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DEVELOPMENT OF PROGRESSIVE TECHNOLOGIES ON THE MARKET OF AGRICULTURAL PRODUCTS OF UKRAINE

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The article considers the study of the theoretical foundations, implementation and prospects of innovative technologies in the market of agricultural products in Ukraine. The intensity of the development of digital trade in terms of volume and scale due to the introduction of artificial intelligence, which has the potential for the digital transformation of trade by significantly reducing geographical barriers, has been established. It is certain that a significant impetus to the development of innovations in trade in Ukraine, as well as in other countries of the world, was given by crisis events, namely, the pandemic, then military actions. In crisis conditions, digital technologies in trade have a significant advantage over traditional ones, because they allow the consumer to order goods without putting their life at risk.

We studied the sector of domestic trade in agricultural products for the use of advanced technologies. The purpose of the work was to highlight the trends in the development of advanced technologies in the trade of agricultural products in Ukraine, to determine the influence of factors that shape the market and consumer trends on the innovative development of trading platforms, innovative challenges in the field of trade in agricultural products. Innovations in the trade of economically developed countries of the world and Ukraine are considered, in particular, the most developed and promising ones are highlighted.

The main aspects of the state and trends of trade development in Ukraine are characterized. The analysis of statistical information and research has established the dominance of large business enterprises, although the trend of positive innovative movement of medium-sized businesses can be traced. It has been determined that in recent years, import operations significantly outweigh export operations, this is especially noticeable from the analysis of the results of 2022. The comparative analysis of indicators of the activity of trading enterprises in Ukraine for 2020-2023 using the example of the index of the physical turnover of retail trade proved its fluctuations depending on the crisis phenomena in the country. In particular, the export of goods decreased by 26.1%, and the import increased by 11.2%, which resulted in a negative balance. The largest share of trade during the studied periods was with EU countries, in 2023 it increased to 56%, while the share of exports decreased by 10%. Since the beginning of active hostilities, the country's economic activity shows signs of stabilization, but this trend will depend on foreign economic relations with partner countries.

It has been proven that the leading trend in the development of progressive technologies in the trade of agricultural products in Ukraine is the increase in the confidence of buyers in purchasing via the Internet. Furthermore, a critical element of digital commerce is an effective cybersecurity management plan that balances technology, geopolitical relations, government capacity; supports market reputation, and public-private cooperation.

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Keywords: *trade, market, agricultural products, progressive technologies, digitalization, turnover, marketing.*

РОЗВИТОК ПРОГРЕСИВНИХ ТЕХНОЛОГІЙ НА РИНКУ АГРАРНОЇ ПРОДУКЦІЇ УКРАЇНИ

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Стаття присвячена вивченню теоретичних засад, впровадження і перспектив інноваційних технологій у ринок аграрної продукції в Україні. Встановлено інтенсивність розвитку цифрової торгівлі за обсягом та масштабами внаслідок впровадження штучного інтелекту, що має потенціал для цифрової трансформації торгівлі шляхом значного зменшення географічних бар'єрів. Визначеного, що значного поштовху до розвитку інновацій у торгівлі в Україні, як і в інших країнах світу надали кризові події – пандемія, військові дії. У кризових умовах цифрові технології у торгівлі мають значну перевагу над традиційними, адже дають змогу споживачу замовляти товари, не піддаючи своє життя загрозі ураження.

Досліджували сектор вітчизняної торгівлі аграрною продукцією за застосування прогресивних технологій. Метою роботи було висвітлення тенденцій розвитку прогресивних технологій у торгівлі аграрною продукцією в Україні, визначення впливу факторів, що формують ринок та споживчих тенденцій на інноваційний розвиток торгівельних платформ, інноваційні виклики у сфері торгівлі аграрної продукції. Розглянуто інновації у торгівлі економічно розвинених країн світу і України, зокрема, виділено найбільш розвинені і перспективні.

Охарактеризовано основні аспекти стану та тенденцій розвитку торгівлі в Україні. Аналізом статистичної інформації та досліджень встановлено домінування великих бізнес-підприємств, хоча і простежується тенденція позитивного інноваційного руху середнього бізнесу. Встановлено, що імпортні операції останніми роками значно переважають експортні, особливо це помітно за аналізом результатів 2022 року. Порівняльним аналізом показників діяльності торгівельних підприємств України за 2020-2023 роки на прикладі індексу фізичного обсягу обороту роздрібної торгівлі доведено його коливання у залежності із кризовими явищами у країні. Зокрема, експорт товарів скоротився на 26,1 %, а імпорт – підвищився на 11,2 %, через що виникло негативне сальдо. Найбільша частка товарообігу за досліджувані періоди відбулася із країнами ЄС, у 2023 році вона збільшилася до 56 %, при цьому частка експорту була меншою на 10 %. Від початку активних бойових дій економічна діяльність країни виявляє ознаки стабілізації, однак ця тенденція залежатиме від зовнішньоекономічних відносин з країнами-партнерами.

Доведено, що провідною тенденцією розвитку прогресивних технологій у торгівлі аграрної продукції в Україні є підвищення довіри покупців до купівлі через Інтернет. При цьому надважливим елементом цифровоїм торгівлі є ефективний

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план управління кібербезпекою, що збалансовує технології, геополітичні відносини, спроможність уряду, підтримує ринкову репутацію та державно-приватну співпрацю.

Ключові слова: торгівля, ринок, аграрна продукція, прогресивні технології, діджиталізація, товарообіг, маркетинг.

Introduction. Under the conditions of globalization and growing competition in the market of agricultural products, the introduction of innovative technologies becomes crucial for the development and improvement of the competitiveness of trade enterprises (Batrakova & Fomenko, 2023; Gavrilyuk, 2023). The use of advanced technological solutions allows to modernize and optimize business processes, reduce costs and improve customer service (Varga, 2020). The development of artificial intelligence in all spheres of human activity and new digital technologies transform, as a result, advanced technologies in trade (Hrybinenko, 2018; Bezus, 2019;). In this direction, Ukraine does not lag behind the economically developed countries of the world (Peshko & Zaverbny, 2023). Progressive technologies contribute to the development of new business models of trade and reduce geographical barriers to economic transactions (Korobka, 2021). Such transformations are most useful for small and medium-sized enterprises (Kirzhetska, 2020). Artificial intelligence exists in the form of digital and non-digital sectors, but its adoption varies considerably according to agreements between countries, including the EU (Zhosan, 2020). Reproducing the flow of data and information plays a crucial role in digital commerce due to the possibility of personalization (Korol, 2019).

Digital trade is not new, but it is taking on new forms that open up new opportunities for globalization (Dubovyk, 2017; Gurenko, 2018; Zharnikova, 2019). Previously, digital trade referred to the trade of goods through global value chains, and the promising phase of globalization due to artificial intelligence will be even more efficient due to the significant increase in trade between economically developed countries and developing countries (Kraus, 2021).

In recent years, digital trade has grown rapidly in both volume and scale due to the development of artificial intelligence, which has the potential to digital transformation of trade by significantly reducing geographical barriers. Artificial intelligence provides the power of software and the ability of machines to develop intelligent behavior (Polyakova, 2020).

Artificial intelligence and other digital innovations have been possible due to exponential growth in computing power, bandwidth, and storage of digital information (Remnyova & Zabashtanska, 2020). Their widespread distribution has changed the way online transactions are carried out (Sadigov, 2022). Such technologies were first used in the sector of technological services, but later they have been used in sectors not only of services, but also of production (Yatsenko, 2022). In the services sector, the drop in capital costs has significantly reduced barriers to market entry for newly created companies. Moreover, network effects and the value of collected data often lead to competition for the market instead of competition within the market (Ustenko, 2019; Tyukha, 2020).

Digital technologies have fundamentally changed consumer behavior (Jiang, 2020; Fanai, 2023). The use of gadgets with which you can use Internet applications has become an integral everyday process. Gadgets give consumers direct access to real-time information about online markets, and digital marketing techniques have been developed accordingly, which have increased the transparency of product information available to consumers (Gupta, 2023). The development of data analytics and machine learning proved to be revolutionary in the monetization of data in digital services. The first

fundamental change brought about by this revolution in commerce was the personalization of services, which in turn increased the efficiency of transactions and the well-being of consumers and led to the expansion of online commerce (Chernega, 2016; Havryliuk, 2020; Gupta, 2023).

The significant impetus to the digitization of trade was provided by the global COVID pandemic, which, unlike other outbreaks of infections such as "bird" and "swine" flu, led to a global economic crisis, which led to a drastic increase in demand for digital services and products, in particular, for online trading (Haidukova, 2019; Dvulit, 2021; Dubel, 2021).

Ukraine, in conditions of difficult trials, does not remain apart from the global processes of digitization of economic processes, which make it possible to carry out activities related to trade more effectively (Polyakova, 2020; Mykolyuk, 2021). Digital trade has a significant advantage over traditional trade in the conditions of war, which led to the destruction of some enterprises, the outflow of the population, a decrease in the purchasing power of the population, the impossibility of movement on the front-line territories and other threats (Sadigov, 2022; Yatsenko, 2022). In the conditions of martial law, the transition of workers and students to the remote format of digital trade makes it possible to order goods around the world and receive them at home or at the nearest post offices. It is precisely in these difficult conditions that it is extremely important to provide the population with the opportunity to purchase the necessary goods, including agricultural products (Shapovalov, 2023).

Therefore, the issue of the development of advanced technologies in trade is relevant, since the Ukrainian economy is intensively integrated into the European economic community (Lisitsa, 2020; Mykolyuk, 2021; Peshko, 2023).

In modern studies, much attention is paid to this promising direction of economic science (Havryliuk, 2020; Glinenko & Goliuk, 2018; Dergachova, 2022; Dubel, 2021; Zharnikova, 2019; Zhegus, 2018; Kraus, 2021; Lapin, 2022; Javier López González & Janos Ferencz, 2018; Ferencz, 2019; Fanai & Abbasimehr, 2023). These authors consider the theoretical foundations of the formation of progressive technologies in trade and offer practical directions for their development at the European level.

The level of implementation of innovative technologies in the trade of agricultural products is inferior to the leading countries of the world. This inhibits the development of the industry and weakens its competitiveness in the conditions of the expansion of global retailers. Therefore, it is necessary to activate innovative processes in Ukrainian trade, and this issue requires careful study. Taking into account the established problems, the purpose of the work is to highlight the trends in the development of advanced technologies in the trade of agricultural products in Ukraine, to determine the impact of factors that shape the market and consumer trends on the innovative development of trading platforms, innovative challenges in the trade of agricultural products.

Materials and methods. The object of the study is the sector of domestic trade of agricultural products using advanced technologies. Special and general scientific methods were used: statistical analysis and generalization, system and process approaches, dialectical method, comparison method, and sociological research methods. The theoretical and information base of the study was Ukrainian and foreign scientific works on the development of digitalization of trade, normative and legislative acts of the Verkhovna Rada and the Cabinet of Ministers of Ukraine, indicators of work efficiency and information and analytical materials analyzed on Internet platforms for the period 2020-2023.

Research results. Innovation is a necessary component for the successful development of trading enterprises in today's global business environment. The implementa-

tion of innovative technologies in the activities of trading enterprises affects various aspects of their activities, from management to customer service. According to the Law of Ukraine "On Electronic Commerce", e-trade is defined as a part of e-commerce, namely, economic activity in the field of electronic purchase and sale, sale of goods remotely to the buyer by performing electronic transactions using information and telecommunication systems.

Electronic commerce (e-commerce) is an important aspect of the innovative development of trade enterprises, it bridged the gap between producers of agricultural products and consumers, provided global coverage and maximum access to the range of goods. Through online platforms, producers of agricultural products are able to demonstrate their offers to a huge client base. The classic example of e-commerce in agricultural products is the English company Farmdrop, which created online platforms that connect farmers with consumers for the sale and purchase of fresh products directly from the farm. Thus, there is no need for intermediaries, fair prices for products are set, and consumers receive fresh, high-quality products.

Direct-to-consumer (D2C) models can be demonstrated by Indian startup *Ninjacart*, which connects agri-food producers with retailers and restaurants through an online platform. Therefore, several thresholds of intermediaries are eliminated, and manufacturers receive higher prices for their products. They ensure timely delivery, which, in turn, affects the reduction of food waste.

Specialized e-commerce platforms for trade in agricultural products have gained popularity due to the creation of centralized hubs. One of the successful hubs is the Chinese platform *Rural Taobao Alibaba*, which offers a wide range of agricultural products, including seeds, fertilizers and agricultural machinery. Such online platforms simplify the trade process by enabling farmers to communicate with buyers effectively, and ensure transaction transparency. Moreover, farmers have the opportunity to expand their customer base beyond local borders and enter larger markets.

Smart farming technologies using Internet of Things (IoT) devices and sensors allow farmers to monitor and optimize plant health, irrigation and pest control. Blockchain technology is used to increase transparency and traceability in the supply chain of agricultural products. For example, the startup *Provenance* proposed a blockchain that allows consumers to trace the path of authentic products from farm to plate.

At the current stage of widespread offline distribution, a variety of high-tech solutions for stores are available, based on the achievements of computer vision, augmented and virtual reality, artificial intelligence technologies, etc. These technologies are used to create impressive visual effects and interiors, interactive showcases and shelves, and innovative fitting rooms. They also help simplify the search for the products they need, provide personalized recommendations to customers and make quick payments using biometric identification.

Innovative solutions in trade of agricultural products also have social significance, especially in crisis conditions. Electronic platforms contribute to expanding the opportunities of rural communities and stimulate the economy of agricultural enterprises of various capacities. Income stability combined with access to information and resources stimulates the development of rural infrastructure. For example, the African company *AgroCenta* offers an e-commerce platform that connects small-scale rural farmers with urban trading platforms by selling their products at competitive prices. This expands the economic opportunities of producers of agricultural products, contributes to the reduction of poverty and the general development of rural infrastructure.

Changing consumer preferences have played a significant role in shaping the landscape of e-commerce in agricultural products. Due to information networks and

marketing applications, the demand for fresh, organic food and craft products is increasing in society. E-commerce platforms cater to these benefits by providing consumers with easy access to such products, for instace, American platforms *LocalHarvest* and *Farmigo* allow consumers to find and buy locally produced goods directly from producers.

With the growing public awareness of environmental issues, consumers are increasingly concerned about the sustainability of production and the impact on the environment. This has led to an increase in demand for products grown using organic and environmentally friendly methods. E-commerce platforms facilitate the connection between environmentally conscious consumers and farmers who use sustainable farming practices, contributing to a more sustainable agricultural sector.

The disadvantages of modern solutions on the market are that some of them are limited in their functionality, which could improve the overall user experience. Some apps help the user from the beginning to the end of the purchase, but only focus on one store. Others, while providing information about the product, do not allow to make a purchase directly in the app, but instead require to go to the seller's or store's website or app. By aggregating various stores into a single comprehensive service, it becomes possible to inform the user about discounts or special offers in stores located nearby them.

The current level of development of domestic and foreign trade is characterized by increased competition and the expansion of international trade relations, the development of logistics, the transformation of the relationship between market participants and strategic partners, and forms of interaction with buyers. The supply chain has changed significantly in recent years, the integration between manufacturers, wholesale suppliers, logistics service providers and consumers has increased, the role of retail network organizations in the system of goods movement is increasing.

The following types of innovations are distinguished (Shevchenko & Sager, 2021) (Table 1).

Table 1

Innovations in trade

Innovations	Characteristic
Step-by-step	Consistently affect the conditions of consumers. As a rule, they have little influence on technological evolution. The example of such innovations is the gradual change of aisles in shopping area, namely their increase, for the convenience of movement in the store.
Technical	Minor changes (for example, product packaging innovations)
Architectural	Changes that occur in the technologies of storing goods and presenting them in shopping area. As for detailed innovations in the field of retail trade, such technologies are gaining momentum
Local	Changes that occur within a particular segment but do not change technology. Such changes lead to the destruction of commercial relations - the creation of own brands and placing them on the shelves instead of products of well-known brands
Social	Technology changes during the responsive evolution of consumer habits. For example, home delivery of products, various options for payment methods (in installments, credit), availability of self-service cash registers and contactless payment, etc.
Revolutionary	Significant changes from old technologies to new ones, for example, the introduction of electronic data exchange, programs for managing the company's resources

Kulesha et al. (2019) note that the innovative type of economic system has fundamental differences and is consumer-oriented. That is, gross output, its volume and structure are formed in accordance with the volume and structure of demand. Producers of agricultural goods are trying to improve the quality parameters of the product, to bring its structure closer to the needs of production and the population, to expand the range of products to meet the requirements of different segments of the population. Therefore, trade needs an innovative direction both as a sphere of realization of the population's demand and as a public recognition of the production of goods.

With the widespread use of the Internet, a whole generation of scientific research and technological innovation, the deployment of infrastructure and, in general, the correct formation of trade policy have developed. Since the development of computer networks, more than 5 billion people have connected to the global digital world. This is associated with a huge leap towards the global improvement of life facing new political challenges. In the United States, the "Declaration on the Future of the Internet" was adopted, highlighting a possible version of the next digital world: free sources of information, better consumer protection, economic growth.

With the development of computer technology and new means of information exchange (search engines, blogger reviews, videos on YouTube, Tik Tok, groups in social networks, mobile applications, ratings, reviews, etc.), buyers have become more knowledgeable in information systems and study the products of various suppliers.

Therefore, the choice of buyers of agricultural products is based on the multiplicity of sources of information and the consumer experience of other buyers. In these conditions, there is an objective need to study the process of transformations of modern trade, to determine the most stable trends in the development of progressive technologies, to analyze changes and take into account the results obtained in the process of improving these technologies in order to increase the competitiveness of trading enterprises.

Nevertheless, the implementation of advanced technologies related to the implementation of electronic commerce itself does not guarantee success for those business entities that decide to engage in it. According to the results of the study of the professional website *allretail.ua* (Chernyavska, 2017), only 11% of new online stores operate for more than five years, and more than 70% of online entrepreneurs close their business before this period.

The main innovation of the last decade is the concept of *SoLoMo*, which combines social networks, geolocation and mobile platforms. Mobile applications are the main example of technologies in the SoLoMo format, because thanks to a smartphone, such applications are always at hand. The social component includes constant contact with "friends" in the network. Geolocation services allow real-time monitoring of retail outlets located near the buyer, regardless the country and city they are in. These technologies have already entered firmly modern life and are strengthening their positions, SoLoMo tools allow the retail enterprise to withstand active competition.

In 2018, the Cabinet of Ministers of Ukraine approved the order "On the approval of the Concept for the development of the digital economy and society of Ukraine for 2018-2020 and the approval of the plan of measures for its implementation" (Ukraine 2030E). The purpose of it was to implement the scenario of digital development at an accelerated pace, the most relevant for Ukraine in terms of problems, needs and opportunities. The scenario provides for the elimination of legal, institutional, fiscal and other obstacles that prevent the development of the digital economy, the introduction of incentives and motivations to encourage the digitalization of business and economic sectors as a whole, as well as the creation and formation of demand, meeting the needs of

citizens in digitalization, primarily through the implementation of large-scale projects of state digital transformations, in particular, based on modern models of public-private partnership, etc.

The history of the creation of advanced technologies in trade began in the USA, where, long before the spread of electronic equipment, trade deals were carried out on stock exchanges, one of the most famous of which is the NYSE. In 1971, the National Association of Securities Dealers created Nasdaq, which began to operate on a computer network, and in 1992, the share of sales through this system was 42%.

With the introduction of electronic financial markets into world trade in 1992, electronic trading platforms were also launched, the first of which was Globex (Segal, 2022). Subsequently, the former online brokerage E*Trade also launched its own consumer-oriented electronic platform. The great popularity of these platforms encouraged the development of e-commerce throughout the world.

The analysis of Global Risk 2019 shows that the most successful are the goods or services that arose as a result of an unsatisfied market need, especially the problems of innovative development become relevant in the period of cyclical crises. The experience of foreign countries shows that during crisis periods, companies try not to cancel promising innovative projects in order to mitigate negative socio-economic consequences.

State and trends of trade development in Ukraine are formed by the influence of a complex of economic, social and political factors. The trade market in Ukraine plays an important role in the national economy, facilitating the exchange of goods and services, creating jobs and influencing the standard of living of the population. The main aspects of the state and trends of trade development in Ukraine are presented in Figure 1.

Along with active development, Ukrainian trade faces numerous problems: high rates for renting commercial real estate, uncoordinated logistics infrastructure, low purchasing power in the regions, and excessive tax pressure. However, in general, the trade sector is characterized by positive dynamics and growth and, according to forecasts, will maintain its leadership in the structure of GDP during the coming years. Further development is connected with infrastructure modernization, business consolidation and introduction of innovative trade formats.

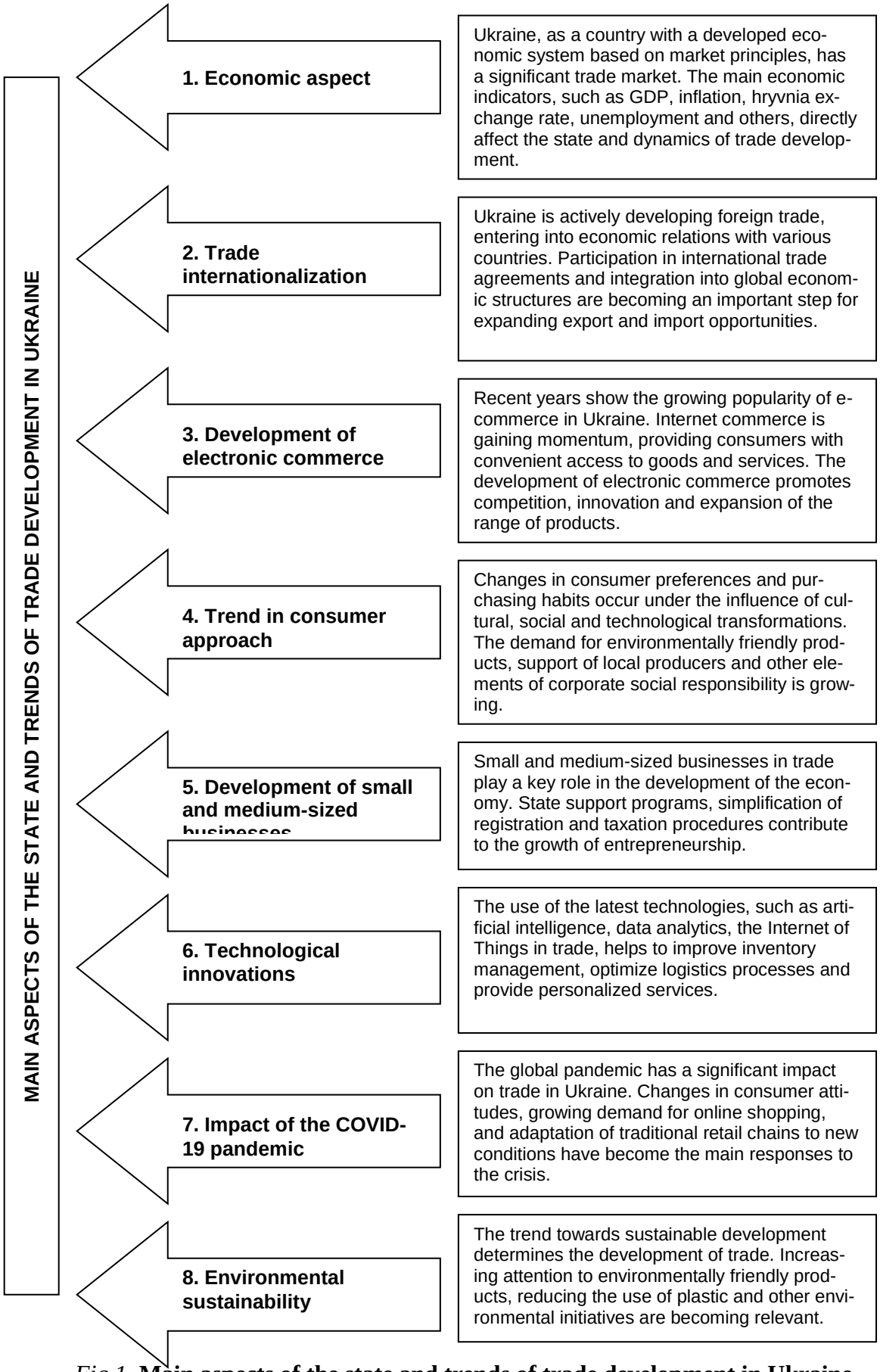

Fig 1. **Main aspects of the state and trends of trade development in Ukraine**

According to the National Bank of Ukraine (bank.gov.ua), in October 2023, the balance of goods and services in Ukraine amounted to $3.5 billion. In October, the import of goods ($5.5 billion) exceeded the export of goods ($2.6 billion), and the import of services ($2 billion) exceeded the export of services ($1.4 billion), this trend was maintained throughout the analyzed period of the year (January-October 2023). Compared to last year, which is associated with active hostilities in Ukraine, the level of trade operations increased in the first quarter, and decreased in recent months (Fig. 2).

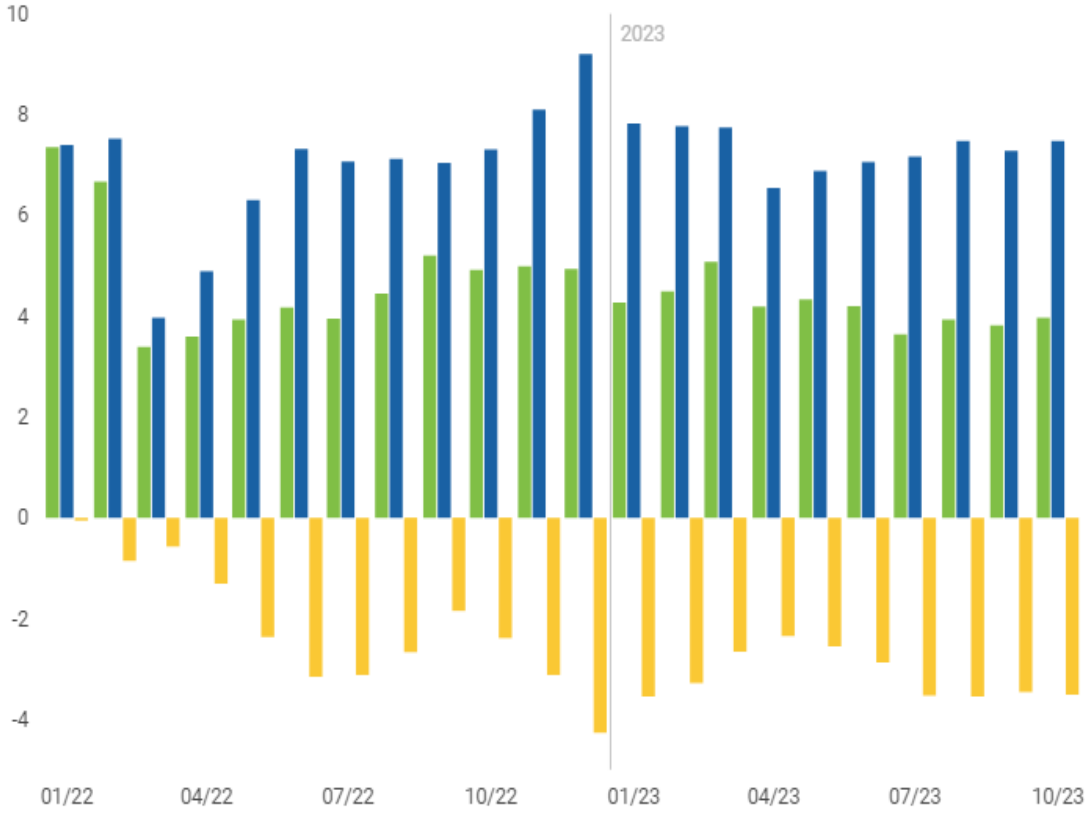

Figure 2. **Balance of payments in Ukraine for 2022-2023: export of goods and services (green), import of goods and services (blue), balance of goods and services (yellow)** (source: NBU)

The NBU improved the GDP growth forecast for 2023 to 4.9% from 2.9% in the 2022 forecast. Among the key reasons for the improvement in the forecast are further adaptation of businesses and households to the conditions of the war, high harvests, the expansion of alternative export routes and higher budget expenditures. The forecast for GDP growth in 2024 was also slightly improved, from 3.5% to 3.6% (Figure 3).

The analysis of statistical information and research by scientists on the activities of domestic trading enterprises established the dominance of large business enterprises, although the trend of positive innovative movement of medium-sized businesses can be traced. It is clear that the dominant role of large industry enterprises in the implementation of innovations occurs at the expense of a higher level of material, organizational, technical and financial resources, which provides the opportunity to use greater powers, as well as the support of industry ministries and regional administrations.

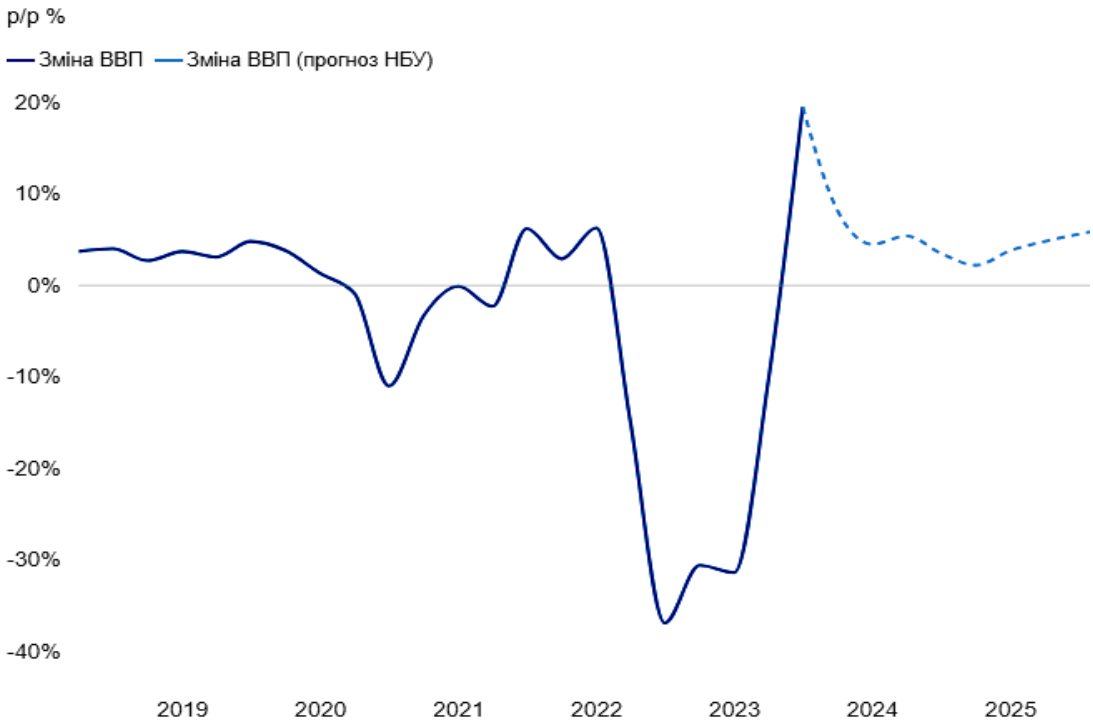

Figure 3. **Indicator and forecast of Ukraine's GDP (Source: NBU)**

The collapse of macroeconomic indicators, caused first by the global pandemic, and then by military actions on a large territory of Ukraine, formed a very low base of comparison for the forecast of the following years. Therefore, in conditions of a low base of comparison, even minor positive shifts can give high relative estimates (Table 2).

Table 2

Main macroeconomic indicators of Ukraine

Indicator	Years			
	2020	**2021**	**2022**	**2023**
GDP, billion hryvnias	4222	5451	5191	6860
GDP, billion dollars	156.6	199.7	159.0	178.1
GDP, % increase	-3.8	3.4	-29.1	4.0
Unemployment, % (World Bank)	9.5	9.8	30.0	20.0
CPI growth, % (avg.)	2.7	9.4	20.2	17.2
UAH/USD exchange rate (annual average)	27.0	27.3	32.3	38.5
Trade balance, %	-1.5	-1.4	-16.3	-15.4

The increase in real GDP in the future is primarily related to the liberation of the occupied territories of Ukraine, the restoration of economic activity in the liberated territories, and the receipt of financial assistance from partner countries, primarily the USA and the EU.

At a meeting with the G7 financial bloc, Minister of Finance Serhii Marchenko said that the domestic economy is showing stability during the current year of 2023, while GDP growth is forecast to 4.7% after a 29.1% drop in 2022.

The dynamics of export and import of goods in Ukraine for these years under study is presented in Table 3, which shows that import operations in recent years have significantly outweighed export operations, this is especially noticeable from the analysis of the results of 2022.

Table 3

Dynamics of turnover in Ukraine (million UAH)

Year	indicators						
	GDP for the year	export	% of GDP	import	% of GDP	Balance (+/-)	% of GDP
2020	4194102	1637399	39.0	-1681526	-40.1	-44127	-1.1
2021	5459574	2224704	40.7	-2286067	-41.9	-61363	-1.1
2022	5191028	1840563	35.5	-2712325	-52.3	-871762	-16.8

The comparative analysis of indicators of the activity of trading enterprises in Ukraine for 2020-2023 using the index of the physical volume of retail trade turnover is shown in Figure 4.

Thus, according to Derzhkomstat, the retail turnover of goods in Ukraine in 2021 increased by 10.7% compared to 2020, which may be related to overcoming the crisis caused by the COVID-19 pandemic. Only in the first quarter of 2021, the volume of physical turnover of retail trade increased by 14%. As a result of military operations, in 2022, the turnover of retail trade decreased by UAH 46 billion. (3.2%), and the index of the physical turnover of retail trade decreased by 21.4%. And already in the first half of 2023, the physical volume of retail trade turnover increased by 7.3%.

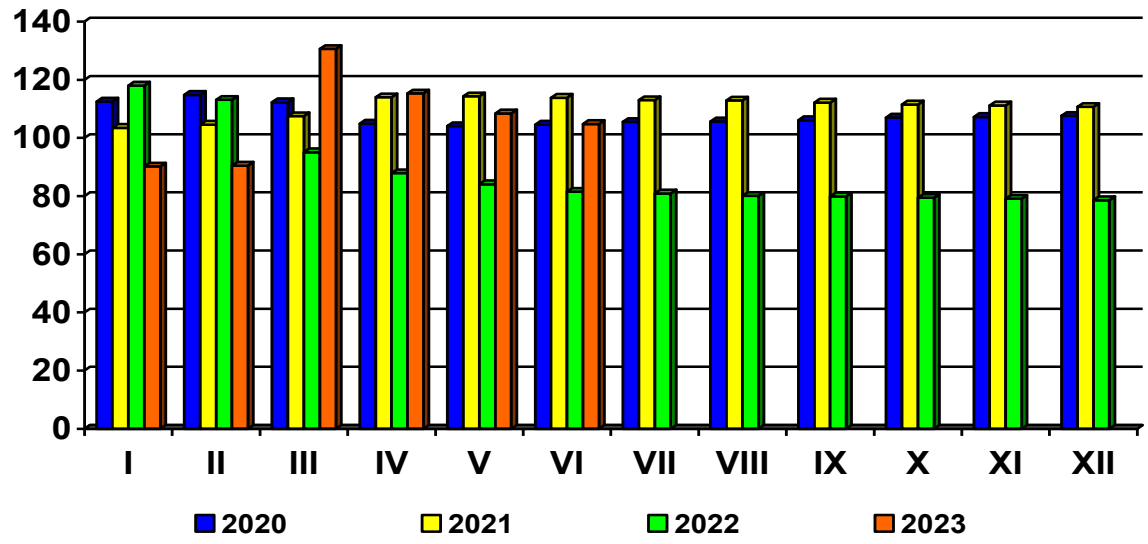

Figure 4. **Index of the physical turnover of retail trade**

As for the level of foreign trade turnover, according to the National Institute of Strategic Studies, already in the first quarter of 2023, it decreased by 7.4% compared to 2022. In particular, the export of goods decreased by 26.1%, and the import increased by 11.2%, which resulted in a negative balance. The majority of exports and imports of goods are carried out with the countries of the European Union (67.2% and 51.4%, respectively). In the first half of 2023, Ukraine exported goods mostly to Poland

($3.06 billion), Romania ($2.19 billion), Germany ($1.08 billion), Spain ($1.0 billion), Italy ($0.89 billion), the Netherlands ($0.86 billion), Hungary ($0.84 billion). Ukraine imported mostly from Poland ($3.81 billion), Germany ($2.75 billion), Bulgaria ($1.36 billion), Italy ($1.19 billion), France ($1.02 billion), Hungary ($1.02 billion), Slovakia ($1.0 billion).

The comparative analysis of the state of trade relations with trade blocs is shown in Figures 5 and 6 (results of the comparative analysis for the first half of 2022 and the first half of 2023).

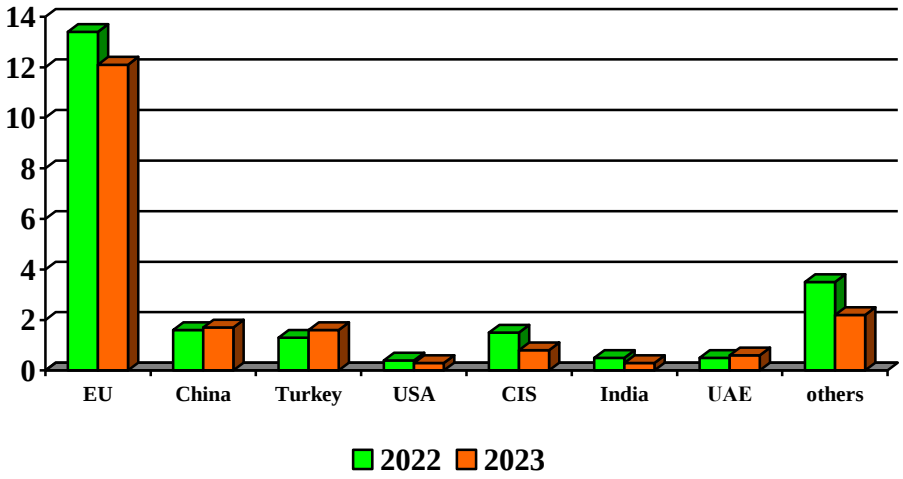

Figure 5. **Dynamics of export of goods to trading partners**

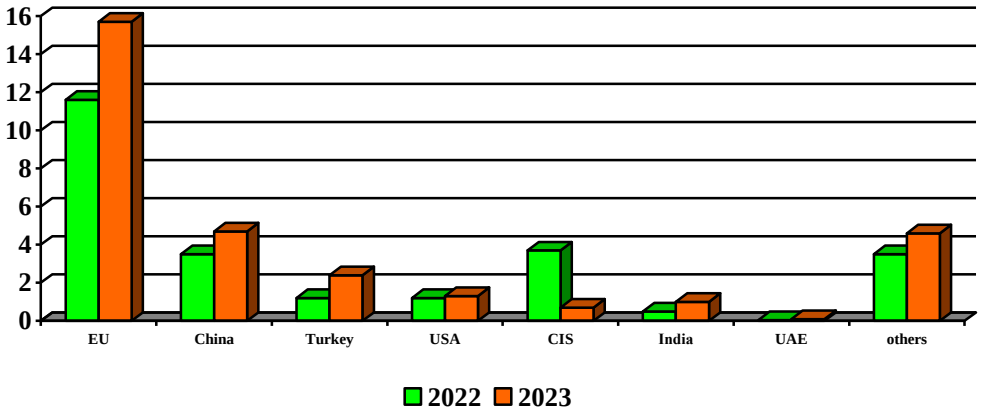

Figure 6. **Dynamics of import of goods from trading partners**

In the first half of 2023, Ukraine exported goods mostly to Poland ($3.06 billion), Romania ($2.19 billion), Germany ($1.08 billion), Spain ($1.0 billion), Italy ($0.89 billion), the Netherlands ($0.86 billion), Hungary ($0.84 billion). Ukraine imported the most from Poland ($3.81 billion), Germany ($2.75 billion), Bulgaria ($1.36 billion), Italy ($1.19 billion), France ($1.02 billion), Hungary ($1.02 billion), Slovakia ($1.0 billion). The largest share of turnover during the studied periods was with the EU countries, in the current year it increased to 56%, while the share of exports was smaller by 10%. The ban on the transit of certain types of agricultural products by some countries had a significant negative impact on the export of goods to the EU. Imports from EU countries of all groups of goods, on the contrary, increased to 35%, which led to an increase in the negative balance in trade relations. There is a noticeable

trend of decreasing trade with the CIS countries, with the exception of Moldova, to which electricity exports have increased. The slight positive trend is observed in the export of goods to Turkey, China and the Arab Emirates. The dynamics of imports with all trading partners (except the CIS) has an upward trend.

According to the results of *YouControl.Market* research, for the period from January to September, 2023, the volume of exports of goods from Ukraine amounted to 24.5 billion US dollars, including 465.8 million UAH due to export duty. In the structure of exports for 8 months, agricultural products made up the largest share (Fig. 7).

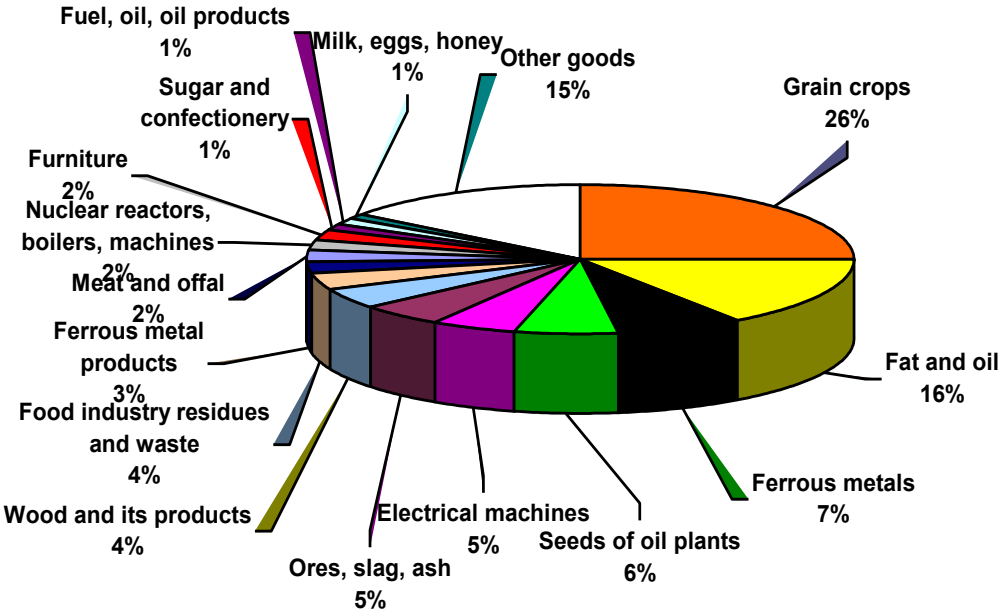

Figure 7. **The share of export of various groups of goods (for 8 months of 2023)**

The total share of exports of goods in the first quarter of the current year was 59.9%. It is worth noting that the reduction in the export of domestic goods occurred in almost all sectors of production (metals and metal products, products of the chemical industry, wood and wood products, machines, equipment, vehicles, food products), the exception was the products of agricultural production, the increase in exports occurred in sugar and confectionery products (181.3%), food industry residues and waste (+27.5%), grain crops (+17.1%), and fat and oil (+3.1%), the rest of the goods lost positions: ores, slag, ash (-54.1%), fuel, oil and oil products (-52.4%), ferrous metals (-51.1%), electric machines (-32.1%), nuclear reactors, boilers, machines (-30.5%), etc. (Fig. 8).

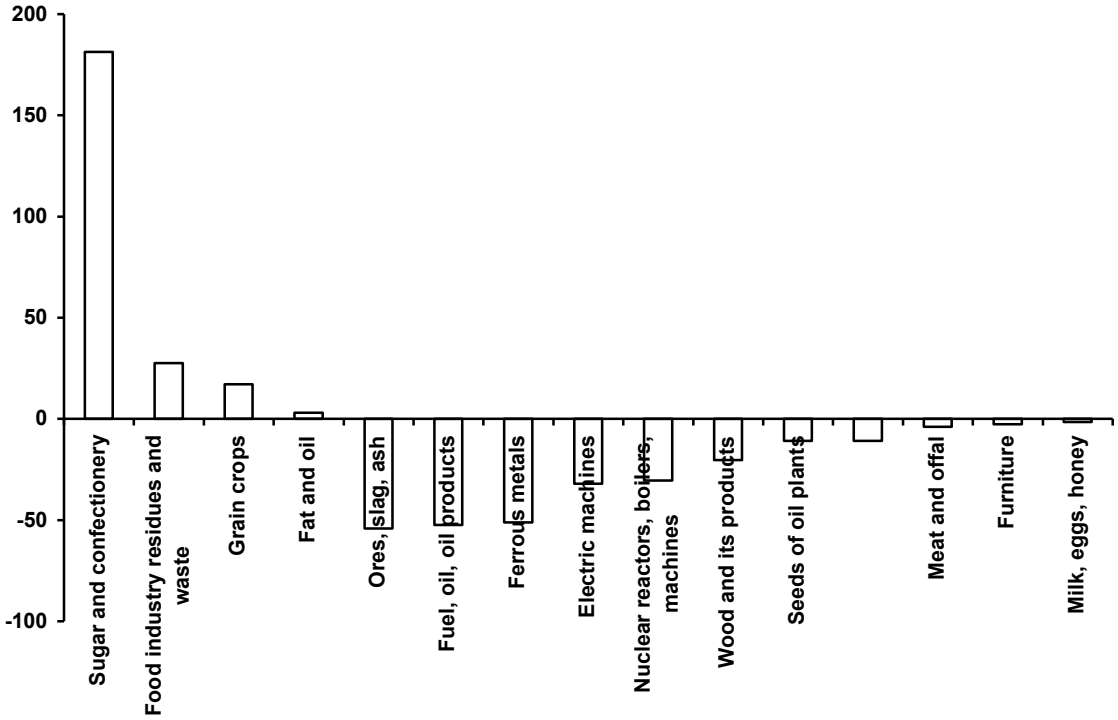

Figure 8. **Export growth of groups of goods (for 8 months of 2023)**

Summarizing the results of the analysis of the state of trade in Ukraine, it can be noted that since the beginning of active hostilities, the country's economic activity shows signs of stabilization, but this trend will depend on foreign economic relations with partner countries. The significant increase in the first half of the year of the negative balance between export and import of goods to the EU was established, compared to the first half of 2022 by 317%. This is largely due to transit problems caused by hostilities and the ban on the import of certain types of agricultural products to the EU. The National Institute for Strategic Studies believes that the solution to this problem can be the diversification of logistics, which will reduce dependence on the use of sea transport routes for trade.

The introduction of advanced technological solutions and innovations is a determining factor for the development of the trade industry of Ukraine. Domestic retail chains are actively implementing world-class best practices in order to optimize and automate their operations, as well as to increase efficiency and competitiveness.

The new stage was the implementation of specialized integrated store management systems (so-called Retail Management System) by leading retail chains. Thus, the experience and solutions of Western companies "Boesh kasse" and "SAP", as well as programs "1C" and "Atol" were adapted. On the basis of these systems, back-office and warehouse operations, pricing processes, product accounting, accounting and control of product balances, management of product flows, logistics, etc., were automated. Such solutions are successfully implemented in the following networks: Fozzi, Velyka Kyshenia, Silpo, Auchan and others.

The share of e-commerce in the turnover of global retail trade is growing every year (eMarketer report). The development of e-commerce depends on the number of Internet users, their ability to navigate social networks, online store sites, etc. In EU countries, the share of Internet users is approaching 100 percent, in Ukraine it is up to 70 percent. The outflow of Ukrainian citizens to Europe for temporary employment had

a significant impact on e-commerce, as a result, the number of interstate transactions significantly increased. This impact increased last year due to population migration caused by military operations. Analysis of reviews on social networks shows that the main motivation for buying on the Internet is a large range of products (especially for buyers who are far from large cities with shopping centers, markets, stores), an acceptable price (not higher, and sometimes lower, than in traditional specialized stores), possibility of home delivery or to the nearest delivery point.

The creation of online trading platforms is a product of powerful IT companies. Ukraine's largest product IT company - EVO (founder - Denys Horovy) has been working for more than 15 years on the creation and development of the most popular online trade and service marketplaces, such as Prom, Shafa, Bigl, Crafta, IZI, Kabanchik and others. The most effective types of traffic of popular Internet platforms are access to sites through search engines (up to 75% of traffic) and direct links by address (Fig. 9).

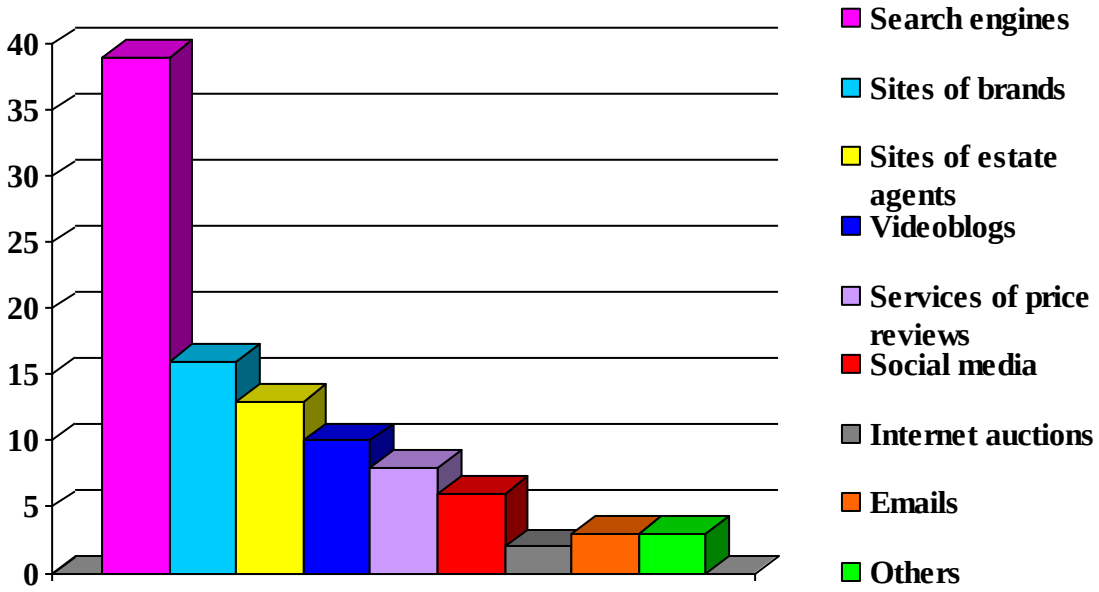

Figure 9. **Rating of information sources by distribution of online purchases**

User surveys, personal experience and data from social surveys prove that buyers use convenient sites with fast loading adapted to smartphones. Marketers have proven that a second of delay in site loading results in 7% lost conversions and reduces customer loyalty by up to 16% (Brzhezitsky, 2017). Taking into account the fact that hundreds of mobile trading applications are used on the market, the consumer faces the task of choosing the most comfortable for themselves from all the offers. Therefore, the effectiveness of domestic e-commerce, as a progressive technology, depends on the development of cutting-edge mobile applications, mobile versions of websites of Internet merchants and sites well adapted to various operating systems. Furthermore, mobile applications that require separate installation on a smartphone and must be constantly updated and take up extra memory in a smartphone are being used less and less.

Considering the fact that the Association Agreement between Ukraine and the EU provides for the promotion of trade development and the attraction of direct foreign investment in the development of the industry, the issue of identifying investment opportunities for the recovery of the trade industry in the long term and its further innovative development becomes urgent.

The development of the trade industry is directly related to the purchasing power of the population, and in this sense, the problem of impoverishment of the population arises, which has increased sharply in connection with military operations (Fig. 10).

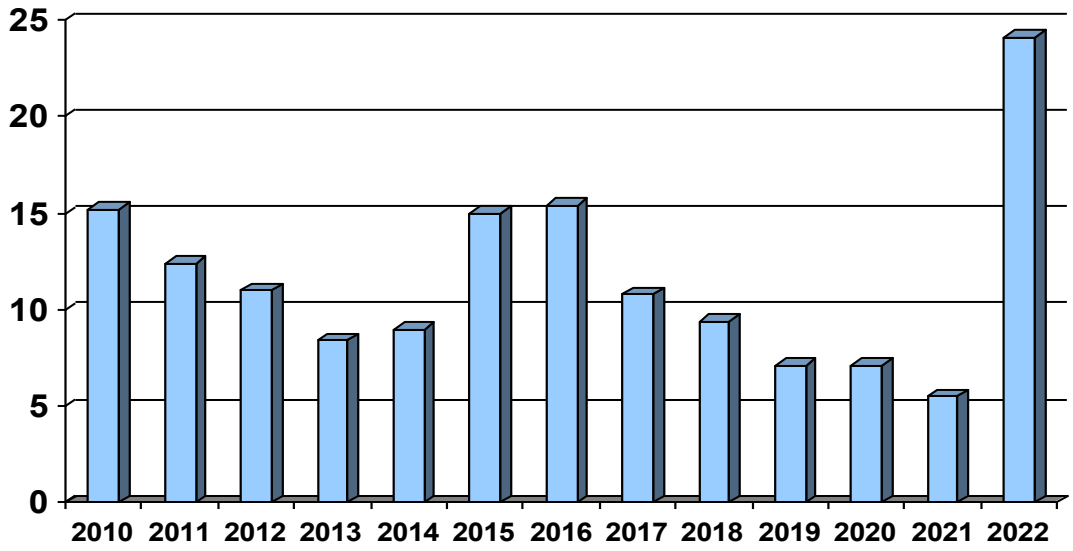

Figure 10. **Poverty level of the population of Ukraine, %**

In the conditions of the lasting hostilities and the bombing of large hubs of fuel, cars, food, etc., the destruction of logistics routes, innovative technologies and resources become relevant. Only during March 2022, 17% of influential holdings were able to work without restrictions (far from the front line), 30% started working online, the rest stopped or significantly limited their activities, about half of the population lost their jobs (mainly in frontline territories). Considering the economic problems, the government introduced measures to liberalize the economy, such as simplification of the taxation system and customs legislation.

Taking into account the international experience of the post-war reconstruction of various countries, it is necessary to understand the need for all the processes of the reconstruction to be as effective as possible and to inspire the trust of society and international partners. Furthermore, on our path to European integration in Ukraine, there are not only partner countries, but also opponent countries that see risks in the insufficient pace of reforms, harmonization of legislation, corruption, security risks, etc.

The restoration and improvement of trade of agricultural products will play an important role in the post-war reconstruction of Ukraine from several directions:

- restoration of the domestic market and stimulation of solvent demand of the population;
- launch and expansion of new domestic productions;
- modernization of logistics and warehouse infrastructure;
- creation of new jobs, especially for youth, internally displaced persons, demobilized military personnel.

Therefore, restoration, modernization and innovative development of the trade industry should become one of the priorities to ensure sustainable post-war reconstruction of the economy and society of Ukraine. This will contribute to both the growth of the national economy and the improvement of citizens' well-being.

Discussion. The introduction of the latest technologies is a key aspect for ensuring economic stability and development of modern trade enterprises, including agricul-

tural products (Dergachova, 2022). Innovative solutions comprehensively contribute to increasing the productivity of business processes, optimizing costs and minimizing risks and threats retailers face (Fanai, 2023).

Our observations coincide with the conclusions of other researchers (Batrakova, 2023; Havrilyuk, 2023) that the introduction of the latest technologies in trade is primarily aimed at automating and simplifying operations in order to increase speed and accuracy. Automated systems make it possible to speed up and economically optimize accounting processes, monitor product balances, prevent theft and damage to goods, which helps to optimize costs and reduce commercial risks.

Modernization of logistics processes and management of supply chains, based on the latest technologies (ERP, WMS, TMS systems), contributes to increasing the efficiency of product flows. The use of automatic identification systems accelerates the processing of cargo, reduces the time of transportation of goods and eliminates idle equipment.

The introduction of cloud and mobile technologies, as well as electronic document management systems, increases the flexibility of management, allows to respond quickly to changes in the market environment and make informed decisions, which reduces commercial risks.

Considering the undeniably huge impact of advanced technologies on the development of commerce, there is also the issue of e-commerce security (Fanai, 2023).

The introduction of innovations contributes to the operational excellence of trade enterprises, reducing costs and risks. This makes it possible to strengthen their economic stability and security, increase resistance to crisis phenomena and external threats. Therefore, investment in technological development is an important strategic task of the management of trading companies.

Conclusions. Innovative technologies in trade have caused an economic revolution in the agricultural sector, connecting manufacturers of agricultural products of various capacities with consumers through digital technologies. The role of e-commerce in the agricultural sector is rapidly expanding, creating opportunities for farmers to receive fair prices for their products, to learn new markets. Consumers, on their own, benefit from unlimited access to a wide range of agricultural products, support local farmers and contribute to the development of rural infrastructure.

The leading trend in the development of progressive technologies in the trade of agricultural products in Ukraine is increasing the confidence of buyers in purchasing via the Internet. So, in addition to the most popular products for agricultural production that are bought online (machinery, farm equipment, electronic equipment, fertilizers, seeds, animals, fodder), there is an increase in the activity and confidence of consumers in the purchase of such categories of products as ingredients for feed mixtures, veterinary drugs, hatching eggs, farmyard processing tools, etc.

The use of shopping platforms and shopping functions in mobile applications (Viber, WhatsApp, Telegram, Twitter, Facebook, Instagram, etc.) led to the development of a separate direction of social media marketing, because the content that is formed by the buyers themselves is highlighted, like active search for goods, communication in groups, analysis of product reviews, video reviews, as a result of which product selection is formulated. So, in recent years, social networks have turned into a trading space very quickly, in which interest groups are created for the sale of goods of a certain purpose and demand. In this context, social networks become agents of global influence on public and individual consciousness.

Media applications are very popular, offering potential buyers to take an active part in promotions, contests, games held on pages in social networks or on the websites

of online stores. These tools, on the one hand, entertain content users, and on the other hand, form their interest in the offered products, when the visitor is required to perform a simple task, for example, post a photo of himself with the product or a review about it on the company's page, make a repost, etc., and for that they receive a discount or a valuable gift from the company.

The introduction of advanced technologies into trade has caused changes in consumer behavior. Therefore, before making a decision to buy goods, buyers first examine the product in an offline store, choose a model or size, look for reviews of other buyers on a certain model, watch video reviews, order this product via the Internet, receive it by mail or courier, inspect it and then pay for the goods. Under such conditions, shopping platforms should raise their level and provide the consumer not only with high-quality products, but also with maximum informativeness and omnichannel, that is, with all possible options for purchasing and delivering goods.

The huge influence of progressive technologies, in particular, electronic commerce, on the development of the world is indisputable and accompanied by an increase in crime and fraud. So, every company, whose digital products are cross-border, needs an effective cybersecurity management plan that balances technology, geopolitical relationships, government capacity, market reputation, and public-private collaboration.

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