43	14.59	16.06	16.71	17.48	17.85	18.05	18.47	18.88	20	5.60
EU-28 countries	12.62	13.16	13.41	14.69	15.38	16.22	16.73	17.00	17.47	17.98	20	10.12

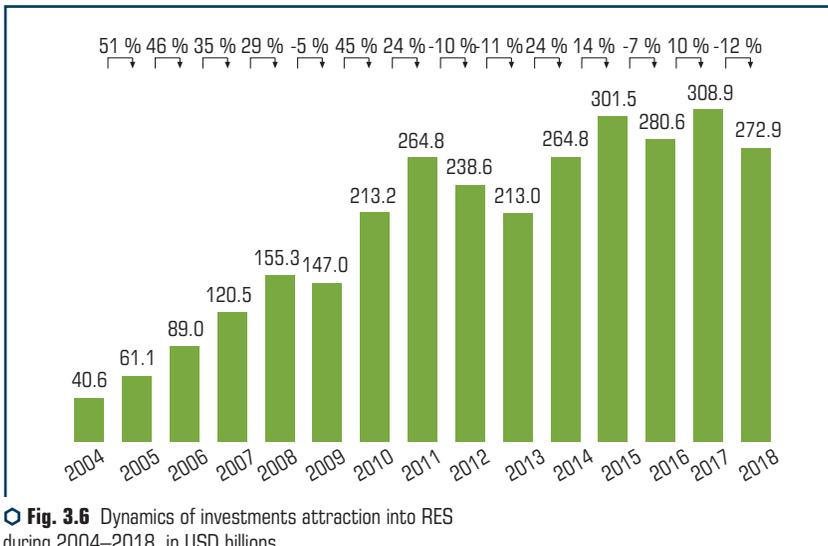
Source: formed by the author according to [185, 186]

At the same time, we consider it necessary to pay key attention to the processes of investing in the energy sector, as they form massive long-term trends in change.

First of all, it should be noted, that over the past fifteen years, the decline in the dynamics of energy consumption is due to increased investment in energy-saving technologies, rather than in the production of energy itself.

Therefore, an important strategic task for them to solve the problem of depletion of natural energy resources is the development of environmentally friendly ways to obtain energy resources, the search for clean energy raw materials based on unconventional and renewable energy sources (RES).

The scale and dynamics of attracting investment in the RES sector are presented in **Fig. 3.6**.



**Fig. 3.6** Dynamics of investments attraction into RES during 2004–2018, in USD billions  
 Source: formed by the author according to [129, 134]

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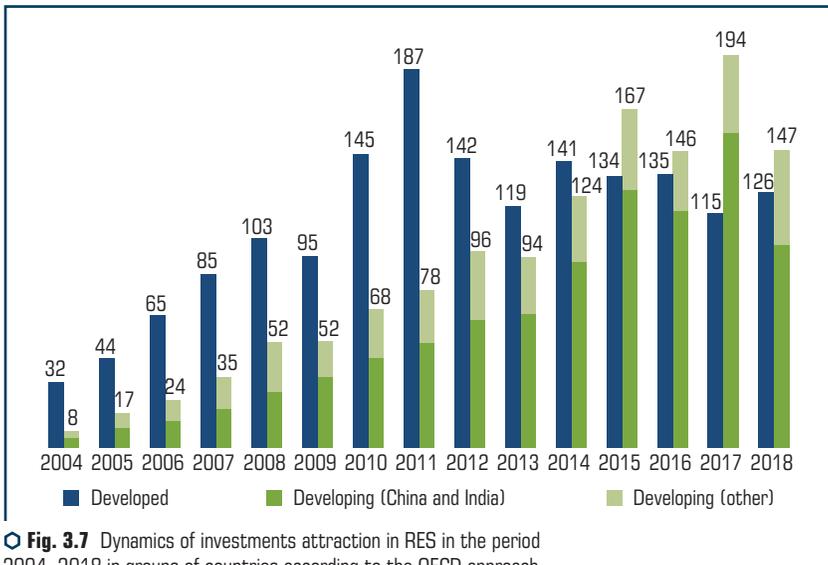
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The scale and dynamics of attracting investment in the RES sector are presented in **Fig. 3.6**.

The data of **Fig. 3.6** show that total investment in renewable energy capacity in 2018 is estimated at \$ 272.9 billion, and does not reach the "peaks" of previous years, in particular 12 % less than in 2017, but is still at a high level in the range of USD 250 billion. In the period from 2009 to 2019, there were 2 investment peaks in RES projects, including: 2015, with a total of USD 301.5 billion and 2017 (USD 308.9 billion).

The general trend is a gradual, albeit not always sustainable, increase in funding for alternative energy projects. Despite the decline in investment in the sector in 2018 compared to the peak of 2017 (\$ 308.7 billion), investment in renewable energy has doubled the funding of fossil fuels, and the share of green technologies in the world increased from 11.3 % in 2017 to 12.6 % in 2018. At the same time, the number of solar and wind turbines set a record at 638 GW during 2010–2019, an impressive figure, given that the world's solar power at the end of 2009 was only 25 GW [187].

An interesting question is which groups of countries do investors bet on when investing in RES projects? Which groups of states are the center of promising and important changes for global development? We will use clustering of countries according to OECD approaches, which provides for their division into developed economies and developing countries (**Fig. 3.7**).



**Fig. 3.7** Dynamics of investments attraction in RES in the period 2004–2018 in groups of countries according to the OECD approach  
 Source: generated by the author according to [187]

It is logical, that developed countries dominate in terms of both timing and scale of investment in alternative energy projects. And it is quite clear that there is a higher dynamism of foreign in-

vestment in developing countries in the outlined sectors, given the extremely low ascending base. The data of **Fig. 3.7** are quite eloquent: until 2014, investments in renewable energy projects in developed countries predominated, but since 2015, there has been a gradual reorientation of investment flows to developing ones.

Of course, we must not forget the weak diversification of investment flows to developing countries. The lion's share of them is taken by India and China. Therefore, any negative processes in the economy of these two giants are immediately reflected in global macroeconomic indicators. Thus, in 2018, the economies of the Golden Billion attracted investments of USD 125.8 billion, which is 10 % more than in the previous year, while developing countries attracted more – USD 147.1 billion, but this is 24 % less than in 2017. This change was entirely due to China and India. The total investment in these two giants fell 36 % to \$ 99.6 billion (shown in dark green in **Fig. 3.7**), while "other" emerging economies rose 22 % to a record high of \$ 47.5 billion of borrowed funds.

If we analyze the scale of investment on the European continent, then the priority is held by the amount of funds, invested in the development of RES in 2018: Spain, Germany, the Netherlands, Sweden, France and other countries (**Table 3.6**).

● **Table 3.6** Volumes and dynamics of FDI in renewable energy projects by European countries in 2018

Country	2018, USD billion	% of increment till 2017
Spain	7.5	859 %
Germany	6.3	-52 %
Netherlands	4.9	197 %
Sweden	4.5	122 %
France	4.1	-8 %
Belgium	3.1	312 %
Italy	2.0	92 %
Denmark	1.7	69 %
Norway	1.1	15 %
Finland	1.0	193 %
Ukraine	2.1	539 %

Source: generated by the author according to [187]

It is interesting to note, that the leaders of European integration processes – France and Germany to some extent exhausted their dynamics in 2018 compared to 2017, while high investment growth was observed in Spain (+859 %) and Belgium (+312 %). Ukraine is also in the focus of interest of non-resident companies: in 2018, \$ 2.1 billion of funds was attracted to its RES development projects, which is 539 % more than in the previous 2017 year.

Ukraine became one of the first European countries to ratify the Paris Agreement on July 14, 2016. One of the arguments was the issue of significant climate change in Ukraine, which increases the risks to human health and life, natural ecosystems and economic sectors, as well as ensuring national, ecological, economic and energy security of Ukraine. And despite defining a key direction of energy transition using RES and understanding the main priority for the energy sector in integration into the European energy system, Ukraine still lags behind its European neighbors in terms of sector development and investment in alternative energy projects.

Sectoral analysis allows to identify vectors of investment in the field of renewable sources. If the total investment in RES projects by sector is about 2.6 trillion US dollars, the lion's share of investment falls on projects, related to solar energy (1.349 trillion US dollars) and wind energy (1.023 trillion US dollars). The rest of the funding concerns projects using biofuels, geothermal energy, biomass-based energy, etc. [134, 187].

Comparing the indicators of attracting investment resources in 2017–2018, it is worth considering the following dynamics. In 2018, global investment in solar energy decreased by 22 % compared to the previous year and amounted to 133.5 billion USA dollars (this reduction is considered one of the main reasons for the reduction in the overall level of funding for RES projects). Instead, there is an increase of more than 3 % in the receipt of funds for projects to generate energy from wind sources and in 2018 amounted to 129.7 billion USA dollars. It is also worth noting a significant increase (61 %) in investment in biomass energy projects, which in 2018 attracted more than 6.8 billion USA dollars.

In accordance with the requirements of The Paris Agreement, after 2020 the projected directions and volumes of investments in the world energy sphere were brought in line with the UN Low-Carbon Development Strategy until 2050, developed by the UN International Conference on Climate Change to prevent exceeding the temperature of the earth's surface above 2 °C.

At the end of 2017, at the summit on finding sources of funding for climate change, the President of the World Bank (WB) announced a long list of measures that are going to be implemented to effectively realize the Paris Agreement. The main one is that the World Bank will stop funding projects for oil and other fossil fuels after 2019. Exceptions will be made only for the poorest countries, where gas production will bring obvious benefits in terms of providing energy to the poor. The World Finance Corporation is also planning to contribute \$ 325 million to the Green Cornerstone bond fund to create the world's largest green bond fund for emerging markets. The fund has already raised more than \$ 1 billion for the creation of local climate conservation projects and subsequently plans to raise at least a billion dollars for further development [188].

If we consider the case of Ukraine, until recently, its energy sector in terms of RES was one of the most promising objects of investment attractiveness for business, not only national but also international. According to the Global Sustainable Development Goals (SDGs) for 2030 [189], proclaimed at the UN summit in 2015 and supported by Ukraine [190], the transition of the country's economy to a low-carbon growth trajectory is one of the strategic objectives of Ukraine's public policy.

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Ukraine's energy sector has begun an energy transition, ie significant structural transformations in energy systems, leading to radical changes in energy supply and demand, energy balances and prices. New relations in the triangle "consumer – producer (transit, supplier) – state" require reformatting of energy policy, development of new tools to ensure energy security of Ukraine, finding the optimal configuration of the energy system at each stage of this transition.

Ukraine has significant potential for the development of all modern and promising energy sources, which can and should be used to stimulate innovative development of the state economy, ensure energy security and achieve global goals in the fight against climate change. Thus, Ukraine has sufficient reserves of traditional energy resources (oil, gas, coal, uranium) and significant opportunities for renewable energy, which allow to ensure energy security and economic development of the country with various "energy mixtures" from its own sources.

At the same time, in Ukraine the competition between different technologies and energy sources is distorted (when lobbyists of certain industries and corporations receive various preferences due to influence on public policy and impose costly technologies with low energy conversion factors and negative impact on the energy system or environment) and does not meet the Sustainable Development Goals.

According to the National Commission for State Regulation of Energy and Utilities of Ukraine (NCSREU), the total installed capacity of renewable energy facilities, which a green tariff (as of 01.01.2020) was set for, was 6378.56 MW. The main players in the market are domestic financial and industrial groups, at the same time the share of foreign investors is growing, which according to data as of 01.01.2020 is estimated at about 30 %.

Among the players in attracting third-party financing, the most active are the Norwegian companies Scatec Solar and NBT, which raised about 170 and 260 million euros, respectively, as well as the Ukrainian holding DTEK – more than 640 million euros. In addition, DTEK placed EUR 325 million green Eurobonds, listed on Euronext Dublin, for 5 years at 8.5 % per annum. Additionally, according to DIXY GROUP LLC, the RES market has other foreign investors who have their projects in Ukraine, including: the Turkish company Guris launched in Ukraine the first wind farm in the Odessa region with a capacity of 33 MW and develops a portfolio of new wind projects with a capacity of 188 MW, Belgium's Greenworx Holding and France's Akuo Energy are developing a 110 MW Dnieper-Bug wind farm project in the Kherson region (estimated at € 189 million, EBRD-approved lending), and Cyprus-based Ukr Wind Investment Limited is implementing a 450-million euro project for the construction of a 300 MW South Ukrainian wind farm in the Mykolaiv region (the company's shareholders are David Lewis (UK), Hodson Thornber (UK/USA), Lev Dulnev (USA), as well as members of their families and partners). There is also the practice of commercial lending through the provision of construction services and equipment, mainly by Chinese companies.

Among Ukrainian investors, in addition to attracting debt financing, there is a practice of creating mutual investment institutions – non-diversified venture capital investment funds. However, it should be noted, that this tool is used in form rather than in essence – as a way to anonymize

investors instead of a real tool for raising capital in RES projects, which also imposes a low level of confidence in such financial institutions.

According to the global think tank Bloomberg NEF, in 2019 Ukraine entered the Top 15 most promising investment markets, including non-residents, in RES [191]. This rating of investment attractiveness takes into account the following groups of factors:

- energy policy on RES, structure and regulation of the energy sector, as well as obstacles to development (fundamentals);
- current and projected demand for electricity, CO<sub>2</sub> emissions from the energy sector, as well as general price attractiveness, short- and medium-term opportunities to sell electricity from RES, the practice of implementing the principles of sustainability in the private sector and existing electrification indicators (opportunities);
- the amount of installed RES capacity, growth trends in investment in RES and the availability of related market infrastructure, including engineering, consulting, legal services (experience).

The active dynamics of RES market development in Ukraine is largely supported by the proactive position of Ukraine's international partners, which provide soft loans, grants or contributions to the authorized capital of RES projects. Among such international financial institutions are the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB), the Nordic Environmental Finance Corporation (NEFCO), the Netherlands Development Bank (FMO), the Overseas Private Investment Corporation (OPIC, USA), the Investment Fund for developing countries (IFU, Denmark), the Scandinavian funds SwedFund, FinnFund and Nordic Investment Fund and others.

According to KMPG estimates, the total amount of relevant MFI investments in 2009–2018 was about \$ 1.425 billion. Thus, the European Bank for Reconstruction and Development (EBRD) provided funding in the amount of \$ 639 million. The Overseas Private Investment Corporation (OPIC) – \$ 392 million, The European Investment Bank (EIB) – \$ 203 million. The International Finance Corporation (IFC) – \$ 73 million, others – \$ 118 million [192].

Thus, among the most active investors in the field of support for electricity generation from RES is the EBRD, which since 2009 has provided funding amounting to more than \$ 600 million, and among state institutions – JSB "UkrGasbank", which, according to the request of LLC "DIXY GROUP", financed more than \$ 580 million.

However, since February 2020, Ukraine's renewable energy sector is in a deep crisis due to high debts of the state-owned company "Guaranteed Buyer" to renewable electricity producers and the government's intention to retrospectively reduce the green tariff, which resulted in the suspension of the sector. The conflict between alternative energy producers and the Ukrainian authorities began with the launch of a new electricity market.

Although the State Enterprise "Guaranteed Buyer" was originally conceived as the exclusive buyer of electricity at a green tariff and the operator was to balance the supply of a group of RES power plants, the government decreed that it must also provide a complex system of subsidizing household consumers. Due to the poorly prepared transition to a new market model, in August

2019 the SE incurred debts to RES. As of April 2020, the level of payments for electricity, supplied to the grid, did not exceed 5 %, there is no such low level of payments before any other type of electricity generation). And although in August the calculations for the delivered generation were performed 100 %, in September the level of calculations fell again and as of 16.09.2020 only 36.3 % of the total debt was paid. Thus, according to investors and their companies in the field of green energy, they are on the verge of bankruptcy, lacking the resources to pay loans, taxes and wages [193].

It should be reminded, that Ukraine has become attractive for investment in the field of RES thanks to the decisions of the state to establish sufficiently attractive conditions for business, in particular in terms of tariffs for green energy, which at the time of their introduction in 2008 were really the highest in Europe, which gave impetus to the above unprecedented high sectoral investment inflows. At the same time, we can now talk about the declining dynamics in setting tariffs for RES (**Table 3.7**).

● **Table 3.7** Level of the green tariff in Ukraine for electricity, produced from solar energy [194]

Validity	Price kopecks / kWh
From 01 April 2013 to 31 December 2014	1189.11
From 01 January 2015 to 30 June 2015	1069.48
From 01 July 2015 to 31 December 2015	664.18
From 01 January 2016 to 31 December 2016	630.26
From 01 January 2017 to 31 December 2019	599.91
From 01 January 2020 to 31 December 2024	539.20

Does the revision of tariffs point exclusively to the Ukrainian problem and demonstrate the turbulence of the institutional environment for RES investors? It is worth recalling, that the Czech Republic and Spain have already taken a similar path, and these EU countries can hardly be accused of violating the rights of investors. In the Czech Republic, the green tariff was introduced in 2005 for 15–30 years, depending on the type. However, in 2010 it was abolished for large stations and halved for small ones. As a result, in 2011 new SPP stopped being built. In Spain, the green tariff was introduced in 2007–2008, for 15–25 years. However, in early 2012, the government also curtailed the program. As a result, a number of lawsuits completely stopped the development of solar energy. At the same time, the state still pays millions in compensation.

Already in 2020, these same high tariffs became the basis for reviewing the regulator's decisions in view of asymmetric conditions for competition in the energy market of Ukraine, when other sectors of energy production (nuclear, hydro, etc.) received in such circumstances much worse tariff conditions. RES investors have provided clear and reasoned explanations for the need for high green tariffs.

First, it is a relatively short guaranteed period of redemption of electricity at such tariffs – about 10 years (until 2030), compared to 20–25 years in many other countries. Secondly, the historically high risk of the country – which is actually illustrated by the current situation with renewable energy. Third, the high cost of capital in Ukraine. Fourth, investors must connect to the network at their own expense (including the modernization of the infrastructure of distribution companies and NEC Ukrenergo).

At the same time, the position of the regulator is also clear, because the "green tariff" as an element of support for the development of alternative energy has exhausted itself, because it was approved under other economic and, most importantly – technological – conditions. And, above all, it was designed to compensate for the significant cost of solar panels and wind turbines.

Compared to 1997 and 2008 (when the relevant legislation was passed), as well as 2013 (when the "green tariff" pegged to the euro), technology has come a long way. The cost of installing equipment per kilowatt of energy produced has decreased many times. And the tariff – in particular, due to a significant devaluation of the hryvnia – is only growing. Thus, guaranteeing the owners of capacity surpluses, and the state – significant losses. It is estimated, that the amount of payments in 2020 is measured by RES producers at 45–48 billion hryvnias. Thus, producing only 6–8 % of electricity, owners of "green" energy receive 20 % of electricity revenues! At the same time, at a cost of solar energy generation of about 2 hryvnias (7 eurocents), the tariff for it is 15 eurocents. It is noteworthy, that in one of the largest European electricity markets – Germany – SPP receive only 4.7 eurocents per kilowatt of energy, which is slightly more than the cost [195]. Therefore, the search for a compromise between the regulator and investors, some of whom are international companies, continues.

For Ukraine, the issue of structural changes in the energy sector in favor of the latest renewable energy sources directly relates to its economic security, overcoming import dependence on gas supplies, and economic development in general. The issue of choosing the very concept of structural changes and developing the optimal target balance is the focus of the relevant ministries, as well as research institutions and individual researchers. In particular, one of the most interesting research results is the development of the National Institute for Strategic Studies (NISS) [196]. The structure and indicators of the target energy balance of Ukraine for 2020–2050 according to the forecasts of NISS experts are presented in **Table 3.8**.

According to experts, electricity should become the main energy source with a share in the total energy balance of at least 70 %. This means the need to develop not only the main renewable energy sources (solar, wind and bioenergy), but also nuclear and hydropower, as to achieve their planned share by 2050, at least 6 GW of NPP capacity (instead of decommissioned) and 1.5 GW of HPP capacity must be put into operation.

The forecast for the potential of hydro resources as a source of energy production is based on the fact that Ukraine's water resources in large rivers of the Dnieper and Dniester basins are almost depleted, and due to climate change agriculture will need more water, which will complicate the possibility of hydropower development and reduce their capabilities and role in maneuvering;

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this means that the increase in hydropower capacity should be mainly due to the development of storage capacity. Indeed, small hydropower, bioenergy, small on-site solar power plants (SPP) and wind power plants (WPP) have high hopes, which should become the basis for local energy needs and the basis of decentralized distributed power generation, which will also increase Ukraine's energy system sustainability. Summarizing the above, it should be concluded, that the development of alternative energy is gaining momentum on a global scale. An important argument for this development is the implementation of green energy projects in both developed and developing countries, this process is particularly noticeable in the last decade.

● **Table 3.8** Target energy balance of Ukraine for 2020–2050

Year/resource, share in balance, %	Oil and oil products	Natural gas	Coal	Nuclear	Hydro	Sun (+ wind)	Wind	Bio- and other RES	Hydrogen	Energy storage
2000	8.96	46.52	28.8	15.02	0.72	0.0004	–	0.2	–	–
2005	10.16	46.56	26.45	16.65	0.77	0.0023	–	0.19	–	–
2010	9.96	41.74	28.91	19.38	0.94	0.0030	–	1.12	–	–
2015	11.71	28.92	30.35	25.05	0.51	0.1487	–	2.33	–	–
2018	14.47	27.53	29.61	23.82	0.96	0.2113	–	3.43	–	–
2020	14.54	26	29	24	1	0.65	0.7	4	0.01	0.1
2025	12.2	26	28	24	1	2	2	4.5	0.1	0.2
2030	10	25	25	24	1	4	4	5	1	1
2035	8	25	22	22	1	6	6	6	2	2
2040	6	25	20	18	1	8	8	7	4	3
2045	5	22	17	17	1	10	9	8	6	5
2050	5	20	12	17	1	12	10	8	9	6

Outlining the prospects for international investment in the global energy sector, one cannot ignore the impact of Covid-19. At the moment, clear forecasts should not be expected, as the question of the duration and severity of the pandemic and its economic consequences is still open. According to the International Energy Agency (IEA), the immediate consequences of the pandemic for the energy system in 2020: falling global energy demand – by 5 %, energy-related CO<sub>2</sub> emissions – by 7 % and energy investment by 18 %; oil consumption will be reduced by 8 % and coal by 7 % [197]. However, it is important from a sustainable development point of view that the

sector of renewable energy sources, especially in the energy sector, has suffered less than other fuels from the pandemic and its aftermath. Based on the updated data of the first consequences of the pandemic, the IEA offered an updated understanding of the processes of the global energy sector, including investment. We are talking about two possible scenarios.

The State Policy Scenario (STEPS) is based on current policy conditions and the assumption that the pandemic will be brought under control in 2021. In this scenario, world GDP will also return to pre-crisis levels in 2021, and global energy demand in early 2023. Renewable energy sources will provide 90 % of the sustainable growth of global electricity demand over the next two decades, primarily through solar photovoltaic systems. The positive trend will be that the use of coal as an energy resource will not return to its previous level. By 2040, for the first time in modern energy history, the share of coal in global energy demand will fall below 20 %.

The Delayed Recovery Scenario (DRS) assumes that despite identical approaches in regulatory policies for the energy sector, the consequences will be different and long-lasting. World GDP will not return to pre-crisis levels until 2023, and global energy demand will return only in 2025 [197].

In any case, despite the variability of global energy system scenarios, modeled in STEPS and DRS, there is a generally positive trend: much slower recovery of emissions is expected than after the 2008–2009 financial crisis. However, such forced emission reductions should not be seen as a long-term way to address global CO<sub>2</sub> emissions. After all, the lower emission trajectory in the DRS than in the STEPS is due to reduced economic activity, rather than structural changes in energy consumption or production methods [198]. The lower carbon capacity of the economy in this scenario illustrates the danger of mistakenly accepting low growth rates as tackling climate change.

Despite the negative effects of both global and regional factors, changes in global and national energy systems are irreversible. The world community's awareness of the benefits of alternative energy over traditional sources gives a positive impetus to increase investment in renewable energy sources. It is expected, that in the medium and long term, the largest amount of investment in renewable energy will remain for China, India, Saudi Arabia, the United States, Japan and the EU. The basis for such positive expectations is the formed strong institutional base in the form of programs to stimulate alternative energy in these countries. We also consider the gradual increase in global investment flows to developing countries to be realistic. Sectoral forecasts point to the persistence of the trend of increasing production capacity using renewable energy sources, including solar and wind energy.

## EPILOGUE

With the intensification of globalization processes, liberalization of international trade and deepening disparities in economic development between countries, it is especially important to form a model of import regulation that would fully meet the capabilities and national interests of a state.

When choosing an economic policy, it is advisable to consider whether openness promotes sustainable growth to a greater extent than protectionism, as high levels of economic openness are not sufficient factors to ensure economic development. The comparative analysis of domestic and foreign scholars' approaches to the need to regulate imports shows that free trade is the policy that is most likely to lead to the highest possible level of economic efficiency, however, the selective application of instruments to protect certain sectors of the economy in practice is aimed at developing and supporting domestic production from foreign competition.

The systematization of the effects of imports and their determinants indicates different views of economists on the impact of imports on the national economy, and thus determines that the ambiguity of results and identification of bilateral causal links between imports and economic growth requires theory and empirical research to consider a number of determinants of impact on the effects of imports (type of imported products, level of economic and technological development of an importing country, institutional factors, type of market environment) according to the time lag of identification of consequences.

Instruments of state policy of import substitution are systematized depending on the goals of a state and specific conditions of economic development, in particular: active industrial policy, aimed at expanding the creation of state corporations and enterprises with mixed ownership in heavy industry; protectionist policy, aimed at protecting the production of uncompetitive local goods from foreign counterparts, in order to develop underdeveloped industries; policies, aimed at regulating foreign economic activity, including state subsidies for exports, regulation of the national currency, support for key industries through tax benefits and concessional lending, subsidizing the cost of electricity, transportation costs.

At the present stage of development of the world economy, the policy of "neo-protectionism" is largely widespread, which involves the establishment of administrative, financial, credit, technical and other barriers that significantly impede the free movement of goods across borders through indirect and covert measures.

Reduction of dependence on foreign markets in the implementation of import substitution policy is carried out by different countries according to different models, in particular, there are three types of import substitution strategy:

- 1) stimulating weak industries, whose products were uncompetitive, compared to imported counterparts;

2) creating new industries and production branches, the policy of "self-reliance";

3) stimulating developed industries that have sufficient potential to expand exports of their products. However, in the end, the main positive result of purposeful actions of the government of such states is to ensure the development of industrial potential and the formation of a stable base for ensuring the self-sufficiency of individual economies in the world market.

For countries with economies in transition, the general imperative of structural change is neo-industrialization, associated with structural shifts in the economies of developed countries due to the development of the latest VI technological system and "Industry 4.0" and encouraging the repatriation of material industries, enriched with new technologies. Despite the global nature of the neo-industrial path, for the Ukrainian economy, the deindustrialization of which has complicated the accelerated development of non-commodity exports, import substitution is the main source of neo-industrialization.

The difference of neo-industrial import substitution from catching up and autarkic is manifested at the level of goals, shifting from short-term market to long-term reproductive – creating conditions for sustainable economic growth in the process of deep industrial and technological diversification, increasing processing of raw materials, creating new jobs in processing and high-tech industries, expanding the tax base.

Effective implementation of the concept of neo-industrial import substitution is hampered by deinstitutionalization of structural policy, which manifests itself in the distortion of long-term economic interests of the state and lack of effective industrial development strategies that unite the interests of the state, raw materials and processing business, large, medium and small entrepreneurship, financial firms and industrial enterprises and is exacerbated by subjective factors – the raw materials lobby, the political interests of maintaining the rent-raw materials model, the government's lack of understanding of the consequences of technological degradation of industry and its loss of competitiveness in the domestic market.

During the years of Ukraine's independence, the command-administrative model of unequal rights and opportunities, discriminatory access to resources, wasteful management has not been transformed into a modern competitive market economic system that generates investment incentives and innovative entrepreneurial spirit. Instead, there is a small commodity economy (exports are of mostly raw material type and consist of low-tech goods) with a depressed business climate, excessive external debt, high dollarization, shadowing and criminalization of economic activity, and significant dependence on imports.

The tendency to increase the share of imports in the domestic market of Ukraine does not meet national economic interests and inhibits the potential for national production. It was stated, that the development of the domestic market was mainly supported by imports, rather than domestic production.

The dominance of the outpacing growth rate of imports in relation to exports in the economy of Ukraine has formed a steady tendency to increase the negative foreign trade balance, which in some years reached 10 % of GDP. The outstripping dynamics of growth of imports in comparison

with exports testifies to the presence of significant imbalances in the structure of foreign trade turnover and in the general output of goods and services.

The problems, accumulated in the Ukrainian economy, which determine the implementation of the strategy of selective import substitution, are: exceeding the growth rate of imports of goods over domestic production, which is inferior to foreign counterparts in price, quality and competitiveness; ousting domestic producers from the domestic market of Ukraine; growing dependence of Ukrainian industry on imported components, materials and raw materials in such industries as energy extraction, light industry, mechanical engineering, chemical and petrochemical industries; reduction of the share of imports in the gross accumulation, which indicates a reduction in the supply of new and advanced equipment and tools from abroad and attempts to renew technological capacity mainly through domestic equipment, which is not advanced, leading to innovative regress in imports of goods to Ukraine.

In order to transition to an innovative economy, an integrated national innovation system (NIS) is important, which transforms new knowledge into products and services, needed by the economy and society. Today, the following are natural in its development and functioning: the leading role of the state, which focuses on creating favorable conditions for the innovative activity of all elements, included in the NIS; accelerated development of information and telecommunication technologies, which contributes to the creation of network interactions between NIS participants; effective functioning of chains "creation – application – dissemination" of innovations; integration of national innovation systems into larger (supranational or global) innovation systems.

According to the qualitative and quantitative indicators of Ukraine's innovation activity, there is a deterioration in the dynamics, in particular, the number of innovation-active enterprises is declining; the number of introduced new technological processes is slowly growing; the production of innovative products is reduced; the share of sold innovative products (goods, services) in the total volume of sold products decreases; the knowledge intensity of GDP is reduced. The decline in the level of education was observed, and it was noted, that the preservation of the human resources potential of science has not yet become a state priority.

A necessary condition for technological progress is the transition from raw material specialization to an export-oriented economy with a predominance in trade of high-tech goods and services, produced by national innovative enterprises.

The analysis of foreign trade in high-tech goods showed the strengthening of the position of high-tech imports in the domestic market of Ukraine.

There are four possible scenarios for the development of the Ukrainian innovation sphere, depending on the technological modes:

- 1) "technological stagnation", which is implemented in the event of curtailment of the industrialization program;

- 2) "technological inertia", which is possible as a continuation of industrialization in its current version, without changing priorities and strengthening the innovation component of implemented investment projects;

3) "new technological niches", which implies the need to strengthen the actual technological competencies by including them in global technological chains;

4) "technological breakthrough", which focuses on the maximum possible synchronization with the global technological dynamics.

Based on the analysis of the preconditions and weaknesses of Ukraine's economic development, it has been concluded, that the scenario of "technological inertia" is most likely to be realized. However, given the potential of Ukraine and the need to form new technological systems for Ukraine's economy, it is less likely to implement the scenario of "new technological niches", which involves opening "innovation windows" for innovation-backward countries using technologies of the 5th system, which have already passed the peak of profitability in the markets of leading countries, but retain the potential for profit in the global market.

During the last decade, the investment climate in Ukraine, which provides for a system of legislative, executive, incentive and control measures, in general can not be called favorable. The inflow of foreign investment, especially foreign direct investment, currently does not meet the country's strategic needs. Due to Ukraine's weak position in international capital markets in competition for investment, it is inferior to Central and Eastern Europe, Southeast Asia and the Far East.

Among the characteristic features that have a negative impact on improving the investment climate in Ukraine are the following: lack of a sustainable state strategy and appropriate national action plan that would be aimed at ensuring equal economic rights and responsibilities for financial and economic activities for all subjects of economic relations; limited ability to attract foreign direct investment to Ukraine through the privatization of state-owned enterprises; overburdening with regulatory norms and complexity of the tax system; significant tax burden; inability of mechanisms to ensure market rights and freedoms of investors, as well as the low level of their protection; ineffective corporate governance legislation; negative international image of Ukraine.

The generalization of the main approaches of the latest regulatory practices to implement the principles of the circular economy of economically developed countries has revealed the logic and focus of systemic transformations that need to go through the transition from a linear economic model to a closed economy. These steps will reduce the level of resource consumption and import dependence in terms of demand for resources, increase the resilience of economies to external shocks and reach higher parameters of international competitiveness of both national business and nation states in general.

Steady progress in neo-industrial development raises the question of the institutional capacity of countries to respond to new challenges and threats. The analysis of the cases of individual countries in regulating new formats of global trade, including digital, has shown the dominance of the pro-national approach as opposed to consolidated international solutions. The biggest challenges that state regulators will have to overcome in the near future due to the growing share of the digital economy in global production and consumption are anti-competitive actions of global technology companies and issues of fiscal optimization of international business through transfer pricing mechanisms and in the implementation of controlled international transactions with intangible assets.

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Assessing the extent and priorities of countries' involvement in global value chains (GVCs) and non-equity modes (NEMs) has shown an important role for a number of countries in external demand as a factor in national economic development. The striving of economically developed countries for reshoring and import substitution can lead to the disintegration of GVCs, the exclusion of individual countries and regions, including Asia from the system of international production and sales cooperation. This leads to a deepening of the risks of deindustrialization processes in peripheral countries that have been part of international technological and production chains. An alternative may be the reorientation of national economies to domestic demand and import substitution, in particular, such an approach seems promising for countries with capacious markets.

The sectoral analysis of the priorities in overcoming the resource import dependence of the world's economies has indicated a strengthening trend towards the modernization of national energy systems, in particular in the direction of increasing the share of renewable energy. The drivers of transformational changes are economically developed countries, however, a set of stimulating institutional solutions can attract the attention of non-resident investors to countries outside the Golden Billion.

Appealing to the cases of the world allows us to identify the intensification of the twentieth century, both at the level of politicians and at the level of experts slogans of economic nationalism, combined with strategies of neo-industrialization and import substitution. The study shows that the initiators of these somewhat anti-globalization trends are not only outsider states that are inferior in economic competition to their more successful competitors, but also the global leaders: the United States, Britain, China, and some EU countries.

Manifestations of interstate competition in the distribution of internationally limited means of protection of the population, medical equipment, and vaccines in 2020–2021 have become a powerful factor in the actualization of import-substituting strategies in recent years. This is another confirmation and a strong argument in favor of the need to find a balance between global and national determinants of social reproduction in countries and the priority of reducing import dependence of economic activities (and on the most complete chain of technological processes) that directly affect national interests, economic security, health and life of citizens of the world.

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Edited by  
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IMPORT SUBSTITUTION POTENTIAL IN THE CONDITIONS OF DIGITAL TRANSFORMATION

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Monograph

Technical editor I. Prudius  
Desktop publishing T. Serhienko  
Cover photo Copyright © 2021 Canva

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PC TECHNOLOGY CENTER  
Published in December 2021  
Enlisting the subject of publishing No. 4452 – 10.12.2012  
Address: Shatylova dacha str., 4, Kharkiv, Ukraine, 61165

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