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## Eu-Ukraine Economic Relations in Context of Desintegration Processes, Informatization and Innovative Development

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## Abstract

The influence of disintegration processes on the development of regional trade agreements is revealed. Opportunities and threats to cooperation between Ukraine and the EU within the Deep and Comprehensive Free Trade Area at the state level, for enterprises and the population have been identified. To achieve the aim of the research, the method of hypotheses, the method of developing search questions and questionnaires, the method of expert questionnaire survey of government officials, business community and the scientific community were applied in

combination with statistical methods of primary information processing and the software SPSS Statistics 23. The aim of article is to identify threats and opportunities of the Ukraine - EU Free Trade Area and priority forms of cooperation. Ukraine is exposed to disintegration tendencies and destabilizing political processes, influence of loss of control over the most industrially developed eastern territories, disruption and severance of established internal economic ties. The efficiency of cooperation forms in ensuring the stability of international economic relations is estimated. Based on results of the study, practical recommendations were developed for both enterprises (micro-level of international cooperation) and for the government (macro-level). In the context of digitalization and informatization in the global environment and the dynamic growth of the IT sector, international cooperation in this area is becoming especially important. According to the results of the study, Ukraine and the EU have mutual economic interests to develop cooperation in the IT field, which requires support and involvement of both parties in improving regulatory conditions and integration mechanisms.

**Keywords:** Free Trade Area, disintegration, informatization, IT sector, Association Agreement, economic relations, cross-border cooperation

## Introduction

The current conditions under which trade agreements operate are characterized by the intensification of regional disintegration processes, which are manifested in different regions of the world. Britain's withdrawal from the EU, the political crisis and the military conflict between Ukraine and Russia, the rapid reduction of foreign economic transactions between Ukraine and the CIS, the termination of US-EU negotiations on the Transatlantic Trade and Investment Partnership and the US withdrawal from the Trans-Pacific Partnership are disintegration processes. The crisis of relations between Ukraine, Russia and the CIS countries, which radically changed the situation in the region in 2014 with the beginning of hostilities in eastern Ukraine, gave rise to a number of unprecedented disintegration processes for our country. In 2019, Ukraine terminated three agreements on economic cooperation concluded within the CIS: agreements on interstate exchange of information, exchange of data in the field of foreign economic activity and the agreement on foreign economic cooperation. This happened as a result of the implementation of the Decree of the President of Ukraine (2018).

The creation of a DCFTA between Ukraine and the EU as a result of the signing of the Association Agreement creates a number of opportunities and threats for the Ukrainian economy. The implementation of the Association Agreement has become a factor that determines the further development of Ukrainian legislation and economy and provides for cooperation with the

EU in various areas of foreign trade, including tariff regulation, banking spheres (Vovk et al., 2020; Vovk et al., 2021; Shkarlet et al., 2019), public finance (Starostina et al., 2019), dispute settlement policy, investment activities (Lomachynska et al., 2021; Nagachevska et al., 2021), competitive behavior, sectoral integration (Nilsson et al., 2014; Willgerodt et al., 1976). Identifying opportunities and threats to cooperation between Ukraine and the EU in the context of intensifying disintegration processes both in the region and within the country, by interviewing government officials, the business community and the scientific community forms the basis for the development of relevant recommendations at both micro and macro levels.

Informatization and the tendency to its dynamic growth in the world economy affect international economic cooperation and integration processes, which causes need in additional research in this context, analysis of prospects for cooperation between Ukraine and the EU in the field of IT.

## Literature Review

Assessments of the impact of the DCFTA on the socio-economic environment of Ukraine have been carried out by many scholars and organizations, but most of them were conducted before the entry into force of the DCFTA and did not take into account the likelihood and possible consequences of aggressive military-political and trade-economic reaction. Also the majority of researches considered mainly CIS countries in general.

Thus, the Institute for Economic Research and Policy Consulting (2020), with a focus on trade liberalization, in particular the abolition of tariffs and the reduction of non-tariff barriers, calculated that the FTA could lead to a 10% increase in welfare in the medium term and have a positive impact on real GDP growth of Ukraine.

The calculations of the Center for European Policy Studies (2006) focused on identifying the most favorable level of regional integration with the EU that would best stimulate the well-being of the population. Estimates have shown that it is the in-depth FTA that will lead to an increase in welfare of 4-7% per year. Also, the components of the FTA were studied, although no study was conducted of the costs and benefits of the future regional agreement.

The Center for Social and Economic Research in Warsaw and scientists J. Francois and M. Manchin (2009) calculated that due to the introduction of a simple FTA, household incomes will fall by 2.12%, and in-depth FTA - by 0.4%, due to unfavorable trade conditions for Ukraine. B. Brummer, S. Cramon-Taubadel and S. Hess (2010) in their work predict an increase in welfare by reducing all bilateral tariffs twice and emphasize that such tariff reductions should occur together with internal reforms of strategic sectors of the country.

P. Havlik (2014), S. Kulik, A. Spartak, Vinokurov E., I. Yugens (2014) assessed the scenarios of integration processes in Ukraine, which enabled to conclude that the EU and Russia were

equally important trading partners for Ukraine. Mentioned group of researchers argued that the loss of the Russian market in terms of trade barriers in response to EU integration, asymmetrically would affect the economy of Ukraine, causing the greatest losses to the eastern regions of the country.

In modern conditions, cooperation between Ukraine and the EU, especially in the trade and economic spheres, is subject to significant and, mostly, unpredictable impact of disintegration processes with the CIS countries in general, and the Russian Federation in particular. There are not many specific studies on the problems of disintegration in the economic literature (Hrabovskyi *et al.*, 2020). While analyzing the disintegration of interstate associations, foreign authors draw historical analogies with the disintegration of various multinational states and empires that existed in Europe in the XIX-XX centuries (H. Bieling (2013), J. Vollaard (2008, 2018), E. Grande (2012)) or focus on the socio-political patterns of the problem (A. Eppler, H. Scheller, (2014), D. Webber (2019), A. Arcuri (2020)). Research in the post-Soviet countries is more focused on economic attempts to explain the collapse of the USSR and the stagnation of the CIS.

A. Gromyko (2020), B. Jordan (2020), emphasize that in modern conditions disintegration has mostly political reasons and is intensified by competition in the field of technological, trade, information domination.

Shnyrkov O.I, Filipenko A.S., Reznikova N.V. (2018) believe that international economic disintegration is a process that involves the abandonment of existing rules and conditions of international exchange of factors of production through the differentiation of national economic policies, leading to increased barriers to international movement of goods, services, labor, capital.

Authors of current research believe that disintegration may mean the transformation of relationships between the components of the previously integrated system, the loss of stability of these ties and reveals the need to find new forms of stabilization of foreign economic relations.

So, the purpose of this article is to identify opportunities and threats to cooperation between Ukraine and the EU within the Deep and Comprehensive Free Trade Area by interviewing government officials, the business community and the scientific community and to develop recommendations for both enterprises (micro-level international cooperation) and government (macro-level), taking into account special importance of the IT-sector. The development of recommendations for cooperation with the EU at various levels is especially relevant in the context of growing disintegration trends in the region.

## Methodology

In the process of research general scientific and special methods of cognition of economic phenomena and processes in the international environment are used. Methods of scientific

abstraction, generalization, dialectical method, method of systematization, comparison, analysis, synthesis, system approach, method of formation and testing of hypotheses are applied. In identifying threats and opportunities of DCFTA between Ukraine and the EU priority forms of cooperation between Ukraine and the EU and in determining the directions of free trade area were used such methods as: method of hypotheses, method of collecting and processing primary data, method of developing search questions and questionnaires, method of expert questionnaires, statistical methods primary information processing, the application software product SPSS Statistics 23.

## Results and Discussion

The study revealed the peculiarities of trade and economic cooperation between Ukraine and the EU and noted that most assessments and forecasts on the functioning of the free trade area were made before the text of the Association Agreement and the actual implementation of bilateral DCFTA, as well as the beginning of political, socio-economic crisis of the country associated with the loss of control over 7% of the territory where 13% of the population of Ukraine lives.

Thus, the collection of primary information through a questionnaire aimed at clarifying the current consequences of the implementation of the DCFTA between Ukraine and the EU, identifying opportunities and threats to the Ukrainian business environment, based on the assessment of business, academia and the executive branch of government. The expert questionnaire allowed to find out the differences in the assessment of political and economic consequences of the FTA by international organizations, representatives of the Ukrainian business environment and other experts and to identify current challenges for the regional trade policy of Ukraine.

Quantitative field research was conducted in accordance with modern methods (Starostina & Kravchenko, 2015; Perevozova *et al.*, 2019) to study the socio-economic processes and phenomena of the country and consisted of a number of stages (Fig. 1).

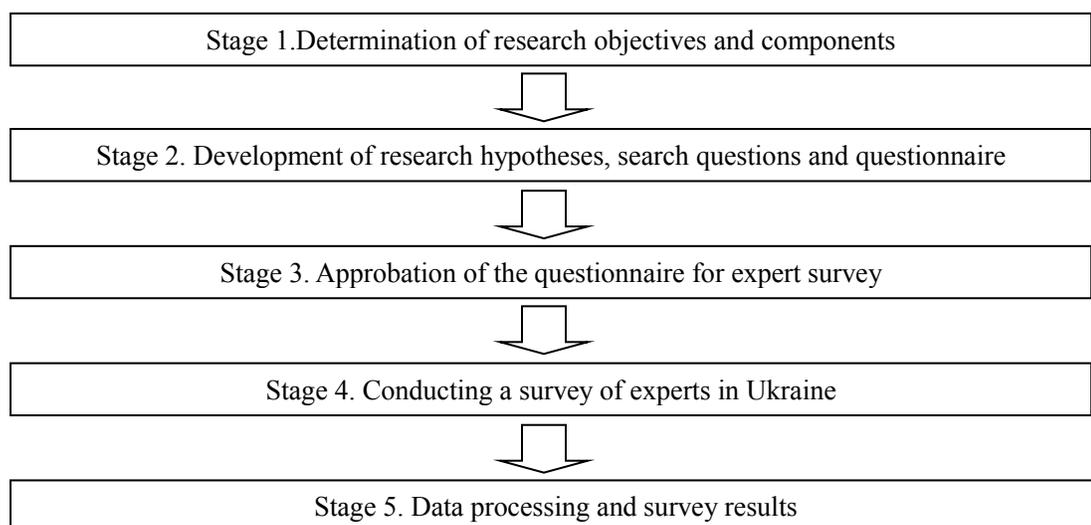


Fig. 1. Stages of the study of the impact of the DCFTA between Ukraine and the EU

Source: own research

The aim of the study was to obtain quantitative and qualitative information on the threats and opportunities for the functioning of the DCFTA between Ukraine and the EU, to find ways to ensure the stability of relations between countries and the realization of their interests under these conditions.

To compile the questionnaire, 12 search questions were developed (Table 1), divided into six components of the goal. Based on and a questionnaire was developed for entrepreneurs engaged in foreign economic activity and for experts belonging to the scientific community and executive authorities (ie, theoretical experts, who do not carry out business activities independently, but have information on the conditions and consequences of the operation of the DCFTA at the present stage). The questionnaire was tested with the help of two focus groups: with 4 entrepreneurs and with 3 economists. As a result of the discussions, the range of issues concerning the assessment of taking into account the interests of Ukraine in the Agreement and the mutual benefit of this Agreement for Ukraine and the EU was expanded. A number of hypotheses were put forward which as a result of the conducted research were confirmed or refuted (Table. 1).

Table 1. Objective components, search questions and hypotheses of the survey

Target Components (TC) / Search Questions (SQ)	Hypotheses (H)	Status (confirmed / denied)
TC 1. Determine how effective the DCFTA is at the present stage of operation		
SQ 1-1. Is the DCFTA between Ukraine and the EU functioning most effectively at this stage?	H 1-1. The FTA between Ukraine and the EU is not functioning as effectively as possible at this stage.	Confirmed
SQ 1-2. What impact does the DCFTA with the EU have on Ukraine's economic environment, according to entrepreneurs and theoretical experts?	Open question	Entrepreneurs' assessments are relatively more negative
TC 2. To find out whether the national interests of Ukraine are fully taken into account in the economic part of the Association Agreement.		
SQ 2-1. Are the conditions of the DCFTA mutually beneficial for Ukraine and the EU?	H 2-1. The terms of the DCFTA are not mutually beneficial for Ukraine and the EU	Confirmed
SQ 2-2. Is there a need to revise the current regulatory conditions for the operation of the DCFTA?	H 2-2. The need exists	Confirmed
SQ 2-3. Do the economic interests of the EU countries contradict the national interests of Ukraine?	H 2-3. There is a contradiction	Confirmed
TC 3. Identify threats to Ukrainian enterprises that arise in the process of functioning of the DCFTA with the EU.		
SQ 3-1. How do the assessments of experts and entrepreneurs differ for barriers to trade with the EU?	H 3-1. Estimates have some difference	Most obstacles are relatively negatively assessed by entrepreneurs
SQ 3-2. Is there a connection between the height of the assessment of barriers to trade with the EU with the forms of international cooperation?	H 3-2. There is a connection	Confirmed
TC 4. Identify opportunities for Ukrainian enterprises that arise in the process of functioning of the DCFTA with the EU.		

SQ 4-1. What benefits from the DCFTA are most significant for entrepreneurs and experts?	Open question	-
SQ 4-2. Which industries are the most export-oriented in terms of the functioning of the DCFTA with the EU?	Open question	The most export-oriented: agriculture, IT, engineering, tourism
TC 5. Find out whether regional disintegration tendencies are intensifying in the world economy, which require the search for sustainable forms of international cooperation.		
SQ 5-1. To what extent do theoretical experts agree that the tendencies towards regional disintegration are intensifying in the world economy?	H 5-1. Most respondents agree to some extent	Confirmed
TC 6. Identify what forms of international cooperation ensure the stability of relations between countries despite the tendency to regional disintegration.		
SQ 6-1. What forms of international cooperation are relatively more capable of ensuring the stability of economic relations between Ukraine and the EU?	H 6-1. Various forms of cross-border cooperation	Confirmed
SQ 6-2. What is the degree of use of various forms of international cooperation by Ukrainian enterprises?	There is no hypothesis	-

Source: own research

The total number of received questionnaires is 60, of which 64% are questionnaires received from Ukrainian entrepreneurs, and the rest are questionnaires of expert theorists. Within the framework of the study of the first component of the goal (CG1), the respondents' assessment of whether the DCFTA between Ukraine and the EU functions most effectively at this stage was determined (Table 2). A comparison of the assessment of entrepreneurs (q\_enterpreneur) and experts (q\_expert) was made.

Table 2. Group median of respondents' assessments of the effectiveness of the DCFTA (SPSS data output window)

	N	Group median	Mean Square deviation	The standard error of the mean
q_expert	21	3,695	,7003	,1528
q_enterpreneur	38	4,015	,6384	,1036

Source: own research

According to the coded data, the answers were distributed as follows: 1-completely agree, 2-agree, 3- agree to some extent, 4- disagree, 5- strongly disagree. It is clear, that the group median shows a more negative assessment of efficiency provided by entrepreneurs, while theoretical experts are more positive about the free trade area.

Using Student's t-test, it is possible to determine whether the respondents' assessments of this question differ significantly. The criterion statistics for the case of unrelated, independent samples are:

$$t_{\text{stat}} = \frac{\bar{x} - \bar{y}}{\sigma_{x-y}} \quad (1)$$

Where  $\bar{x}$ ,  $\bar{y}$  is the arithmetic mean in the experimental and control groups,

$\sigma_{x-y}$  is the standard error of the arithmetic mean difference. Located from the formula:

$$\sigma_{x-y} = \sqrt{\frac{\sum(x_i - \bar{x})^2 + \sum(y_i - \bar{y})^2}{n_1 + n_2 - 2} \cdot \left(\frac{1}{n_1} + \frac{1}{n_2}\right)} \quad (2)$$

where  $n_1$  and  $n_2$ , respectively, the values of the first and second samples.

The number of degrees of freedom is calculated by the formula:

$$k = n_1 + n_2 - 2 \quad (3)$$

Next, it is necessary to compare the obtained value of temp with the theoretical value of the Student's t-distribution. Since temp > t was obtained, this means that the difference in efficiency estimates is significant in 95% of cases, ie entrepreneurs are significantly less satisfied with the efficiency of the DCFTA between Ukraine and the EU than the surveyed experts.

Comparison of estimates of the impact of the DCFTA on the business environment of Ukraine was also carried out within the 1st component of the goal. The respondents note the positive impact on the Ukrainian economy as a whole in terms of increasing areas of cooperation with the EU, facilitating access to the EU market for Ukrainian products, bilateral trade, and investment. In Ukrainian legislation, 60.5% of entrepreneurs feel positive changes, 71.1% note the positive impact of intensified competition, 76.3% consider the DCFTA favorable in attracting investment into the economy of Ukraine. At the same time, 18.4% believe that Ukrainian legislation has been negatively affected by the commitments made to harmonize with EU requirements.

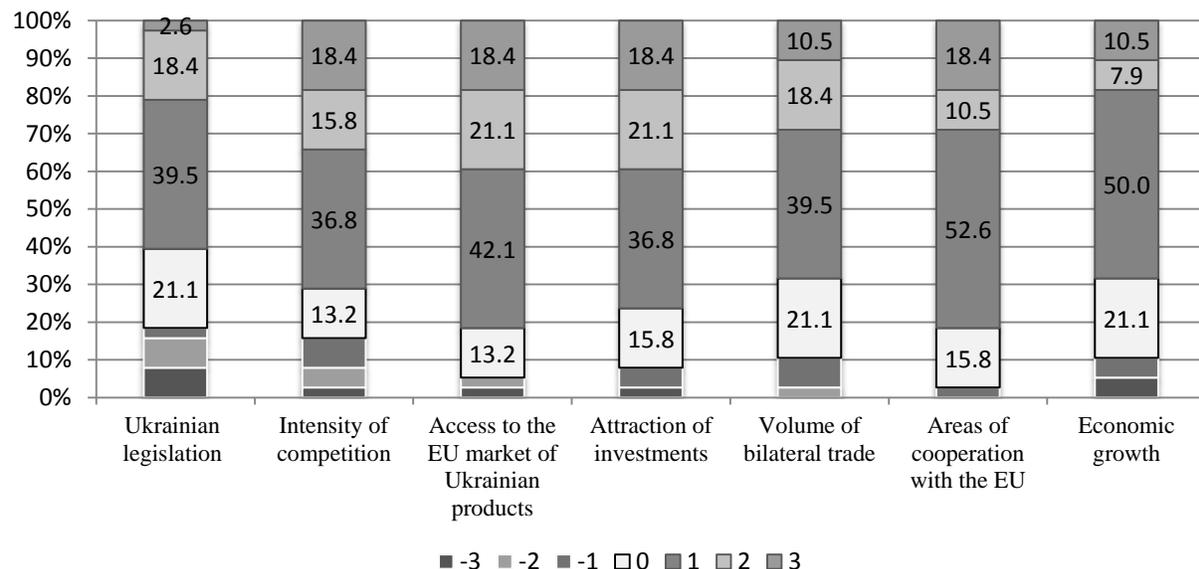


Fig. 2. Score by entrepreneurs of the direction of the FTA's impact on the Ukrainian economy on a scale from -3 to 3 (where -3 is the most negative impact)

Source: own research

Experts, agreeing with entrepreneurs in assessing the impact of the DCFTA on the intensity of investment and competition, more strongly assess the overall economic growth of the country (81% of experts and 68.4% of entrepreneurs note the positive impact of the FTA). The lack of impact of the DCFTA on Ukraine's economic growth is indicated by 21.1% of entrepreneurs and 4.8% of experts, which demonstrates significant differences in the attitude of the Ukrainian business environment, the executive and the scientific community to the nature and assessment of economic processes in the country.

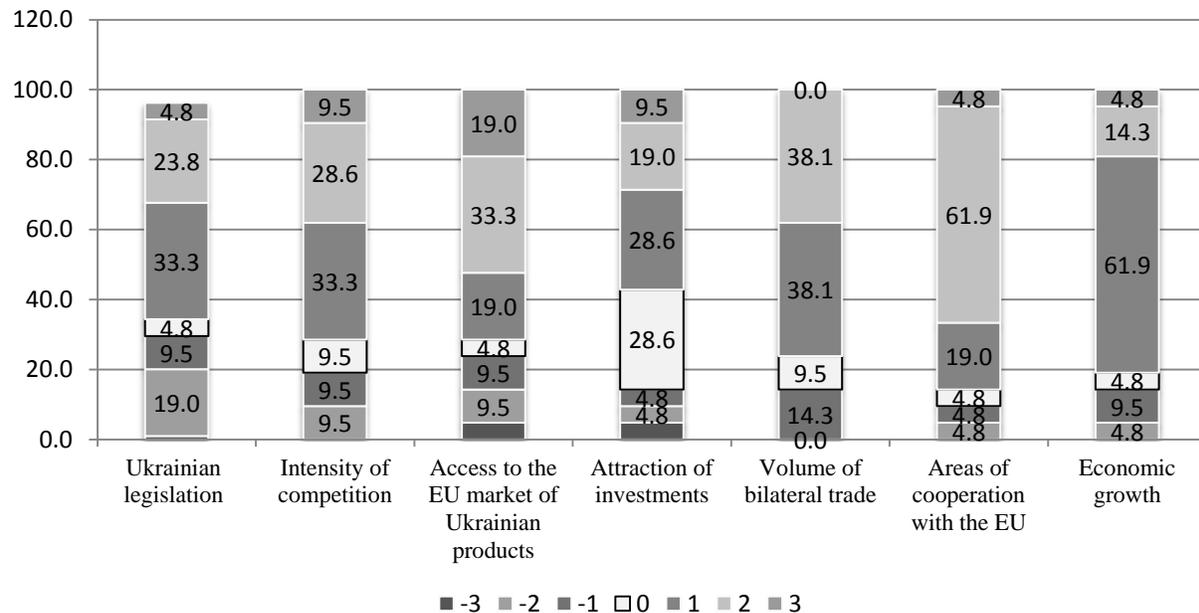


Fig. 3. Experts' scoring of the direction of the FTA impact on the Ukrainian economy on a scale from -3 to 3 (where -3 is the most negative impact)

Source: own research

For a more thorough study of the estimates of the impact of DCFTA the medians were compared, as they are used in cases where the variation series has individual members that are much larger or smaller than others, and the volume of the population is small (Table 3).

Table 3. Group median of experts' valuations of DCFTA impact in selected areas (for the range of evaluations -3 to 3, where -3 is the most negative impact, 0 is no impact, +3 is the most positive impact)

Indicator	Ukrainian legislation	Intensity of competition	Access to the EU market of Ukrainian products	Attraction of investments	Volume of bilateral trade	Areas of cooperation with the EU	Economic growth
Group median	0,75	1,15	1,45	0,70	2,19	2,65	2,00
Standard deviation	1,793	1,793	1,817	2,053	1,049	1,640	1,108

Source: own research

Comparing the medians of assessments of entrepreneurs and experts, the significant differences in the impact of the free trade area on investment (experts are more pessimistic about the impact) may be noted. Entrepreneurs are less likely to assess changes in bilateral trade, areas of cooperation with the EU and economic growth. Which indicates that the real Ukrainian business in practice does not receive the benefits and advantages that were expected by experts.

Turning to the state statistics of bilateral trade, the EU's share in Ukraine's foreign trade is really growing. Thus, the EU share in exports of goods and services of Ukraine increased from 32.8% in 2015 to 37.1% in 2020 year, and in imports of goods and services - from 42.1% to 44.3% (State Statistics Service of Ukraine, 2020). However, in dollar terms, exports are almost at the level of 2010-2012, and imports - below 2011-2014, which indicates some reorientation of trade, rather than improving production capacity and industry.

Summarizing the results of the study of the 2nd component of the goal, which concerns the study of the consequences of the creation of the DCFTA of Ukraine and the EU, it is appropriate to systematize the identified opportunities and threats at the state, enterprise and population levels (Table 4).

Table 4. Opportunities and threats to the functioning of the DCFTA at the state, enterprise and population levels for Ukraine

State level	
Opportunities	Threats
Increasing the country's negotiating power at the international level. Increasing investor confidence in the Ukrainian market. Increasing opportunities and areas for foreign trade. Simplification of customs procedures, their automation. Quality management according to EU standards.	Obsolescence of the provisions of the Agreement and the need for a modern revision of the text of the agreement. Conflict of political and economic interests of the EU and Ukraine. Loss of independence in economic policy related to international financial organizations and their terms of financial assistance.
Enterprise level	
Access to more capacious markets. Transfer of know-how, best practices of business management. Expanding access to new technologies. Transparent and equal rules of doing business in the country.	Reduction of incomes of existing firms and increase in the number of bankruptcies of small enterprises due to higher competition. Introduction of higher standards of safety and quality of goods, the transition and compliance with which will require significant costs.
Population level	
Mutual recognition of qualifications, which increases the mobility of service providers. Implementation of European requirements for respect for human rights. Improving the security of goods and services, better institutional protection of consumer rights.	Increasing the gap between the remuneration of employees of the highest and lowest qualifications. Loss of jobs and declining incomes disproportionately affecting the poorest.

Source: own research

A questionnaire on taking into account the national interests of Ukraine in the economic part of the Association Agreement enabled to identify the following issues. Experts mainly appreciate the positive impact of the FTA on the country's economy. At the same time, they state

that there is a need to review current operating conditions i(86% of experts and 61.9% agree (in to some extent) that the economic interests of the EU contradict the national interests of Ukraine (Fig. 4)). Such results raise the issue of fundamental revision of the principles of cooperation between Ukraine and the EU.

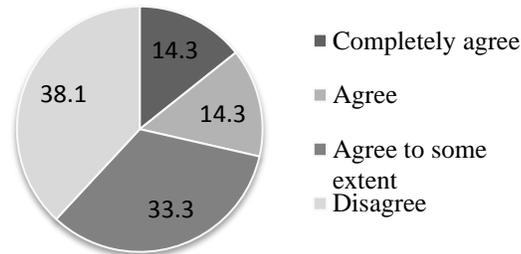


Fig. 4. Experts' answers to the question "Do the EU's economic interests contradict Ukraine's national interests"  
Source: own research

With the conflict of interests and the ambiguity of assessments of the impact of the FTA on the economy of Ukraine, there is a need to find ways to deepen relations between countries and ensure their stability. This need is confirmed by the fact that 70% of experts agree that the world economy is growing tendencies to disintegration, the signs of which can be traced in Ukraine's foreign economic relations.

According to experts, bilateral agreements between enterprises dominate among the effective forms of international cooperation that can ensure the stability of relations between countries in the context of disintegration trends, but these forms are mostly short- and medium-term, one of the easiest to implement and do not involve deep cooperation. Such forms of cooperation are focused on the realization of the interests of enterprises, while the state is interested in the sustainable development of all regions and long-term international cooperation. Focusing on the long-term perspective, it is worth to focus on such forms of cooperation that have also received the highest rating - international cluster (7,892), Euroregion (7,457), cross-border agreements between regions (7,195), which are forms of cross-border cooperation (Table 5).

Table 5. Experts' assessment of the effectiveness of forms of international cooperation in ensuring the stability of relations between countries in the context of disintegration trends (on a scale of 1-10, where 10 is the best indicator)

Indicator	Direct contacts	Bilateral agreements	Cross-border agreements	Joint venture	Cross-border trade	International cluster	Euroregion	Public-private partnership
Group median	7.00	7.964	7.195	7.38	5.00	7.892	7.457	7.09
Standard deviation	2.291	1.484	1.659	1.562	1.863	2.006	1.788	2.180

Source: own research

As Ukraine, interacting with the EU under the Association Agreement and the DCFTA, is exposed to disintegration trends and destabilizing political processes, its task is to ensure the sustainability and long-term cooperation with a strategic partner, which is possible through cross-border cooperation (CBC). CBC is a manifestation of regional economic relations at the meso level, which occurs between the administrative-territorial units of neighboring countries and ensures stability in cooperation between countries at the macro level. Opportunities of CBC in reducing the shortcomings of the operation of the DCFTA are:

- CBC has historically presupposed the existence of more stable relationships between the subjects of foreign economic activity of the region due to their socio-economic interests.
- Cross-border contacts, including trade between the population and local businesses; exist regardless of political tendencies.
- Cooperation is aimed at achieving maximum convergence of socio-economic development of the regions.
- Ability to create an extensive system of regional connections that can be used as a basis for integration.
- Coordination of strategies at the level of local self-government, which contributes to the actualization and faster decision-making.
- CBC is aimed at eliminating the negative manifestations of the existence of borders and the consequences that arise in border areas due to their location, in order to improve the welfare of the population. With the complication of forms of cooperation, their longevity and ability to realize the national interests of the state increases.

By signing the Association Agreement with the EU, Ukraine aims at long-term development based on the use of geographical and market advantages, resource potential, innovative technologies and effective cooperation with the EU in the context of DCFTA. Ukraine's geographical location, combined with low production costs, can provide Ukraine with a place of service, production and trade center, but in order to support an export-oriented economy, the state should develop cooperation with the EU in a number of perspective economic industries. Among those industries there are such areas as information and telecommunications, transport, industry, agriculture, tourism. According to the analytical report of the National Institute for Strategic Studies of Ukraine (2018), these industries have the highest potential to ensure the progressive development of Ukraine and integration into the European market.

By type of economic activity "Information and Telecommunications" the most dynamic and growing is the information technology sector, which has a high-tech, knowledge-intensive and innovative nature. According to the results of a survey of respondents (entrepreneurs and experts), it was noted that the information technology (IT) sector is one of the most export-oriented and promising for economic cooperation between Ukraine and the EU in terms of the functioning of the DCFTA. Moreover, Ukrainian IT sector is ahead of the global average development rate. Sector is a driver of the national economy, it forms a significant share of export revenues, and is an important component of shaping Ukraine's international image. More

than 100 Fortune-500 companies, which include the most successful companies in the world, are clients of Ukrainian IT companies (Fortune 500, 2020).

The assessment of the economic interests of Ukraine and the EU in the information technology sector shows the existence of mutual interest of the parties and the grounds for mutually beneficial cooperation (Table 6). Representatives of the IT sector of Ukraine are interested in cooperation with the EU in the areas of exchange of leading technologies, management experience and ensuring high standards of work.

Table 6. Interests of Ukraine and the EU in the information technology sector

Interests of Ukraine	Interests of EU	Contradiction / coincidence
Providing a favorable business environment for foreign and domestic legal entities and individual entrepreneurs. Gaining simplified access to the EU market, which has a high capacity and solvency.	Involvement of Ukrainian specialists into the projects. Reducing the cost of creating software products, providing information services, using opportunities of outsourcing.	Ukraine's interest in retaining qualified specialists in the country, preventing "brain drain", overcoming the downward trend in the economically active population. In contrast, the EU is interested in the most qualified and experienced professionals who are offered the best working conditions.

Source: compiled by the authors

The information technology sector of Ukraine includes: computer programming, consulting, information services and other related activities, development of computer games, data processing, management of computer equipment, etc. The IT sector of Ukraine is represented by the activities of more than 1,600 companies providing IT services (outsourcing and outstaffing companies), product companies, R&D centers, more than 4,000 technology companies (Tech Ecosystem Guide To Ukraine, 2019; IT market report, 2020). An important component of the IT sector is the technological ecosystem, which is represented by associations, IT clusters (in more than 20 cities of Ukraine), coworking and hubs, accelerators and incubators.

Revenues generated by the IT sector of Ukraine and the number of IT specialists are growing dynamically (Fig. 5, Software development in Ukraine: 2019-2020. IT market report, 2019).

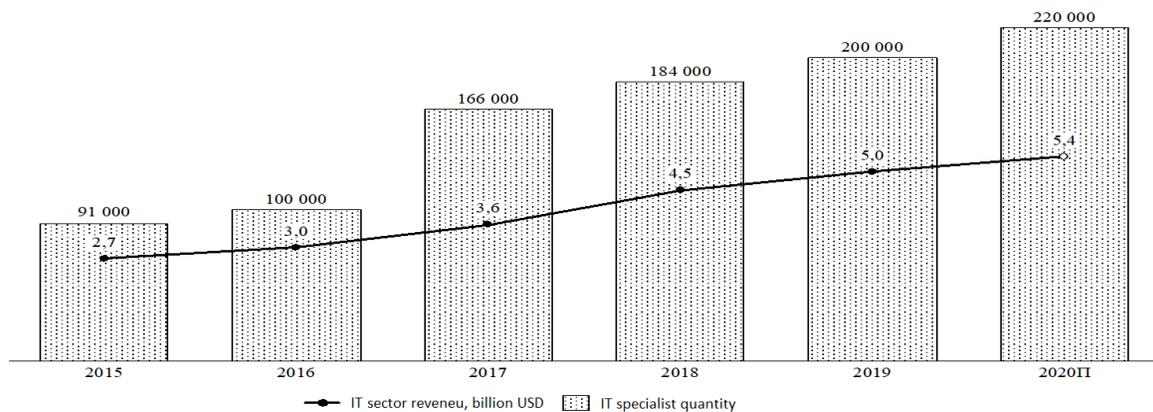


Fig. 5. Dynamics of revenues of the IT sector of Ukraine and the number of IT specialists, 2015–2020

The growth was expected to be 8% in 2020, and in fact the market for IT services in Ukraine showed a 20% growth rate (Beetroot, Ukrainian Tech Market Overview 2021).

Exports of services in the field of telecommunications, computer and information services of Ukraine in 2020 amounted to 2.9 billion dollars. USA, which is 13% higher than the previous year, and took 2nd place in total exports of Ukraine, second only to transport services (State Statistics Service of Ukraine, 2021). High quality education, qualified personnel, leading software development, high-tech efficient solutions for data collection, processing, analysis provide Ukraine with leading positions in the world market of information technologies. Thus, Ukraine ranks 1st in Europe and 4th in the world in the number of IT specialists (230 thousand people), as well as 3rd in the number of certified IT workers at the international level. The Global Sourcing Association, which is a branch professional organization of the global service industry, has identified Ukraine as the outsourcing direction of the year (The Global Sourcing Association. Outsourcing Destination of the Year, 2018), which has become a defining moment for the Ukrainian IT industry. In addition, in 2020, the top 100 global outsourcing companies included 13 Ukrainian companies and 8 companies with offices in Ukraine (The Global Outsourcing 100, 2020). The rating of the American research company Clutch top-1000 best b2b-companies in the field of IT for 2020 includes 68 Ukrainian companies that are providers of IT services in the field of e-commerce, entrepreneurship and finance. (Clutch Top 1000 Service Providers, 2020).

The largest consumers of Ukrainian IT services are the United States (70% of exports), the United Kingdom and Germany (7% each), and Israel (6%). The international level of the Ukrainian IT sector is ensured by high quality training. Namely, 79% of Ukrainians have higher education, 57% of IT professionals have STEM degrees (in science, technology, engineering and mathematics), 75% of professionals are fluent in English, 12% - have experience in IT more than 10 years, 19% - have experience of 5-10 years (EBA, Export-oriented segment of Ukraine's IT services market, 2018).

The IT Export Boost project identified 19 promising export markets for Ukrainian IT, including EU countries such as Germany, the Netherlands, Sweden, Denmark, Finland, Portugal, Spain, France, and Austria (IT Association of Ukraine, 2021). It will be expedient to involve diplomatic missions of Ukraine in these countries to establish business relations of IT business with European foreign partners of the public and private sectors. Such assistance from the state can accelerate the integration of the IT sectors of Ukraine and the EU.

According to experts and representatives of the IT business, today in Ukraine there is a very favorable level of taxation, but periodically there is a threat of its revision in the direction of deterioration. Applying the scenario approach, experts draw conclusions about the danger of slowing down the growth of Ukraine's IT sector, reducing its international competitiveness and global market share. Therefore, for the further development of the IT sector, the state must ensure stable, predictable and consistent taxation, as increasing the tax burden on individual

entrepreneurs, who are the majority of IT professionals, can lead to their annual emigration at the level of 10 thousand people, worsening the current staff outflow statistics. The share of employees in the IT sector who moved abroad in previous years averaged 4.8% of the total.

In addition to a stable tax level, effective legislative protection of intellectual property rights, lack of pressure from government agencies on enterprises, favorable conditions for business development are important for the development of the industry, as the ICT sector provides from 420 to 670 thousand jobs in telecommunications and related industries.

To assess the prospects of international cooperation with the EU in the field of information technology, consider the strengths and weaknesses of the IT sector of Ukraine (Table 7).

Table 7. Strengths and weaknesses of the IT sector of Ukraine

Strengths of the industry	Weaknesses of the industry	Recommendations
<p>High competitiveness and competence of sector specialists in the international labor market.</p> <p>High quality product (software) and related services for development, testing, consulting.</p> <p>Ability of specialists to solve integrated tasks of high complexity, wide specialization of IT companies.</p> <p>Opportunities to form large teams (50-100 people).</p> <p>Growth in exports of information and computer services.</p> <p>Favorable taxation.</p> <p>Low costs for starting and running an IT business.</p> <p>Increasing the profitability of the industry to 13.8%.</p> <p>Developed IT infrastructure.</p> <p>Cultural closeness with European countries.</p> <p>Extensive network of universities and colleges (over 150) that train IT professionals.</p>	<p>Increasing the emigration flow of highly qualified workers.</p> <p>Disproportionate fiscal burden for individual entrepreneurs, large and medium-sized businesses in the country.</p> <p>Insignificant actual level of compliance with legislation on protection of intellectual property rights.</p> <p>Low level of protection of corporate rights and assets.</p>	<p>Provision by the state of stable and predictable business conditions for foreign and domestic legal entities and individual entrepreneurs.</p> <p>Guaranteeing transparency, impartiality of state supervision and control over business activities on the territory of Ukraine.</p> <p>Simplification of procedures and administrative barriers to starting a business.</p> <p>Optimization of the regulatory burden and, accordingly, reduction of opportunities for corruption.</p> <p>Avoid abrupt transformations of tax and labor legislation.</p> <p>Introduce a moratorium on tax increases and inspections by regulatory authorities.</p> <p>Development of education, including informal, updating and opening new programs.</p> <p>Set immigration quotas for IT professionals.</p> <p>Government promotion and promotion of IT projects through commercial diplomacy.</p> <p>Assistance of diplomatic missions in establishing contacts with public and private customers.</p> <p>Organization of trade missions to export countries.</p> <p>Improving integration mechanisms in the IT sector.</p>

Source: compiled by the authors

According to the results of the study, the IT sector has significant strengths that outweigh the weak ones (Table 7), which is the basis for effective cooperation between Ukraine and the EU.

Thus, a promising area of cooperation between Ukraine and the EU is cooperation in a dynamically growing IT industry. Improving public policy in this area can contribute to the development and expansion of cooperation.

## Conclusion

The study of threats and opportunities for the functioning of the free trade area through an expert questionnaire revealed differences in the assessment of its political and economic consequences by representatives of Ukrainian business and scientists. Entrepreneurs rate the inefficiency of the free trade area with the EU at this stage, as well as the importance of such barriers to trade as: imperfection of Ukrainian legislation, burdensome customs procedures, unsatisfactory level of non-tariff restrictions, non-acceptance of Ukrainian goods by European consumers. Ukrainian legislation and competition in the market are among the areas of the greatest negative impact of the free trade area on the economy of Ukraine. The most significant positive impact on the economy of Ukraine DCFTA had in the following areas: according to entrepreneurs - access to the EU market of Ukrainian products and investment; According to scientists - economic growth, opportunities for cooperation with the EU, the volume of bilateral trade.

Ukraine, cooperating with the EU within a DCFTA, is exposed to disintegration trends and destabilizing political processes, the impact of loss of control over the most industrialized eastern territories, disruption and severance of established internal economic ties that supported the integrity of the economic system, so its task in modern conditions is to ensure the stability and long-term cooperation with a strategic partner, which is possible through cross-border cooperation. Field empirical research has confirmed the hypothesis that such forms of CBC as the cross-border cluster and the Euroregion are able to ensure the development not only of sectoral ties, but also of the free trade area as a whole.

The realization of Ukraine's economic interests and the possibility of equal participation in integration agreements largely depends on its economic importance and significance, including for international trade relations in the region. All this should be ensured by strengthening cooperation between Ukraine and the EU, by establishing stable cross-border ties in the most export-oriented industries, which economically, socially and politically bring the regions of the country together, promote their comprehensive development, eliminate the influence of political factors on the stability of economic ties, facilitate the coordination and implementation of decisions at the local government level.

Guided by the principles of international economic relations, Ukraine and the EU at this stage have the opportunity to review the priorities, tools and forms of their integration cooperation in the direction of more mutually beneficial conditions for deepening and improving the effectiveness of cooperation taking into account the above recommendations.

Based on results of research, IT sector is attractive and perspective for further collaboration between Ukraine and EU.

## Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

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**Bibliographic information of this paper for citing:**

Starostina, A., Bilovodska, O., Nagachevska, T., Derbenova, Ya. & Pashchuk, L. (2021). EU-Ukraine economic relations in context of desintegration processes and informatization development. *Journal of Information Technology Management*, Special Issue, 1-19.