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Development of IT-consulting in the system of foreign economic activity of agriculture in the region

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Abstract

The purpose of this study is the development of IT-consulting in the system of foreign economic activity of the Black Sea region. The relevance of this study is due to the need to address the development of consulting services in the system of foreign economic activity of the agro-industrial complex in the region. It is established that today many companies are interested in reducing the risks associated with running their own business. This has led to a

rapid growth of consulting companies. The most popular are IT consulting services, market research, financial consulting and auditing with the largest market share, while environmental consulting is only gaining momentum. Institutional priorities of IT-consulting services in the system of foreign economic development of agro-food production of the region are established. The mechanism of development of the system of regional IT-consulting for stimulation of foreign economic activity of agro-food sphere is offered. The basic elements of development and functioning of the international infrastructure of regulation and self-regulation of IT-consulting services are investigated. It is determined that in the long run the services will be developed on the basis of innovative concepts and management tools to ensure the strategic competitiveness of customers. The consumers served are metallurgy, energy, construction, telecommunications, chemical industry, food industry, trade and distribution, media companies and the financial sector. In general, the consulting industry in Ukraine has some space, and domestic consulting companies also have a significant share of reserves in the market of consulting services. The estimated value of exports of the Black Sea region according to the models in 2022 is projected at the level of 2989.242 million dollars, and in 2023 - at the level of 3146.893 million dollars. It is proved that for further intensification of foreign economic activity of enterprises two main problems should be solved: to overcome excessive dependence on export of plant products (and other products with low added value) and to intensify export capacities of Kherson region.

Keywords: Consulting services, Foreign economic activity of the region, Export, Import, Dynamics, Regional foreign economic relations, Foreign economic relations of the region.

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Introduction

The field of consulting services is one of the most important and fastest growing parts of the world economy. In the context of globalization of the world economy, the field of information and consulting services is becoming one of the factors influencing economic growth, increasing the country's competitiveness in the world market and improving people's well-being. The formation of the Ukrainian economy as a holistic system is carried out under conditions of development of the market of consulting services. The transition process in Ukraine objectively requires the coordination of national economic policy and the transition of the services market, so research on this issue is of practical importance and relevance.

Ukraine has the potential to develop consulting services, but there are some obstacles that hinder its further active development. The development of science, technology and highly skilled labor is a necessary prerequisite for the dynamic development of consulting as a component of market infrastructure that can stimulate the development of the entire national economy and ensure a strong competitive advantage in the world market (Masyuk, YU. V. and Kachur, VS (2019)). O'mahoney, J. (2010).

It is now necessary to solve new problems that agricultural enterprises have not encountered before, but solving these problems is necessary for their normal operation. It is especially important to produce competitive products and conduct civilized sales in foreign markets to get the maximum profit from sales. Analysis of the state and development of foreign economic relations of agro-industrial enterprises of the Black Sea region shows that not all agro-industrial complexes have the appropriate degree of scientific and methodological support and practical solutions to problems of foreign economic integration. They can be solved with the help of external consulting support. Thus, the development of IT consulting in the system of foreign economic activity of the region's agro-industrial complex becomes especially relevant. Many companies today are interested in reducing the risks associated with running their own business. This causes a rather rapid growth of consulting firms. The most popular are IT consulting services, which took the largest share of the market, market research, financial consulting and auditing, while environmental consulting is only gaining momentum. In the long run, services will be developed based on innovative management concepts and tools that will ensure the strategic competitiveness of customers. Consumers of services are metallurgy, energy, construction, telecommunications, chemicals, food industry, trade and distribution, media companies, the financial sector. In general, the consulting industry of Ukraine has room to move and there are reserves for domestic consulting companies to occupy larger shares in the market of consulting services (Bukht R and Heeks R (2017), Eastwood, B., Kipping, M. (1999), Kushnir, TM (2016) , Newton, R. (2010), Lylyk, I. (2020), Lutsk, NI (2018)).

In the conditions of constant transformational changes of economy the role of IT consulting in system of foreign economic activity of agrarian and industrial complex of region amplifies, the specified tendency demands development of multifunctional strategy of perspective strategic strengthening of symbiotic combination of elements of market, state, and private mechanisms of regulation (Stewart, E., Cooper) (Yanchuk). , TV (2019), Ovsiienko, O. (2021).

The main task facing IT consulting in the system of foreign economic activity of the region's agro-industrial complex is timely and effective organization and further consolidation with the possibility of effective implementation of the regulatory function of the state, integration of elements of the function into a multilevel system of socio-economic relations. regional structure, which has an impact on achieving a balance of supply and demand, increasing the financial stability of the agri-food sector, foreign economic development,

cross-border cooperation and accelerating the development of individual communities and rural areas (O'mahoney, J. (2011), Oryshchenko, M. 2014), Reportlinker (2021)).

Therefore, the need to predict exports using the time trend method by solving the extrapolation problem and should be reduced to finding a relationship that accurately describes the behavior of the variable in the past and at the same time also determined for some time interval in the future.

The purpose of the study is to form a mechanism for forecasting export indicators with the help of IT consulting in the system of foreign economic activity of the region's agro-industrial complex. The main idea of the study is that the effectiveness of IT consulting is the main criterion for ensuring long-term growth of exports of agricultural enterprises for selected purposes, according to the determinants of export security, within acceptable risk.

The research hypothesis is as follows:

IT consulting in the system of foreign economic activity of agro-industrial complex of the region plays a role in effective overcoming of crisis phenomena in the agrarian sphere of Ukraine, provides opening of access of production of agro-food sphere to the world markets. provides a way out of the domestic agri-food sector from the crisis, creates a basis for stabilization and development of agricultural production.

Literature Review

In the theoretical aspect, we consider consulting, taking into account the following aspects: 1) issues and problems of consulting relate to its economy and organization (essence, model, history, typology of species, market characteristics, marketing policy, legal and personnel support, strategy, etc.), as well as general technology issues; 2) disclosure of the essence of consulting is based primarily on determining the specifics of the content of the activities of experts in the provision of consulting services (consultants); 3) consulting acts as a sphere of entrepreneurship in the field of creating an information (intellectual) product; 4) the result of consulting are recommendations (practical advice) to improve the activities of economic entities, which is the driving force of progress; 5) consulting contains an element of innovation, provides an innovative approach to solving problems. However, in practice, consulting is implemented in different directions. (Gernego, Iulia, 2019).

The development of the market economy of Ukraine has led to the integration of domestic economic entities into the "financed economy", which is one of the attributes of modern society. After all, financial relations are present in all areas of management, the role of financial institutions and the relationship between the performance of the entity and the effectiveness of financial resources management. Therefore, it is natural to appear financial advisers, strengthening the position of financial consulting among other services. Under financial consulting is understood as a set of measures aimed at improving the efficiency of financial management, taking into account the use of all financial resources of the client

organization (Oryshchenko, M. 2014). In other words, financial consulting market participants consider all those services that relate to the financial activities of the enterprise. Financial consulting services can be provided through the use of experience and resources: consulting multinational corporations, large multifunctional firms, specialized firms, independent consultants. In view of the above, the range of financial consulting services can vary, starting from the consideration of the financial aspect as one of the areas of business activity, and ending with highly specialized services that allow you to implement specific measures for financial management of the enterprise. (Oryshchenko, M., 2014).

The main measures of IT consulting (Beych, E. 2006):

• analysis of financial and economic activities of the company;

• development of proposals on ways to correct the identified shortcomings and violations of accounting and tax accounting, preparation of financial statements;

• management of receivables and payables;

• setting up and restoring accounting and tax accounting;

• calculations (economic, financial, strategic and other types of analysis) to assess the status and results of economic activity;

• economic and legal expertise on various issues of financial and economic activities;

• identification of reserves in order to increase the economic efficiency of the enterprise;

• independent financial investigations and asset searches;

• risk management in organizations and assisting companies in assessing business strategies for their stability in relation to strategic, economic and financial risks;

• construction of the concept of the anti-crisis program, which includes the development of measures for the financial recovery of the enterprise (organization) using modern methods of overcoming crises;

• development of business plans - the first step to obtaining funding;

• attraction of financing on stock markets, asset management.

The main tasks of IT consulting (Bortnikova, M. H. 2017):

• formation of financial policy of the organization;

• conducting financial expertise;

• search for sources of financial resources;

• analysis and increase of current financial efficiency of activity of the organization;

• strengthening the financial position, achieving financial stability and independence of the organization;

• optimization of the organization's capital management;

• optimization of financial relations with clients and creditors, with business entities, government agencies;

• optimization of tax management, accounting and management accounting;

• introduction of advanced methods of financial management.

Since the main product of consulting companies is knowledge and the practical aspect of their application, the level of education among employees of consulting companies is quite high. Thus, according to expert estimates of the research company "International Marketing Group Ukraine", 95% of employees have higher education, 18% of consultants have the degree of candidates and doctors of sciences. Many of them are not full-time employees of consulting companies, but invited specialists from leading institutions of the relevant profile. About 28% have a master's degree, have specialized certificates (management certificates, certificates of training, etc.), 49% have higher education (Babenko, 2020; Bila et al., 2020; Perevozova et al., 2020). These are mainly employees working in the field of consulting from a few months to 1.5 (rarely 2) years. Let's analyze the market structure by types of consulting services based on the amount of income received by consulting companies from the sale of various types of services as of July 2020 (Yanchuk, T. and Zemlyakova, O. 2021).

The largest part (more than 40%) consists of consulting services on the organization of business processes, including issues of business reorganization; about 20% falls on the development of corporate culture, business development in general; 12% - is consulting on organizational design; the balance was almost equally divided: financial consulting, sales and marketing consulting or marketing consulting, as well as HR-consulting or personnel development consulting. Thus, a significant proportion of consulting projects account for the organization of business processes in the firm. With the deterioration of the general economic climate, this service is becoming increasingly important because it directly affects the efficiency and competitiveness of the firm. Recent advances in information technology, global information networks have changed perceptions of enterprise boundaries and technologies of production, management and doing business (Yanchuk, T. and Zemlyakova, O. 2021; Gontareva et al., 2020). Large companies open their offices in different regions, while small ones leave with a consulting project at the client's location. Therefore, often employees of consulting companies, whose offices are located in Kiev, work on business trips in the Eastern, Western or Southern regions, less often - vice versa. Thus, the market of consulting services is national.

When setting the time limits of the consulting services market, a number of factors are taken into account (Arestenko, V. V. (2015), Lopashchuk, I.A. (2016), Starostina, A. O. and Kravchenko, V. A. (2015)):

• the duration of each consulting project due to its uniqueness is different and is not a standardized value;

• the market of consulting services in Ukraine is developing rapidly and dynamically;

• constant change of market leaders, the lack of appropriate legal framework governing the market, the lack of officially recognized quality standards for service delivery indicate the immaturity of the market for consulting services in Ukraine.

Given the instability of the market structure of consulting services in Ukraine (expansion of customer base, change of market operators, prices, services, etc.), which is only exacerbated by the global economic crisis, the time frame can be determined based on when the market structure began to stabilize . From 2018, the Ukrainian economy is gradually emerging from the crisis. Thus, the time limits of the market are defined at the level of 3 years (2018-2020), because during these two years the structure of the market of consulting services in Ukraine remained virtually unchanged.

The composition of sellers in the market of consulting services in Ukraine:

• domestic consulting companies;

• broad-based consulting companies;

• highly specialized consulting companies.

Clients of consulting companies are enterprises, institutions and organizations of private and state ownership, as well as individuals. The vast majority of clients of consulting companies are medium-sized enterprises.

Methodology

To achieve the goal of this study, a system of general scientific and special methods and approaches was used, in particular: general, general scientific, interdisciplinary and special research methods.

The study is based on the use of a set of modern methods:

• system analysis - in the study of theoretical aspects of intensification of IT consulting and foreign economic development of regional agri-food production in the conditions of market transformation;

• abstract-logical - to determine the essence of the basic concepts, definitions and categories, it-consulting and foreign economic development of the agri-food sector at the regional level;

• historical - in the study of the main stages of formation of the theory and practice of organization of foreign economic development of agro-food production in the region and the development of IT-consulting;

• dialectical - to consider the phenomena in their relationship and development, unity and struggle of opposites;

• statistical analysis - to determine the dynamics, structure and effectiveness of IT consulting in foreign economic processes of the regional agri-food sector;

• analogies and comparisons - when comparing various processes and trends of intensification of foreign economic activity of regional economic entities in the conditions of market transformations;

• monographic method - to identify factors, manifestations, patterns, principles of it-consulting of foreign economic activity of the regional economy;

• methods of system-structural analysis and synthesis - to analyze the object of study after dividing it into separate components for further study as part of the mechanisms of IT-consulting of foreign economic development of agri-food production in the region in market changes;

• graphical - to visualize the analysis process and its results;

• methods of forecasting and programming - for the development of concepts and probable scenarios for the intensification of IT consulting of foreign economic processes in the context of sustainable development of agri-food production in the region;

• economic and mathematical modeling - to model the processes of determining and implementing foreign economic priorities for sustainable development of regional agri-food production.

Results

Institutional priorities of IT-consulting services in the system of foreign economic development of agro-food production of the region

Now there is a need to solve new problems that agricultural enterprises have not faced before, but the solution of which is necessary for their normal functioning. Especially important is the production of competitive products for civilized sales in foreign markets in order to obtain maximum profits from producers. Analysis of the state and development of foreign economic relations of agro-industrial enterprises of the Black Sea region shows that not all problems of foreign economic integration of agro-industrial complex have the appropriate level of scientific and methodological support and practical solutions. They can be solved with the help of external consulting support. Currently, the intensification of foreign economic activity of the agri-food sector is particularly important along with this, not every agri-food company considers it appropriate or has the opportunity to allocate a separate structural unit to advise on marketing activities and foreign economic activity, because it involves additional labor and financial costs. Moreover, not for every manufacturer the organization of such a structure will be an economically justified step. In this regard, now in the region there is a need to develop a mechanism for intensifying foreign economic activity of the agri-food sector through consulting methods and a specialized regional structure of advisory services aimed at

promoting the sale of fruits and vegetables to enterprises that do not have separate units / specialists and appropriate conditions for large-scale marketing and marketing activities. The elements of the system of institutional support of consulting services in the system of foreign economic activity of agro-food sphere of the region include: external institutes, internal institutes, institutions, associative institutions, mechanism of institutes implementation, consulting infrastructure in FEA (international, state, private, public subjects and their technical support). activities). In addition, there is a danger of creating systemic barriers and risks to the activities and development of consulting companies in the system of foreign economic activity. In this regard, a mechanism for timely detection and elimination of institutional pitfalls (corruption, bureaucracy, encroachment on property, competition law) is needed. (Figure 1.)

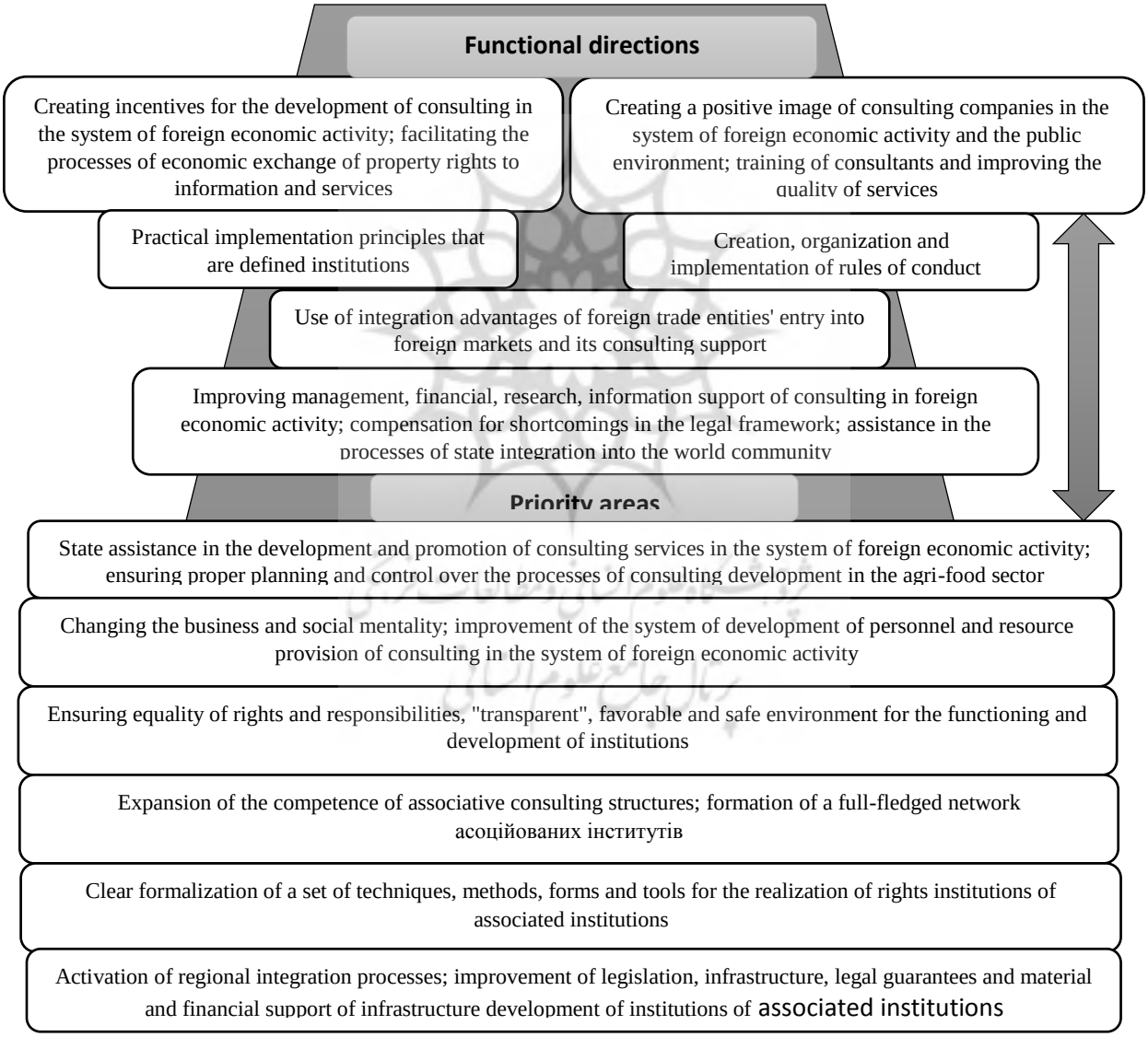

Fig. 1. Institutional priorities of IT-consulting services in the system of foreign economic development of agro-food production of the region.

To overcome the general negative trends, the transformational transition to new standards of consulting services in the agri-food sector of the region must solve many of the problems that can be solved by:

≠ proper institutional support to create a favorable economic and legal basis for consulting as an economic activity , including adherence to the principles of market demonopolization, attraction of economic resources and improvement of the management system;

≠ development of an alternative direction for the development of non-governmental institutions and organizations;

≠ effective fight against the shadow economy by preventing the participation in the economic system of illegal and shadow institutions;

≠ increasing the predictability of economic development and doing business;

≠ reaching a compromise on the effectiveness of the horizontal - foreign economic activity and its advisory support.

The mechanism of development of the system of regional IT-consulting for stimulation of foreign economic activity of agro-food sphere

The practice of using the advisory service has become widespread in agriculture in foreign countries.

Modern foreign agro-consulting services perform a wide variety of functions: from consultations on marketing and foreign economic activity, to consultations on technical aspects and issues of agronomy, as well as the provision of educational services together with educational and scientific institutions.

In addition, the analysis of the state of advising on foreign economic activity of the agri-food sector at the regional level requires the improvement and development of new approaches to launching effective advisory services.

An effective combination of the world consulting system and the state consulting system is needed to create a modern system of regional consulting to stimulate foreign economic activity in the agri-food sector. (Figure 2)

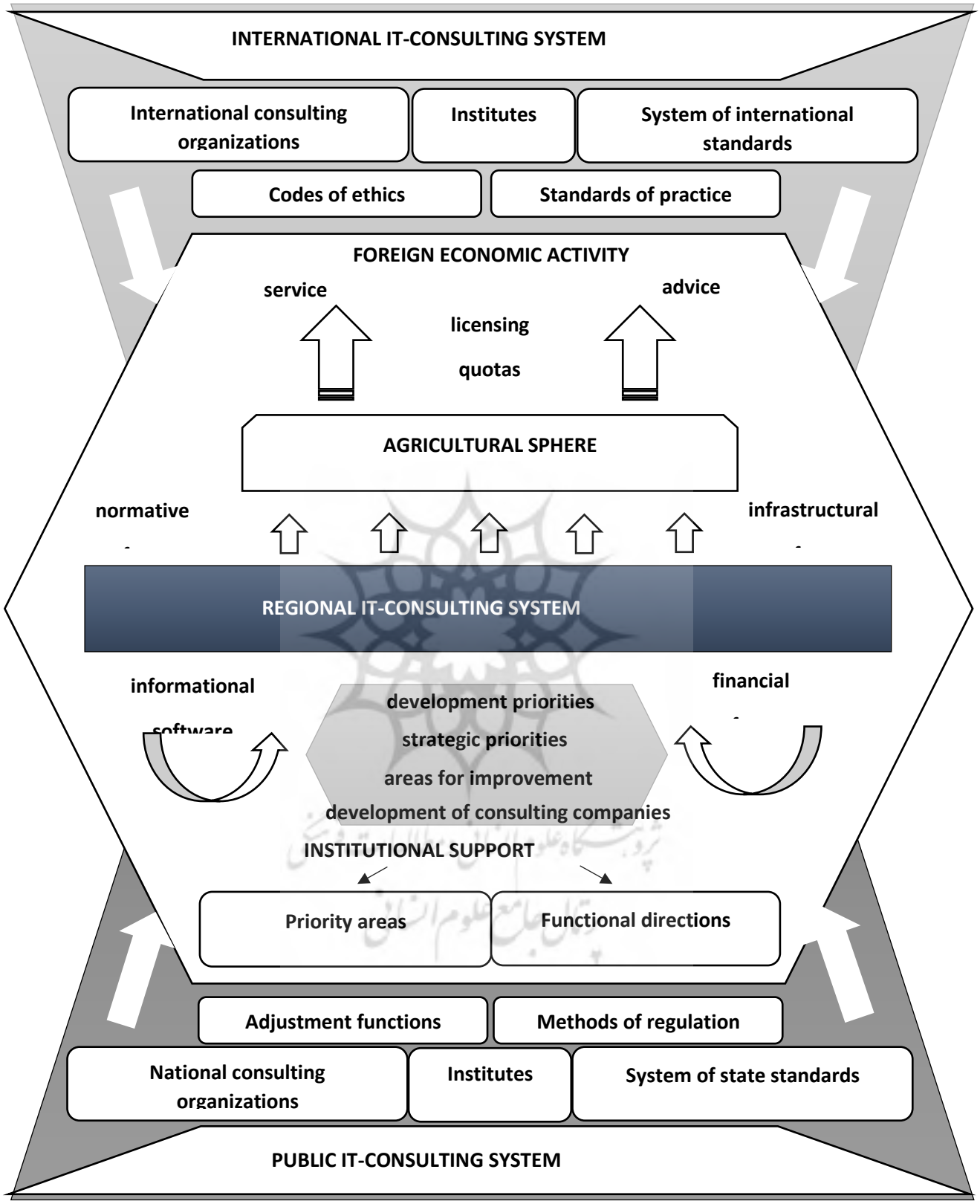

Fig. 2. The mechanism of development of the system of regional IT-consulting for stimulation of foreign economic activity of agro-food sphere

An important element of the domestic level of consulting that uses training as the main means of ensuring the functioning of both the market and each individual consulting company is the association of consultants (associations or associations of consultants). The experience of world leaders shows that their activities play an important role in construction and develop consulting activities along with the development of national economies, by solving important tasks by associations of consulting companies that develop codes of ethics and standards.

The main elements of development and functioning of the international infrastructure of regulation and self-regulation of IT-consulting services

For the effective use of consulting services in the agri-food sector of the region, it is appropriate to identify the main elements of development and functioning of the international infrastructure of regulation and self-regulation of consulting services. (Figure 3)

Fig. 3. The main elements of development and functioning of the international infrastructure of regulation and self-regulation of IT-consulting services

The most common areas of consulting in the agri-food sector should be considered: strategic consulting, financial consulting, operations management, IT consulting, personnel management, environmental consulting, but there is a small number of consulting services provided in each area. At the same time, the problem of using agro-consulting of foreign economic activity at the regional level remains acute. On the one hand, most farms do not use agro-audit (independent assessment of fields, crops, technology); modeling (development of a business model of crop production); support (agronomic support of production during the

season); agrocontrol (global crop management system) application of trichogramma (bioprotection of corn and sunflower fields from pests); sidereal mixes (seed mixtures to improve soil fertility); soil analysis (determination of soil fertility and fertilizer needs); training (transfer of knowledge on technology in crop production) on the other hand there is a need for consultation on foreign trade and customs legislation of Ukraine, preliminary analysis and drafting of contracts on foreign trade, advice on classification of goods according to UKT FEA, advice on preliminary clarification of customs with further representation of the client's interests at customs.

The institutional basis of consulting is formed with the help of domestic and international institutes and institutions. Institutions, in turn, can be divided into status (formal and informal) and normative. The status should include: rules of entrepreneurial behavior; databases; Information Technology; strategies, business models; information and statistical bulletins to the normative we include: normative legal acts; requirements; regulations; standards. Institutions should include: government, central, regional and local authorities and self-government; fiscal and controlling bodies; public and associative organizations; market institutions; consumers and their organizations. In this regard, the main directions of launching the institutional environment of consulting services for foreign economic activity of the agri-food sector of the region are the following: promoting the creation and development of consulting companies; ensuring cooperation of consulting enterprises with foreign economic entities and external economic agents, international organizations; improving coordination and interaction of internal and external consulting; implementation of projects of integration, cluster and network cooperation, transnationalization, outsourcing in the system of relations of subjects of foreign economic activity and consulting enterprises. Along with this, a state policy is needed to support the regional level of consulting development in the system of foreign economic activity of the agri-food sector. The main components of such a policy can be: legal and regulatory regulation; social-communicative, informational and explanatory measures; actions of organizational and structural nature; tax incentives, preferential and credit measures, innovation and investment tactics; multilevel management system for the development of agri-food regional consulting.

The main direction of consulting the foreign economic development of the agri-food sector at the regional level should be the expansion of markets, profit growth and leadership through effective analysis of the global agricultural market based on innovative solutions. It is necessary to increase the speed of access to data and ensure the ability to operate with this data, be able to compare them and draw conclusions. To make effective and efficient business decisions, it is necessary to provide analysis of both the original statistics and the predictability of market scenarios. Independent analysis of the agricultural market should be accompanied by high dynamic visualization of digital flows. This allows you to effectively calculate the key points of development in the leading direction.

Directions of development of IT-consulting on the basis of forecasting of export component of foreign economic activity of agro-industrial complex of region

The main function of forecasting is to clarify the main ways and prospects of evolution of the economic system, structural changes that may occur in the economic system, priority areas of socio-economic progress, scientific analysis of economic development and technical progress under specific conditions, the relevant review period and forecast projects , identification of alternative ways of economic and social development, accumulation of scientific materials and confirmation of certain decisions. The purpose of developing forecasts of socio-economic development is to determine possible options for the development of the analyzed system under different conditions of development and government decision-making. Thus, the calculation of possible development scenarios allows to make the most acceptable decision in these conditions and to develop a specific action plan to achieve the forecast state of the system.

As a specific form of planning, forecasting is mainly aimed at analyzing and identifying the main patterns and trends of economic development, forecasting changes in conditions and factors of economic development and creating a scientific basis for the formation of long-term economic policy and policy. Economic forecasting should be considered as a necessary and important stage of scientific analysis in the overall planning process. At the same time, its purpose is not to formulate specific planning measures, but to confirm the trend of socio-economic process and identify problems that need to be addressed in the future. The objects of forecasting are economic, social, scientific and technical and other phenomena and processes in the national economy, industry and complex. The main element of economic forecasting is qualitative and quantitative changes in the economy under the influence of general or individual factors during the forecast period.

Agricultural enterprises of the Black Sea region, for the organization of profitable foreign economic activity need timely information on the projected demand, sales conditions and prices for a particular agricultural product, and these forecasts should be for different purposes:

• long-term, for 3-5 years, based on the analysis of the world market situation and taking into account the targeted state and regional programs to support agricultural development - to develop business plans to optimize the structure of production, investment;

• medium-term, for the next marketing year, taking into account measures on credit and subsidy policy of the state - for the current planning of production, marketing and financial activities;

• short-term, with a monthly, and for vegetables and fruits and for shorter periods, taking into account the measures of the state to regulate food markets - to make decisions on purchase and sale.

To forecast export indicators, we choose the time trend method.

A trend or trend is a regression line in time series. If - – $X(t)$ random variables, the distribution of which depends on t, then the trend is called a function $X(t)$ whose value in the interval of observations at each point t is equal to the average value $X(t)$.

The solution of the extrapolation problem is to find a dependence $X \cong f(t)$, which describes with sufficient accuracy the behavior of the variable X in the past and at the same time is also determined for some time interval in the future.

The choice of the type of function is based on a theoretical analysis of the essence of the phenomenon being studied and the nature of its dynamics. Usually preference is given to functions whose parameters have a clear economic meaning and measure the absolute or relative rate of development. An important help in choosing the functions is the analysis of the chain characteristics of the intensity of the dynamics. If the chain absolute increments are relatively stable, do not have a clear tendency to increase or decrease, the alignment of the series is performed on the basis of the linear function: $Y_t \cong a \cdot bt$. If the chain growth rates are relatively stable, then the exponent $Y_t \cong ab^t$ is the most adequate to this type of dynamics. In these functions, t - is the ordinal number of the period (date), a - is the level of the series at t = 0. The parameter b characterizes the rate of dynamics: the mean absolute in the linear function and the mean relative in the exponent. When the characteristics of the rate of development increase (or decrease), other functions are used (parabola of the 2nd degree, modified exponent, etc.).

The parameters of trend equations are determined by the method of least squares. According to the condition of minimizing the sum of squares of deviations of the actual levels of a number y_t from the theoretical Y_t parameters, they are determined by solving a system of normal equations. For a linear function, it is written as follows:

$$\begin{vmatrix} na & b\sum t \\ a\sum t & b\sum t^2 \end{vmatrix} \cong \begin{vmatrix} \sum y \\ \sum yt \end{vmatrix}.$$

Continuation of the detected trend beyond a number of dynamics is called trend extrapolation. This is one of the methods of statistical forecasting, the prerequisite for the use of which is the invariance of the causal complex that forms the trend. The forecast, expected level $Y_{t.v}$ depends on the forecast base and the bias period v.

We use this method in practice to forecast the volume of exports of agricultural enterprises in the near future (2019-2020).

Forecasting the volume of exports of agricultural products can be done on the basis of official statistical information [1-4]. Let us denote 2009 by t = 0.

Forecasting for the Nikolaev area, actual dynamics is shown in fig. 4.

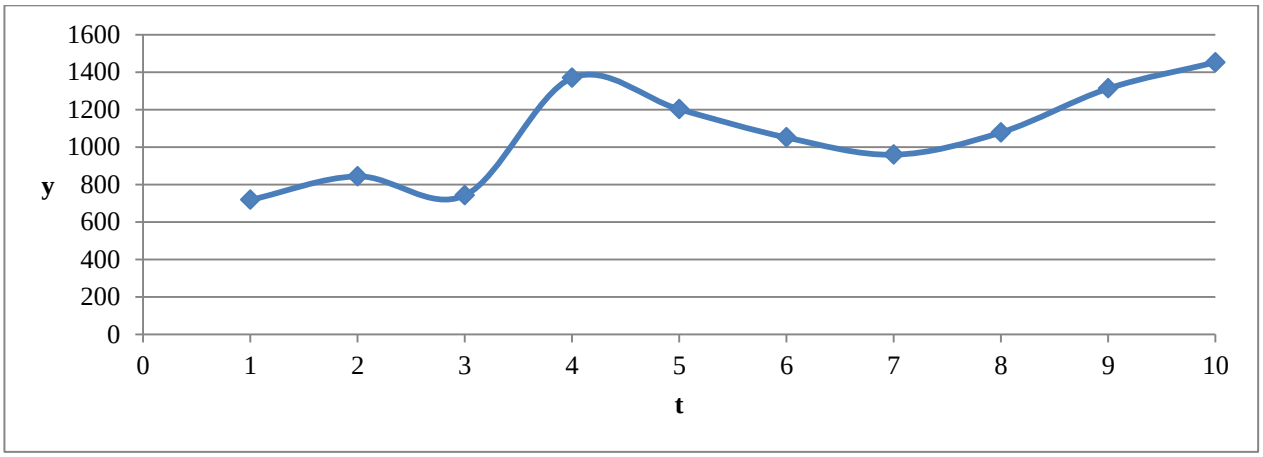

Fig. 4. Actual dynamics of the enterprises of agrarian and industrial complex of the Nikolaev area in 2011-2021 (t = 1 - 10).

We see that in general the dynamics of the indicator is positive, so the equation of the trend is modeled linearly:

$$y(t) \cong b \,.\, at \tag{1}$$

We apply the method of least squares, it leads to the system:

$$\begin{cases} bn \,.\, a \left| \; t_i \cong \right| \; y_i \\ b \left| \; t_i \,.\, a \right| \; t_i^2 \cong \left| \; y_i t_i \right. \end{cases} \tag{2}$$

Auxiliary data:

Table 1. The calculation table for construction of model of a linear trend of volumes of export of the enterprises of agrarian and industrial complex of the Nikolaev area

	t	y	t*t	y*t
	1	718,3	1	718,3
	2	843,8	4	1687,6
	3	742,7	9	2228,1
	4	1369,1	16	5476,4
	5	1201,6	25	6008
	6	1051,1	36	6306,6
	7	959,3	49	6715,1
	8	1078,1	64	8624,8
	9	1312,6	81	11813,4
	10	1452,2	100	14522
Σ	55	10728,8	385	64100,3

Substitute for the system:

$$\begin{cases} 10b\,.\ 55a \cong 10728.8 \\ 55b\,.\ 385a \cong 64100.3 \end{cases}$$

System solutions:

b = 733,42;

a = 61,72.

Trend equation:

$$y(t) \cong 733.42\,.\ 61.72t$$

The value of the regression coefficient a = 61.72 means that on average every year the export of products of agricultural enterprises of the Mykolayiv region increases by 61.72 million dollars USA.

Predicted values:

y(2019) = 733,42 + 61,72*11 = 1412,34 million dollars USA;

y(2020) = 733,42 + 61,72*12 = 1474,06 million dollars USA.

Forecasting for the Kherson region, the actual dynamics is shown in Fig. 5. We see that in general the dynamics of the indicator is also positive, so the equation of the trend is modeled linearly:

$$y(t) \cong b\,.\ at \qquad (3)$$

Auxiliary data:

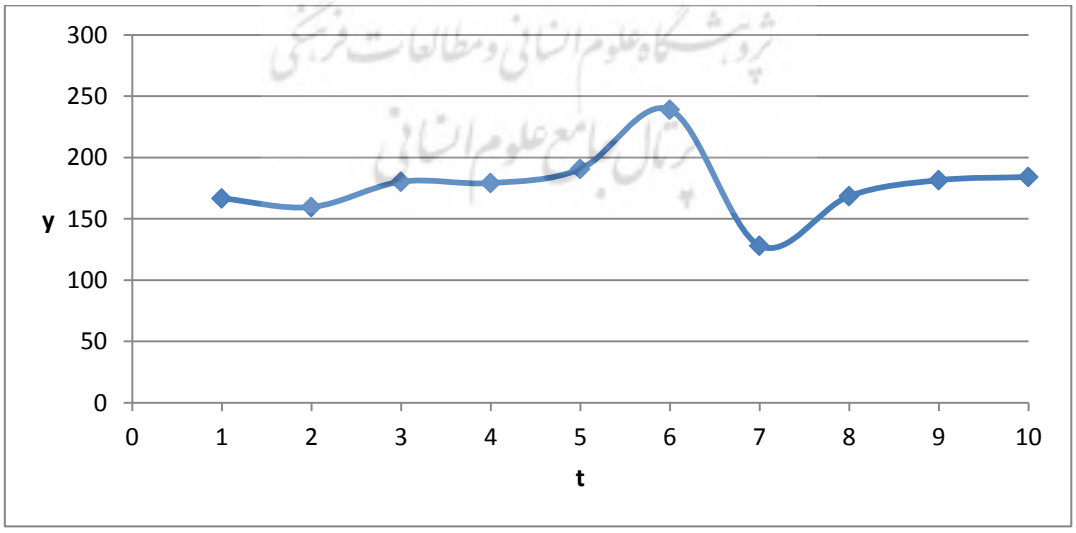

Fig.5. The actual dynamics of agricultural enterprises in the Kherson region in 2011-2021 (t = 1 - 10).

Table 2. Calculation table for building a model of the linear trend of export volumes of agricultural enterprises of Kherson region

	t	y	t*t	y*t
	1	166,7	1	166,7
	2	159,6	4	319,2
	3	180,3	9	540,9
	4	179,1	16	716,4
	5	190,6	25	953
	6	238,9	36	1433,4
	7	128,1	49	896,7
	8	168,5	64	1348
	9	181,5	81	1633,5
	10	184,1	100	1841
Σ	55	1777,4	385	9848,8

Substitute for the system:

$$\begin{cases} 10b + 55a \cong 1777.4 \\ 55b + 385a \cong 9848.8 \end{cases}$$

System solutions:

b = 172,87;

a = 0,8861.

Trend equation:

$$y(t) \cong 172.87 + 0.8861t$$

The value of the regression coefficient a = 0.8861 means that on average every year the export of products of agricultural enterprises of Kherson region increases by 0.8861 million dollars USA. Predicted values:

y(2019) = 172,87 +0,8861*11 = 182,617 million dollars USA;

y(2020) = 172,87 + 0,8861*12 = 183,503 million dollars USA

Forecasting for Odessa region, the actual dynamics is shown in Fig. 6.

Fig. 6. Actual dynamics of agro-industrial enterprises of Odessa region in 2011-2012

(t = 1 - 10).

We see that in general the dynamics of the indicator is also positive, so the equation of the trend is modeled linearly:

$$y(t) \cong b \,.\; at \tag{4}$$

Auxiliary data:

Table 3. Calculation table for building a model of the linear trend of export volumes of agricultural enterprises of Odessa region

	t	y	t*t	y*t
	1	532,5	1	532,5
	2	549,6	4	1099,2
	3	552	9	1656
	4	673,8	16	2695,2
	5	695,5	25	3477,5
	6	989,4	36	5936,4
	7	967,8	49	6774,6
	8	1169,5	64	9356
	9	1274,5	81	11470,5
	10	1200,8	100	12008
Σ	55	8605,4	385	55005,9

Substitute to the system:

$$\begin{cases} 10b \,.\; 55a \cong 8605.4 \\ 55b \,.\; 385a \cong 55005.9 \end{cases}$$

System solutions:

b = 348,79;

a = 95,045.

Trend equation:

$$y(t) \cong 348.79 \,.\; 95.045t$$

The value of the regression coefficient a = 95.045 means that on average every year the export of products of agricultural enterprises of Odessa region increases by 95.045 million dollars USA. Predicted values:

y(2019) = 348,79 + 95,045*11 = 1394,285 million dollars USA;

y(2020) = 348,79 + 95,045*12 = 1489,33 million dollars USA

Many companies today are interested in reducing the risks associated with running their own business. This causes a rather rapid growth of consulting firms. The most popular are IT consulting services with the largest market share, market research, financial consulting and auditing, while environmental consulting is only gaining momentum. In the long run, services will be developed based on innovative management concepts and tools that will ensure the strategic competitiveness of customers. Consumers of services are metallurgy, energy, construction, telecommunications, chemicals, food industry, trade and distribution, media

companies, the financial sector. In general, the consulting industry of Ukraine has room to move and there are reserves for domestic consulting companies to occupy larger shares in the market of consulting services.

In general, the volume of exports of the Black Sea region according to these models in 2022 is projected at 2989.242 million dollars, and in 2023 - at 3146.893 million dollars. This is, so to speak, a realistic forecast, which is based on the assumption of the preservation in 2022-2023 of all important factors.

In general, for the Black Sea region to further intensify the foreign economic activity of enterprises should solve two main problems: to overcome excessive dependence on exports of plant products (and other products with low added value) and to intensify the export capacity of Kherson region.

The main problems and obstacles to the development of consulting in the system of foreign economic development of the agri-food sector at the regional level: low level of awareness of the need for consulting, limited investment, weak development of the industry; high cost and complexity of access to consulting services, the presence of informal institutions, unaccounted services; lack of information about the system of foreign trade consulting, underdevelopment of the institution of property; high level of competition from leading international consulting organizations; lack of systematic interaction between the government, foreign trade entities and consulting firms; limited resource potential for the development of consulting companies. (Bukht R and Heeks R (2017), Eastwood, B., Kipping, M. (1999)).

It is appropriate to propose strategic priorities and consulting on foreign economic development of the agri-food sector at the regional level:

1) development of domestic consulting organizations;

2) improvement of opportunities for access of subjects of foreign economic development of agro-food sphere to consulting services;

3) strengthening of consulting support of the state policy of development of foreign economic association of agro-food sphere;

4) improving the quality and reducing the monopoly on state information and consulting services;

5) development of the institutional base and infrastructure of consulting support of the foreign economic association of agro-food sphere;

6) coordination of state priorities for the development of foreign economic development of the agri-food sector, the interests of its participants, market institutions and enterprises in the field of consulting.

The main results of the development of consulting support for foreign economic development of the agri-food sector should be: expanding opportunities, increasing the number and volume, improving the quality of services and efficiency of consulting organizations; intensification of the demand for consulting from the subjects of foreign economic activity; ensuring transparency, reducing transaction costs of foreign economic association entities in obtaining state information and consulting services, improving the competitive environment and increasing market capacity for non-governmental consulting organizations; formation of the effect of synergy of development (effective and rational) of the sphere of foreign economic association and its subjects, infrastructure and consulting; formation of favorable for the development of consulting in the system of foreign economic association institutional environment.

At the same time, within the long-term perspective it is appropriate to outline the directions of improvement of consulting support of foreign economic development of agro-food sphere:

1. Development of national legislation on the development of the foreign economic sector.

2. Signing of international agreements, accession to existing international economic organizations.

3. Licensing, quotas and certification of export-import operations, tax and customs tariff regulation.

4. Providing access to information on the state of the domestic market, the state of production and financial resources.

Conclusion

This study considers the development of IT-consulting in the system of foreign economic activity of the region's agro-industrial complex. The institutional priorities of IT-consulting services in the system of foreign economic development of agro-food production of the region are established. The mechanism of development of the system of regional IT-consulting for stimulation of foreign economic activity of agro-food sphere is offered. The basic elements of development and functioning of the international infrastructure of regulation and self-regulation of IT-consulting services are investigated. It is determined that in the long run the services will be developed on the basis of innovative concepts and management tools to ensure the strategic competitiveness of customers. The consumers served are metallurgy, energy, construction, telecommunications, chemical industry, food industry, trade and distribution, media companies and the financial sector. In general, the consulting industry in Ukraine has some space, and domestic consulting companies also have a significant share of reserves in the market of consulting services. The estimated value of exports of the Black Sea region according to the models in 2022 is projected at the level of 2989.242 million dollars, and in 2023 - at the level of 3146.893 million dollars. It is proved that for further intensification of foreign economic activity of enterprises two main problems should be

solved: to overcome excessive dependence on export of plant products (and other products with low added value) and to intensify export capacities of Kherson region.

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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