COMPETITIVENESS
OF THE AGRARIAN SECTOR
OF UKRAINE
IN THE CONDITIONS OF INTEGRATION TO THE EUROPEAN MARKET

SCIENTIFIC MONOGRAPH

by

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PROLOGUE-REVIEW

Competitiveness of the Agrarian Sector of Ukraine in the Conditions of Integration to the European Market

A review by John Ikerd

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Review

The authors of this book update the economic theory of comparative advantage to reflect the realities of competitiveness in today's global economy. They begin by reviewing various economic theories of competition and competitiveness, which provide the conceptual foundation for further theoretical development. Their emphasis on the agrarian sector of Ukraine implicitly recognizes that the classical assumptions of comparative advantage and competitiveness are no longer adequate in today's economic environment. Unlike in the times of Adam Smith and David Ricardo, today capital, labor, and technology can easily move across national borders in search of higher economic returns. The competitiveness of any nation ultimately depends on its potential competitive advantage in the development of its geographically-fixed resources — in the case of Ukraine, its fertile farmland.

The ease with which capital, technology, and labor move across national economic boundaries is affected by national public policies and international agreements. The authors recognize that a nation's public policies must serve public interests by improving the quality of life of the nation's people—not simply promoting economic growth. In many situations today, the economic benefits from developing a nation's natural resources go largely to other nations' investors, technology owners, or temporary workers. In addition, the political sovereignty and economic security of a nation ultimately depends on its ability to meet the basic economic and noneconomic needs of its people. These basic needs include sufficient wholesome, nutritious food and a clean and healthful living environment. Thus, the logic of focusing on organic agriculture as a strategy for achieving sustainable international competitiveness of Ukraine.

With the ongoing integration of Ukraine into the European Union (EU), the continuing competitiveness of Ukraine's agrarian sector will depend on its ability to compete as it moves toward harmonization of its national policies with the Common Security and Defense policies of the EU. The international competitiveness of Ukraine's agrarian sector will depend not only its competitiveness with other members of the European Market but also the competitiveness of the EU in the global economy. The authors provide a comprehensive enumeration and assessment of the quantitative and qualitative factors that Ukrainian policy makers must consider in developing a comprehensive strategy to meet this challenge. This aspect of the

book may prove most useful to Ukrainian government officials in developing national economic and trade policies.

The authors recognize that qualitative judgements of policymakers may be more useful than traditional quantitative models in assessing the competitiveness of Ukraine's economy. They propose using sophisticated trade models that utilize both qualitative and quantitative information to inform political decisions. One analytical approach, called "fuzzy logic", allows objective conclusions to be derived from subjective information. However, the authors emphasize that their models are to be used to inform rather than replace the judgement of policymakers. The primary theoretical contribution of the book is that it recognizes the crucial roles and social responsibilities of national governments in assessing and affecting the international competitiveness of their economies.

Short biographical data

Dr. Ikerd was raised on a small dairy farm in southwest Missouri and received his BS, MS, and Ph.D. degrees in agricultural economics from the University of Missouri. He worked in private industry for a time and spent thirty years in various professorial positions at North Carolina State University, Oklahoma State University, University of Georgia, and University of Missouri before retiring in early 2000. Since retiring, he spends most of his time writing and speaking on issues related to sustainability with an emphasis on economics and agriculture.

Since retiring from the University of Missouri, Ikerd has maintained an active speaking schedule, typically speaking at 20 to 25 different non-local events per year, including venues all across the United States and Canada, Australia, Norway, Sweden, Scotland, South Korea, Costa Rica, Finland, China, Poland, and most recently Colombia, Brazil, and Italy. Most of these presentations relate to sustainable agriculture, organic farming, small farms, agricultural industrialization, and quality of life issues. However, many presentations relate to broader issues of food, economics, globalization, social change, and personal transformation. Since retiring, he has also written six books, ten chapters for books, and five forwards for books written by others.

In 2014, John Ikerd was commissioned by the Food and Agriculture Organization of the United Nations to write the regional report, Family Farms of North America, in recognition of the International Year of the Family Farm. This report led to speaking engagements in Italy, Brazil, and China, where he presented the case for independent family farms as a viable alternative to industrial agriculture.

Prior to retirement, Dr. Ikerd state co-coordinator for Missouri of sustainable agriculture extension programs from 1995 to 2000. Ikerd was responsible for implementing state-wide professional development programs related to sustainable agriculture. Other major research and educational programs included participatory on-farm research and demonstration programs and evaluation of impacts of sustainable agriculture on the quality of life of farm families and others in rural communities. Dr. Ikerd was project leader for a three-state, five-year program from 1995 to 2000, with funding from the W.K. Kellogg Foundation, linking sustainable agriculture and sustainable community development.

Co-coordinator of Sustainable Agriculture Extension Programs, University of Missouri--1995 to 2000. Liaison to States in Southern and Northeast Regions, USDA Sustainable Agriculture Research and Education (SARE) program--1993-1995. Professor and Head, Department of Extension Agricultural Economics, University of Georgia, 1984-1988. President, Southern Agricultural Economics Association, 1986 (Also served as first and second vice president, president elect, and past president, SAEA 1983-87). Professor and Extension Economist, Department of Agricultural Economics, Oklahoma State University, 1976-1984. Associate Professor and Extension Economist, Department of Economics, North Carolina State University, 1970-76.

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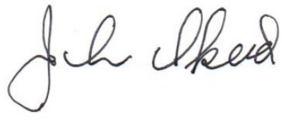

John E. Ikerd
21/12/2020

Review to book:

"Competitiveness of the Agrarian Sector of Ukraine in the Conditions of Integration to the European Market"

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Review

Nowadays, economic growth of countries is highly determined by the consistent extroversion and internationalization of local markets toward an international marketplace. In pursuing such an economic growth, countries are predominately requiring to optimize the developmental capabilities in the industrial, manufacturing and agrarian sectors. In this context, the developmental opportunities of the Ukrainian national economy are certainly linked to optimization of products and services offered at its agrarian sector. In response to an imperative epistemological need of approaching the historical status, the present situation, and the challenging prospects of the agrarian sector of Ukraine, it is my pleasure to read the book titled "Competitiveness of the Agrarian Sector of Ukraine in the Conditions of Integration to the European Market". The book chapters are covering a broad theoretical, methodological and strategic background, in order to evaluate the contribution of the national agrarian sector toward both the economic growth of Ukraine, and the competitiveness of national agrarian products at the European agrarian market. The multi-parametric analyses, the institutional conditions, and the mathematical models of forecasting the aforesaid national-European transition, they have been deployed in a systematic and integrated manner. Moreover, the book chapters have been accompanied by an impressive plethora of Annexes, thus adding value to the book content. The combination of these features makes a timely book that is both useful and unique.

Short biographical data

Dr. Grigorios L. Kyriakopoulos is a Teaching and Research Associate at the School of Electrical and Computer Engineering, National Technical University of Athens (NTUA), Greece. Over the period 1991-2018 he completed a broad range of University qualifications including: Chemical Engineering (Meng, PhD, PostDoc), Environment (BSc, 2 MSc), Business Administration (BA, MA), Hellenic Culture (BA, MA), Energy (MSc), Education (PGCE), Psychology (PGCert). He authored or co-authored 55 papers at 34 journals, 11 invited book chapters, and 30 papers at conferences. He was also guest editor, associate editor, handing editor, or editorial board member, at 20 scientific journals. He is reviewer of more than 3800 manuscripts at more than 260 scientific journals. His research interests are: Engineering, Environmental Systems and Remediation, Energy, Renewable Energy Sources, Analytical Techniques, Development Economics, Behavioural Ecology.

Grigorios Kyriakopoulos

Grigorios L. Kyriakopoulos
07/12/2020

ABBREVIATIONS

AIC – Agroindustrial complex.
DCFTA – Deep and Comprehensive Free Trade Areas.
DIF – Differential shift effect.
CAP – Common Agricultural Policy.
CIS – Community of Independent States.
CMO – Common Market Organizations.
EAGF – European Agricultural Guarantee Fund.
EAFRD – European Agricultural Fund for Rural Development.
EBITDA – Earnings before interest, taxes, depreciation and amortization.
EBRD – European Bank for Reconstruction and Development.
ETS – Emissions Trading System.
EU – European Union.
FAO – Food and Agriculture Organization.
FTA – Free Trade Area.
FTZ – Free Trade Zone.
GCI – Growth Competitiveness Index.
GDP – Gross domestic product.
IFOAM – International Federation of Organic Agriculture Movements.
IFC – International Finance Corporation.
ISO – International Organization for Standardization.
LFI – Lafayette index.
LLC – Limited Liability Company.
MF – Membership function.
PE – Private enterprise.
PESTEL – The method describes a framework of macro-environmental factors (political, economic, socio-cultural, technological, ecological, law) used in the environmental scanning component of strategic management.
SS – State Standard.
SWOT – Strategic planning technique identify strengths, weaknesses, opportunities, and threats related to business competition or project planning.
VAT – Value Added Tax.
VCS – Voluntary Coupled Support.
UAH – National currency of Ukraine – hryvnia.
USD – National currency of The United States of America – dollar.
WEF – World Economic Forum.
WTO – World Trade Organization.

FOREWORD

At the present stage of the global economic environment evolution and the formation of international markets for goods and services, the development of competition prevails, which is the basic mechanism for ensuring the economic development of the country in the context of transformations. The processes of internationalization and globalization increase the interdependence and interconnection of national economies, thus creating opportunities for the development of international competition. In this case, the development trends of the national economy of Ukraine require an increase in the rate of development, production and sale of products manufactured by domestic producers, the introduction of resource-saving technologies and the use of effective procedures for managing production processes in order to ensure the international competitiveness of the Ukrainian economy.

The competitiveness of a country is determined by the competitiveness of its sectoral complexes. The need to ensure the food security of the country, meet the needs of the population for food and increase the socio-economic efficiency of agriculture brings to the fore the task of increasing the competitiveness of the agrarian sector of Ukraine. Without highly efficient and competitive agroindustrial production it is impossible to solve many urgent and strategic tasks of developing a socially oriented economy of the country and forming a civilized agrarian market.

Among the significant researches of theoretical and methodological foundations of formation and development of competitiveness of branch complexes it is worth mentioning the works of such foreign scientists as: L. Abalkin, G. Azoev, O. Williamson, D. Gelbraith, E. Dakhmen, M. Enright, J. Johansen, J. Ikerd, M. Castels, J. M. Keynes, R. Coase, R. Miles, A. Marshall, B. Milner, D. North, R. Paturel, F. Perru, M. Porter, S. Rosenfeld, J. Ramanauskas, I. Tolenado, G. Torelli, V. Feldman, J. Schumpeter, R. Fathutdinov, A. Yudanov.

Issues of development of competition and competitiveness of national economic complexes in the conditions of globalization and European integration processes are devoted to the works of scientists:

V. Andriychuk, V. Baidala, O. Bilorus, B. Burkynskyi, N. Vdovenko, V. Vlasova, A. Voychak, V. Heyets, O. Hudzynskyi, H. Zabolotnyi, Y. Zhalilo, M. Ilchuk , H. Kaletnik, V. Kozlovskyi, N. Kochergina, V. Kurylo, Y. Lupenko, P. Makarenko, M. Malik, H. Mazur, S. Mocherny, O. Ulyanchenko, I. Okhrimenko, V. Sytnik, O. Shpychak.

The scientific works of these scientists are of great scientific and practical importance, they formed the methodological basis of this problem and, in their totality, created a reliable theoretical base for further research. However, not all problems have been fully resolved. Thus, the issues of mechanisms for ensuring the competitiveness of Ukraine's agrarian sector under conditions of integration into the European market remain insufficiently elaborated.

In the context of integration into the European market, it is important to develop further the institutional foundations of competitiveness of the Ukrainian agrarian sector. It is necessary to ensure a high-quality level of competitive advantage management at all stages of production, which will stimulate the economic development of the country. Increasing the need for a long-term balance of the economic system requires improving the efficiency of determining the competitive advantages of national producers on the basis of a comprehensive analysis of internal and external factors of competitiveness, the links between them, the characteristics of institutional functioning of markets and the degree of openness of economic systems. It is advisable to increase the intensification of agroindustrial production, by ensuring the level of profitability and profit of agriculture sufficient for expanded reproduction, investment and scientific and technological progress.

The purpose, objectives and structure of this study are due to insufficient scientific elaboration of the theoretical and methodological aspects of the development of competitiveness of the agrarian sector of Ukraine in the conditions of integration into the European market.

The scientific novelty of the results obtained is to justify the proposals and to develop recommendations on enhancing the competitiveness of Ukraine's agrarian sector in terms of integration into the European market. The paper defines conceptual approaches to the

formation of the concept of "Smart Competitiveness of Agroindustrial Complex" ("Smart Competitiveness"), which will provide a comprehensive implementation of the tactical and strategic priorities of the development of the domestic agroindustrial complex in terms of integration into the European market. An economic-mathematical model for assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine, based on the theory of fuzzy logic, which allows to determine the level of competitiveness of the agroindustrial complex of Ukraine with dynamic changes in the linguistic parameters of the model. Methodical bases of an estimation of the international competitiveness level of an agroindustrial complex are formulated, giving the chance to increase efficiency of definition of competitive advantages of national manufacturers. The generalization and systematization of the experience of using the elements of the institutional environment of the EU agrarian market is made, which will help to strengthen the efficiency of managing the competitiveness of the agrarian sector of Ukraine.

The practical significance of the obtained results is that the theoretical provisions and practical conclusions made in this work can be used in the activity of state authorities and local self-government at all levels of government in carrying out complex measures aimed at ensuring the competitiveness of the Ukrainian agrarian sector. The conclusions, suggestions and recommendations given in the paper can be used as a tool for developing and adjusting the economic policy of the state, as a mechanism for ensuring the competitiveness of the Ukrainian agrarian sector in the conditions of integration into the European market.

CHAPTER 1.
THEORETICAL-METHODICAL FUNDAMENTALS OF INTERNATIONAL COMPETITIVENESS FORMATION OF UKRAINE'S ECONOMY IN THE AGRARIAN SECTOR

1.1. Theoretical and methodological principles of the international competitiveness formation system of the country's economy

The international competitiveness of national production as an object of study of economic science has emerged relatively recently and is a complex economic category. It includes a wide range of approaches of defining the nature, role and mechanisms of realizing competitive advantages in a globalized environment. Competitiveness of the national economy, methods of its definition and improvement are constantly in the focus of attention of scientists all over the world, because adequate assessment of the current state of competitiveness significantly affects the formation of tactical and strategic goals of state development. That is why the analysis and characterization of scientific approaches to the definition of basic concepts will allow to form a qualitative theoretical and methodological base of research, and to highlight the current parameters of the development of global economic systems, to highlight the main characteristics and features of this economic category.

The study of the determinants of country's international competitiveness system formation requires to find out the essence of the category "competition", because they are closely interrelated – competitiveness exists only in the presence of competition between manufacturers of certain products or services.

Competition as an economic phenomenon arose from the development of production, exchange and consumption of works, goods and services and the emergence of the state as a subject of political power. The basis of competition theory in ancient times was the mechanisms of use of existing natural or technological advantages

in the manufacture of certain products, as well as the possibility of their realization in the domestic and foreign markets. Manufacturing required considerable labor and time consumption, which diminished the opportunities for the full growth of the economy of the country, so small producers began to unite, create artisan unions and workshops, thus increasing their competitive advantages.

The competition comes from the lat. concurentia – competition, and defined as economic struggle, competition between producers of products, works, services to meet their interests related to the sale of these products, works performed, providing services to the same consumers. It is an incentive for business entities to develop and improve production, reduce costs, improve the quality of products sold in the market, which in turn allows to increase its competitiveness [41].

The basis of competition theory was described by a representative of the classic economic theory, A. Smith, in "An Inquiry into the Nature and Causes of the Wealth of Nations" [166] (Appendix A). Analyzing the price that is formed in the market through supply and demand, the author considers competition as an element of the market mechanism, which allows to smooth out the imbalances arising in the market and to provide conditions for efficient and balanced development of the economic system as a whole. Competition arises not only between sellers for buyers, but also between buyers for goods, so this causes a certain deviation of the market price from the equilibrium.

The founder of neoclassical direction A. Marshall in his works approached the definition of competition through the competition of one person with others, especially in the process of selling or buying something. This approach reveals the peculiarities of interaction of market actors, but does not reflect the tools by which this interaction takes place [113]. Marshall also substantiated a set of mechanisms by which the automatic equilibrium is marketed in the conditions of perfect competition.and the application of marginal utility and productivity laws. Economics authors McConnell C. and Brue S. consider competition as having more and more independent buyers and sellers on the market, and an opportunity for them to enter and leave freely,

which qualitatively complements A. Marshall's views on perfect competition [108].

G. Y. Kiperman defines competition as the process of interaction, interconnection and struggle of manufacturers and suppliers in the sale of products, economic rivalry between isolated producers or suppliers of goods (services) under the most favorable conditions of sale. P. S. Zawyalov and B. A. Reizberg also share the same opinion. I. A. Spiridonov, in turn, adds to this definition the motives of the enterprises in the market, such as providing the best opportunities for marketing their products, meeting different needs of customers and obtaining the highest profit [55, p. 23].

N. I. Pertsovsky considers competition through the process of managing an entity's own competitive advantages to achieve its goals in the fight against competitors, to meet objective and subjective needs within the law or in natural conditions. This approach necessitates the formation of a system of criteria for determining comparative advantages and developing a mechanism for their use in practice, which will improve the efficiency of competitiveness management [118, p. 74]. T. V. Yureva says there is a constant competition between producers for the most profitable areas of investment, markets and sources of raw materials [213, p. 328]. This competition leads to economic losses for some market participants, and benefits – and, consequently, profits – for others. R. A. Fatkhutdinov argues that competitions, when independent actions of competitors effectively limit the ability of each of them to unilaterally influence the general conditions of circulation of goods on the corresponding the commodity market allows to increase the qualitative characteristics of the functioning of the market, to create preconditions for the development of perfect competition and to provide opportunities for sustainable economic development in the country [189, p. 436].

Well-known american economist M. Porter points out that competition must be based on a comprehensive understanding of the structure of the industry and the processes of its change. The essence of competition is expressed by five factors: threat of competitors

comming, threat of goods-substitutes appear, ability of suppliers of component products to bargain, ability of buyers to bargain, rivalry of already existing competitors among themselves [147, p. 52–53]. Businesses find competitive advantage through a variety of innovative processes, including new technologies and new ways of doing business. They open new areas of competition or find the best means of doing so in the past. Innovation can be expressed in a new product design, a new production process, a new approach to marketing, or a new training method. Many innovations are of a private nature and are small in scale; they are often the result of steps related to well-known ideas that have never been thoroughly studied before. Innovation always involves investing in the acquisition of skills and knowledge, as well as tangible assets and the firm's reputation. Some innovations create a competitive edge by being aware of brand new opportunities that are emerging in the market or by serving a market segment that is ignored by other firms. In cases where competitors are in no hurry to respond, this innovation brings the firm a competitive edge.

Regulatory consolidation of the concept of economic competition is presented in the Law of Ukraine "On Protection of Economic Competition" as a competition between economic entities in order to gain due to their own advantages over other economic entities, whereby consumers, economic entities have the opportunity to choose between several sellers, buyers, and the individual entity cannot determine the conditions of turnover of goods in the market [57].

Analyzing the concept of competition it is necessary to examine its structure. As the data of fig. 1, there is a subject and an object in the competition structure. The subject may be an individual product, a national economy, a country, and the object is the cause of competitive relations (the struggle for investment, for technology, for information, price struggles, the struggle for markets).

Competition exists from the macro level to the mega level of the economic system. In transitional and crisis periods, it exhibits its peculiarities and specificities: due to the increase of dynamism and aggressiveness of market participants, competition becomes difficult,

multifactorial, simultaneously in many manifestations and aspects, which is why a large number of enterprises are closed during crises.

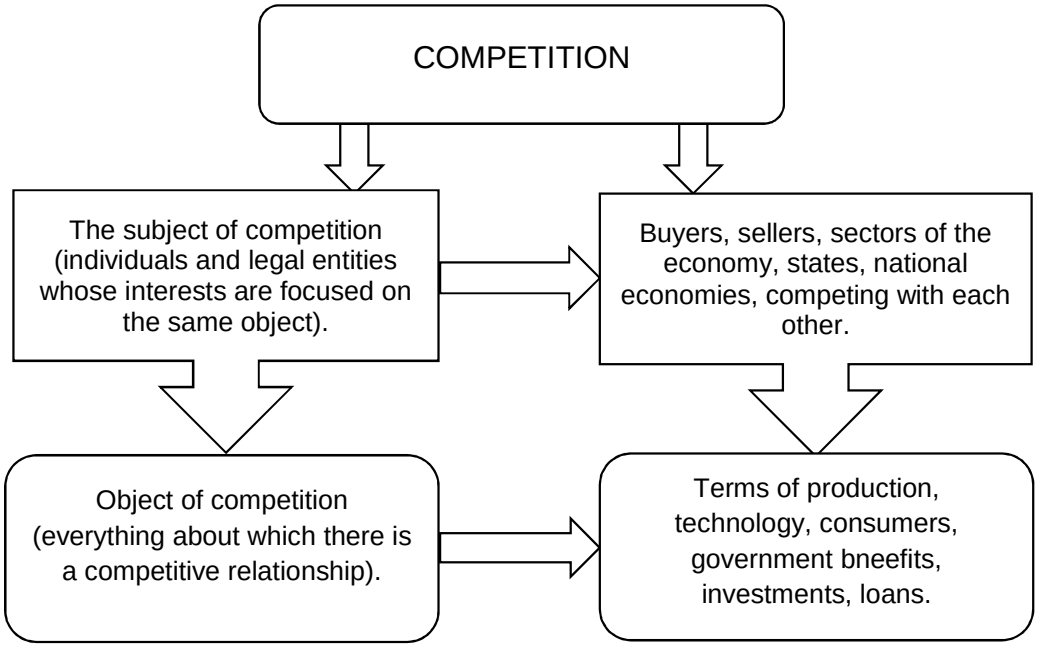

Figure 1.1 – The structure of competition

F.V. Gorbonos argued that competition is an economic competition of manufacturers of identical products in the market aimed at to attract as many consumers as possible, thereby maximizing the benefits. B. Carloff views competition as a process of managing a subject's competitive advantage in order to win or achieve other goals in the fight against competitors to meet objective or subjective needs within the law [31].

An analysis of the competition definitions shows that scientists take into account the multidimensional aspects of this issue: its modern dynamism, coerciveness, indisputable connection with innovation and investment. According to T. I. Goncharuk, competition performs a number of important functions, which he divided into two groups, depending on the coverage of economic space. Macroeconomic group: regulatory, controlling, unifying, function of socializing progress and profitability. Microeconomic group: stimulating, innovative, adaptive. Distributive and selective exist at micro and macro levels [155].

According to M. Porter [148], competition must be based on a comprehensive understanding of the structure of the industry and the process of changing it. The essence of competition is expressed through five forces: the threat of competitors, the threat of substitutes, the ability of suppliers of components to bargain, the ability of buyers to bargain, the rivalry of existing competitors among themselves. It was at that time that competition became internationally and globally significant. However, scientific and technological progress, transformational processes in global economic markets, and the volatility of geopolitical attitudes give the competition new features, which are reflected in fig. 1.2.

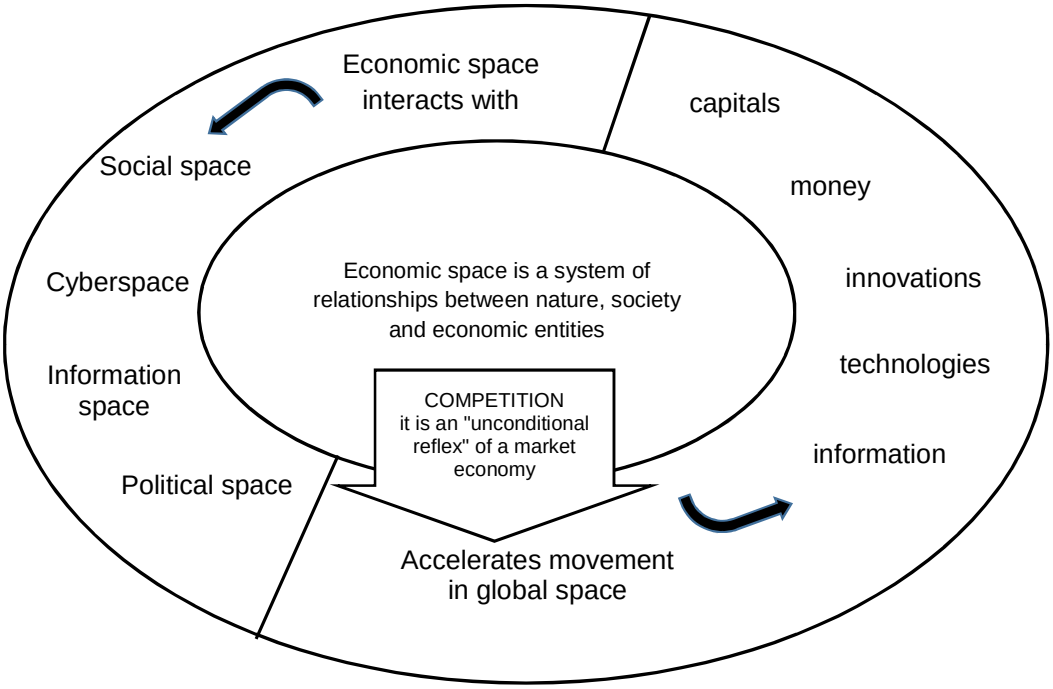

Figure 1.2 – The manifestation of competition in modern globalization processes

Based on the above, we can provide an author's interpretation of the competition "Competition is an integral, entrenched form of responding to economically, socially, politically significant actions of the outside world or changes in the internal environment of the object un-

der study in the context of globalization and turbulence of world processes, which in its essence becomes a catalyst for speed of movement, money, capital, information, innovation, scientific knowledge, technology".

The role and function of competition in the global economy has led to the continued interest of scientists in this concept. Theoretical studies in which competition has been the object of study, especially in the context of economic transformation, which determined the socio-economic structure of the world economy, allowed us to form several complementary approaches: behavioral, market, entrepreneurial, evolutionary, reproductive.

In a behavioral approach, the content of competition is explained as rivalry, gaining an advantage in the production and realization of rare goods. The scope of competition is limited to commodity and resource markets, and price is the main object of competition. The main function of competition is to focus production on demand-producing goods, to influence the economy by bringing production structure in line with demand structure [199, p. 14].

The market approach is to recognize the simultaneous existence of several types of market competition, mostly imperfect. The content of competition is determined by the ability to influence the pricing of goods, as well as the struggle for increasing role in the market. However, the area of competition remains unchanged, it operates only in commodity and resource markets. The basic element of competition is the reduction of the price of goods and services in order to ensure a balance between supply and demand.

In turn, the entrepreneurial approach is based on comparing the available alternatives to the use of resources and confirming that the decision is made to the real needs. The object of competition in this case is the innovation process, the modernization of production, the use of modern technologies and changes in organization and management. The main function of competition is to stimulate innovation, identify and support its most innovative elements.

However, the evolutionary approach is to select the most

effective options for competitive interaction and to check the compliance of the firm with the logic of market conditions. The object of competition is the principles of organization and functioning of the market, represented by standards of behavior, and the field of competition is limited by the institutional aspect of market and investment activities. Its main function is to develop a propensity for self-improvement and to seek new ones methods and methods of competition, selection of the most effective forms of organization and management.

The content of the reproductive approach is to identify the goals of market competition as a struggle for the profitable use of capital and its efficient use. This type of competition is decisive in the upstream phase of the capital life cycle. Thus, the analysis of approaches to the characteristics of competition showed that this concept is decisive in the process of forming an enterprise management strategy and creates prerequisites for the development of market relations based on the principles of efficiency, meeting the needs of both consumers and producers and fairness.

The result of competition is competitiveness, which is manifested in the struggle between various market actors for more favorable and economically optimal results of production and sale of products, works and services, for better quality of valued goods and customer service. As the market conditions of the enterprise's operation require new strategic approaches to solving the problem of their competitiveness, the efficiency of the enterprise's operation requires active search and development of its own strategy for enhancing their competitiveness. It is the competitive strategy that determines the direction of activity of the enterprise in determining the type of competitive advantage and formation of resource potential of its realization. Competitive advantage is a significant factor in the competitive situation on the market. They are determined by a set of characteristics and properties of goods that create certain advantages for businesses over direct competitors. The quantitative assessment of the level of competitiveness of the enterprise allows it to purposefully shape and

distribute its resource potential and thereby ensure its competitiveness.

At present, competitiveness is one of the most important features of today's business environment. L. L. Antonyuk characterizes competitiveness as ownership of a subject certain qualities that enable it to develop on an innovative basis and to win in competition. It is determined that an important sign of a country's competitiveness is the ability of its subjects to respond promptly to changes in world demand and production structure [2, p. 62].

Thus, Y. B. Bazylyuk defines competitiveness in his works as an economic category, which characterizes the state of public relations in the country in terms of providing conditions for sustainable improvement of the national economy efficiency, adapted to changes in the global market and domestic demand based on the disclosure of national competitive advantages and achievement better than competitors, socio-economic parameters [9, p. 130]. At the same time, M. Porter, based on the analysis of the competitive advantages of the firm, characterizes competitiveness as the property of the goods, services, the subject of market relations to act on the market alongside with the similar goods, services or competing entities present there of market relations [148]. Interesting are the views of V. E. Khrutsky and I. V. Korneeva, who characterize competitiveness as a stable opportunity to satisfy certain needs of customers better than competitors, and therefore successfully sell products with acceptable financial results for the manufacturer. W. Stevenson focuses on the effectiveness of the company in meeting its customers' needs compared to other companies offering such a product or service. This requires not only the demand for products, but also the tastes and tastes of consumers, which is quite difficult for the enterprise or the economy as a whole. A similar opinion is held by M. I. Knysh, who understands competitively the degree of attractiveness of a given product, to a consumer who generates solvent demand [109].

Only enterprises with a high level of competitiveness can exceed or exceed the average profit, since their costs will be much lower than

their competitors, and the short-term period will not allow them to re-tool their own production [58]. Also, due to the relationship between manufacturers, competitiveness is also determined by M. O. Ermolov, who characterizes it as a relative characteristic, which reflects differences in the process of development of a certain manufacturer from its competitor, both in terms of satisfaction with its own goods and in the efficiency of production activity. While V. P. Groshev sees in the competitiveness complex of consumer properties of the goods, which determines its difference from other similar products in terms of the deg-ree and level of satisfaction of customer needs and the cost of its purchase and operation.

In the Encyclopedia of Businessman, Economist, Manager, the competitiveness of an enterprise is defined as its level of competence in comparison with other competing enterprises in such parameters as technology, practical skills and professional knowledge of staff, the level of strategic and current planning, sales policy , the level of management, communication, quality of production management systems, which quite broadly discloses all aspects of the enterprise's activity, through which its economic potential is realized [51].

Competitiveness as a complex multidimensional concept is considered in their works by scientists such as A. Pechinkin and V. Fomin, noting that it determines the ability of a product to occupy and hold a position in the competitive market for a certain period when competing with other similar products. They distinguish: the competitiveness of products – a property that is evaluated by the set of basic technical, economic, qualitative and cost indicators that distinguish a product from a competitor product and the level of product competitiveness is a relative characteristic of a product as a commodity, reflecting the degree of its superiority in a given market over a competing commodity. The competitiveness criterion proposes to take a relative share of the sales of goods evaluated [72, p. 145].

A rather complete definition is offered by R. A. Fatkhutdinov, who speaks about competitiveness as a property of an object, characterized by the degree of real or potential satisfaction of a specific need in

comparison with similar objects presented in this market. Competitiveness determines the ability to withstand competition over similar entities in the process of transformational changes in the economic environment [189]. In turn, I. O. Poddubny and A. I. Poddubna point out that competitiveness is a potential or realized ability of an economic entity to operate in a relevant external environment, which is based on and reflects competitive position relative to competitors.

Thus, the economic meaning of the concept of "competitiveness", with all the complexity and versatility of its internal content, lies in the ability of the entity to ensure the sustainable development of its activities in the current and long-term prospects. The main reason for the differences and diversity of the author's positions regarding the definition of the concept of competitiveness in the first place is the identification of the competitiveness of the enterprise and the competitiveness of products or services, the scope of consideration of competitiveness in a regional, national or world market (enterprise, industry, country), replacing one concept with another (competitive status, competitive level) and the characteristic of any component of the enterprise's competitiveness is the competitiveness of the production, labor potential.

As already mentioned, competition is an integral part of the market economy system. Changes to this institute occur not only through a passive reaction to international trade and flows of factors, but also through active institutional adaptation, in order to increase competitiveness in the struggle for the market share of mobile factors of production. The globalizing economy creates the preconditions for the emergence of stimulating (or systemic) competition.

Institutional systems, in the current context, influence the level of spending to such an extent that they are important elements of international competition, as a result, it can be argued that countries have to more or less openly compete with each other. It should be noted that while globalization has really taken international competition to a new level, the concept of institutional competition is not new. In A. Smith's work, "An Inquiry into the Nature and Causes of the Wealth of Nations", analyzing the expected response to differences in capital

taxation, he drew attention to the fundamental interaction between mobile and non-mobile factors of production and the evolutionary impact on the mobility of factors in the process of determining competitive advantages industry or country [166].

A powerful factor in institutional change is the openness of the economy. When previously closed political and economic systems are opened, power groups lose control and institutions inevitably change. Lower transport, communication and transaction costs in trade and the movement of some production factors have generally contributed to an increased openness of the economic system and reduced lobbying opportunities. Openness is a powerful incentive to reduce information costs. However, representatives of the neoclassical approach deny competition between countries in particular P. Krugman believed that "countries do not compete with each other as corporations". Like other neoclassic who typically considered zero transaction costs and, as a consequence, reduced the value of the analysis of the institutions available in the economy, he did not consider the proposal they were creating as a means of reducing costs and attracting mobile factors of production.

Institutional competition (or systems competition) emphasizes the importance of sets of internal and external rules for the national level of expenditures and thus international competitiveness. Globalization – with intensive trade and greater mobility of factors, it creates a close link with high-cost institutional systems and determines the need to adapt these systems to the international environment.

The quality of the institutional environment has a significant impact on competitiveness and economic growth. It affects investment decisions and production organization, and influences how companies distribute profits and bear the costs of implementing programs and strategies for their development. For example, owners of land, corporate stock or intellectual property will not invest in their property unless they are guaranteed the rights to it. The attitude of the authorities to the market, as well as the efficiency of its work, play an important role: bureaucracy, excessive state regulation, corruption, low

transparency, political dependence of the judiciary lead to significant economic costs for business and slow down the process of economic development, which in turn reduces competitiveness. The financial component of competitiveness is largely determined by the quality and conditions of formation and use of financial resources (ie investment attractiveness, solvency, liquidity, financial stability, efficiency and intensity of use of resources) and acts as an objective basis for the realization of conditions of economic conditions development.

The competitiveness of the country's economy is characterized by the state of a territorially separated independent political and economic entity, which retains its identity over a sufficiently long time interval, as well as the ability to further sustainable development on the basis of the accumulated innovation potential as an organic part of the world economy. The existence of a link between the dynamics of the country's economy potential and the level of competitiveness does not raise questions, and the competitiveness of the national economy is a concentrated expression of the economic, scientific, technical, industrial, managerial and other potential that it possesses and or another country and which is sold in goods and services that successfully withstand foreign goods competing with them in the domestic and foreign markets. Therefore, the competitiveness of the country's economy is its readiness for the future and lasting interaction on the international market as an independent and effective organizational structure of the world economy.

In the course of historical development, approaches to determining international competitiveness and its basic characteristics have undergone changes, which have been caused by the economic, political and social processes that took place in society during that period. The following economic theories of international competition can be distinguished on the basis of the analysis of the scientists' views: the theory of mercantilism, the theory of absolute advantages, the theory of relative advantages, the evolutionary theory, the theory of competitive advantages and the theory of global advancement of competitors (fig. 1.3) [181, 166, 113].

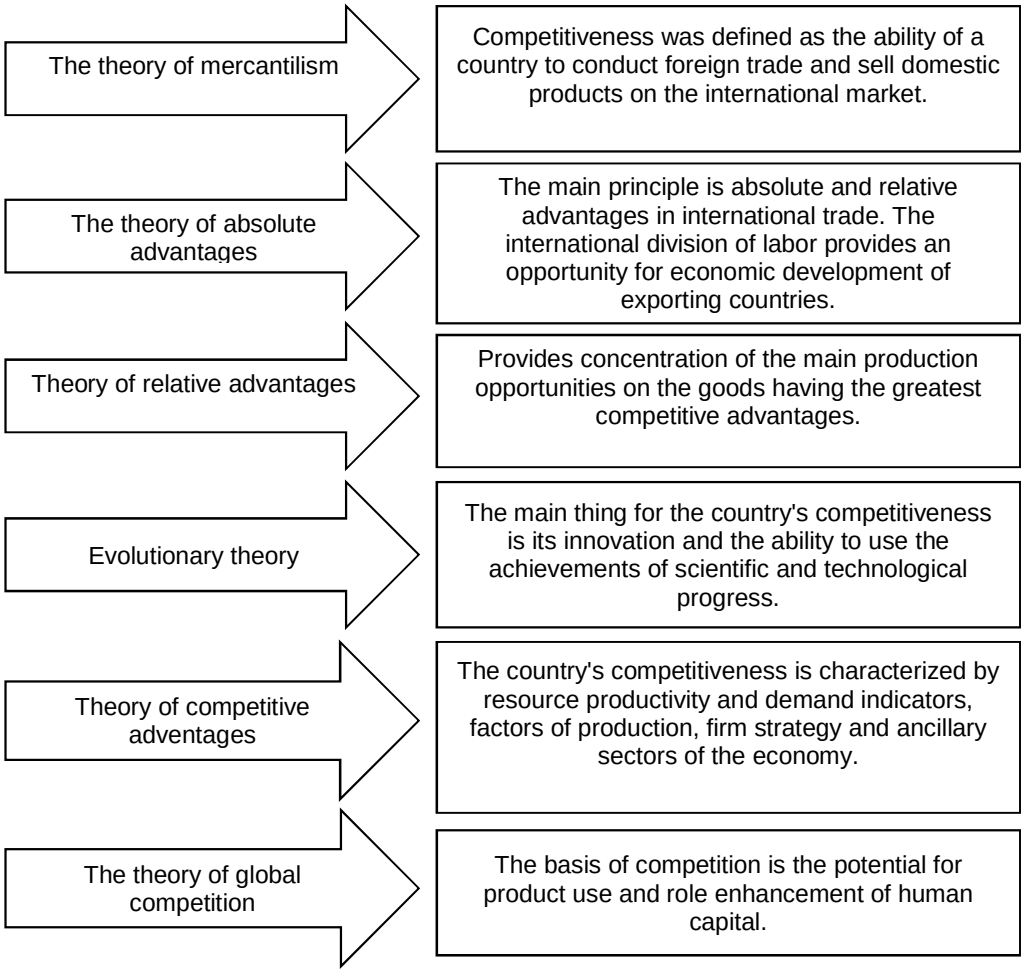

Figure 1.3 – Evolution of international competitiveness theory

Thus, the country's international competitiveness also includes the competitiveness of the goods, the producer and the sectoral competitiveness. In general, it can be defined as the ability of a country in free trade to produce goods and services that meet the requirements of the world market, the implementation of which increases the well-being of the country and its individual citizens. Therefore, the competitiveness of an economy lies in its ability to hold and hold steady positions in certain segments market due to: powerful economic potential; sustainable economic growth on an innovative basis; advanced system of market institutes; possession intellectual capital

and investment resources; flexible system for responding to changes in the world [105, p. 11].

The competitiveness of the national economy has certain characteristics because it is based on the volume of the raw material base of a particular territory, human potential, social, cultural characteristics of a particular people or nation, levels of investment, etc. In the vast majority of cases it is impossible to achieve a high level of competitiveness of the national economy without competitive competition within the country. Competitiveness requires economic entities to constantly search for new ideas, developments, technologies, and the state requires the right conditions for economic growth.

It is also important that the competitiveness of the national economy must take into account socio-economic optimality, in which the positive importance of efficient use of material, labor and financial resources is consistent with the implementation of economic development programs. It should also be borne in mind that only the state is responsible for the state of competitiveness of the national economy.

The assertion that a country's competitiveness is a major driver on the path to a sustainable prosperity of the state and the growth of the well-being of its citizens is a well-known fact. Increasing competitiveness is a long-term process that requires progress in many areas and a willingness on the part of the parties concerned to mobilize resources, time and effort for a long period. Accordingly, to make quality management decisions, participants in this process need information and data that would reflect all the processes occurring in both domestic and international markets.

The ideas of competitiveness of the national economy are of great practical importance in the development of programs to improve the competitive advantages of the country, the development of its expert base in the long run at national and regional levels. The concept of competitiveness for the domestic economy is a prerequisite for a crisis and a high level of national security. Only the high competitiveness of

the country, both in the domestic and the world markets, is able to lift the Ukrainian economy and lay the foundations for the growth of living standards of citizens [2, p. 104].

The above definitions show that the competitiveness of national production is a complex and multifaceted phenomenon. Traditionally, it is regarded as due to the economic, social and political factors of the position of the country or its producers in the domestic and foreign markets. The same multifaceted problem is the methodology of competitiveness assessment. Researching competitiveness, it is necessary to consider this category at all levels where it occurs (fig. 1.4).

The essence of competitiveness research stems from identification of the position of the enterprise (industry, country) in a competitive environment. Competitiveness as a multilevel factor requires the combination of information coming from external and internal environments. The external environment is characterized by variability and complexity. The internal environment of the enterprise is also variable because it is subject to changes in the external environment. Competitiveness can be seen as a set of institutions and factors that determine a country's level of productivity. The level of productivity, in turn, affects the level of well-being that the economy can provide. In addition, the level of productivity also determines the return on investment in the economy, which is a fundamental driver of economic growth. In other words, competitive economies are those that are able to develop faster over time. Thus, the concept of competitiveness includes static and dynamic components. Although country productivity determines its ability to maintain a high level of income, it is also one of the main determinants of investment return, one of the key factors that explain the potential for economic growth [44, 179].

It is worth noting that an important determinant of the competitiveness of the national economy is the management of its development strategy, especially human resources in the long term [77].

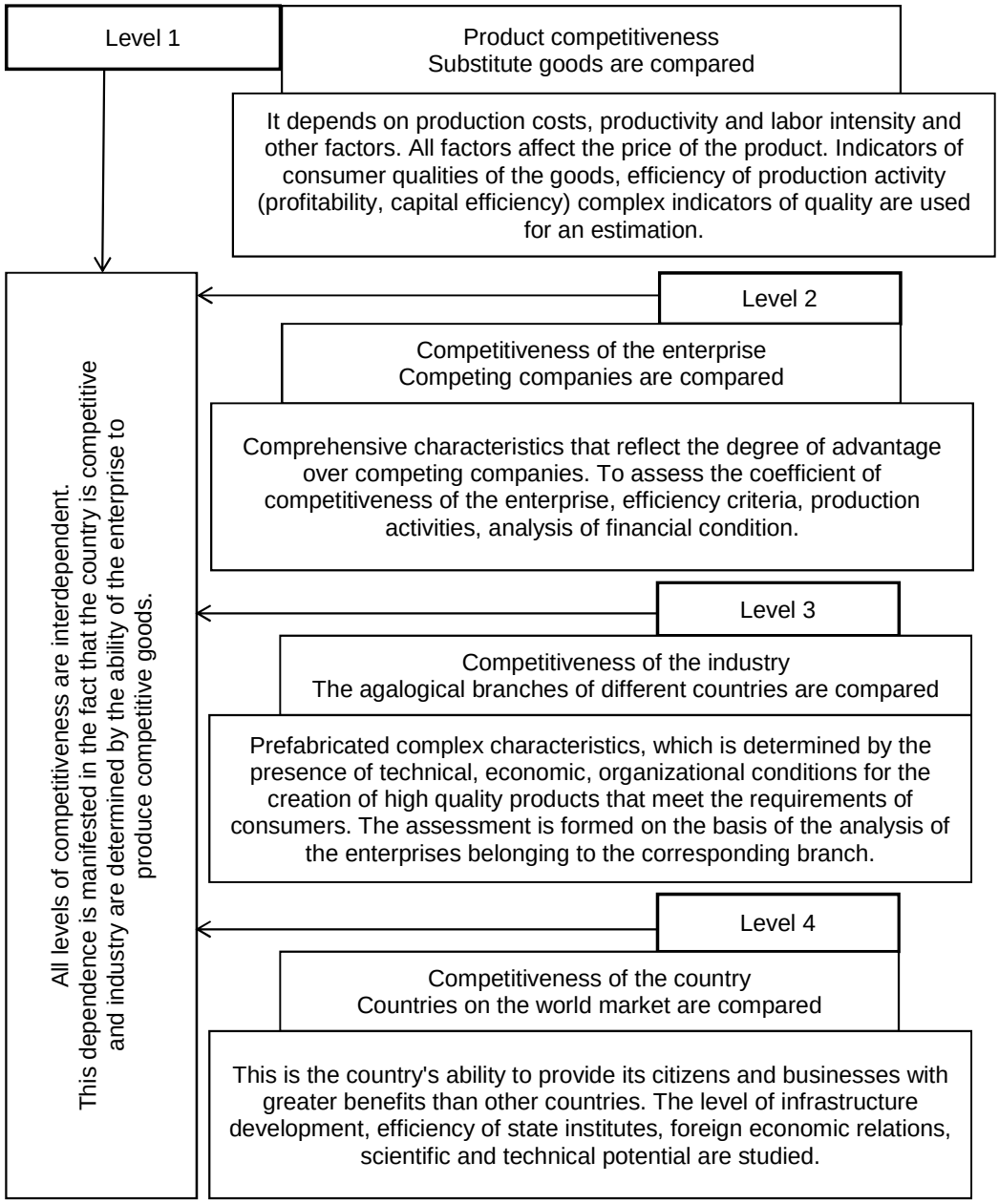

Figure 1.4 – Competitiveness as a multilevel factor

This position is particularly important in the context of globalization of markets and competition between large firms from around the world. The nature of competitive advantage often leads to increased concentration in certain industries (mechanical engineering

in Germany, electronics industry in Japan) and geographical areas. An important point is that national competitive advantage is often achieved due to the initially unfavorable environment when nations or industries find themselves forced to actively respond to the challenge they face. Some disadvantages of factors of production, large local buyers, early saturation of the market, international suppliers and intense internal rivalry can all be important conditions for creating and maintaining competitive advantage. Pressure and adverse conditions are powerful drivers of change and innovation. It is for this reason when new industrial forces are trying to change the existing order, nations are experiencing ups and downs (in terms of competitive advantage).

Therefore, on the basis of the above, we can determine the following determinants of the competitiveness of the national economy: production conditions or the presence in the country of such factors of production as necessary for production; skilled workforce or industrial infrastructure; the conditions of demand or specificity of the market for a particular product or service; the presence of supporting or related industries that have international competitiveness; suppliers or distributors; the nature of the firm's strategy, its structure, and the characteristics of its rivalry with other companies, including factors such as organizational and managerial climate, as well as the level and nature of internal competition. On the basis of these competitiveness features of the national economy, it is possible to construct a pyramid of its main components (fig. 1.5).

The analysis of the selected determinants of competitiveness of the national economy also reveals the basic conditions of competitiveness, which are fundamental characteristics of the business environment, which can be attributed to the climatic and socio-political conditions. Baseline conditions largely determine all four elements of "National diamond" of competitiveness. Thus, the fundamental conditions determine the resource intensity of the business and the structure of consumption of resources, which in turn creates differences in the requirements for the structure of related industries.

This applies primarily to material production, but it also affects the production of intangible products and services. The structure of resource consumption determines the nature of competition in the domestic markets and influences the formation of the competitive strategy of other participants in the competition. Fundamental conditions affect the specifics of domestic demand, the structure of which may include needs that do not appear in other conditions [111, 162, 53].

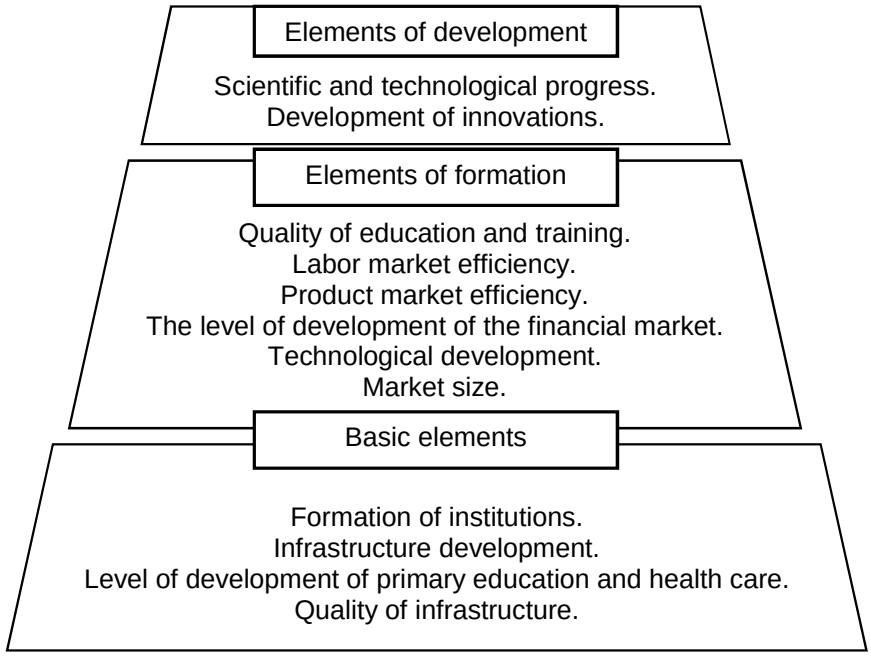

Figure 1.5 – A pyramid of the national economy competitiveness features

In modern dynamic markets, the ability to respond quickly to changes in the external and internal environment is an important determinant of the competitiveness of economic systems. Responding to change often requires non-standard actions, going beyond typical solutions, that is, an innovative approach that allows us to introduce the concept of innovative competitiveness of the national economy, which is manifested in the sphere of production, marketing and financial decisions. Analyzing research results, it is possible to establish

the relationship between innovation and competitiveness in its traditional interpretation: innovation is one of the most important factors for improving productivity, since in high-tech industries, their role in productivity growth is crucial; innovation intensifies competition and enhances market dynamics; competition encourages innovation aimed at resource conservation and increased use of resources; competitive advantages gained through the introduction of innovations stimulate further innovation; competitiveness in the world markets can only be achieved by an innovation-oriented business; innovative development should be the object of strategic planning, the goals of which should be formed from the standpoint of competitiveness of the national economy [101, p. 40].

To objectify the level of competitiveness assessment of the economy as a system, you can use a cluster approach, based on the formation and analysis of the following cluster elements: the quality of managerial work (the parameter of evaluation – administrative resource); quality of staff (parameter – professionalism); quality of resources (parameter – potential of the organization); quality of management processes (parameters: intermediate and final operational results: promptness, timeliness, fulfillment of obligations, availability of complaints and claims, motivation, budgeting, document flow, formalization); quality of the control system (parameters: intermediate and final functional results: production, marketing, finance, personnel) [80, p. 396].

Therefore, for an objective and complete study of the determinants of competitiveness of the national economy and its sectoral complexes, it is advisable to highlight the most important characteristics of their formation: the possibility of virtually unlimited development and improvement; the key role of intellectual factors that cause the transformation of scientific knowledge into physical reality; strategic orientation – relationship with the country's development strategy; progressiveness – a focus on increasing and introducing new knowledge, advanced scientific and technological achievements; creativity – creative search, innovation, non-standard solutions;

situationalism – making managerial decisions on the situation, taking into account specific circumstances and features of different stages of economic development; dynamism – the increasing rate of acceleration of the globalization process; optimality of achievement of the set goals, as a rule, on the basis of intensive factors; systematic relations between the elements of economic potential and the external environment; emergence – the presence in the system of special properties that are not peculiar to its individual subsystems and blocks, as well as the sum of elements not connected by special system-forming links; synergistic effect resulting from the multiple enhancement of the properties of individual elements during their interaction in the system; adaptability, flexibility to change; performance is an indicator that reflects higher economic performance when using competitive advantage. That is why research and characterization of the competitiveness of the agrarian sector of the national economy requires the formation of a qualitative model for identifying, analyzing and enhancing its competitive advantages.

1.2. Classification, structure and models of competitive advantage in the agrarian sector

Modern economic transformations are characterized by increasing requirements for the quality of manufactured products. In general, this is due to the fact that ensuring sustainable development in the market of goods and services is determined by the level of product competitiveness, which in turn depends on the competitiveness of enterprises and industry complexes. Competitiveness, in turn, is determined by the level of price and the level of product quality. Ukraine's accession to the World Trade Organization has created significant opportunities for Ukrainian producers, which enable the country to enter the world markets of goods and services, expand the consumer product range and facilitate access to foreign technologies. Therefore, priority should be given to ensuring the competitiveness of the Ukrainian agrarian sector both domestically and internationally.

The competitiveness of the agroindustrial complex (AIC), taking into account the specificity and social importance of the agrarian sector, should be defined as its competitive ability to function and develop in a market environment, effectively providing processes of reproduction of agrarian potential. Developments in the geopolitical space make the issue of food independence as a basis for social stability and national security relevant to the domestic economy. Therefore, agroindustrial complex, with its large role in the economy, should be the basis of state policy in the system of national decision making. At the same time, ensuring the competitiveness of agroindustrial complex should be considered as a strategic task, the solution of which will not only achieve the necessary level of self-sufficiency of food products, but also give impetus to the development of other sectors of the economy. Research of domestic experience in the study of agroindustrial complex allowed us to distinguish the following approaches (Appendix B).

Along with the agroindustrial complex in science, you can find the term agribusiness – as a field of knowledge that provides an assessment of the current state, potential, methods of entrepreneurial initiatives implementation. In terms of organization, the terms "agribusiness" and "agroindustrial complex" are very similar. The only difference is that agribusiness is used to designate agribusiness in market economies.

It is obvious that these two concepts are interrelated. Agribusiness, which represents all agricultural producers on the market, attracts marketing, scientific, technical, financial support and creates effective schemes for agricultural development, without which the functioning of agriculture in general is impossible.

Theoretical study of the issues of structural construction of the system of forming agroindustrial complex allows to distinguish the following approaches to its characteristics: production and technological – reflects the set of factors of production and technological ways of their combination in order to obtain certain products with the relevant product and consumer characteristics; organizational and managerial – reflects the possibilities of using

various forms of organization and management of production processes at all stages of the product life cycle; territorial-production – reflects the peculiarities of formation and functioning of territorial agroindustrial complex, which are formed under the influence of the social division of labor, the natural and climatic conditions of the territory and the administrative and territorial structure of the country; socio-economic – characterizes the level of development of the institution of property in the country and the economic system that create the conditions for the existence of different population groups; subject-technological (product) – is considered as a set of interrelated activities related to different spheres of agroindustrial complex, industries and sub-sectors and organizationally and technologically united for the implementation of the production process, starting with the production of specialized tools for the product and ending it implementation; sectoral – reflects the totality of interconnected industries and activities that perform certain functions and integrate within the agroindustrial complex of the country in order to realize the country's goals in the system of its inter-sectoral links.

European integration poses new challenges for Ukraine, in particular for the agroindustrial complex. Modern economic transformations are characterized by increasing requirements for the quality of manufactured products. In general, this is due to the fact that ensuring sustainable development in the market of goods and services is determined by the level of competitiveness of products, which in turn is consistent with the competitiveness of enterprises and, directly, the competitiveness of the industry. Competitiveness is determined by the level of price and quality of products. Ukraine's accession to the World Trade Organization and European integration provide Ukraine with opportunities to enter the world markets for goods and services, expand its product range and facilitate access to foreign technologies. Therefore, the priority is to ensure the competitiveness of the Ukrainian agroindustrial complex both domestically and internationally. There are many approaches to defining agrarian and industrial complex, which indicates a complex structure with a distinct system.

Thus, the agroindustrial complex is an inter-sectoral formation of an integrative type, where agriculture and other branches of the national economy are structurally combined. The functioning of this complex is based on the relevant technological chain: "production – processing – marketing – consumer", which greatly influences the possibilities of market transformations of the socio-economic space of the country. Therefore, in our opinion, the agroindustrial complex should be considered as an integral, sectoral and integral part of the economic system, which ensures the food security of the country through the cultivation of agricultural raw materials, production, harvesting, storage and unimpeded sale of products for the population as a domestic and foreign markets.

The sectoral structure of the agroindustrial complex of Ukraine is basic in the process of determining the main directions of its functioning and reflects the technological line of production of goods, works and services. Thus, on its basis it is possible to distinguish the branch links of this complex (fig. 1.6). New industries are being involved in agricultural production. Many of them work directly on raw materials and semi-finished products of agricultural origin. At the same time, the products of other industries are used in the agroindustrial complex. All this will lead to the expansion of inter- and inter-branch relations and the interdependence of the development rates of the industries engaged in the production of these products. Some of these industries only partially cooperate with agroindustrial complex, focusing on other complexes (fuel and energy, machine building, transport). They are not included in the agroindustrial complex, but in order to fully understand the system of production and economic relations, to determine the actual cost of production, as a final product, it is necessary to know the value of their investment and labor.

Thus, in the agroindustrial complex there is a vertical integration, that is, the desire to control the upper superstructure of the production chain to ensure the sale of agricultural products, protection against fluctuations in commodity markets and flexible response to consumer requests. Significant investment is also needed in the form of a concen-

tration of capital through the horizontal integration of cooperatives (mergers, partnerships and alliances), or the raising of capital from other sources through the creation of subsidiaries in the form of joint stock companies.

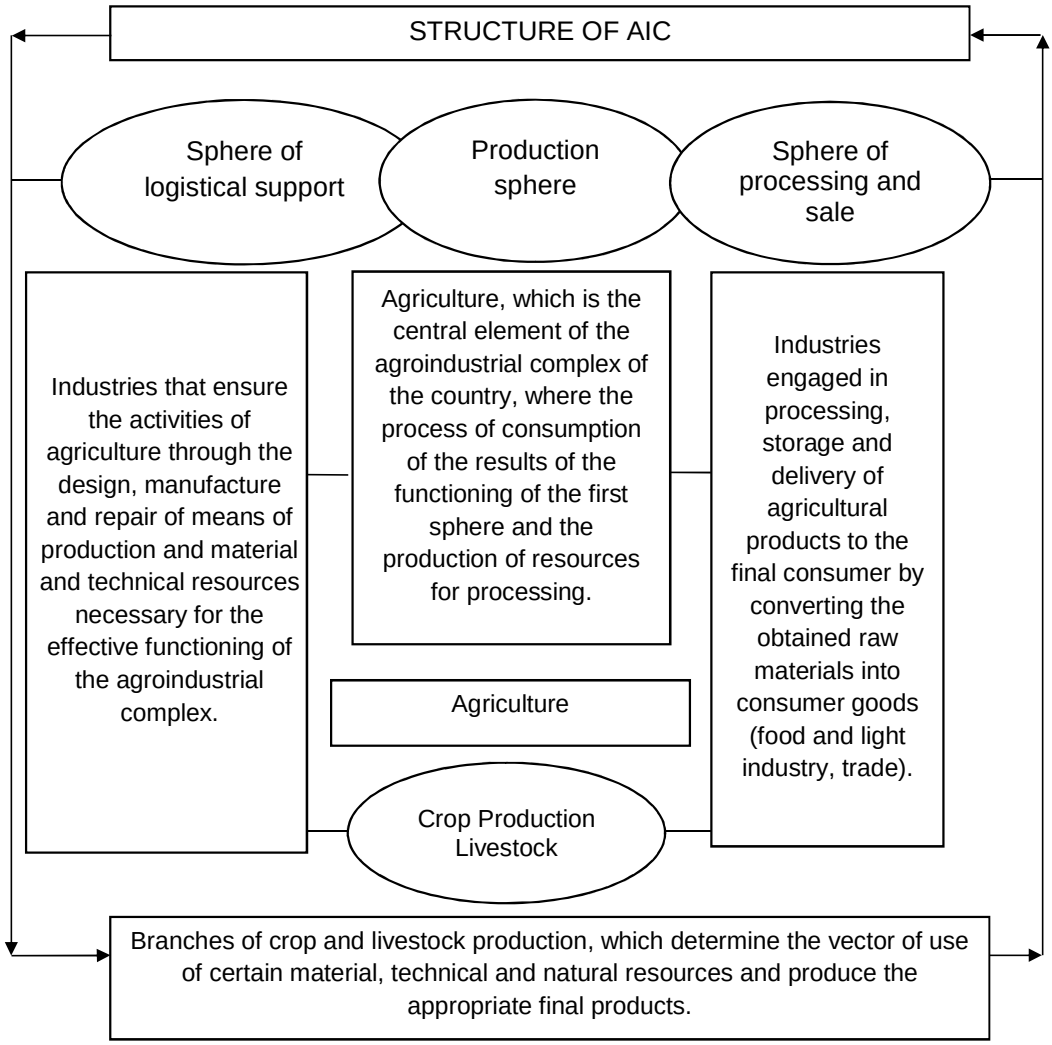

Figure 1.6 – Current approaches to the structure of the agroindustrial complex

Vertical integration can be achieved through the construction of processing facilities or the acquisition of a controlling stake in already existing enterprises.

The competitiveness of the agroindustrial complex should be considered separately, since the agrarian sector has its own specificity. The competitive industry of the agroindustrial complex is not only an advantage in terms of economic efficiency. This issue covers food security and conservation of bioresources (table 1.1) [151].

Table 1.1

Approaches to defining the concept of competitiveness in the branches of agroindustrial complex

Author	Definition
Pucenteilo P. R.	The ability to create a growing amount of value added on the basis of improving the efficiency of the use of factors of production, ensuring investment attractiveness and development of new markets.
Vasyuta O.P., Miroshnyk M.V.	Concretization of the total ability of enterprises in the industry to create, manufacture and sell goods that are more attractive in terms of quality and price characteristics for consumers than the goods of similar foreign competitors, while ensuring sustainable high rates of economic growth of the industry.
Shevchenko M.M.	The ability of the national industry to provide a high level of satisfaction with their own goods of a certain social need compared to competitors, to maintain and change a sustainable position in certain segments and to ensure profitability based on the rational use of resources in the internationalization.

The level of competitiveness of the agroindustrial complex stems from the identification of the positions of enterprises in the competitive environment. Determinants of industry competitiveness can be determined by the production conditions or the presence in the country of such factors of production that are required for production, skilled labor or industrial infrastructure, raw material resources, climate, government support, conditions of demand or specific market of specific goods or services, the presence of supportive or related industries such

as those with international competitiveness, suppliers or distributors, the nature of the firm's strategy, structure and competition peculiarities as to other companies, including factors such as organizational and managerial climate, as well as the level and nature of internal competition.

The competitiveness of the agroindustrial complex with regard to the specificity and social importance of the agrarian sector should be defined as its competitive ability to function and develop in the market environment, effectively ensuring the processes of reproduction in the agrarian sector. The level of competitiveness is reflected in the value of the basic types of agroindustrial products per person, their positive dynamics and creation of conditions for sustainable development of the national economic system in the long run. The events taking place in the geopolitical space make the issue of food independence as a basis for social stability and national security relevant to the domestic economy. Therefore, the agroindustrial complex is capable of being the basis of state policy in the system of national decision-making. At the same time, ensuring the competitiveness of agroindustrial complex should be considered as a strategic task, the solution of which will not only achieve the necessary level of self-sufficiency of food, but also give impetus to the development of other sectors of the economy. Returning to the realities of the Ukrainian agrarian market, let us emphasize the achievement of commodity competitiveness. In many cases, this is questionable in the European market. Fig. 2 shows the measures for achieving competitiveness of the commodity in the agricultural market.

The practical application of the quantitative method to achieve competitiveness is made possible by gaps in legislation, the absence of effective principles of standardization and certification. This leads to the impossibility of exporting such products to international markets and the negative impact on food security. Therefore, we consider it expedient to formulate modern conceptual approaches to the concept of "reasonable competitiveness of the agroindustrial complex" ("SMART COMPETITIVENESS"), which can be implemented by regulation and control of the rules of functioning of economic entities in the agricultural

market (fig. 1.7). We propose to implement the following areas within the control of the component blocks: land reform, harmonization of legislation, ensuring food safety, quality and safety of food products, compliance with sanitary and phytosanitary standards, support of small and medium-sized agricultural businesses. It envisages improvement of legislation, introduction of innovations, state support and use in the production of modern measures to achieve competitiveness in agro-market. Such actions should be comprehensive and should be carried out in a clearly defined timeframe.

Therefore, Ukraine's accession to the EU is the basis for introducing changes and reforming the agroindustrial complex. It is established that the market for agricultural products significantly changes the conditions of its functioning, the legislation adapts to EU norms. At the same time, the products must be of high quality, comply with certificates of quality, and priority must be given to organic production and it’s financing.

Thus, the conducted researches make it possible to conclude that the introduction of conceptual approaches to the concept of "reasonable competitiveness in the agrarian market" will be the basis for qualitative changes in the domestic agrarian sector of the economy. At the same time, considerable attention is now being paid to the dialogue between Ukraine and the EU on such changes. Therefore, the set requirements will further encourage the domestic agrarian sector to implement legislative, institutional, technological and other changes in the conditions of transformation processes.

A more complex form of change in the relationship between the state and business the implementation of diversification activities to ensure the sustainability of the agroindustrial complex is underway. The problems of diversification of agroindustrial production are being payed increased attention for a number of reasons: conservation of raw material orientation of economic development and search for effective means and mechanisms for overcoming monostructure; the need to create a national innovation system (organizational, economic, technological changes).

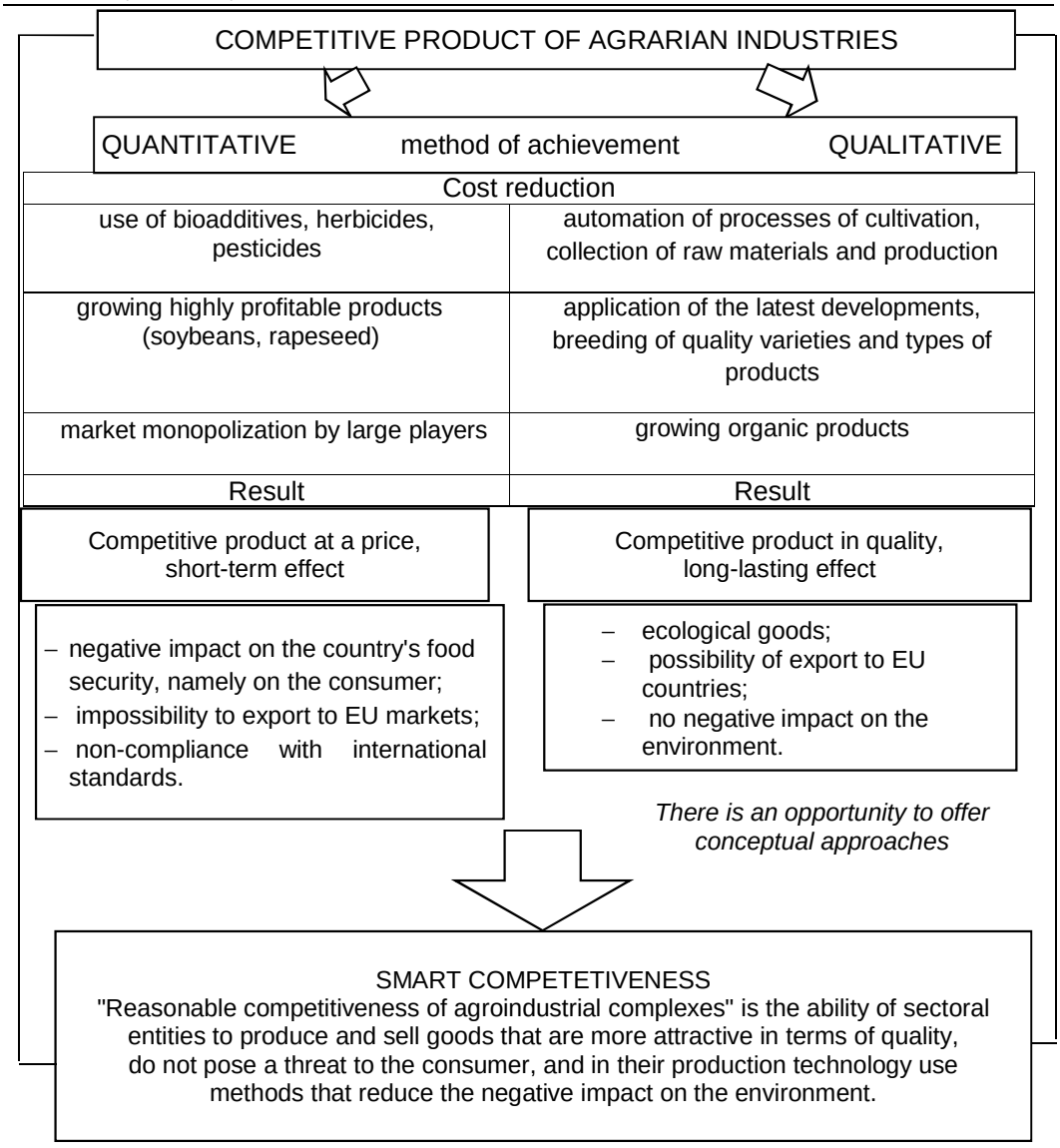

Figure 1.7 – Methodological approaches to achievement competitiveness of agroindustrial complex

The diversification potential of the agroindustrial complex is a measure of the ability and willingness of the agroindustrial complex to solve tasks that ensure the achievement of the set socio-economic goals in the conditions of realization of the innovation-investment policy of the country in order to achieve the stability of the territory and the sustainability of the activity of economic entities on it. Thus, the

structure of diversification potential includes the following components: natural resource potential; innovative potential; investment potential; scientific potential; production potential; organizational and structural potential; export-import potential.

In these circumstances, the main tool for pursuing a policy of diversification into agroindustrial complex management is qualitatively new management mechanisms, adapted to real conditions with large-scale prospects for development, which create conditions for increasing competitiveness and increasing the level of competitiveness, the welfare of the population, which is achieved through the effective use of the socio-economic potential of the territory.

Ukraine has a strong natural resource potential for the development of the agrarian sector of the economy, favorable and diverse climatic conditions, which creates opportunities for the production of high quality agricultural products, ensuring food security of the country, positioning the country in the global food market, as well as sustainable socio-economic development of rural communities. Effective development of the agrarian sector in Ukraine requires changes in the use of its resource base, implementation of resource-saving innovative high-performance technologies agricultural production, to ensure the production of high quality and competitive in the domestic and foreign markets for agricultural products and food. The rationality and maximum efficiency of the use of the resources involved in the agricultural production process is a necessary prerequisite for achieving a balance of interests of society on social, economic and environmental criteria, as well as the basis for ensuring national priorities in the development of the agrarian sector, in particular, the achievement of food security, successful export, successful profitability goals of agricultural producers and ensuring a socially oriented state agricultural policy. This requires, in particular, increased attention to the issues of land use, the realization of labor potential, increasing the level of innovativeness of applied techniques and technologies in the agrarian sector of the economy.

Solving the problem of stabilizing and further increasing production in agroindustrial complex requires improving the utilization of pro-

duction potential of agricultural enterprises. Production potential is the ability to obtain a certain quantity and quality of products in the current circumstances, with the availability of resources and the level of their quality. Taking into account the peculiarities of agriculture, the possibilities of production in this field also depend on the natural and climatic conditions and biology of plants and animals, their genetic potential. The combination of these conditions and opportunities is defined as biological potential. In turn, the resources themselves should be optimally combined with quantitative and qualitative characteristics: their volume and size must be sufficient to ensure production; they must meet the required standards, since poor quality requires a large amount of resources or is equivalent to lack of resources; there must be proportionality between the various structural elements of the resource.

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This problem becomes of top priority, since the improvement and development of quantitative and qualitative characteristics of the agricultural production potential deserve special attention. Indeed, the system of sustainability and development of agricultural production po-

tential fully determines the efficient use of resources and, ultimately, increases competitiveness and optimal management. In addition, it contributes to the balance of demand and supply for the production and sale of agricultural products and products of its processing, regulates the relationship of market agents within the main spheres and subcomplexes of the agroindustrial sector, forms a healthy competitive environment, where each enterprise is agribusiness place and above all in the structure of management of the agroindustrial complex. In the system of agricultural relations, production processes and factors of their competitiveness occupy a special place and play a decisive role, since within the socio-economic system, agricultural production and competitiveness should be considered as a ratio of form and content, determined, ultimately, by quantitative and qualitative parameters functioning of production potential. It is important to evaluate the export-import potential of the agroindustrial complex Ukraine, which is influenced by a complex of complex factors that are divided into internal and external factors (fig. 1.8).

The economic mechanism for the development of the innovative potential of the agroindustrial complex includes: strategic innovation management, aimed at developing activities, programs, projects to achieve the set goals, based on of scientific potential, production capacity of enterprises, external and internal factors, consumer needs for innovations; innovation planning, including tools, policies, information and processes aimed at achieving end goals; support and stimulation of innovative business activity; system of financing of innovation processes, including multichannel sources of financial resources receipt, principles of investment of accumulated funds, mechanism of control over the use of investments, their return and evaluation of efficiency of innovation-investment projects; taxation of organizations that develop and develop innovations, insurance of innovative risks; strategic and tactical innovation marketing aimed at supporting the competitiveness of the business entity and the development of new markets; pricing for innovative products (works, services).

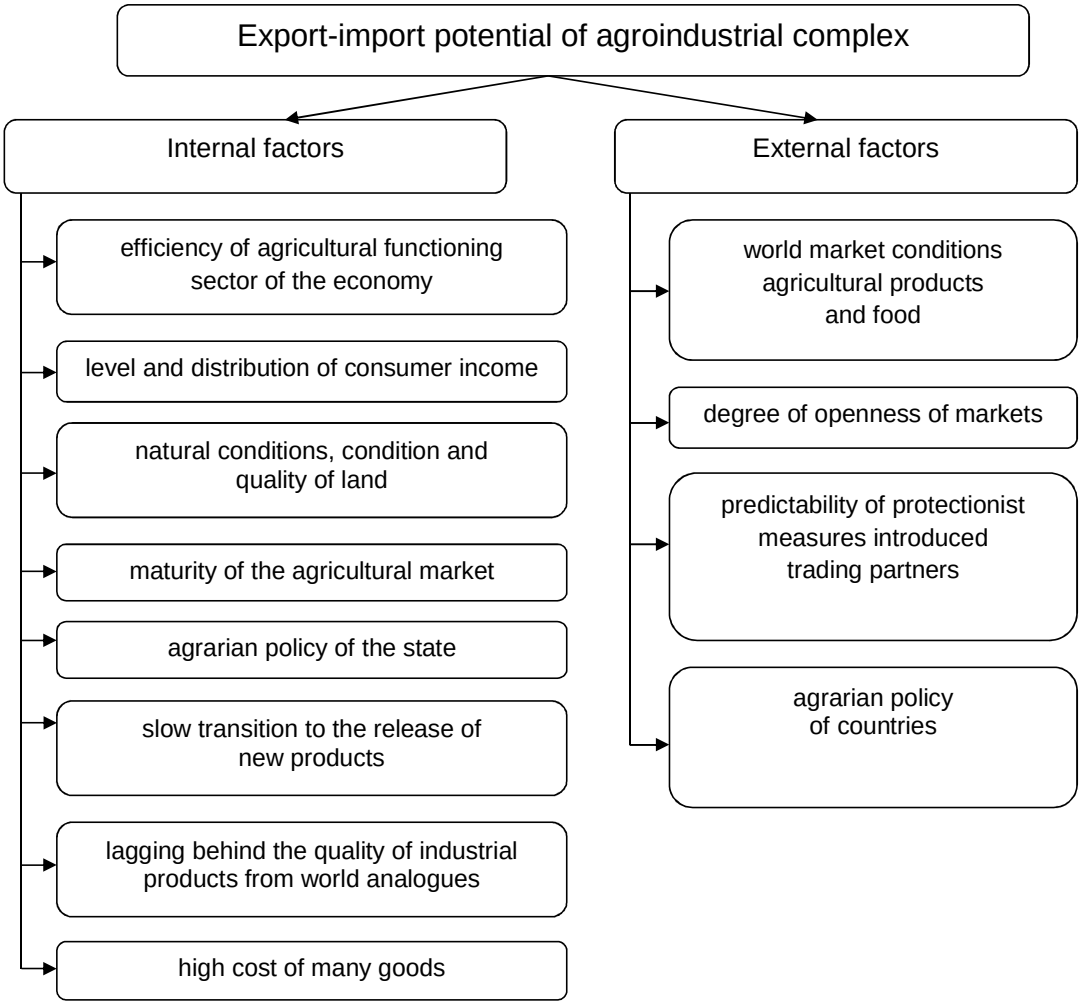

Figure 1.8 – Factors influencing the export-import potential of the agroindustrial complex of Ukraine

The issues of improving the organizational and structural potential of the agroindustrial complex are becoming more important, because at the present stage of creating the right conditions for the development of agrarian production can no longer be limited to the formation of industrial and social infrastructure, without taking into account the requirements of environmental protection, financial support credit institutions for the purpose of ensuring the free movement of funds, production funds and property of agroindustrial producers, ensuring the development of new products, introduction of progressive scientific

and technical developments and technologies in the agrarian sector under severe market conditions. Market infrastructure, the most important function of which is to create a competitive environment through the development of free market institutions and food markets, should be considered as the main component of the agroindustrial complex, which logically complements and expands its capabilities.

Thus, ensuring the competitiveness of the domestic agroindustrial complex involves determining the competitive advantages of producers by analyzing and managing the elements of their production, resource-raw materials, innovation, investment, scientific, export-import, organizational and structural potential. The characterization of the main elements and the search for the mechanisms for its improvement is a functional structure of comparative advantages and allows increasing the level of competitiveness both in the short and long term.

The main feature of a country's competitiveness is its ability to turn the disadvantages of its economic and geographical location into competitive advantages. This means that if there are shortcomings in the country, through a creative approach and without involving resources from the center, a crisis is possible. Followers of British theory, for example, argue that the state, having shortcomings in absolutely all fields, can still find benefits in the world market. Therefore, the main conclusion that can be drawn from the analysis of theories – the main advantages are created at the regional level, and they are expressed in such forms of production organization as clusters. In practice, there are two types of clusters – "top" and "bottom". The "top" initiative around the world means that the state decides to create clusters on the basis of a complex mathematical model of development, and "bottom" – cluster programs are initiated by the local business community.

One of the main means of enhancing the competitive advantage of Ukraine's agrarian sector in the world market is the use of regulatory policy. The Government's primary task is to harmonize agricultural product standards with the world, and to improve the World Trade Organization's compliance criteria. European integration processes are

becoming an integral feature and direction of development of the agrarian sector of the Ukrainian economy. In this context, it is important to develop an agricultural policy that takes into account the socio-economic, environmental, demographic and other components, and is based on the familiarization, study and practical application of agricultural experience in foreign countries, which causes a naturally increased interest. In this context, the interdependent activities of the state and economic entities, aimed at ensuring food security (fig. 1.9), are of primary importance.

To solve the problems of European integration successfully, the agrarian sector of the Ukrainian economy has sufficient prerequisites: rich natural resource and export potential, high quality human capital, gradually increasing investment attractiveness, preserved way of life and centuries-old farming traditions. In this context, research and scientific understanding of national competitiveness. The agroindustrial complex will help to carry out structural reforms in the field of agriculture and increase the level of competitiveness of agro-food products in the European and world markets.

Thus, the internal competitive advantages of modern agroindustrial complex can be divided into the following groups [208, p. 141]:

- structural: production structure of the enterprise, specialization and concentration of production, level of unification and standardization of products and components of production, accounting and regulation of production processes;
- technical: equipment, quality of manufactured goods, patented goods, patented technology;
- managerial: managers, formation of the management system, functioning of the quality management system of the organization;
- market: access to markets, market share, exclusivity of goods, channels of distribution and advertising of goods of the organization, an effective system of sales and warranty service;
- resource: suppliers, access to cheap raw materials and other resources, optimization of resource efficiency;

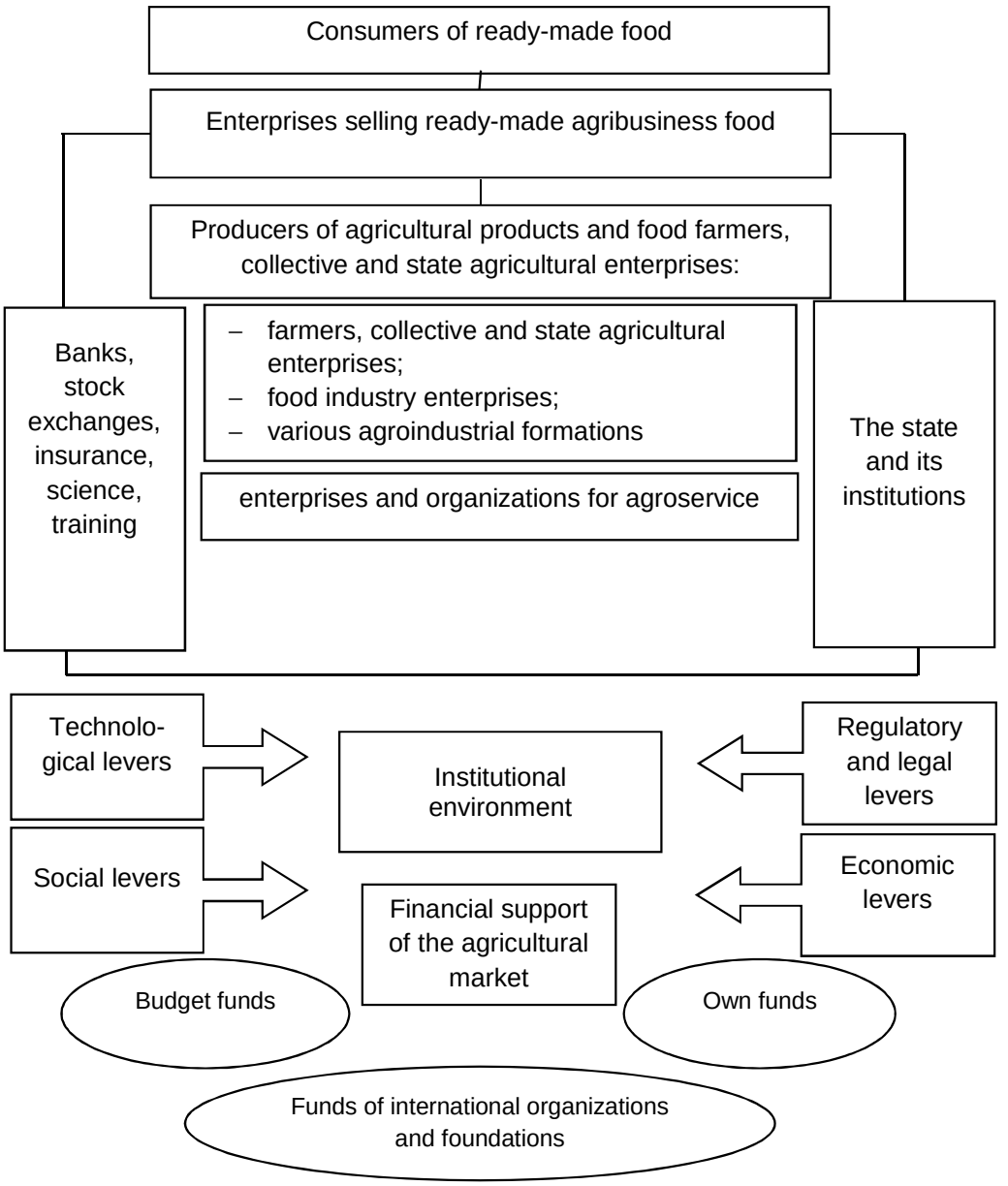

Figure 1.9 – Institutional environment of financial support of the agroindustrial complex

– effectiveness of the organization: profitability indicators, capital intensity, financial stability.

The value of each preference parameter can be quantified and analyzed using both accurate and expert estimation methods. Howev-

er, integrating all the benefits into a single indicator is hardly possible. Each individual company may not have all of these competitive advantages. In order to increase the competitiveness of the management of an enterprise, region or industry, it is necessary to formulate a list of the main competitive advantages. As they are further viewed as the foundation of a development strategy, the composition of competitive advantages may change over time and in accordance with the particularities of the tasks that the management faces. The more the company has competitive advantages over its competitors, the higher its competitive power and efficiency. And for this, the company must constantly win new competitive advantages [179, p. 145].

Comparative benefits are not a static indicator: some of them weaken over time and may be lost, while others may be acquired. It is relevant for each country to analyze the dynamics of changes in comparative advantages, which allows building a certain strategy for the development of foreign economic relations of the country. Thus, determining quantitative calculations of existing comparative advantages of agroindustrial complex and determining the direction of their dynamics is an important task of economic research. The results obtained allow us to develop recommendations for improving the commodity structure of foreign trade and stimulating the development of economic sectors, which forms the basis for increasing the benefits of participation in international division of labor and international commodity exchange.

1.3. Methods for assessing the competitiveness of national economy sectors in international markets

The development of market relations is directly linked to the search for the most favorable conditions for the production and sale of products in order to maximize profits with minimal labor and production costs. The competitiveness of agroindustrial complex is associated with the full utilization of production capacities, reduction of produc-

tion costs and increase in market share, with real and potential ability to design, manufacture and sell products that are more attractive to consumers by price and non-price characteristics than competitors' products. The competitiveness of the agroindustrial complex acts as an integral numerical characteristic by which the results of activity of the enterprises of the branch achieved by the enterprises in the given period are estimated. It is a system of elements, each of which is intended to display a numerical (e.g. a point) estimate of a particular kind of potential. Competitiveness is provided at the expense of various advantages acquired compared to its main competitors, namely: economic, financial, investment, personnel, image, etc. [165, p. 124].

In order to identify priority areas for the timely development and selection of an effective strategy that most closely matches the trends of the market situation and based on the strengths of its activities, any agribusiness firm should constantly monitor and analyze the competitive weights (advantages) in the market in which it and competing companies offer similar consumer goods.

Competitiveness analysis begins with an assessment of regulatory parameters. If at least one of them does not meet the level stipulated by norms and standards, then further assessment of competitiveness is impractical regardless of the result of comparison to other parameters. At the same time, excess of norms and standards cannot be considered as an advantage of products, because from the point of view of the consumer it is often useless and does not increase the consumer value. The exceptions may be cases where the buyer is interested in some excess of current norms and standards in view of strengthening them in the future.

Independent research direction consists of methods of assessing the competitive advantages of enterprises, which are based on the theory of equilibrium of firm and industry by A. Marshall and the theory of factors of production. Equilibrium refers to a state where the entrepreneur has no incentive to move to another state, that is, to change production. In the conditions of equilibrium of the manufacturer – at achievement of the maximum possible volume of production and sale

of the goods at constant nature of demand and level of development of equipment in the given market – each of production factors is used with equal and at the same time the greatest productivity [113]. The criterion for competitive advantage in this approach is the presence of manufacturers of production factors that can be used with better performance than other competitors. Methods for assessing the competitive advantage of an enterprise based on equilibrium theory have significant limitations in its application: first, the equilibrium theory of the manufacturer was developed to study the processes of industry development under conditions of perfect competition; secondly, this method is based on a theory that assumes that the industry, as a result of its development, must reach equilibrium [58, p. 124].

A separate group consists of methods of assessing and providing competitive advantage based on the theory of effective competition, which was advanced by American economist J. B. Clark as opposed to the theory of A. Marshall [76].

At the heart of effective competition theory is the development of a criterion for the existing level of competition, sufficient to support the effectiveness of economic activity. An important characteristic of this approach is the ability to bind competitive advantages to specific time intervals. This allows us to consider the dynamics of real market processes as a function of or in conjunction with changes in the characteristics of competitive advantage. There are also matrix methods for assessing competitive advantages that consider the processes of competition in dynamics. This group of methods is based on the concept of the product and technology life cycle (four stages: implementation, growth, saturation, and decline). The most popular matrix models that can be used to gauge competitive advantage are the Boston Consulting Group (BCG) and the General Electric – McKinsey matrix. This method makes it possible to compare the positions of enterprises within one portfolio in large corporations and to ensure the correct combination of units that need capital for their growth, with enterprises that have excess capital [205].

The methodology used by the Boston Consulting Group matrix is based on an analysis of competitiveness that takes into account the life cycle of the product. In order to evaluate the competitiveness, it is necessary to analyze the matrix, built on the following principle: horizontally – the rate of increase / decrease in the number of sales on a linear scale; vertically – the relative share of the aggregate of goods in the market. Often enough we use the matrix "market attractiveness – advantages in competition", the main characteristics of which is to determine the attractiveness of the market and the advantages of competition in it. The attractiveness of the market is determined by its properties: quality, delivery methods, volume, while competitive advantages are described by the following indicators: relative position on the market, product potential, research potential and qualifications of managers and employees.

According to classical comparative advantage theory, a positive economic effect, called trade-offs, improves the well-being of countries and promotes free trade. There are two basic theories of international trade based on the calculations of comparative advantages: the theory of comparative advantages by D. Ricardo and the theory of factor proportions by Heckscher-Olin. Ricardo's theory suggests that comparative advantages are manifested by differences in technology levels and are revealed by comparing the relative industry costs of producing two products in two countries. The Heckscher-Olin theory explains the existence of certain comparative advantages of differences in the provision of countries by factors of production and in the proportions of factors necessary for the production of certain goods. The country will have a comparative advantage in the production of goods requiring a relatively larger quantity of that factor of production which it has in abundance [195].

In order to assess the competitiveness of a commodity, the concept of B. Balassa is often appealed, according to which the competitive advantage is a sufficiently large share of the goods on the international market, therefore the lack of competitive advantage is a low share of these goods in export markets. To do this, they use a toolkit developed

by him – the Ratio Comparative Advantage (RCA), which is reflected in the formula [217]:

$$RCA = (Xij / Xit) / (Xnj / Xnt) = (Xij / Xnj) / (Xit / Xnt) \qquad (1.1)$$

where *X* is export; *i* – the country under study; *j* – product (or industry); *t* – a group of goods (or industries); *n* – group of countries

It is assumed that when the value of the RCA coefficient exceeds one, the country is competitive in the production of the product, if less than one, the country has no competitive advantage. At first glance, the RCA can identify those sectors of the economy in which the country has a competitive edge. However, the main disadvantage of this approach is the use of only export data in the calculations, whereas import indicators are not taken into account at all. To compensate for the shortcomings of this approach, the Lafayette index is used as an additional one, the methodology of which is to take into account two points of view at the same time. Competitiveness is assessed as: cross-sectoral, that is, when countries export the products of the industries in which they specialize and import the products of other industries; intra-industry – that is, trade in the same type of goods, which is the most intensive, as a rule, between developed countries. In this case, the country is both an exporter and an importer of goods falling into one product category [111, p. 98]. In this regard, many authors consider any export-based competitiveness assessment to be incomplete. This disadvantage inherent in the Balassa coefficient eliminated in the Lafayette index (LFI) index, which is determined by the formula:

$$\mathrm{LFI}_j^i = 100\left(\frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j-1}^{N}\left(x_j^i - m_j^i\right)}{\sum_{j-1}^{N}\left(x_j^i + m_j^i\right)}\right)\frac{x_j^i + m_j^i}{\sum_{j-1}^{N}(x_j^i + m_j^i)} \qquad (1.2)$$

where x_j^i і m_j^i – export and import of products *j* to country *i;*

N – is the number of products.

In essence, the formula represents the difference between the ratio of net exports of products j to foreign trade turnover of goods j in a

certain year and the ratio of total net exports to foreign trade turnover, as well as the share of the latter in j products in the aggregate foreign trade turnover of a certain country. The positive values of the Lafayette index indicate that there are competitive advantages. Moreover, the higher the value of the coefficient, the higher the level of competitiveness. On the contrary, negative values indicate the uncompetitiveness of products. Another important feature of the index is its restriction on the minimum and maximum values: from minus 50 (complete specialization) to plus 50 (full competitiveness).

However, in order to qualitatively define and manage the competitiveness of an industry, it is necessary to take into account its basic parameters and characteristics. Thus, from the analysis of theoretical principles of competition and competitiveness it can be concluded that competitive advantages are the basis for achieving the competitive state of the industry; industry competitiveness is determined by comparison with competing industries in the world market and is relative; the competitiveness of an industry is inherent in the system – it is determined by the competitiveness of the entities that belong to it and the competitiveness of the macro-environment in which the industry operates; competitiveness of the industry is a component of the multilevel category "competitiveness" along with the competitiveness of goods, enterprises, national economy; industry competitiveness is a dynamic phenomenon and is manageable [170].

The grouping of competitiveness parameters is based on the analysis of a wide range of technical, economic and social problems, resulting in the identification of variables that ensure competitiveness. The starting point of such analysis is to determine the list of technical and economic factors of competitiveness, which are treated as a set of criteria for quantitative assessment of the level of competitiveness of the enterprise. This integral indicator should reflect all possible aspects of the enterprise's activity and its current position on the market. Due to the justified need for quantitative assessment of competitiveness, the methodology for assessing the competitiveness of the processing plant is proposed. The application of this technique explores different areas

of activity of the enterprise, while analyzing such aspects as: market activity, material and technical sphere, organizational and management sphere, investment sphere and financial sphere. The decisive factor in improving the competitive status of an enterprise is the increase in the competitiveness of its products. The following groups of indicators can be distinguished on the basis of competitive advantage analysis (table 1.2) [128, 124].

Benchmarking is an important method of researching the competitiveness of enterprises and industry complexes (from English bench - place and marking - to mark) – a process that involves the study, analysis and characterization of business entities, especially competitors, in order to use their positive experience in their work. Benchmarking is a management technology that helps to increase the efficiency of regional and local governance by implementing advanced economic, industrial, innovation, investment and infrastructure mechanisms in the course of its activities. The main task of benchmarking is the continuous improvement of marketing, financial structure of the company's income, product technical support, development of enterprise management. It is related to finding and learning the best ways and methods of business development and improving the management structure.

The object of benchmarking is the methods, processes, technologies, qualitative parameters of production, indicators of financial and economic activity of enterprises (structural units) in the respective industry structure. When researching production processes, methods or technologies of production and marketing of products, the main attention is paid to finding reserves to reduce production costs and increase the competitiveness of products.

Benchmarking, as a management tool used to enhance competitiveness, focuses on specific areas of research: marketing, manufacturing, innovation, logistics, staffing or investment, which allows you to clearly identify the competitive advantages of this area and to formulate management decisions to improve them. Benchmarking is functional by the subject of the study – that is, the

mechanism is being studied functioning of a particular enterprise or complex; procedural – the focus is on the process of production, consumption and realization of economic goods in economic activity; strategic – the goal is to have a long-term plan to increase competitive

Table 1.2

Groups of indicators of competitive advantages of agroindustrial complex

Indicators that characterize the market activity of the enterprise and the current state of the market	demand for products manufactured by the enterprise
	the market share occupied by the enterprise
	the degree of popularity of the enterprise and the attractiveness of its products
	cost-effectiveness of production costs
	positioning in global and domestic markets
	development of cooperative relations
	degree of intensity of foreign competition
	level of market concentration
Indicators that reflect the logistics	rational operation of fixed assets
	perfection of manufacturing technology
	organization of work in production
	efficiency of inventory and working capital management
Indicators to obtain information about rational use of labor resources	the degree of staff satisfaction with working conditions
	effectiveness of management costs
Indicators of product competitiveness	quality, range, novelty, level of production costs
	level of after-sales service
Indicators that give an idea of innovation activity and investment attractiveness enterprises	level of attracted investments
Indicators that characterize the effectiveness of financial management	the company's ability to pay its debts
	financial sustainable
	the possibility of sustainable development of the enterprise in the future

advantage; indicators – the basic economic indicators of a competitor's activity and the determination of the factors that influence them are subject to analysis. Benchmarking is also carried out once as a tool for resolving certain competitive issues, or systematically in order to identify, improve and maintain its place in the market.

The standard benchmarking process involves several steps. Its success is the clear adherence and proper execution of each of the following steps:

- planning, which involves identifying critical success factors, selecting a benchmarking process, documenting the process, developing indicators;
- determination of parameters for the benchmarking process;
- observation and gathering of information from the selected directions – the information on your enterprise and the enterprises of the benchmarking partners is collected, both primary and secondary data are used for this purpose (the information must be reliable);
- analysis – the information received is classified and classified, the method of analysis is selected and the degree of achievement of the goal and the factors that determine the result are evaluated;
- adaptation – choosing the best practices of the benchmarking process, adapting them to the conditions of work of your enterprise, making changes;
- improvement – the task is to choose the elements of processes, borrowed methods and schemes that enable the implementation of a strategy of continuous improvement of the enterprise in the world food market.

It is important to take into account the national component, which takes into account the growth of the studied indicator on a scale of national economy (National Share Factor, or National Share – NS). The second component estimates the shifts provided by the proportion effect (MIX effect of sectoral factors), which is influenced by the structure by type of economic activity and is provided by the difference between the sectoral and national rate of change. The third factor

detects a shift due to the effect of the region's internal competition (DIF-differential shift effect) [124, p. 162].

The multi-level approach to competitive advantage research derives from the general provision on the relationship between competitiveness characteristics and the competitive field, as well as the level of aggregation at which competition between individual entities is conducted. In accordance with this approach, competitive relations are divided into: microlevels – reflect consumer characteristics of the product, quality in the broad sense and cost of production; mezzanine – provide a sustainable improvement in the efficiency of utilization of existing production resources of industries and socio-economic potential of the regions; macro-levels – show the general state of economic systems, their balance, investment climate, tax regime, tariff and customs policy; mega-level – reflects the characteristics of the global economic landscape, the distribution of power centers, the configuration of "quality of life zones", the localization of directions of "technological breakthroughs".

Quantitative (hard data) and qualitative (survey data) methods are used to assess international competitiveness. Quantitative methods are based on the use of mathematical and statistical information, and qualitative methods use sociological and expert indicators. One of the major ratings that reflects the country's real competitiveness is the IMD World Competitiveness Center. Researchers from the leading IMD-Lausanne Business School (Switzerland) have been publishing annually since 1989 and ranked countries on more than 320 criteria. In recent years, the methodology for competitiveness research has been constantly refined, taking into account the evolution of the global environment. Thus, in 2015, the number of these criteria reached 342, which were grouped into 4 subgroups (table 1.3).

An important comprehensive analysis of the determinants of competitiveness in global competition is a study by the European Commission (Second Report on Economic and Social Cohesion; A Study on the Factors of Regional Competitiveness).

Table 1.3

Factors of competitiveness according to the IMD method

Economic growth	Management efficiency	Efficiency of the business environment	Infrastructure
84 criteria	71 criteria	68 criteria	116 criteria
Macroeconomic assessment of the domestic economy: - domestic economy; - international - trade; - international investment; - employment; - prices.	The extent to which government policies promote competitiveness: - state finance; - fiscal policy; - institutional structure; - business legislation; - social structure.	The degree to which national conditions stimulate enterprises to profitability, solvency, innovative activities: – productivity; – labor market; – finance; – management ractice; – traditions and habits.	The degree to which the main technological, scientific, human resources satisfy the business: – basic infrastructure; – technological infrastructure; – knowledge infrastructure; – health and environment; – education.

The latter carried out a detailed analysis of the theoretical foundations of regional competitiveness and identified three main factors: infrastructure and accessibility, human capital, production environment. These factors were divided into a number of criteria, according to which the analysis is carried out: educational opportunities, development of highways, airways and railways, living conditions, natural environment, migration of highly educated population, competences, correlation of major spheres of production, structure of foreign trade, security production resources and others. The methodology of Second Report on Economic and Social Cohesion determines the determinants of the region's competitiveness employment level and labor productivity, the ratio of employment levels in different sectors of the industry, demographic trends, foreign direct investment, investment in research and development.

An important indicator is the international competitiveness, which is presented annually by the World Economic Forum (WEF). The ranking

includes more than 140 countries, and the competitive advantage is the factor that puts the country in 50th place and higher in the ranking. The competitiveness index determines the ability of the economy to grow in the long run. It is formed taking into account 114 indicators (2/3 – the results of the survey of business executives, 1/3 – the statistical information). Beginning in 1971, the competitiveness ratings of the countries represented at the WEF have been compiled. The methodology for determining competitiveness has changed over the years. In 2000, J. Sachs proposed the use of a Growth Competitiveness Index (GCI) based on the theory of economic growth.

The aforementioned structuring of the factors and properties of competitiveness allows us to characterize the elements of this complex category more clearly and identify their relationships. This, in turn, helps to substantiate effective approaches to the analysis of competitive advantages, depending on the specific competitive field, which reveals additional opportunities to open the existing reserves and determine the strategic directions of its increase at each level. Not only the general provisions of competitiveness and competitive advantages are subject to research, but also the aspects of micro-, meso-, macro- and megacompetitiveness are clearly distinguished. Each of these areas involves the use of specific approaches, methods and sets of indicators.

Thus, the inseparable link between competitiveness at macro-, meso-, and micro-levels is evident, and the current processes of globalization make the fact that international integration increases competition at the national level, which in turn significantly affects the competitiveness of territories, industries and enterprises. The possibility of integration of the presented directions in the theory of competition and competitiveness is conditioned by the existing concept of spatial organization in modern science, which allows to substantiate the presence in the approaches of general problems of differentiation of socio-economic development of territories, industries and enterprises in order to improve the effectiveness of regional, structural and competitive policies.

The main methodological principles for assessing the competitiveness of agroindustrial complex are:

- systematic and comprehensive, which involves the assessment of the interaction of the complex of internal and external factors of competitiveness of agroindustrial complex;
- integrity that ensures deepening and concretization of the links between the factors of competitiveness of agroindustrial complex;
- taking into account the specificity of production, according to which the assessment system should include indicators that reflect the specific sectoral features of agroindustrial complex and take into account their impact on the competitiveness of the national economy;
- taking into account the peculiarities of different segments of the agroindustrial complex, based on the most accurate determination of customer requests in the region (market segment) and their full satisfaction;
- quasi-stability of the market situation, which takes into account that at each specific time the structure of solvent demand is quite sustainable and allows for segmentation of consumers by the importance (importance) for them of individual indicators of services in agroindustrial complex;
- hierarchies of indicators included in the system, which must be ranked from general to partial (consolidated generic indicators reflect the integral characteristics of the main areas of increasing the competitiveness of agroindustrial complex, partial indicators – complement the overall picture by taking into account the impact on the process of specific features studied);
- information security – the system should contain indicators, the calculation of which can be provided with statistical reporting, the information must be complete, reliable and characterized by timely receipt;
- ontinuity – considers possible adjustments to system performance or the inclusion of additional performance indicators as new APC status data or changes in its competitive environment are received.

Thus, in modern economic science, more than 100 methods and more than 300 indicators are used to evaluate the competitiveness, which allows to characterize the competitive advantages of the enterprise, industry, region or economy of the country as a whole. However, there is no single technique that can do this. To obtain a qualitative result to be verified, it is necessary to use a whole set of analytical, statistical, graphical indicators that will reflect the processes taking place in the market. Therefore, only the integrative combination of methods, techniques and principles of competitiveness assessment can accurately reflect the market situation.

Based on the research, it is possible to determine the main competitive advantages, the development of which will contribute to the sustainable development of agroindustrial complex: ensuring the production security and independence of the country by increasing the volume of production and export of agricultural products; preserving the traditional location of industries in order to restore and improve economic ties between business entities in the territory; ensuring the competitiveness of manufactured products through the development and placement of industries where the costs of socially needed labor and resources for production and transportation of manufactured products is the smallest, and the possibilities of obtaining high quality products are greatest; optimum use of natural conditions and biological properties of plants and animals, all things being equal, crop yields and animal productivity will be higher where they are most favorable; ensuring rational proportions in the production of different types of products, allowing the most complete use of land, material and labor resources of agriculture in the region, balancing the livestock and the volume of production of feed; bringing food and processing industries closer to sources of raw materials and agricultural enterprises to the places of consumption of their products, to minimize the loss of labor and means of delivery; the development of all modes of transport and vehicles, including the road economy; use of the results of scientific and technological process, investment and innovation development; meeting the needs of the country and the regions in the production and

consumption of agricultural products, raw materials and food; maintaining social and environmental sustainability in individual regions in the process of integrating agroindustrial complex into the system of the International Division of Labor; economic policy of the state, which is expressed in the amount of investments, innovation activities, budget support for agriculture, stimulation of production of its products, etc.

The main measures aimed at stimulating the development of competition in the agrarian sector of the country are: availability of financial resources for enterprises of the industry, protection of domestic markets, stimulation of export of agricultural products. The development of a directly competitive environment largely requires: the creation of farmers' associations for effective interaction with large suppliers of raw materials and processing plants; development of a system of educational measures capable of adapting farmers to modern business processes; improving the system of state support measures for farmers; simplifying the procedure for allocating land for plant and animal husbandry. Competition in the market crop production could be substantially higher when creating a rational grain trading system (and in general agricultural production) aimed at creating a level playing field for access to trading venues around the world. In the livestock sector, the main measures for improving competition are measures to improve the investment climate, aimed at sustainable growth of high-yield livestock, introduction and adaptation of modern technologies, maintaining the required level of profitability of production. Thus, simultaneous and synchronous inclusion of the whole set of measures allows to form and maintain a normal competitive environment in the food markets of different regions of Ukraine, which ensures a sustainable dynamics of agroindustrial complex development.

So, strategic initiatives to increase the international competitiveness of agroindustrial complex are [16, 20, 21]:

– increasing the profitability of agricultural producers, by ensuring the level of profitability and profits of agriculture, sufficient for

expanded reproduction, investment, scientific and technological progress (STP). It is expedient to maintain the level of profitability of agricultural production with the help of a guaranteed level of prices for the main types of agricultural products;

- increasing the level of intensification of agroindustrial production. For these purposes, it is advisable to use the mechanism of differentiated subsidies, the standards of which should be developed on a scientific basis, taking into account industry and regional specifics. It is impossible to increase the level of competitiveness of agroindustrial complex without large-scale modernization, introduction of advanced technologies, modern information and staffing;
- stimulating the domestic food market. The growth of consumption of basic foodstuffs contributes to the increase of physical capacity of the relevant segments of the food market, stimulation of food producers to increase the supply of products and, as a consequence, creation of conditions for increasing the competitiveness of agroindustrial complex. The main directions within this strategic initiative, taking into account the systemic logic of the economic complex and the role of the agroindustrial complex in it, should be considered to increase incomes, ensure rational food consumption, protectionism against domestic agricultural producers, improving quality and greening of domestic products;
- ensuring the development of the social sphere of agriculture. This strategic initiative is the most difficult in terms of its implementation, as it requires a change in public assessment of the place and role of agriculture in the life of the nation. First of all, it is the creation of material living conditions in the countryside in accordance with social standards, increasing the level of wages in accordance with the general economy, the implementation of infrastructure projects in accordance with existing program documents. In the long run, the strategic initiative for rural social development should be focused on the priority development of agriculture.

CHAPTER 2.
FEATURES OF AGRARIAN SECTOR COMPETITIVENESS FORMATION OF UKRAINE

2.1. A retrospective analysis of the economic development of the agrarian sector of Ukraine

The agroindustrial complex is an important strategic branch of the Ukrainian national economy, which provides food security and independence of our country, and provides jobs for a large part of the population. At the same time, agriculture plays a significant role in the formation of gross domestic product. Researching the development of agricultural enterprises, it should be noted that enterprises in this sector should be considered as an open system, which is connected with the external environment by a certain set of elements of relations. That is why the efficient and successful functioning of agricultural enterprises in a market environment implies the possibility of their adaptation to changing external conditions. Thus, in order to succeed in the market, one should use in practice a so-called strategic vision that reflects the essence of the business and directs all its efforts to achieve higher performance than its closest competitors.

Effective development of processes of specialization, cooperation and agroindustrial integration, improvement of the system of interconnections between all participants of the production process can occur provided that such a system of regulation, which through its mechanisms exerts an effective impact on the entire agroindustrial complex. Such a system of inter-sectoral regulation allows to combine the interests of the region and the state with the sectoral interests, to coordinate the actions of all those involved in the functioning of the food complex. In other words, this system will ensure the effective implementation of state food policy. At the same time, the role and importance of state regulatory bodies in the development of regional food complexes in modern conditions (with significant expansion of the independence of primary management subjects and strengthening of their

responsibility for the final results of the work) will not only not decrease, but will increase. Such regulatory structures should act, firstly, as full representatives of the state, leaders in the implementation of its economic and social policy in the development of agroindustrial complex, and secondly, to guarantee the established for agroindustrial enterprises various forms of ownership, rights and conditions of economic activity [99, p. 175].

In the current conditions of development of globalization processes, it is important to determine the factors and features of the development of the agroindustrial complex of Ukraine, which form the prerequisites for the development of competitiveness of the national economy. The change in the structure of the domestic agroindustrial complex, its reorientation to the European markets, certain raw materials orientation and low level of technological equipment form the unfavorable factors for obtaining the proper level of production income. A striking example of these processes is the low profitability of agriculture in Ukraine, especially in the case of livestock production (see Appendix C).

According to the data in Appendix C, the overall level of profitability of agricultural products in Ukraine is quite high compared to European countries, and amounts to 14.16 % for the period 2002-2016. Also, this indicator is characterized by a stable upward trend, so in the period 2002–2006 it was 7.04 %, in 2007–2011: 18.18 %, 2012–2016: 17.26 %. This situation was due to the unfavorable situation of the agroindustrial complex in 2000, however, after the completion of structural reforms in agriculture, the completion of the privatization processes increased significantly. However, compared to the general indicator, the profitability of livestock products is much lower, which is caused by a long payback period of invested investments, fluctuations in market prices, which adversely affects certain types of production. It is unprofitable in Ukraine to breed cattle, sheep and goats. Therefore, the average value of cattle profitability for 2002–2016 is 34.56 %, meat of goats and sheep – 38.16%, which is very low. It is cost-effective to breed poultry for egg production – the profitability in 2002–2016 was

25.2 %, with the poultry meat breeding during this period was negative, but in 2016 its profitability was 5 %, while the profitability of egg production dropped from 60.9 % in 2015 to 0.5 % in 2016. These processes determine the vector of livestock development in the domestic agroindustrial complex and clearly reflect the priority areas investment in agriculture.

The situation in crop production is somewhat different and is characterized by higher profitability compared to animal husbandry (see Appendix D).

According to the data of Appendix D, the average value of the profitability of crop production for 2002–2014 was 22.64 %. Of the highest profitability was growing sunflower seeds, which in the period of 2002–2016 amounted to 49.6 %. In recent years, the profitability of sugar beet cultivation has increased significantly, rising from 5.71 % in 2002–2002 to 20.28 % in 2010–2016. This growth was due to the recovery of part of the sugar refineries and the growth in demand for sugar in world markets. At the same time, the profitability of growing potatoes fell sharply from 24.2 % in 2015 to – 3.2 % in 2016. Thus, crop production remains one of the most important in the structure of agroindustrial production. Ukraine and accounts for a significant percentage of exports. However, today raw materials are at the heart of exports, while finished products, which have a much higher added value, make up a small part of them.

Qualitatively reflects the agricultural producer`s position the aggregate index of costs for its production, which is an aggregated (average) value of the price indexes of producers of industrial products and products of agricultural origin used in agriculture, indexes of tariffs for services, provided to agricultural producers and wages in agriculture (see Appendix E).

As can be seen from Appendix E, the index of agricultural production costs in 2016 was 113.5. This indicates a steady increase in costs in the agroindustrial complex, especially for spare parts, components and fuels, which are a significant component of the costs of any agricultural enterprise. The table also shows that the index of livestock costs is

higher than in the crop industry, which in turn also affects their profitability. In this regard, most agricultural producers need to consider these factors in the planning of their activities.

Also important is the agricultural index, which reflects the relative level of change in the total physical volumes of agricultural products produced over certain periods of time, which are selected for comparison. In its composition, this index is an index of gross agricultural output, which includes, along with marketable products intended for sale, agricultural products consumed in the production process, namely seeds and feed, as well as work related to crop production. next year. The Laspeyres formula was chosen to calculate it [227].

As the data in table 2.1, there is no clear tendency to increase or decrease the physical volume of agricultural production in Ukraine, which is mainly due to market fluctuations in demand for it and climatic factors. Thus, in 2015, this indicator decreased from 102.2 % in 2014 to 95.2%, and in 2016 the index increased again to 106.3 %. The important thing is that this indicator is quite dependent on the type of property. For example, in agricultural enterprises the index is 110 % in 2016, while in households it is only 101.8%. This differentiation is caused mainly by the amount of capital involved in production, as well as by the maneuverability of the manufacturer to change market demand and supply. The presence of certain competitive advantages of domestic agricultural producers is evidenced by the commodity structure of Ukraine's foreign trade (see Appendix F).

The commodity structure of the AIC foreign trade in 2016 reflects the qualitative state of domestic exports and imports of agricultural products. Thus, exports of plant products in 2016 accounted for 22.3 % of the country's total exports, while imports accounted for only 3.3 %. The basis of domestic export is cereals, most often it is feed grain. On the one hand, this is a positive one, as the product is highly competitive in international markets, has a high profitability index and fills the domestic market with foreign exchange earnings, but on the other hand, a significant share of primary raw material exports from low to proportion of value added is the need for the development of the processing

industry of the domestic economy and enhancing its competitiveness. For this purpose, the Ukrainian State Farm Support Fund is established and operates, which is a state budgetary institution that performs the functions of implementing the state policy to support the formation and development of farms.

Table 2.1

Agricultural production indexes

Year	Enterprises of all categories			Including					
	Agricultural products	among		Agricultural enterprises			Households		
				Agricultural products	among		Agricultural products	among	
		Crop products	Livestock products		Crop products	Livestock products		Crop products	Livestock products
2006	102,5	101,8	103,6	108,3	106,1	115,4	98,6	97,8	99,5
2007	93,5	90,9	98	94,5	89,9	108,3	92,8	92	93,8
2008	117,1	128,6	98,7	136,3	148,8	105,2	102,5	108,3	95,6
2009	98,2	95,3	104,2	94,9	90,2	111,3	101,5	102,4	100,5
2010	98,5	95,9	103,4	97,7	93,7	109,1	99,1	98,5	100,1
2011	119,9	130,4	101,3	128,7	137,9	106	111,8	121,7	98,3
2012	95,5	91,9	103,9	93,4	89,1	107	97,8	95,5	101,7
2013	113,3	117,9	104	120,8	125,6	108,1	105,5	108,4	101
2014	102,2	103,2	99,7	104	104,2	103,5	99,9	101,9	96,6
2015	95,2	94,8	96,3	94,9	94,4	96,4	95,7	95,4	96,3
2016	106,3	109,9	98	110	113,9	98,1	101,8	104,1	97,8
2017	97,8	97	100,1	96,8	95,8	100,7	99,2	98,9	99,7
2018	108,1	110,7	101,5	112,6	114,8	105,2	102,3	104,3	98,4

The main activities of this fund are: ensuring efficient use and in time repayment of funds allocated for financial support of farms from the State Budget; determining the amount of need for funds to support farms financially; providing financial assistance to farms with detached estates, farms that carry out economic activities and are located in mountain settlements, in the Polissya territories on an irrevocable basis and on a competitive basis on a refund basis, and to other farms only

competitive bidding on a refund basis; financing the costs associated with the development of land allotment projects for farming; providing loans to farms for the production, processing and marketing of self-produced products for the implementation of production activities; creation of sustainable conditions in the case of obtaining a bank loan by farms; intensification of entrepreneurial activity of farms through the establishment of agricultural service cooperatives and credit unions, other service processing and marketing enterprises; promotion of personnel, advisory, information, scientific and technical support of farms in the conditions of market economy, etc. State budget funds are provided in accordance with the procedure established by law on a non-refund and competitive basis on a refund basis. However, the amount of state aid is currently negligible, which necessitates the search for additional sources of investment both in the domestic and external financial markets [116, p. 111].

The analysis of the internal market for agricultural producers reflects certain transformations in its structure and attractiveness to external investors. The presence and functioning of large agroholdings allows concentrating considerable financial resources on priority directions of development of the agroindustrial complex of Ukraine (table 2.2).

All activities of agricultural enterprises are based on a precise and reliable knowledge of the needs of the target market and consumer demand, assessment and consideration of production conditions in the near future and in the future. The formation of agrarian enterprise development strategy should be based on: ensuring permanent improvement of product quality, its attractiveness for the consumer; optimizing the supply of goods and the prices available to the consumer; creation of an effective sales network based on stable contacts with intermediary trading companies and agencies; national general characteristics and specifics of consumer requests in different regions. Each agricultural enterprise can employ a large number of probable alternative strategies.

Strategic planning is an effective tool for managing the economic and social development not only of the agrarian sector as a whole, but of a single agricultural enterprise. Strategic planning is a special type of planning work that involves the formation of the mission, goals and strategy of the company, the development of a strategic plan to ensure its effective functioning, rapid adaptation to changing environmental conditions.

Table 2.2

The largest producers of agricultural products in Ukraine

Producer	Land Bank, thousand hectares	The share in the total amount of agricultural land, %	Reve-nues, UAH million	Expens pens-es, UAH million	Profit (loss), UAH million	EBITDA dollars USA per hectare
Uklandfarm-ing	670	1,57	24550	28678	-4128	311
Kernel	390	0,91	48966	46720	2246	115
Myronivsky bread product	360	0,84	21747	28244	-6497	231
Astarta	245	0,57	6767	8076	-1309	124
Industrial dairy company	136,7	0,32	2180	2366	-186	420
Nibulon	82,5	0,19	9262	11212	-1950	225
Svarog West Group	80	0,19	-	-	-	700
Agrotrade	65	0,15	2235	2126	109	-
Agromars	35	0,08	2435	2379	56	-
Terra food	28	0,07	-	-	-	-

Nowadays, the management of most agricultural enterprises is beginning to realize the benefits of strategic planning and is trying to use its methodological tools in its activities. At the same time, strategic planning has not found systematic application in enterprises. The overwhelming majority of enterprises in the agrarian sector react chaotically to changes in the external environment; instead, each enterprise must manage its strategic capabilities by identifying the internal potential for adaptation in the external environment [139, p. 116].

Of paramount importance in the strategy of competitiveness management are: product quality management, which in times of complex economic relations is the basis for ensuring competitiveness; development and release of new goods; comprehensive market research and marketing planning; organization of work of the commodity apparatus; advertising and sales promotion; improvement of manufactured products; price policy; strategic action policy; improvement of organizational structure; selection of the most effective distribution channels; reduction of costs of treatment; credit policy and financing.

2.2. Strategic analysis of agrarian policy and competitive environment of the European agrarian market

The regulation of agriculture abroad is a complex mechanism, including instruments for influencing the structure of agricultural production, farmers' incomes, the agrarian market, the social structure of the village, inter-sectoral and inter-economic relations. The achievements of the EU's agriculture are a direct result of its consistent, but at the same time, flexible agricultural policy. In order to ensure the competitiveness of Ukraine in the agricultural market in the context of integration processes, it is necessary to investigate the mechanism of functioning of the European agroindustrial complex and to determine the basic characteristics of its regulation.

The purpose of EU agrarian regulation is to create sustainable economic, legal and social conditions for agrarian development, to meet the needs of the population for quality food at affordable prices and to protect the environment. The main content of the agrarian policy of most economically developed countries is the state support of the agrarian sector with the help of various subsidies, subsidies and benefits. The purpose, objectives of the common agricultural policy, prerequisites, restrictions, measures and decisions are given in Appendix G.

Thus, the common agricultural policy (CAP) aims exclusively at improving the productivity and efficiency of agriculture, ensuring a de-

cent standard of living for consumers and penetrants of agricultural products, stabilizing markets, and ensuring the security of supply of goods and services at affordable prices to consumers. Within the framework of the common agricultural policy, assistance is provided for the purpose of protecting farms that have suffered damage as a result of structural and natural factors [50].

In the EU, agrarian policy is defined by the Common Agricultural Policy framework and is based on two concepts: the first aims at regulating the support market within the common market and includes a single payment system and a system of payments per unit area of cultivated land; the second contains various co-financing activities for EU Member States, such as agro-environmental programs, payments for less favorable areas, investment aid, and is funded by the European Agricultural Fund for Rural Development. The single payment system is used in place of various subsidies and serves to separate support based on compliance with a set of standard requirements for environmental, food security and health care. The unit area payment system is a transitional income support system offered to new members to facilitate direct payments [230].

The stages of the development of the common agricultural policy are summarized in Appendix H. The formation of a specific "European model of agriculture" in the fourth stage meant enhancing the viability and competitiveness of EU agrarian, including regions with relatively worse production conditions. An important element of the model is the strengthening of producers' requirements for food quality and safety, environmental protection and maintaining welfare standards. Regardless of the effectiveness of the mechanisms of the common agricultural policy, there is always a need to change and improve the common agricultural policy. The problem of overproduction of food products has adversely affected trade and created environmental problems. Thus, 2003, 2008, 2013 were periods of reform and improvement of the agrarian policy of the EU Member Countries. The aim of reforming the common agricultural policy was to formulate an agrarian sector focused on market conditions, ensure the consumption of safe and affordable

food, solve environmental problems and ensure sustainable development. In particular, the 2003 reforms introduced a new system of direct payments, under which a single payment system was introduced, which guarantees farmers a sustainable income under the common agricultural policy. In 2008, additional changes were made whereby agriculture was granted aid until 2012. In the fifth stage (2007–2013), the requirement for agrarians to leave 10 % of arable land under steam was canceled; it was decided to gradually increase milk quotas and to eliminate them in 2015.

It is agreed that purchases of surplus products will be made only to protect the market and farmers' incomes when food prices fall to an alarmingly low level. The priorities of the 2013 reform were to improve production and improve the quality of food; rational management of natural resources; balanced rural development [135, p. 24].

The stages of the formation and development of the CAP are inextricably linked to the processes of integration of European economies from simple to more complex forms – from the zone of preferential trade in foodstuffs to the common economic mechanism of regulation of the agrarian sector. At the beginning of the CAP, national governments retained autonomy to influence their agrarian sector. Over time, supranational institutes for regulation of agricultural production were established. The highest form of integration for today is the delegation of powers over the CAP to specially established governing bodies and other EU institutions. Thus, it is possible to identify the main objectives of the common agricultural policy of the EU, which are achieved through the presence and observance of the principles (see Appendix I).

Regulation of the European agribusiness market is carried out by means of direct state subsidies and indirect state regulation of the agroindustrial complex (fig. 2.1.).

The features of pricing for agricultural products in developed countries include the differentiation of target (guaranteed) prices by months of the business year within up to 10 % of their average annual level. This is intended to compensate farmers for storing unprocessed produce directly on their farms or for paying commercial and govern-

ment warehouse tariffs. In the latter case, partial compensation for losses from agricultural products during storage is carried out.

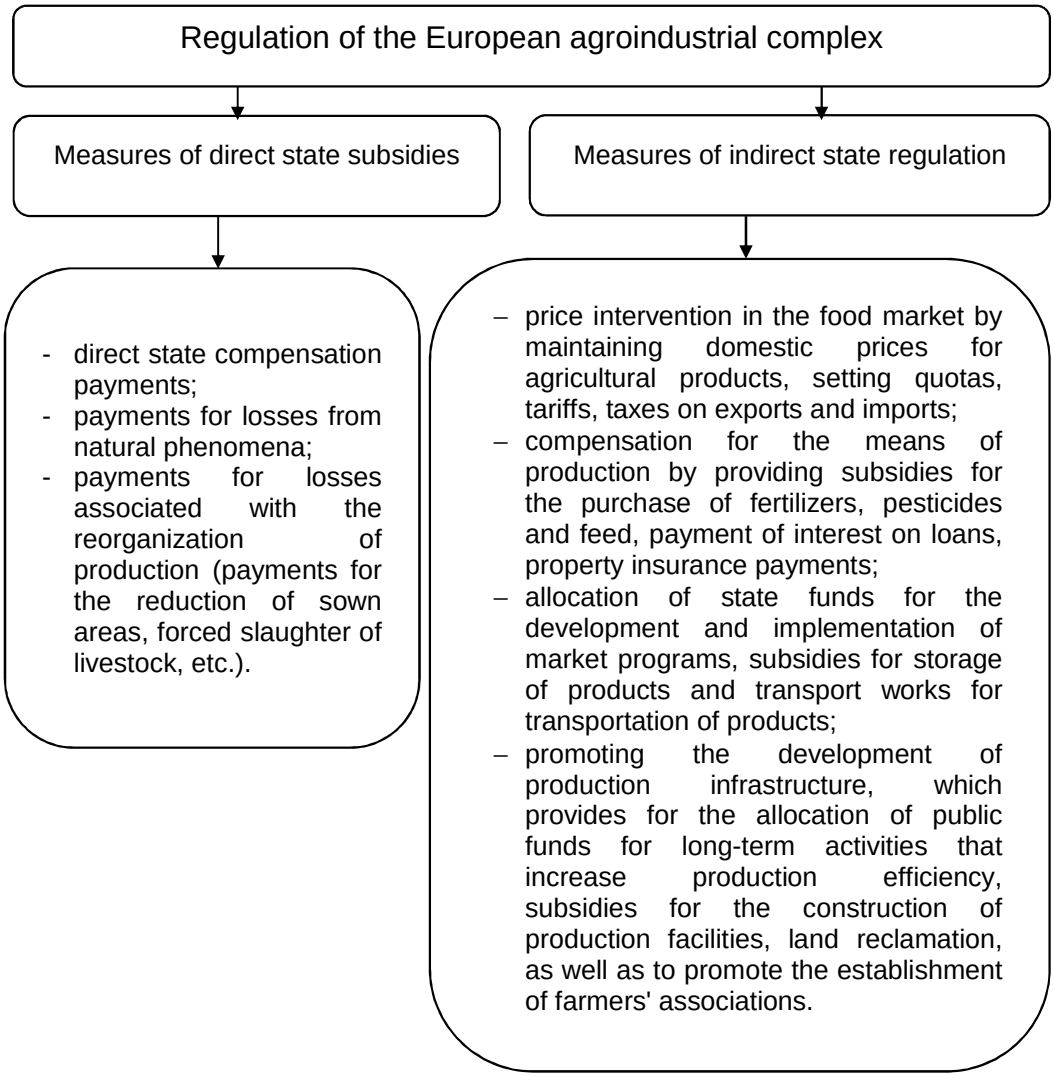

Figure 2.1 – Methods for regulating the European agribusiness market

The common basis of pricing in the agroindustrial complex of the EU is to align the purchase costs for agricultural products with the socially necessary costs of their production and sale. At the same time, they seek to take into account the level and dynamics of world prices.

The most important function of the price is the regulation of agricultural income for the further development of the industry. The pricing system provides for rapid monitoring of the dynamics of prices for agricultural production, costs and income, prices for agricultural end products and services, thus ensuring a high level of income from agricultural activities [70, p. 71].

One of the most important principles of state support in EU countries is the accounting of the dynamics of world prices for agricultural products. This principle works as follows: the higher the world prices for agricultural products, the less government support, and vice versa, the lower the world prices, the higher the import duties. Thus, the main mechanisms of the common agricultural policy are the guaranteed common prices set in euro and the common market organization (CMO), which exist in 26 products or product groups and cover about 90% of total agricultural production in the EU. Common market organization exist for the following products: cereals, rice, olive and sunflower oil, sugar, concentrated feed, flowers, fruits and vegetables, bananas, wine, fruit and vegetable processing products, tobacco, flax fiber, hops, seeds, beef and veal, pork, lamb and goat, eggs and poultry, dairy, and other agricultural products for which there are no separate market organizations. There are no markets for potatoes and alcohol. Common market organization are made up of certain rules adopted to regulate the production and trade of agricultural products in all the Member States of the European Union. After the adoption of the CAP common organizations markets were gradually replaced by national market organizations in those sectors where needed. Their main task is to achieve the main goals of the CAP, in particular to stabilize the market, fair living conditions for farmers and increase productivity in agriculture. The elaboration and enforcement of rules for the functioning of market organizations is the responsibility of the Council of Ministers of the EU and the European Commission. Although there is much in common with the activities of different market organizations, the specific mechanisms for regulating individual products differ significantly. At the same time, each such entity uses a set of tools in its activities,

which includes measures related to imports (tariffs and licensing), as well as subsidies (production support and export subsidies). According to the requirements of the European Commission, there are four types of common market organization: organizations for certain types of crop production (cereals, oilseeds, protein crops), beef and lamb – provide direct assistance to producers related to the level the use of production factors such as land or livestock, with some limitations on their use; organizations of olive oil, tobacco, cotton, as well as certain types of vegetables, fruits and products of their processing (citrus, tomatoes, plums, table wine) – provide assistance in accordance with the volume of production, which, however, should not exceed the historical level; dairy and sugar organizations – provide assistance within defined production quotas, such support is provided mainly at the expense of consumers; organizations dealing with vegetables and fruits, high quality wines, pork, poultry, eggs and honey allow markets to function with minimal government intervention [78, p. 19].

Pricing policy also includes customs regulation (especially relevant for those countries that import products), interventions (purchase of certain types of products), and quotas for agricultural production. These measures directly influence the price of agricultural products sold. Prospects for state regulation and state support for the EU agricultural sector related to effective use of agricultural land. Thus, in order to prove the efficiency of the use of agricultural land, the management of the business entity must confirm the implementation of the basic rules, which are prescribed in the legislation.

EU Regulation 1307/2013 did not lay down rules for direct payments to farmers under the support program under the reformed common agricultural market. However, the document includes provisions for voluntary coupled support (VCS) of € 4.11 billion in 2015. Commenting on such changes, we note that EU Member States have been granted the right to provide voluntary coupled support to specific sectors of the rural sector farms that have significant economic, social and environmental importance and "reflect" temporary financial difficulties.

According to Eurostat, the agricultural sectors are potentially eligible for voluntary framework support (cereals, oilseeds, protein crops, cereals, flax, hemp, rice, nuts, potato starch, milk and dairy products, seeds, sheep and goat meat, beef and veal, olive oil, silkworms, dried fodder production, hops, sugar beets, cane and chicory, fruits and vegetables). In 2016, the following sectors received the largest support: beef and veal production (41 % of the voluntary framework support budget for 2015); milk and dairy products (20 %); sheep and goat meat (12 %); protein cultures (11 %).

Regulatory policy measures should increase the competitiveness of agrarian in the EU member states. Studies have shown that EU interstate bodies such as the Council and the Commission implement the common agricultural policy in practice through a series of instruments grouped into two "pillars" (fig. 2.2).

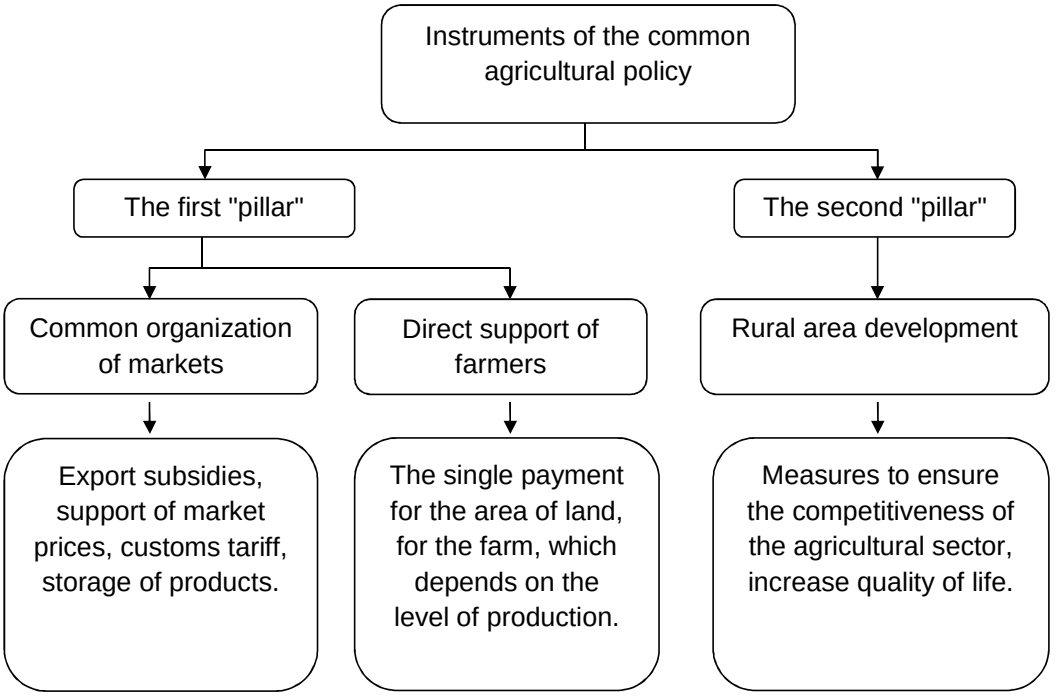

Figure 2.2 – Common agricultural policy instruments

An important factor in establishing an effective agricultural policy in the EU is the quality of the institutional environment, which changes,

including, under the influence of the development of the economic potential of the economy. Agrarian policy architectonics should shape the institutional conditions for the functioning of an effective mechanism for influencing economic competition, rural development, and improving the well-being of the population. Institutional structure as a significant component of state regulation is an effective tool for ensuring the country's competitiveness. Given that economic activity is carried out within the relevant institutional model, which is a set of interconnected institutions, an effective model of agrarian policy must be based on the institutional environment of society. Creating appropriate institutional conditions for the formation and implementation of effective agrarian policy requires the use of adaptive architecture of the system of economic regulation, which will contribute to the achievement of balanced and sustainable socio-economic development of the country and increase its competitiveness.

Thus, in the EU institutional environment, a system of market regulation is in place that includes a set of interrelated elements influencing the competitiveness of agroindustrial products. Thus, uniform tariffs on agricultural imports are used, and their level is considerable higher than in other sectors of the economy. In recent years, mechanisms for banning imports for sanitary reasons (e.g. meat products) have begun to be used. In addition, the EU has availed itself of the World Trade Organization's special guarantees for poultry, eggs and sugar (based on price), as well as for fruits and vegetables (volume based). Exports of products require a mandatory license, and export subsidies are valid for agricultural products such as wheat and wheat flour, crude grain, rice, rapeseed oil, olive oil, sugar, dairy products, beef, pork and poultry, eggs, raw tobacco, alcohol and some processed products. In addition, export credits, insurance, and guarantees are provided at country level [104].

The European Union's non-tariff regulation system reflects the desire of European countries to ensure the competitiveness and further strengthening of their companies' positions in the world arena, economic and food security of the group, as well as to protect European

companies in the so-called "sensitive" sectors of the economy that are important and, despite their economic inefficiency, they are closely monitored by states.

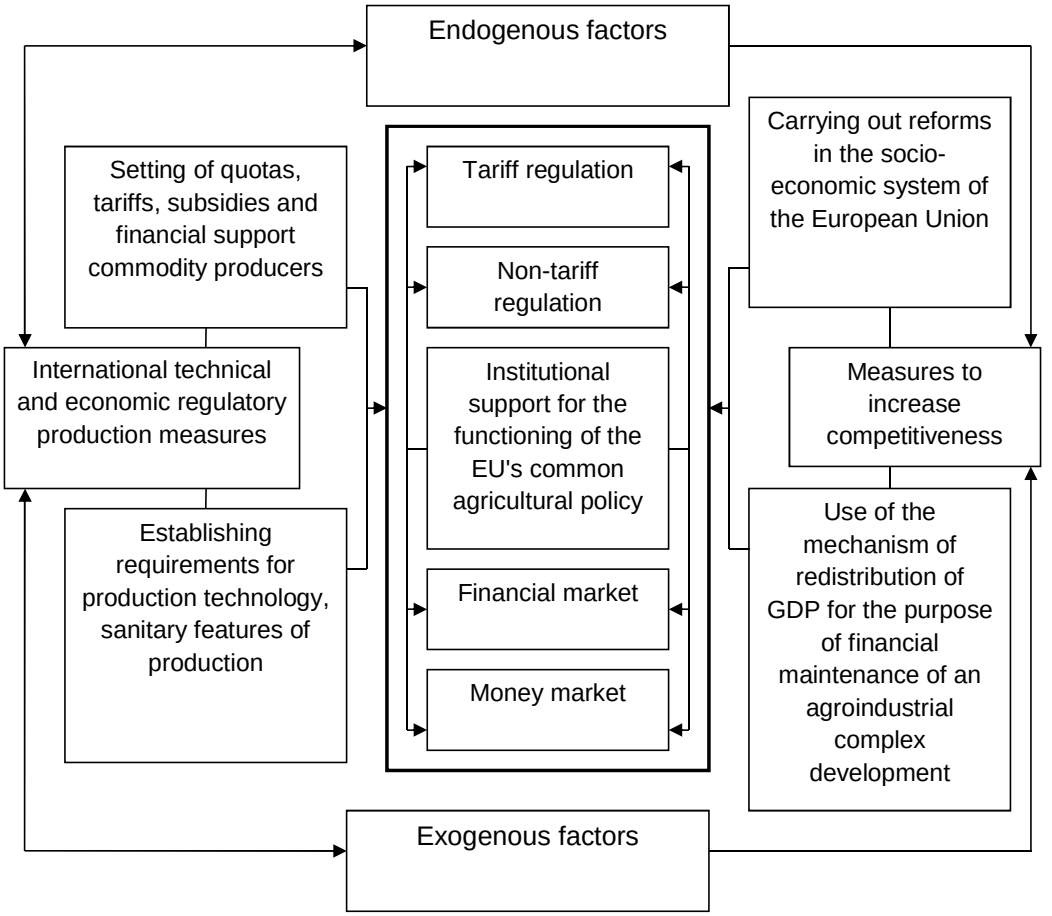

Figure 2.3 – Institutional support for the functioning of the common agricultural policy of the European Union

The use of non-tariff regulation allows for flexible and targeted policies, both for individual countries or groups, and for specific types of goods. Currently, the full range of non-tariff instruments that are allowed under the World Trade Organization (WTO) is being actively used, and in practice their use is often clearly dependent on political factors. At the same time, a number of non-tariff measures are in breach of WTO standards and cause fair criticism from trading partners.

Among the wide variety of non-tariff measures, the most numerous are technical barriers, since almost 2/3 of international trade is regulated by one or another type of technical barrier. Price controls and quantitative restrictions cover a significant portion of world trade. The division of non-tariff measures into five broad categories (technical barriers, sanitary and phytosanitary measures, pre-shipment inspections, quantitative restrictions, price controls), for each of which a frequency index (percentage of product lines covered by non-tariff restrictions) and coverage ratio (percentage of trade covered by non-tariff regulation).

On-going cooperation between Ukraine and the EU in the field of technical regulation is carried out within the framework of the current EU-Ukraine Association Agenda, implementation of the program of budget support (Phase I) "Promotion of mutual trade by eliminating technical barriers to trade between Ukraine and the EU", joint projects involving agencies of Ukraine and individual EU Member States. The overall objective of such cooperation is to approximate the legislative framework of Ukraine in the field of technical regulation to EU and WTO requirements, including transition from mandatory certification to conformity assessment, adoption of technical regulations in line with EU New Approach directives, revision and replacement of old standards (state standard (SS)) and implementation ISO (International Organization for Standardization) and European Standards, establishing a market surveillance system, updating and modernizing the material base, reforming and strengthening the institutional framework for quality assurance, etc. [131].

In order to implement EU Member States' economic development programs and minimize the negative effects of international trade transactions on the agroindustrial market, all goods imported into the customs territory of the EU must comply with the requirements aimed at ensuring consumer protection. Marketing standards or restrictions may also be set for certain products, which also serve as a mechanism to protect the internal market against imported goods that do not meet the basic quality and safety requirements.

Thus, the EU's internal market protection policy involves the development and implementation of a number of standards and regulations for product quality, the fulfillment of which is a basic condition for the formation of quality trade relations. At the same time, products that meet these standards are competitive in the market. Therefore, in the process of implementation of the Association Agreement with the EU, it is important to focus on internal standards and requirements for product quality with international standards, which will allow forming additional competitive advantages of the domestic production of the agricultural sector of production.

On the whole, the situation in the European agrarian market testifies to its ability to provide the population with guaranteed access to food in the required range and volumes not only of the EU Member States but also of other countries. In 2016, the annual volume of food exports from the EU reached a new record level, with total exports reaching € 13.07 billion against € 1.7 billion in 2015. Major countries-exporters were the US (up to EUR 1.26 billion) and China (up to EUR 1.06 billion). At the same time, imports of agro-food products to EU Member States decreased by 1.5 % to EUR 112 billion, which led to an increase in the trade surplus in agro-food products in EU Member States. During 2016, EU producers exported non-raw primary products (pork, vegetables), processed agricultural products (wine, olive oil) and ready meals. At the same time, exports of commodities (wheat and other cereals, milk powder) and non-food products declined. It is advisable to emphasize that almost one third (30 %) of direct payments in the common agricultural policy system is aimed at introducing environmentally sound farming practices, such as: diversification of crops; maintaining permanent pastures or protecting ecological areas on farms; specific aid for organic farming (fig. 2.4) [59, 168].

It should be emphasized that almost one-third (30 %) of direct payments in the common agricultural policy system is directed to introduction of environmentally sound farming practices, such as: crop diversification; maintaining permanent pastures or protecting ecological areas on farms; specific support for organic farming.

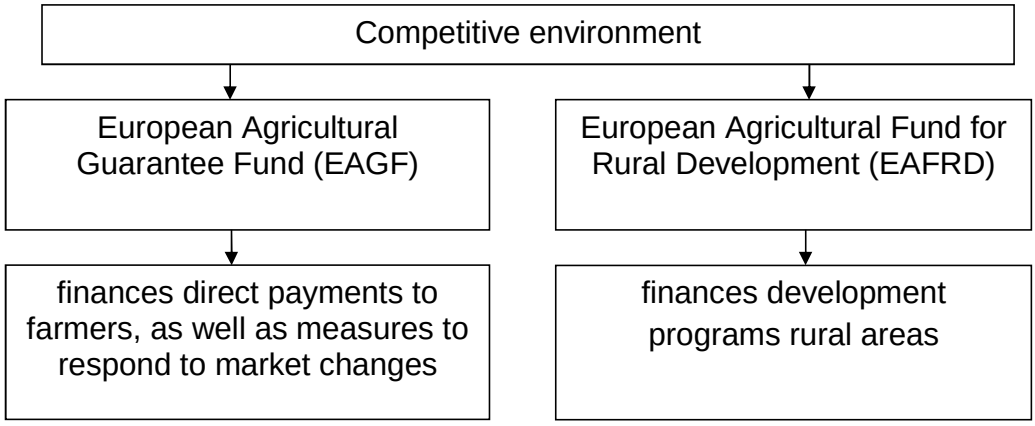

Figure 2.4 – System of financing of the Common Agricultural Policy of the EU

The EU's state support policy for agriculture is generally shaped in Brussels. The procedure for developing a support policy is as follows: The European Union and the European Parliament develop and propose a general policy of state support and regulation. They then adjust it to reflect national and regional reforms and programs, and agree with national economic development indicators. The EU's state support policy is aligned with the member states and a common economic policy and development strategy is being developed. In Germany, for example, development programs are developed in the federal states, then adjusted at the federal level, and only then submitted to the government in the European Union.

In order to provide effective state support for agriculture in the EU, a special fund for rural development has been established. It regulates, finances, monitors and controls the funds allocated to their development needs. The Fund operates in four main areas that determine the development of rural policy: Increasing competitiveness – this direction provides for at least 10 % of state support; environmental protection and compensation – no more than 25 % of funds; ensuring diversification and improving the quality of life – no more than 10 % of costs; formation of industry leadership – not less than 5 % of funds. In all four directions, at least 50 % of state aid is envisaged, i.e. it can be doubled. The following measures are planned for the first direction: in-

vestments in agricultural production; early retirement of employees; processing and sale of agricultural products; participation in the program of food quality improvement; stimulating the transition to new standards and forms of production; participation in meetings; educational and information activities; transformation of agriculture and forestry infrastructure. The second direction includes agrarian measures to protect the environment, equalization of compensation in certain areas, restrictions on water use and land reclamation. The third strands include: diversification of rural households; tourism and business trips; setting up small businesses in agriculture; village renewal and development; preservation and creation of cultural and natural heritage; formation of regional development bodies. The fourth area involves regional cooperation and regional management, creation of structures on the bottom-up principle [42, p. 55].

One of the most important indicators of state regulation of agriculture in EU countries is the level of budget support for farm prices for products produced. This indicator reflects the ratio of all price and non-price budget subsidies for the production and sale (including export) of certain agricultural products to its farm price. Since the 1980s, the level of budget support for farm prices has increased from 14.7 % to 35.8 %, including for crop production 8 from 8.5 % to 47 %, livestock – from 20 % to 28.3 %.

National Agrarian Policy in the EU is an extension of the Common Agrarian Policy, but there are differences in the ways and methods of financing agriculture. For example, in support of production and markets, Denmark spends one third of its agricultural budget on the EU system, the UK – 15 %, Ireland about 20 %. Almost all countries spend half of their national agrarian budgets on structural policies (these include modernization and enlargement of farms, improvement of land and other agricultural resources, improvement of farmers' operational activities, reduction of production costs and development of disadvantaged areas). There are significant differences in these spending lines, for example, the UK spends almost a third of its agricultural budget on modernization programs, and the Netherlands and Luxembourg spend

less than 10 %. In general, in EU countries to support farmers for start-ups, an average of 10 % of agricultural budgets are allocated, including in France – 25 %, in the UK and Ireland this expenditure item is rather insignificant. Budget programs and research and development are averaged around the EU average of around 10 %, compared to almost 30 % of the budget in the Netherlands.

In the structure of government subsidies, the most important share is the cost of maintaining the price itself. Current concepts of pricing for agricultural products in the European Union provide for active state intervention in pricing and regulation. The system of state regulation of prices in almost all countries with developed market economies is the same and provides for: the establishment of upper and lower limits of price fluctuations and indicative or conditional prices that the state seeks to support; purchase or sale of products under commodity intervention and maintaining the desired level of prices. The policy of regulating agricultural prices and farm incomes in developed countries foresees the organization of monitoring the following economic indicators: production costs by groups of specialized farms (EU countries) or by types of production (USA); price parity for industrial and agricultural products; profitability of farms and industries. As a result, the information and statistical data system necessary for quality regulation of the agricultural market is elaborated.

Subsidies in EU countries have reached 45–50 % of the value of commodity produced by farmers, Japan and Finland, this figure is 70 %, in Russia – 3.5 %. In the United States, agriculture per unit of production is invested 30 % more than in other industries.

In addition to the price mechanism, EU common rules for the organization and regulation of agricultural commodities and food markets include the control of budgetary subsidies (national aspect), as well as pan-European measures aimed at ensuring producers' incomes, maintaining a certain level of retail prices that allows you to unify the competition conditions as in manufacturing and sales. The main aspiration of EU supranational bodies is to find tools and methods in the field of

producer support that would provide him with approximately equal positions in each country [27].

In the EU, national grants are provided within the framework of a pan-European subsidy policy in accordance with its principles. Any other assistance that creates conditions for greater assistance within a particular country is forbidden. Such benefits include: price interventions (price supplements), regulation of production volumes, and high compensation for export products. At the same time, the national government is involved in financing and carrying out measures to improve the quality of products produced, provide veterinary supervision, implement scientific and technological progress, protect the environment, stimulate production in the so-called problem areas, and ensure a minimum level of income for small farms. In addition, budget support can be provided by both EU Member States and autonomous entities (autonomous regions of Italy, departments and regions of France) or federal states (German states) which have their own budgets (tax revenues). However, it was determined that the absolute amount of investment subsidies should not exceed the specified amount. Thus, pan-European policy in the agrarian sector aims at a clear organization of markets, support for farmers' incomes, assistance in the realization of surplus products and solving a number of other problems.

The CAP combines elements of regulatory, market, price, foreign trade and structural policies. As in the agrarian economy sectoral and territorial factors are integrated into one whole, the objectives of the CAP gradually shifted from solving the problems of agriculture to the tasks of rural development. Therefore, when talking about the current agricultural policy of the EU, it must be understood that it is formed and operates on the foundation and within the framework of regional, first of all structural, policy. Common agricultural policy in the broad sense is an EU common policy direction aimed at: improving the legal regulation of relations in the EU: improving the administrative relations between the respective institutes and the agricultural entities; adopting economically feasible and effective regulatory acts that help to increase the competitiveness of EU agriculture and rural development; promot-

ing further liberalization of agriculture in accordance with WTO requirements [5, p. 113].

The EU Common Agricultural Policy has identified a number of key principles for the targeted allocation of monetary subsidies in order to: ensure the profitability of agricultural production, oriented towards stimulating economic growth and increasing employment in rural areas; the use of more effective and flexible crisis management tools to solve new economic problems; greening for long-term productivity and ecosystem conservation; additional investment in research and innovation; creating a competitive and balanced market chain of food supply from producer to consumer; promotion of measures for the protection of the environment in agriculture; facilitating the opening for start-up farmers of their own agricultural enterprise; promotion of employment and entrepreneurship in rural areas; taking into account the interests of structurally weak regions.

The new programming period for the implementation of the EU Common Agricultural Policy for the period 2014–2020 is expected to reduce the share of expenditures in the EU budget from 39 % in 2013 to 33 % in 2020. Maintaining rural development priority will be achieved through policy orientation towards: socio-economic development of communities, efficient use of local resources to conserve ecosystems and prevent the negative risks of climate change, innovations in the rural economy, increasing farmers' competitiveness and their involvement in chains appreciate value preferential supply of safe food (mostly organic products) in institutions toward social responsibility and encourage the development of partnerships relations with processing enterprises, guaranteeing and protecting the rights of agricultural producers through the development of professional and non-governmental organizations.

Among the main distinguishing features of the current EU CAP (2014–2020) compared to the previous period (2008–2013) are the transition from support for the production of certain products to direct support for agricultural producers aimed at creating a competitive environment in the agrarian sector production, as well as enhancing envi-

ronmental security by abandoning the monoculture of the economy, stimulated by production subsidies; expanding rural development support programs, diversifying rural income through co-operation, improving the quality of agricultural produce and marketing, adhering to basic environmental and animal welfare standards, training in new technologies, assisting young farmers; transition to politics "Horizontal modulation", which implies an increase in the budget for rural development and the expansion of environmentally sound activities through the redistribution of part of direct payments; the allocation of targeted subsidies for the development of depressed areas to support the vitality of regions characterized by less favorable economic and social conditions for the development of agricultural production, or its limitation in favor of environmental protection; the transition to a "cross-accountability" policy, which implements the dependence of subsidy payments on compliance with basic environmental requirements for farmland, hygiene and animal care; introduction of targeted support for special agri-environmental measures in the agricultural production process; organic farming; ecologically sound afforestation and conservation of agricultural land; agricultural land; conservation of rural landscapes, landscapes, green spaces, wetlands, ditches, forest areas, flora and fauna. Since 2014, a special regime for small business support has been applied (up to 10% of annual budget). The farmer receives a lump sum payment, it implies simplified monitoring and application for such assistance, a relaxation of environmental commitments and cross compliance principles [225].

The implementation of the common agricultural policy has had a positive impact on agricultural production by EU Member States (see Appendix J).

According to the calculations, agricultural output at producer prices increased by 15.19 % during 2005–2016 (28 EU countries); the highest growth rates were in the following countries: Hungary (84.94 %); Czech Republic (45.49 %); Ireland (48.34 %); Croatia (19.80 %); Spain (19.27 %). The downward dynamics were in countries such as: Bulgaria (9.66 %); Denmark (15.02 %); Greece (18.62 %).

The dynamics of agricultural production shows that the region is characterized by a high level of intensity and marketability of the industry, as a consequence: EU Member States are self-sufficient agricultural countries, which guarantees food security and social well-being of the population; in most EU Member States today, the average family spends about 15 % of their monthly income on food, which is half what it was in 1962; consumers prefer local or regional products, and farmers are increasingly selling products directly to consumers in specialized markets; the high quality of agricultural products makes it competitive in world markets, which allows it to export agro-food products.

The results of agricultural enterprises show that the common agricultural policy is the most effective mechanism in ensuring a competitive and sustainable agrarian sector, taking into account the challenges of food security, climate change, and the creation of new jobs in rural areas.

In 2018, agricultural production was the largest in countries such as: France (approximately 16 % of total production by EU Member States); Italy (19 %); Spain (16 %); Germany (8 %); The Netherlands (7%), which was achieved through market reforms within the framework of the common agricultural policy of the EU Member States aimed at modernizing productive forces and institutional changes through funding from differentiated sources.

Traditionally, the situation in the European agricultural market is shaped by almost all types of agricultural products (fig. 2.5).

Livestock production in Belgium, Denmark, Germany, Ireland, Estonia, Austria, Poland, Finland, the United Kingdom, Finland, Switzerland accounts for more than 50 % of the basic agricultural production and sales, indicating the relevant sectoral specialization of these European countries. The leading agricultural producers in the EU Member States are: France (cattle meat, wheat, chicken eggs, sugar beet, sunflower seeds, maize); Germany (cow's milk, pig meat, potatoes, rapeseed, meat); Italy (tomatoes, apples, mushrooms and truffles, peaches and nectarines); Spain (olives and strawberries); United Kingdom (the largest producer of chicken meat and lamb).

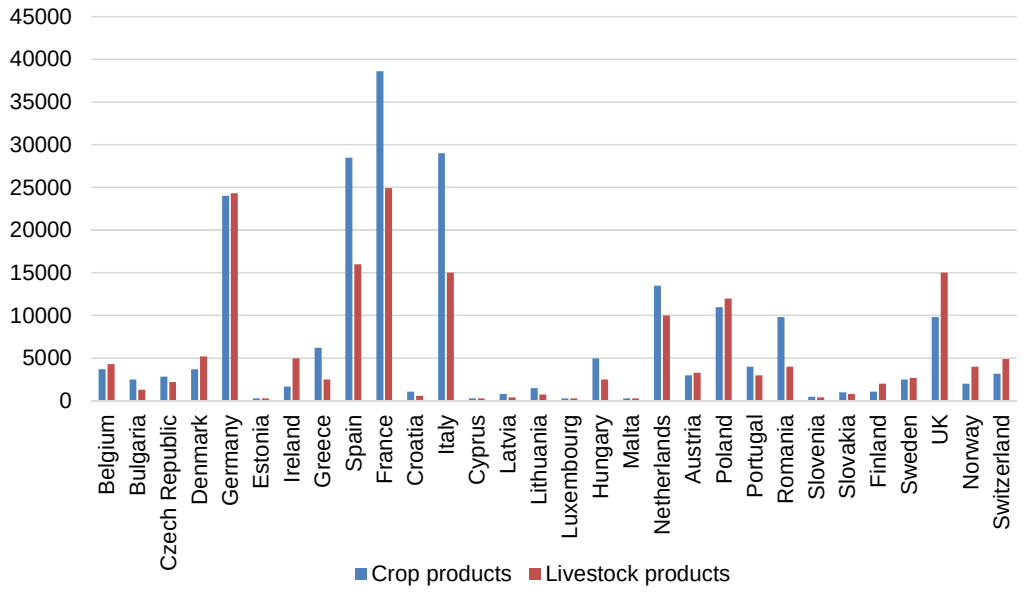

Figure 2.5 – Agricultural market in 2018

In order to produce safe and high-quality food, the common agricultural policy of the EU member states envisages the implementation of instruments such as: marketing standards that apply to all producers and set minimum quality standards for products and some labelling requirements; quality control systems; certification systems; rules of hygiene.

In order to ensure sustainable development, it was decided in October 2014 that all sectors should contribute to reducing EU emissions by 2030. In July 2016, the European Commission published a proposal to share responsibility for greenhouse gas emissions for the period up to 2021–2030. These targets cover sectors of the economy that go beyond the EU Emissions Trading System (ETS), including agriculture and other. In parallel, the European Commission has adopted an action plan for the future of organic production in Europe to adapt organic farmers, processors and retailers to new developments. Today, there is a special European logo for organically produced produce, which guarantees that European organic standards are adhered to in the production of these products. In January 2015, the European Commission launched a re-

view of the legal framework relating to agriculture. Such verification is aimed at collecting and organizing information in order to identify directions for improvement and simplification of the common agricultural policy.

Thus, the European Union's strategy is aimed at creating a dynamic and competitive economy, which should develop in the following areas: stimulating investment, including improving transport infrastructure, improving the environment for economic and employment growth, using renewable energy resources; development of the scientific base of society and innovations, which include research and implementation of innovations, development of entrepreneurship and stimulation of investments, promotion of informatization of the society, improvement of access to financing; job creation – increase of quotas and modernization of social infrastructure, diversification of jobs (regional and sectoral mobility) and enterprises, increase of the role of human capital (education and specialization), promoting healthy lifestyles.

In order to develop agriculture in the context of European integration processes, it is important for Ukraine to create a modern competitive agroindustrial complex characterized by the following criteria: effective use of new agricultural machines, material resources and technological systems; production of competitive products; ability of production to widespread introduction of scientific and technological achievements, dominance in the agroindustrial complex of science-intensive industries; high level of development of agricultural market infrastructure; rational use of land, introduction of resource-saving and renewable technologies; high level of environmental safety; achievement of efficient functioning of agricultural enterprises.

The agricultural policy of the European Union is an example of the most successful model for the formation and development of the agrarian economy. West European agriculture, having overcome in the short term post-war devastation, has become the largest food producer with huge export potential. All of this was made possible by an effec-

tively developed and effective agricultural policy that is unified for all countries of the Union.

One of the main objectives of the European Union's common agricultural policy for the development of the agrarian sector is to provide farmers with a decent standard of living (promoting more competitive and sustainable rural development and rural promotion). Although the concepts of indicators for assessing the standard of living of agrarians are not defined in the CAP, a number of parameters, including agricultural income indices, can be used to determine progress towards this goal [39, p. 14].

When conducting agrarian policy, it is important to take into account the special nature of agricultural and food production, understanding that the markets for agricultural raw materials and food are less resilient to changes in market conditions. Agricultural production is generally inelastic, depending on prices, if price fluctuations are short-lived, the industry itself is conservative. Production in horticulture, horticulture and viticulture cannot be changed quickly, as it is associated with crop rotation, which limits the maneuvering of acreage. The effect of intensification factors (fertilizers, machines, technologies) is detected after a certain period and may have mixed results depending on the formed natural conditions. Thus, it takes considerable time to adjust agriculture to a new level of prices, reorienting the activity if prices for means of production change in the same direction.

In a market economy and increasing competition in the market, the issue of improving the competitiveness of products is becoming increasingly relevant. The current conditions of development are characterized by deepening of integration processes, liberalization of conditions of trade in agricultural commodities, orientation to foreign markets, as well as increased attention to the quality of products. The problem of competitiveness holds one of the leading positions in the economic analysis of various business entities, which is explained by the objective intensification of international and domestic competition. Due to this, the increase of competitiveness of domestic agricultural products is of particular relevance.

In Europe, 962 million hectares of agricultural land is concentrated, accounting for 20.7 % of the world area and 134 million hectares of arable land, or 10 % of the total world area. There is about 1.5 ha of agricultural land per capita. Europe is one of the countries with a high level of land plowing: about 30 % (43 % in EU countries), which is a result of long-term agricultural production and population density. According to Food and Agriculture Organization of the United Nations (FAO) research, reserves for the expansion of arable land in Europe are scarce – only 6 million hectares.

Table 2.3 shows the dynamics of the area of agricultural land for organic production in EU countries in 2007–2018. In general, the ratio of total agricultural area to total land area in EU countries is higher than the world average share, which in 2016 was 37.9 %.

The dynamics of agricultural area growth can be called positive, as in general the percentage of the area increased in the national average by 2.91 % in 2010–2016 and by 3.81 % in 2007–2016. The most competitive countries can be considered Sweden and Switzerland, since in these countries the percentage of agricultural land to the total area of land increased by 10.36 % and 15.49 % respectively for the period under study. The leaders also include Greece (up 8.10 %), Estonia (up 10.26 %), Spain (up 5.40 %), Latvia (up 5.93 %), Slovakia (up 5.28 %), Croatia (up 5.47 %) and Italy (up 6.10 %). Agricultural land has declined in countries such as England, with a slight increase in Serbia, Ireland, Malta, and the Netherlands. Absolutely low levels of organic crops are allocated to producers in countries such as Hungary, Luxembourg, Latvia, Romania, and Germany.

In the structure of production of basic agricultural products, 55.4 % is occupied by livestock products, which testifies to the corresponding sectoral specialization of European countries. The largest share of the total livestock production is cow's milk (first rank), pig meat (second position), cattle meat and chickens (third and fourth positions respectively). Wheat, grapes, potatoes and olives occupy the leading positions in the crop production rating.

Table 2.3

Dynamics of agricultural lands area under organic products in EU countries in 2007-2018, %

Country	Years							Deviation, 2018-2010	Deviation, 2018-2007
	2007	2010	2014	2015	2016	2017	2018		
European Union	4,12	5,01	6,08	2,99	3,88	7,47	8,00	2,91	3,81
Bulgaria	0,30	0,50	0,96	2,06	2,26	2,72	2,56	1,64	1,84
Czech Republic	8,20	12,40	13,44	2,36	6,56	14,09	14,76	3,90	8,10
Denmark	5,00	6,10	6,25	3,65	4,75	8,60	9,75	1,46	2,56
Germany	5,10	5,90	6,18	1,44	2,24	6,82	7,34	1,64	2,44
Estonia	8,70	12,80	15,96	7,77	11,87	19,60	20,57	6,16	10,26
Spain	4,00	6,70	7,26	2,58	5,28	8,73	9,28	2,70	5,40
France	1,90	2,90	3,87	4,11	5,11	5,99	7,01	2,37	3,37
Italy	7,90	8,60	10,91	6,64	7,34	14,86	15,24	5,40	6,10
Latvia	8,10	9,20	10,86	5,27	6,37	13,92	14,47	4,83	5,93
Lithuania	4,50	5,20	5,57	2,93	3,63	7,98	8,13	2,56	3,26
Hungary	1,80	2,40	2,34	1,52	2,12	3,73	3,92	0,47	1,07
Netherlands	2,50	2,50	2,67	0,68	0,68	3,14	3,18	0,70	0,70
Poland	1,80	3,30	4,56	0,03	1,53	3,41	3,33	1,80	3,30
Portugal	6,30	5,80	5,74	0,13	-0,37	7,04	5,93	1,63	1,13
Romania	1,00	1,30	2,09	1,13	1,43	1,93	2,43	0,99	1,29
Slovenia	5,90	6,40	8,55	3,61	4,11	9,60	10,01	4,07	4,57
Slovakia	6,10	9,10	9,37	0,75	3,75	9,90	9,85	2,28	5,28
Finland	6,60	7,40	9,29	5,69	6,49	11,41	13,09	4,18	4,98
Sweden	9,90	14,30	16,53	5,99	10,39	19,16	20,29	5,96	10,36
England	3,70	4,10	3,02	-1,46	-1,06	2,85	2,64	-0,57	-0,17
Norway	4,70	0,00	5,05	4,72	0,02	4,79	4,72	5,85	1,15

In the table 2.4 the dynamics of agricultural output in the EU countries in 2007–2018 is reflected. In 2014, the percentage of output to Gross Domestic Product (GDP) increased from 3.85 % to 4.22 %, but remained at the level of 2010 again in 2016. However, this trend is considered positive, given the rather significant GDP growth.

In terms of agricultural output and agricultural productivity, the Euro region is characterized by a high level of intensity and marketabi-

lity of this sector. The vast majority of EU countries are not only self-sufficient agricultural countries, but also significant exporters of agro-food products. In general, the European agricultural business is a highly competitive sector of the market economy, the functioning and development of which guarantees the food security and social well-being of the population of Europe.

Table 2.4

Dynamics of livestock production in countries of EU in 2007-2018

Indicator	Year							Deviation, 2016-2010, billion euro	Deviation, 2016-2007, billion euro
	2007	2010	2014	2015	2016	2017	2018		
European Union, billion euros	140,4	142,4	171,2	162,6	156,9	173,1	168,7	26,5	28,5
Euro zone, million euros	102,2	103,3	122,8	115,7	112,9	124,1	120,6	17,3	18,4
European Union, in % to GDP	1,08	1,11	1,22	1,09	1,05	1,12	1,06	-	-
Euro zone in % to GDP	0,79	1,08	1,21	1,10	1,04	1,11	1,04	-	-

Market reforms of agriculture under the EU CAP are aimed at modernizing productive forces and institutional changes that are adequate to the current model of the world agriculture. Based on the benefits of an open economy and active state support, European agribusiness enables agricultural producers to realize their potential in producing high-yield products and achieve competitive advantages in the external market.

In the table 2.5 shows the dynamics of the number of enterprises in the EU countries engaged in organic production in the agrarian sector in 2007–2018.

The negative dynamics of the decline in agricultural producers registered at the end of the year can be explained by the increased competitiveness among agricultural producers. However, the negative

trend of this indicator is offset by the indicator of the number of agricultural producers registered during the year, which increased by 10929 units during the analyzed period. This can be linked to the registration process. Also negative is the dynamics of the number of agricultural producers who withdrew their registration during the year as regards fisheries, there is a positive trend towards registration of producers, especially at the end of the year. Positive indicators are also recorded for the number of importing and exporting agricultural products registered at the end of the year. Moreover, the number of registered importers is much larger, which may indicate the advantage of imports over exports of agricultural products.

Table 2.5

Dynamics of the number of enterprises in the EU countries engaged in production of organic products in the agrarian sector in 2007-2018

Indicator	Year							Deviation 2018 to 2010	Deviation 2018 to 2007
	2007	2010	2014	2015	2016	2017	2018		
1	2	3	4	5	6	7	8	9	10
Producers of agricultural products, registered at the end of the year, thousand units	300,6	319,7	257,1	257,6	295,6	305,7	172,6	-147,1	-127,9
Producers of agricultural products registered during the year, units	1245	0	5179	7959	5085	4551	1963	1963	718
Agricultural producers who revoked their registration during the year, units	568	0	4759	5776	4620	5036	809	809	241
Producers of fishery products registered at the end of the year, units	452	382	521	456	448	403	201	-181	-251
Producers of fishery products registered during the year, units	5	0	11	1	5	21	5	5	0

Continuation of table 2.5

1	2	3	4	5	6	7	8	9	10
Producers of fishery products that revoked their registration during the year, units	1	0	5	3	9	7	1	1	0
Producers-importers of agricultural products, registered in end of the year, units	985	1321	2916	3694	4076	4574	3064	1743	2079
Producers-importers of agricultural products, registered during the year, units	0	0	56	30	79	57	19	19	19
Producers-importers of agricultural products who withdrew registration	12	0	42	13	26	28	30	30	18
Producers-exporters of agricultural products, registered at end of the year, units	233	337	866	1910	1970	2479	1825	1488	1592
Producers-exporters of agricultural products, registered during the year, units	5	0	25	5	34	9	2	2	-3
Producers-exporters of agricultural products, which revoked the registration during the year, units	2	0	9	6	6	5	10	10	8

According to the cost estimate of agricultural production, France (cattle meat, wheat, chicken eggs, sugar beet, sunflower seeds, maize) occupy the first place in the rating); the second is Germany (cow's milk, pig meat, potatoes, rapeseed, turkey meat); the third – Italy and, at the same time, the first in such positions as tomatoes, apples, mushrooms and truffles, peaches and nectarines; the fourth is Spain, while in terms of olive and strawberry production, this country is the first among the

above countries; fifth – UK, which is the largest producer of chicken and sheep meat.

In Appendix K shows the dynamics of organic production in the EU by species. On the whole, there is a positive trend towards an increase in organic production, as this indicator increased by 1943257 tons in 2016–2010, and by 5484475.94 tons in the period 2016–2007. Such growth was due to an increase in the production of cereals for the production of grain, wheat and rye, mixtures of winter cereals, barley, oats and mixtures of cereals sown in the spring, maize, dried beans and protein crops, root crops, industrial crops , fresh vegetables, strawberries, grapes.

Table 2.6 reflects the dynamics of the total labor input used by the EU and Eurozone countries in the agricultural sector in 2007–2016.

The reduction in total labor consumption in the EU we can attribute to the introduction of high-tech equipment. At the same time, we can unequivocally call the positive dynamics to the growth of paid work units, compared to the reduction of unpaid work units (by 121,65 paid work units increased in 2016–2010 and by 1076,91 unpaid working units decreased in 2016–2010).

Less than one-tenth of the workforce was effective in agriculture, hunting, fishing and forestry in most EU Member States in 2016. Gender differences in employment rates must be taken into account in the formulation of CAP objectives: even in those countries, where the share of active women in agriculture is higher than the share of active men, the number of women working in this sector is lower than the number of men, because overall the number of women employed (female employment rate) is lower than that of men.

At that time, in 2016–2010 there was a significant increase in the volume of dairy products produced, compared with 2007 in 2016 this indicator decreased by 3468.90 thousand tons. The production of fatty milk products during the analysed period was significantly increased, which can be explained by the demand for these products. The downward trend is the downward trend in the production of skimmed milk

powder and buttermilk, as these products are inferior in value to others and therefore the demand for them is diminishing.

Table 2.6

Dynamics of total power consumption of labor, involved in the EU and the euro area in the field of agriculture economy in 2007-2016.

Indicator	Year					Deviation, 2016-2010, units	Deviation, 2016-2007, units
	2007	2010	2014	2015	2016		
European Union (28 countries), total labor consumption	11 877,12	10 344,81	9 739,28	9 532,49	9 389,55	-955,26	-2 487,57
Euro zone (19 countries), total labor consumption	5 665,27	5 218,96	4 905,03	4 876,72	4 854,92	-364,04	-810,35
Paid work units							
European Union (28 countries)	2 449,27	2 346,94	2 377,46	2 424,99	2 468,59	121,65	19,32
Euro zone (19 countries)	1 655,96	1 607,24	1 601,54	1 639,73	1 658,58	51,34	2,62
Unpaid work units							
European Union (28 countries)	9 427,94	7 997,86	7 361,83	7 107,50	6 920,95	-1 076,91	-2 506,99
Euro zone (19 countries)	4 009,39	3 611,73	3 303,49	3 236,99	3 196,34	-415,39	-813,05

In fig. 2.6 the dynamics of areas for growing / harvesting / production of crops in the EU countries in 2007–2018 (1000 ha) are shown.

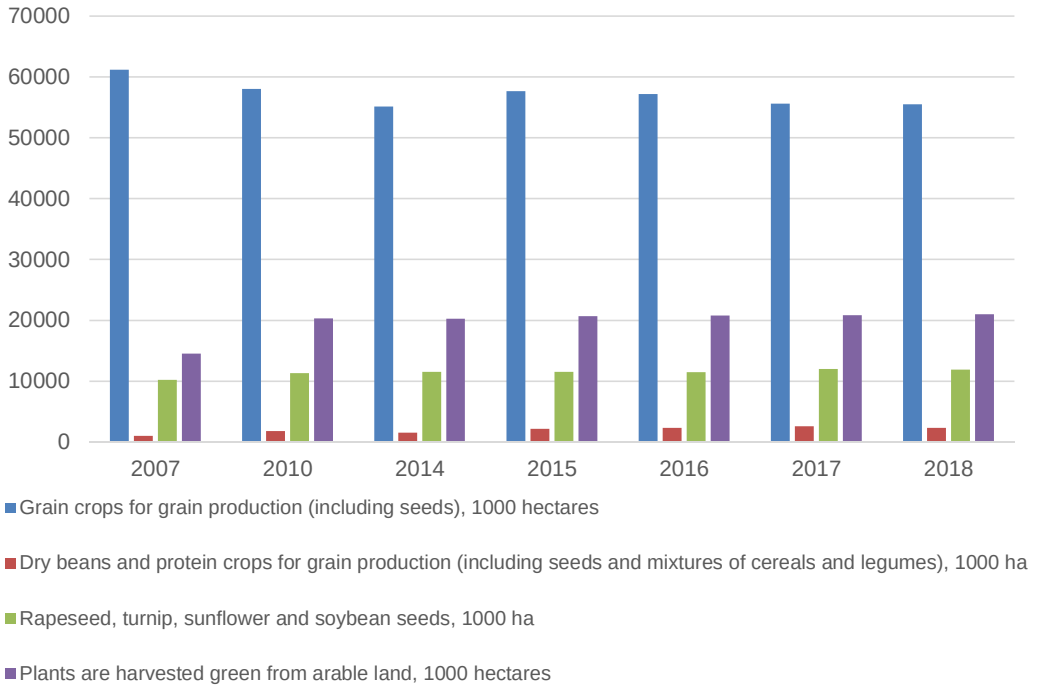

Figure 2.6 – Dynamics of areas for growing / harvesting / producing crops in countries EU in 2007–2018 (1000 ha)

The dynamics of areas under cereals is multi-vector, with the highest peak in 2014, reaching 70127.31 thousand hectares. The dynamics of areas under dry beans and protein crops is also diverse, with the highest peak being reached in 2015 – 2158.40 thousand hectares. Areas for growing / harvesting / production of rapeseed, turnips. Sunflower and soybean seeds also declined by 2016, reaching having the highest value in 2015 – 12713.47 thousand hectares. In 2016, the area for growing unreached plants on arable land suffered a significant reduction. The dynamics of this indicator cannot be called negative, because it is obvious that due to good weather conditions the harvest is harvested ripe, which will further affect its quality characteristics and producers' costs.

In the table 2.7 shows the dynamics of the main indicators of the agrarian economies of the EU countries in 2007–2016.

Table 2.7

Dynamics of main indicators of agricultural enterprises of EU countries in 2007-2016

Indicators	Years					Deviation, 2016-2010	Deviation, 2016-2007
	2007	2010	2014	2015	2016		
Number of farms, units	14598640	13920160	12402850	10881560	11382112	-2538048	-3216528
The area of agricultural land used, thousand hectares	174128	175818	179716	175610	183688	7869	9559
Farm area, thousand hectares	219095	224634	225469	219121	229201	4567	10106
Number of farms with available livestock, units	9138750	8802870	7035610	6271310	6559790	-2243080	-2578960
Release rate products, thousand euros	289351978	288407827	316635101	334514671	349902345	61494	60550
Labor force (directly employed), units	12593100	12023080	10070290	9550410	9989729	-2033351	-2603371
Farms whose households consume more than 50% of the value of final products, units	6415570	6024450	5993120	4766120	4985362	-1039088	-1430208

As we can see, the number of farms has declined in the agrarian sector of EU countries, which could be the result of a decrease in the number of registered units and high competitiveness in this area. At the same time, the area of utilized agricultural land has increased which may indicate the cultivation of previously unused land, and is clearly a positive phenomenon. The area of economies is also growing, which makes it possible to make assumptions about mergers and acquisitions in the agrarian sphere of EU countries. This is why economies are becoming more competitive. The dynamics of the decline in the number

of farms with available livestock are negative, indicating a change in the priorities of agricultural producers and the transition from livestock purchases to farms and enterprises. This, in turn, will reduce the risks to product quality and certification. The increase in production rates among EU countries is positive. The workforce is shrinking, which may be due to the decline in the number of farms themselves. Also, in the context of globalization [232] and increased cooperation between EU countries, the fact and the tendency to reduce the number of farms whose households consume more than 50% of the value of final products is obvious.

In Appendix L reflects the dynamics of EU crop production in 2007–2016 and shows that total crop production increased by EUR 12172.36 million over the period under review. In particular, this may be related to the increase in organic production. The leaders in terms of production are countries such as Bulgaria, Spain, Italy, Hungary, the Netherlands, Romania, England, and Norway. Slight dynamics to growth in Belgium, Greece, France, Lithuania, Portugal, Slovakia, Iceland. Crop production was reduced in Germany, Greece, Croatia, Cyprus, Poland, and Finland. In the table 2.8 shows the dynamics of livestock production in EU countries in 2007–2018.

On the whole, the dynamics are positive despite the number of EU Member States: in 2016-2007, there was an increase of € 14545.65 million in livestock production, reducing the percentage of GDP to the level of 2007. However, this did not serve as the only one a factor in the absence of changes in relative growth, as there was also a significant increase in GDP.

The feasibility of integration in the agrarian sector with the EU brings certain economic benefits to domestic agricultural producers. First, the European market is the most expensive; second, the most profitable; third, with high quality standardized products. Provided that Ukraine's agricultural sector complies with European rules and regulations, which is also required by the EU's CAP, the country will receive equally accessible trading partner conditions not only in European but also in world markets.

Table 2.8

Dynamics of livestock production EU countries in 2007-2018

Indicator	Years							Deviation, 2018-2010, billion euro	Deviation, 2018-2007, billion euro
	2007	2010	2014	2015	2016	2017	2018		
European union (28 countries), billion euro	134,9	135,9	175,8	174,7	164,3	157,1	175,2	39,3	40,3
European union (27 countries), billion euro	123,6	123,6	158,9	156,9	146,4	141,7	159,1	35,4	35,5
Euro zone (19 countries), billion euro	98,7	99,1	125,9	125,6	116,0	112,3	125,6	26,5	26,8
European union (28 countries), in% to GDP	1,04	1,06	1,25	1,18	1,10	1,02	1,10	-	-
European union (27 countries), in % to GDP	1,15	1,13	1,35	1,28	1,17	1,09	1,18	-	-
Euro zone (19 countries), in% to GDP	1,05	1,04	1,24	1,19	1,10	1,00	1,09	-	-

The European agrarian market has its own peculiarities under the influence of which the situation is developing and the system of foreign economic relations with Ukraine in trade in agricultural products is being formed.

Prospects for improving the agro-trade situation between Ukraine and the EU depend on many factors, among which a key role is played by the rules and regulations lay down in the Free trade zone (FTZ), which is in line with WTO principles and defines strategic guidelines for domestic and European agricultural policy. In spite of certain difficulties and long-term activation of the European integration process in the agrarian sector of the Ukrainian economy, it is worth noting a sufficient level of its predictability. In view of this, the following trends in the development of the domestic agricultural sector require further improvement. According to the value estimate of agricultural production,

France (cattle, wheat, chicken, sugar, beetroot, sunflower seeds) ranked first in the ranking; the second is Germany (cow's milk, pig meat, potatoes, rapeseed, turkey meat); the third – Italy and, at the same time, the first in such positions as tomatoes, apples, mushrooms and truffles, peaches and nectarines; the fourth is Spain, while in terms of olive and strawberry production, this country is the first among the above countries; fifth – the UK, which is at the same time the largest producer of sheep meat and sheep meat: reviewing the mechanism of government financial support towards supporting small and medium-sized producers; motivation to create an attractive investment climate in agriculture; strengthening control over imports of agro-food products; granting loans for the reconstruction and modernization of enterprises in order to reduce the cost of domestic agricultural products; development of the domestic agricultural market and orientation towards achieving self-sufficiency in particular types of foodstuffs, import independence and price parity (the rate of increase of prices for products of the agrarian sector should correspond to the rate of increase of prices for industrial products, resources and services used in the agroindustrial complex) [70, p. 71].

Therefore, we can conclude that the agrarian sphere of the EU countries has developed significantly thanks to the unified instruments that operate in all EU countries. We can predict the further development of this area thanks to budget financing under the "classical" lines and CAP instruments for 2014–2020, which at current prices may amount to about 420 billion euros, that is, it will exceed its size compared to 2007–2013. Over 75 % will be covered by direct subsidies and market activities, while 24 % will be rural development.

2.3. Analysis of the organic products market of the European Union

The intensification of competition and the constant change of economic conditions require the enterprises of the EU organic products market to solve the problems of strengthening the competitive position

and development in the market, intensification of production and increase their social status. At the same time, short-term goals of "survival" and surplus for enterprises become more important than long-term development. The current goals conflict with the strategic goal, which influences the choice of both the tools for evaluating the performance of the outputs and the means of achieving them. Instead of the classical analytical toolkit for understanding the enterprise as an open system with relevant subsystems and elements, a holistic vision of a complex synergistic system as a single whole is required, which requires complex (holistic) socio-economic solutions. The relationship of the enterprise to the market is decisive as a key factor in success, which determines the viability and necessity of its operation. In this regard, it is not enough to separate the factors of influence on external and internal, since the importance of influence of all interested parties has become critical for the enterprise [193, p. 223–225].

Ensuring the development of enterprises in the market of organic products of the EU is of paramount importance, because on this basis, in part, the development of the industry is formed. Enterprises face important strategic tasks: filling the domestic market with competitive products, entering the European and world markets.

Several analytical tools need to be used to extend the boundaries of assessment and to formulate a strategy for the further development of enterprises in the volatile economic environment of the sectoral market. In the EU organic market example, it is advisable to combine PESTEL analysis with SWOT analysis by identifying factors affecting the EU organic produce market and assessing their likelihood when predictting the development of the EU organic produce market and determining the low [141, p. 87].

It is worth noting that the development of the EU organic produce market is influenced by many macro and micro factors, both economic and technological (specialization, cooperation, interest in increasing productivity, technical equipment, application of scientific and technological achievements, size of enterprise); biological; forms of communication between workers, land and other means of production; organi-

zation and remuneration; sizes of production; organization and methods of managing labor and production processes; soil and climatic conditions (soil types, temperature, precipitation, production potential of plant varieties and hybrids, animal species); social.

Most EU organic market enterprises are characterized by the fact that they do not have officially adopted plans and lack a planning mechanism, namely, there is no system of norms and regulations, planning process technologies, organizational planning structures, etc. It is often replaced by different types of enterprise decisions about certain areas of economic activity, which are usually designed for a rather short period of time and in the absence of the necessary approach can be one of the reasons for the problem situation in the future. Thus, for EU organic market businesses, effective planning for production and raw material needs becomes important today a condition of competitiveness. Rapid changes in the external environment of domestic enterprises stimulate the emergence of new methods, systems and approaches to competitiveness management [140].

Carrying out a SWOT-analysis of the enterprise involves analysis of the current situation, namely: assessment of external and internal factors, determination of competitive advantages and disadvantages, forecast of the future. Forecast of trends of the development of the analyzed external factors, development of requirements and recommendations aimed at strengthening the advantages and overcoming the disadvantages of each of the factors. The use of SWOT analysis allows you to systematize all available information and make informed decisions regarding the development of the enterprise. A table of SWOT analysis and identification of alternative strategic tasks are necessary for further analysis, selection of enterprise development strategy and choice of the best marketing strategy. The SWOT analysis emphasizes that the strategy should best combine the internal capabilities of the enterprise and the external situation.

As trends in an unstable business environment have a similar impact on all EU organic production enterprises, a general SWOT analysis of the surveyed enterprises is conducted (table 2.9).

Table 2.9

SWOT-analysis of the studied enterprises in the conditions in the unstable business environment

S (strength)	W (weaknesses)
High quality products. Flexible pricing policy. Large range of prodcts. Competitive product that is in great deand. Established sales network.	Insufficiently high level of staff qualification. Unstable financial position of the enterprise. Low advertising activity. Weak marketing policy. Standard methods of product promotion in different markets.
O (opportunities)	T (threats)
Expanding the product range. Development of competitive relations. Involvement of highly qualified personnel. Creating new sales channels. Use of new technologies.	Increasing competitive pressure. High inflation. Devaluation of the national currency. Socio-political instability. Decrease in consumer income due to financial instability.

After undertaking a SWOT analysis, the following strengths can be identified: a sustainable competitive position at the expense of high product quality and a wide range. However, the lack of a high level of personnel qualification, low advertising activity and unstable financial position of the enterprise are the weaknesses of the activity. By linking the strengths and weaknesses of an enterprise with external opportunities and threats, it is possible to develop and justify a system of measures that is necessary to formulate an enterprise strategy. To do this, it is necessary to create an extended matrix of SWOT analysis, resulting in four fields at the intersection of divisions: "strengths and opportunities", "strengths and threats", "weaknesses and opportunities" and "weaknesses and threats" (table 2.10) [3].

Thus, from the analysis we can give the following recommendations to the investigated enterprises: to strengthen the weaknesses: to apply new methods of promotion of services, i.e. to find new channels of sales, and also to send employees of enterprises for advanced training to use the opportunities: to make the best use of the possibilities of

Table 2.10

Extended SWOT-analysis matrix for subjects enterprises in an unstable business environment

Internal environment	S (strength)	W (weaknesses)
	1. High quality products. 2. Flexible pricing policy. 3. Large range of products. 4. Competitive product that is in mass demand. 5. Established sales network.	1. Insufficient level of staff qualification. 2. Unstable financial position of the enterprise. 3. Low advertising activity. 4. Weak marketing policy. 5. Standard methods of product promotion in different markets.
External Environment	O (opportunities)	T (threats)
	1. Expanding the product range. 2. Development of competitive relations. 3. Involvement of highly qualified personnel. 4. Creation of new sales channels. 5. The use of new technologies.	1. Increasing competitive pressure. 2. High inflation. 3. Devaluation of the national currency. 4. Socio-political instability. 5. Decrease in consumer income due to financial instability.
Strengths	O (opportunities)	T (threats)
	1. A wide range and high quality products will facilitate entry into new markets. 2. The use of new technologies will reduce costs. 3. Attracting new customers.	1. Increasing competitive pressure will lead to additional financial costs. 2. The company's strategy will be affected by changes in competition, inflation and socio-political instability in the country. 3. Effective monitoring will allow timely detection of trends in demand.

Continuation of table 2.10

Weaknesses	1. Increasing profits by increasing capacity utilization. 2. Optimize supply volumes. 3. Expanding the product range will lead to an increase working capital and costs.	1. Lack of management staff makes it difficult to respond quickly in a crisis. 2. Unfavorable government policy, high taxes can lead to negative consequences. 3. High costs will worsen the competitive position.

technical re-equipment, installation of sales equipment to attract new customers and thereby to eliminate competing manufacturers from the distribution channels, as well as to attract highly qualified personnel; eliminate threats: reduce competitive pressure, and hire management decision-makers.

Considering the factors influencing the development of the EU organic market, we have formed a table of factors influencing the development of enterprises (see Appendix M).

We will conduct a detailed analysis of the threats and opportunities of the macro-environment for an enterprise occupying a relevant niche in the EU organic produce market using PESTEL analysis. The acronym PESTEL is a compound abbreviation of the first letters of the name of the following factors: social (S), technological (T), economic (E), political (P), ecological (E), law (L).

A strategic analysis of each of these components should be systematic. All six factors are interdependent with each other and characterize the different hierarchical levels of society, presenting them as a system as a whole. There are a number of rules to be followed when performing PESTEL analysis. We should start by developing a list of key strategic factors that have a high likelihood of manifestation and impact on the functioning of the EU organic produce market as a whole and of its enterprises, in particular. Then the importance of each event for the analyzed industry is evaluated by assigning it some weight.

The rating scale can be both quantitative and qualitative: in digits from one (the most important event) to zero (insignificant). The sum of

the weights should be equal to the unit provided by the rationing (quantitative method); in the percentage from 100 to 0 %, but in total still the same 100% (quantitative method); high, medium, low probability of occurrence in qualitative analysis [141].

The next step is to assess the degree of impact of each factor-event on the organic market development strategy of the EU and individual enterprises on a 10-point scale: "10" – a stronger impact, a serious risk; "1" – no influence, threat. The weighted estimate is determined by multiplying the weight of the factor by the force of its influence. The end of the analysis is to calculate a Total Weighted Estimate (Total). The PESTEL analysis is used to predict the "behavior" of the environment in relation to EU organic market actors only in that if the impact of all six factors was adequately and objectively assessed.

Since the methodology we propose involves assessing the impact of certain factors both on the EU organic market and on individual enterprises, we consider those that are interrelated in internal interaction as constituent factors. The assessment of such factors not only allows us to predict trends in the development of the EU organic produce market, but is also necessary when making management decisions at individual enterprises.

Now for each of the parameters of PESTEL-analysis as an illustrative example, we give a table in which we consistently show the groups of factors, events, opportunities / threats, the probability of occurrence of an event or their manifestation, as well as their importance for the organic market EU and the degree of influence on it.

It is worth noting that the importance of the factors of the opportunities of manifestation, importance and influence on the EU organic produce market are obtained by us on the basis of studying the state of enterprises in the EU organic produce market. Let us begin the PESTEL analysis of the political group of factors (P) in table 2.11.

Political factors are analyzed in order to express the plans of public authorities, as politics affects all spheres of life. The main factors in the process of attracting capital investments for the purpose of developing organic EU enterprises are the type of political regime, political

stability, and the position of public authorities on business. Thus, in the process of analyzing political factors, it is worth examining the positions of authorities at all levels of government regarding the activities of EU organic produce enterprises, as well as anticipating potential changes in government policy, etc.

Table 2.11

Assessment of the impact of political factors on competitiveness EU organic products market enterprises

Events / factors	Threats (-) / Opportunity (+)	Possibility of manifesta-tion	Importance	Impact on the organic market of EU products
P1	-	0,30	10	+3,00
P2	-	0,04	8	-0,32
P3	+	0,03	10	+0,30
P4	+ / -	0,02 / 0,02	7	+0,14 / -0,14
P5	+ / -	0,02 / 0,04	8	+0,16 / -0,32
P6	+	0,20	9	+1,80
P7	-	0,03	8	+0,24
P8	+	0,04	10	+0,40
P9	-	0,20	9	-1,80
P10	+	0,03	8	+0,24
P11	-	0,01 / 0,02	7	-0,14
Total P	6 (+) / 7 (-)	1	94 from 110	+6,28 / -2,72

Summarizing all the weighted indicators of the political group of factors influencing the development of EU organic production enterprises, one can find that their impact is quite significant (-2.72). If we analyze the data obtained (table 2.11) by political group of factors (P), we can find that the weighted impact of the political parameters of the impact assessment on the EU organic produce market can take both negative and positive values (-2.72 / + 6.28).

Now let us analyze in more detail the factors of economic group E, see table 2.12. Economic factors are equally important for EU organic producers. Business executives are obliged to analyze in sufficient detail the global economic situation and the world as a whole, as well as

their impact on enterprise performance, since this impact is primarily aimed at the cost of resources used by enterprises and the purchasing power of consumers.

Table 2.12

Assessment of the impact of economic factors on competitiveness EU organic products market enterprises

Events / factors	Threats (-) / Opportunity (+)	Possibility of manifestation	Importance	Impact on the organic market of EU products
E1	-	0,20	10	-2,00
E2	-	0,30	10	-3,00
E3	+ / -	0,10	10	+1,00 / -1,00
E4	+ / -	0,03	9	+0,27 / -0,27
E5	-	0,10	10	-1,00
E6	+	0,05	7	+0,35
E7	-	0,02	5	-0,10
E8	+ / -	0,03	7	+0,21 / -0,21
E9	-	0,04	9	-0,36
E10	+	0,02	8	+0,16
E11	+	0,01	6	+0,06
E12	+	0,10	10	+1,00
Total E	7 (+) / 8 (-)	1	101 from 120	+3,05 / -7,94

These factors include: improving or worsening the economic situation, which causes an increase or decrease in the income of the EU country's population. However, economic phenomena such as inflationary processes, rigid taxation and pricing can significantly impede the work of EU organic producers. Therefore, economic factors may have both a positive and a negative impact on the level of development of EU organic production enterprises.

As a result of the analysis of the influence of economic factors on the activity of EU organic production enterprises, the weighted indicator has received both negative and positive values (-7.94 and +3.05 respectively), which confirms the importance of the influence of economic factors. It should be noted that factors E1, E2, E3 and E5 made the

most significant negative contribution to the overall influence of economic factors (Total E).

Therefore, in forming the strategy for the development of EU organic products, it is necessary to take into account economic factors: the state of the economy, inflation, investment business climate, the scale of economic support for EU organic products.

Next, we analyze the social group of factors S (see table 2.13). Social factors are characterized by the formation and perception of values, tastes, customs and social norms. Assessment of these factors is quite important for EU organic produce companies, as they exert an influence on both the external and internal environment of the enterprise.

Table 2.13

Assessment of the impact of social factors on competitiveness EU organic products market enterprises

Events / factors	Threats (-) / Opportunity (+)	Possibility of manifestation	Importance	Impact on the organic market of EU products
S 1	-	0,20	10	-2,00
S 2	-	0,20	10	-2,00
S 3	-	0,02	9	-0,18
S 4	+ / -	0,02	5	+0,10 / -0,10
S 5	+ / -	0,01	7	+0,07 / -0,07
S 6	-	0,02	6	-0,12
S 7	+	0,02	9	+0,18
S 8	+	0,10	10	+1,00
S 9	+ / -	0,01	9	+0,09 / -0,09
S 10	+	0,30	10	+3,00
S 11	+	0,10	10	+1,00
Total S	7 (-) / 7 (+)	1	95 from 110	+5,44 / -4,56

Of the social factors threatening are: S1 demographics (- 2.00); S2 structure of income and expenses (-2.00); S3 baseline values (- 0.18); S4 lifestyle trends (+ 0.10); S5 healthy lifestyle (+ 0.07); S6 consumer behavior models; S7 level of education (+ 0.18); S8 cataclysms and force

majeure (+ 1.00); S9 consumer benefits (+0.09); S10 media representation (+3.00); S11 advertising and public relations (+ 1.00). It should also be noted that social factors affect EU organic produce businesses no less than political and economic factors.

Let us analyze the technological group of factors T (see table 2.14).

Table 2.14

Assessment of the impact of technological factors on competitiveness EU organic products market enterprises

Events / factors	Threats (-) / Opportunity (+)	Possibility of manifestation	Importance	Impact on the organic market of EU products
T 1	+	0,10	10	+1,00
T 2	-	0,30	10	-3,00
T 3	+ / -	0,10	9	+0,9 / -0,9
T 4	+ / -	0,10	9	+0,9 / -0,9
T 5	+	0,07	5	+0,35
T 6	+	0,10	9	+0,9
T 7	-	0,03	5	+0,15
T 8	-	0,10	10	-1,00
T 9	+	0,10	10	+1,00
Total T	3 (-) / 8 (+)	1	77 from 90	-5,80 / +5,20

Technological factors are one of the main drivers of social development and the economy as a whole and of EU organic products in particular. Technological innovations have a significant impact on the quality of EU organic produce. The latest technologies provide EU organic products with enormous potential prospects for development (introduction of progressive technological processes, modern advanced equipment). Technology innovations are available to all competitors, which determine the increase in the level of competitiveness. It should be noted that the scientific and technological revolution provides significant prospects for the company (comprehensive mechanization and automation of production, modernization of existing equipment), but hides for him

some threats (mixing their funding, reducing the "life cycle" of technology). All sorts of innovations endanger outdated technologies and methods of work, which can lead to negative results if you do not study the technological group of factors.

After analyzing the data in table 2.14, it can be concluded that the weighted Total T has received both a negative and a positive value (- 5.80 / + 5.20), which indicates the favorable position of the scientific and technological sphere in the EU countries.

Let us analyze the ecological group of factors En (see table 2.15). Environmental factors include various natural disasters (earthquake, flood, hurricane; environmental catastrophe). Such factors are risk factors for any enterprise, and its impact can be catastrophic for it.

Table 2.15

Assessment of the impact of environmental factors on competitiveness EU organic products market enterprises

Events / factors	Threats (-) / Opportunity (+)	Possibility of manifestation	Importance	Impact on the organic market of EU products
En 1	+	0,10	8	+0,8
En 2	+	0,20	4	+0,80
En 3	-	0,04	7	-0,28
En 4	-	0,02	1	-0,02
En 5	-	0,02	9	-0,18
En 6	+ / -	0,10	5	+0,50 / -0,50
En 7	+ / -	0,02	5	+0,10 / -0,10
En 8	+	0,20	6	+1,20
En 9	+	0,30	9	+2,70
Total En	5 (-) / 6(+)	1	54 from 90	+6,1 / -0,8

Therefore, from the data presented in table 2.15, it follows that the considered impact of environmental factors on EU organic products can be both negative and positive (-0.8 and +6.1), which depends on the future environmental policy of the EU countries. Let us analyze the law group of factors L (see table 2.16).

Table 2.16

Assessment of the impact of law factors on competitiveness EU organic products market enterprises

Events / factors	Threats (-) / Opportunity (+)	Possibility of manifesta-tion	Importance	Impact on the organic market of EU products
L 1	+ / -	0,20	6	+1,20 / -1,20
L 2	+/-	0,09	4	+0,6 / -0,36
L 3	-	0,10	5	-0,50
L 4	+	0,05	8	+0,40
L 5	-	0,10	3	-0,30
L 6	-	0,10	9	-0,90
L 7	-	0,06	5	-0,30
L 8	+/-	0,10	6	+0,60 / -0,60
L 9	+	0,20	2	+0,40
Total L	6 (-) / 5 (+)	1	48 from 90	+3,2 / -4,16

As we can see, the influence of legal factors is more negative than positive. This situation is typical for almost all EU markets, which reveals the ineffectiveness of legislation. In addition to the above considered quantitative estimates, we will also conduct a qualitative PESTEL analysis. To do this, we will assess the factors influencing the enterprises of organic products of the EU on a qualitative scale: high, medium, low probability of occurrence of an event [15, 17, 19, 20]. To do this in table 2.17 separate groups of factors in the following order: economic, law, political, social, technological, and environmental.

The most likely manifestation of external factors affecting the activities of EU organic production enterprises is observed by such factors as: rising inflation, increasing competition, decreasing solvent demand of the population, lack of qualified staff, legislative changes, increasing social instability, increase in labor migration abroad, change in consumer preferences, decrease in education level, introduction of new technologies. Conducting a PESTEL analysis and combining it with the results of a SWOT analysis is necessary and is considered as a conceptual basis for the development of appropriate organizational and eco-

nomic measures by the management of enterprises operating in the EU organic produce market.

Table 2.17

Probability of occurrence of individual factors and possible measures in response to their manifestation

Group of factors	Factor (probability of its occurrence)	Signs and their manifestation	Appropriate measures of enterprise management are possible
1	2	3	4
Economic	Rising inflation	Depreciation of money, rising prices, trade deficit	Conducting additional marketing research of the EU organic products market
	Increasing competition	Provision of new products by competitors termination of contracts with customers	Activation of sales, implementation of trade-marketing measures, well-thought-out pricing policy, improvement of product quality
	Decrease in effective demand of the population	Decrease in prices for products of competitors	Conducting additional marketing research of the EU organic products market
	Lack of qualified personnel	Increasing staff turnover	Create a training system, improve financial motivation, form a personnel reserve
Political	Legislative changes	Introduction of an additional tax burden, raising tax rates	Find ways to increase profits the extra costs to be payed off
	Rising social instability	Rising of social upheavals	Political risk insurance
Social	Growth of labor migration abroad	Outflow of qualified personnel	Improving the system of incentives and motivation of employees, formation of social package

Continuation of table 2.17

1	2	3	4
	Changing consumer preferences	Growing feedback from existing and potential consumers	Responding to information from consumers
	Decrease in education	Problems with the development of innovations	Allocation of funds for professional training of employees
Technological	Introduction of new technologies	The growth of science-intensive products, the emergence of the problem of disposal	Allocation of funds for "know-how", renewal of production facilities

It is important to formulate a strategy for the development of agricultural enterprises, which should be based on ensuring a permanent improvement of the quality of products, their attractiveness to the consumer, optimization of the supply of goods and affordable prices to the consumer, creation of an effective sales network based on sustainable contacts with intermediary trading firms agencies, taking into account national peculiarities and specifics of consumer requests in different regions. Of utmost importance in the strategy of competitiveness management is the quality management of products, which is in time complex economic relations are the basis of competitiveness, development and release of new goods, complex market research and marketing planning, organization of the machine, advertising and sales promotion, improvement of products, pricing, improvement of organizational structure of the domestic agroindustrial complex.

In order to formulate an effective agricultural policy, it is advisable to diversify the commodity structure of agricultural exports by increasing the share of value-added products (processed food), diversify geographic export markets for agricultural products by opening new markets and expanding the range of products in certain countries, expanding the range of exporters of food and agricultural products by increasing the number of small and medium-sized producers and processors able to export; increasing the level of competitiveness of producers and processors to enter the foreign market.

CHAPTER 3.
ORGANIZATIONAL AND ECONOMIC MECHANISMS OF INTEGRATION OF UKRAINIAN AGRARIAN PRODUCERS INTO THE MARKETS OF THE EUROPEAN UNION

3.1. Prospects and implications of Ukraine's associate membership in the European Union for the agrarian sector

There is no doubt that political, economic, social, cultural and other benefits are gained from Ukraine's accession to the EU. The changes that are currently taking place in the agroindustrial complex of Ukraine and related to the signing of the agreement relate to the legal field, product safety, standardization, changes in approaches to investment in the agrarian sector, leading to numerous reforms, among which land occupies an important place.

In 2014, Ukraine, by signing the Association Agreement with the EU, laid a new foundation in the development and functioning of the agricultural market. Since then, various spheres of activity of the agrarian market have undergone significant changes, and political and economic relations between Ukraine and Europe have changed. The signing of the Agreement is a minor part of the vector of changes that need to be made in order to fully reform the agrarian market. For today, the signing of the Agreement, agreements with other European countries, for example, on the Free Trade Area with Turkmenistan, the approval of normative legal acts, the adoption of laws and bills, etc., will not change the conditions of functioning of the market until they are implemented. As practice shows, most laws that are supposed to stimulate the agroindustrial market are not being enforced, are losing their force, and development strategies are being cancelled without good reason. On the other hand, Ukraine's continued accountability to EU countries will have a stimulating and controlling influence on changing approaches to the functioning of the agricultural market. Therefore, it can be argued that the signing of the Association Agreement is a starting mechanism for laying new foundations for the activity of agricultural producers [164, p. 178].

The Association Agreement contains the provisions on the Deep and Comprehensive Free Trade Area (DCFTA). The DCFTA will provide Ukraine with conditions for modernizing its trade relations and for economic development by opening markets and gradually eliminating customs tariffs and quotas, and a comprehensive process of harmonizing trade related laws, norms and rules in various fields. This will create conditions for aligning key sectors of Ukraine's economy with EU standards. The economic part of the Association Agreement has been partially effective since January 1, 2016. [186]. According to the DCFTA, new agricultural safety standards, new phytosanitary and technical standards must be implemented in Ukraine for 10 years. Such changes will significantly facilitate the export of products by agricultural producers, which will meet both Ukrainian and European standards at the same time. The main advantage for Ukrainian agrarian companies is the opening of a commodity market that operates on the basis of binding trade rules and will provide new export opportunities. Approximation of legal acts to the legislation will allow providing the best quality of products, will serve as a guarantor of protection of consumers and the environment. That is, in fact, we can talk about the gradual improvement of the quality and safety of agricultural products after the signing of the Agreement and the lack of such competitive advantages before signing.

Thus, Chapter 17 of the Agreement contains the basic provisions on agriculture and rural development, namely: 403 provides for cooperation between the parties to ensure the development of agriculture and rural areas, in particular through the progressive approximation of policies and legislation [186].

The main areas of cooperation between the parties to the Agreement in the field of agriculture and rural development are set out in Appendix N.

Thus, the Agreement provides for the main areas of cooperation in the field of agriculture and rural development, within which it is advisable to implement certain measures that will create benefits for Ukrainian agricultural enterprises. Among the most important

measures are the implementations of regional development programs, including rural areas in their most competitive areas of agriculture, to attract qualified personnel for technological re-equipment of enterprises, to finance small enterprises and facilitate the procedure for obtaining loans funds, to hold scientific conferences on international experience in implementing agricultural reforms, which will allow domestic farmers to radically change the approach to product quality management, loan and equity management, production and personnel, providing a qualitatively new level of activity in the agricultural market.

In 2014, the EU was an important trading partner of Ukraine, accounting for 35 % of foreign trade. Deepened economic integration within the DCFTA has become a powerful impetus for Ukraine's economic growth. In 2016, after the entry into force of the economic part of the Agreement, the EU became a major trading partner, due to political relations with Russia, exports and imports of goods and services increased. At the same time, in 2016, the agrarian sector became a leader in product exports, outpacing industry and accounting for 30 % of total exports. In January-April 2017, the share of EU Member States in foreign trade was already 38 %, with exports of goods increasing by 21.4 % during this period. Despite positive changes, Ukraine continues to supply significant volumes of raw materials to European countries. At the same time, there is a positive fact that there is no significant increase in the import of European agricultural products to Ukraine.

The signing of the Agreement and the creation of a Free Trade Area (FTA) with the European Union are important factors in the deve-lopment of the agricultural sector, as Ukraine has prospects for gradual development of the EU market by domestic companies, improving the quality, safety and environmental performance of Ukrainian agricultural products improving the food security of the state. Therefore, the task of Ukraine is to develop mechanisms of public policy to improve the use of the existing potential of the agrarian sector of the economy, its adaptation to new conditions, incl. taking into account the possible risks arising from the liberalization of foreign trade relations with European countries [20]. To date, Ukraine must take all the above

measures to maintain the EU market and increase its exports to countries that are major markets.

The Agreement stipulates that a free trade area will be gradually established over a transitional period of up to 10 years. In the case of minor changes introduced into Ukrainian legislation, we can speak of the lack of such a term for Ukraine to fully transition to the new conditions of functioning of the agroindustrial complex. After all, many issues remain unresolved and some legislative changes have not been tested in practice and time. It also envisaged a reduction or cancellation of duties, which had a positive effect on the competitiveness of Ukrainian products by reducing its cost. The consultations between the countries envisaged in the Agreement will be a mechanism to facilitate the consideration of acceleration and the extension of the abolition of import duties in trade.

In the text of the Agreement, the main instrument for restricting agricultural trade is tariff quotas, which provide for duty-free access to the EU market. Such regulation of export / import of products between Ukraine and the EU have advantages and disadvantages for domestic enterprises, since on the one hand it limits the volume of deliveries and on the other hand promotes competition in the domestic market.

In June 2017, the EU published an appendix to the Association Agreement, which provides for the implementation of the following measures for a three-year period: additional annual zero import tariff quotas for the following agricultural products (0 % tariff rate quotas); complete removal of import duties on manufactured goods such as fertilizers, dyes, pigments and other colouring matter, shoes, copper, aluminium, as well as television and sound recording equipment [185]. Thus, the use of quotas and the removal of import duties are instruments of regulation of the Ukrainian market, including the agrarian one the sector which continues to be used after the signing of the Agreement, in particular by increasing the volumes of quotas stipulated in the Agreement. Thus, it is advisable to highlight the potential benefits, threats and disadvantages of Ukraine's cooperation with the EU in the field of agriculture and rural development (table 3.1).

Table 3.1

Potential benefits, threats and disadvantages of Ukraine's cooperation with the EU in the field of agriculture and rural development

Group	Advantages	Threats	Disadvantages
Political	Participation in the European collective security and guaranteeing, with its help, the territorial integrity of Ukraine.	The danger of Ukraine's involvement in the conflict of civilizations between the West and the Muslim world.	Partial loss of sovereignty, uncertainty of the EU development strategy, deterioration of relations with the CIS countries and other countries.
Economic	Macroeconomic stability, new markets for Ukrainian goods and additional investments in the Ukrainian economy, subsidies to degrading agriculture, reduction of customs tariffs and positive trade balance.	It is possible to move harmful industries to Ukraine.	Loss of competitiveness of certain industries, the difficulty of transition to the European price level.
Social	Effective protection of human rights in the EU institutions, opening borders for the free movement of the population and expanding opportunities for education, work and leisure, ensuring a high standard of life.	Deepening demographic decline, the problem of illegal migration and outflow of personnel.	Complications of the visa regime with the eastern neighbors.

Thus, in addition to the benefits that will be gained in 10–20 years due to the implementation of the reform of the agroindustrial complex, Ukraine, first of all, will experience a number of threats and disadvantages after joining the EU. First of all, there is an obvious problem of increasing the production capacity of foreign companies, which, on the one hand, will facilitate the employment of the population of

Ukraine, and, on the other, will facilitate the removal of capital abroad. Another problem is labour emigration, leakage of labour resources, further degradation of the labour force in Ukraine. As a result of labour leakage, there will be a drop in spirituality, since a decrease in income will affect the level of human development and quality of life. This will undoubtedly affect Ukraine's political and economic relations with the East and Community of Independent States (CIS) countries. The complexity of the transition to European agribusiness conditions will affect the development of many industries, including agribusiness subsectors, more competitive EU products in terms of Ukrainian products may oust the latter from the European market or not allow Ukrainian producers to go out with such products at all goods to the European market. In addition, joining the EU means not only increasing Ukrainian exports, it is an incentive for Europe to export its products with additional preferences, so some Ukrainian farmers may lose their niche. At the same time, some products previously unknown to Europeans, if properly supported and financed, can occupy a niche in the European market. Significant advantages include Ukraine's access to technological, information, and macroeconomic resources. Cheaper import prices can improve the quality of life of Ukrainians, and bringing standards and living standards to European levels can improve the purchasing power of the population, which will continue to be consumers of domestic agricultural products.

Thus, Ukraine's accession to the EU laid the groundwork for introducing changes and reforming the agrarian sector. From now on, the agricultural market must significantly change the conditions of its operation, the legislation must comply with EU standards, the products must be of high quality and comply with quality certificates, priority should be given to organic production and it’s financing. In addition, there should be ongoing dialogue between Ukraine and the EU on the changes implemented. Exported products must be safe. It is advisable to introduce quotas and special tax regimes. These requirements require Ukraine to introduce legislative, institutional, technological and other changes.

One of the major problems in the agrarian sector reform process is the approval of agribusiness development programs without actually implementing them. Examples of such programs are the rural reform program "Ridne Selo", which remained at the local level and was not implemented due to lack of budget financing. Ukraine also worked on the implementation of the Agrarian Code, which was not implemented due to a time lag. At the expense of the taxpayers of the European Union and with the participation of leading international and local experts, a "Unified integrated strategy and action plan for the development of agriculture and rural territories in Ukraine for 2015–2020" was developed. This program was not actually implemented either, it was discussed at a meeting of the profile committee of the Verkhovna Rada. At the moment, a new strategy called "3+5" was formed by the Ukrainian government. The main directions of work under this strategy are land reform, reform of state support to the agrarian sector and reform of state-owned enterprises. It is planned to launch a transparent land turnover, to focus on small and medium-sized farmers, to provide new jobs and agricultural profitability. The absence of specific measures and actions in the implementation of strategies will negatively affect relations with the EU and, consequently, in the market of agroindustrial complex of Ukraine. In fact, the basic requirements for market development will not be fulfilled, which will contribute to the spread of mistrust, lack of financing, threats of cancellation of quotas and duties [171].

The established Complex Strategy for the Development of Agriculture and Rural Territories for 2015–2020 will allow Ukraine, provided its implementation, to obtain the following benefits: approximate the legislative norms of Ukraine to the norms of the EU in the agricultural sector. In the above all, the strategy should ensure the implementation of legislation in the context of product safety, sanitary and phytosanitary measures. The initiative of the European Integration Commission was to include a mechanism of transition from Ukrainian to European norms of product labelling and marking. The relevant standards will facilitate the procedure for obtaining export licenses for agricultural

products, since the quality evidence will be confirmed by appropriate marking.

Due to the deregulation of the agroindustrial complex and a significant reduction in the pressure of state control authorities on the market and the subjects of its functioning, the cancellation or revision of some regulatory acts, market reform will take place. Changing the format of relations in the field of operation of state-owned enterprises and state property makes it possible to make the market less monopolistic, for example, the grain market, which increases the level of competition between players and, accordingly, affects product quality.

Important is the issue of financing agrarian enterprises, which, if simplified access to credit, reduced interest rates, will enable them to attract credit and develop their business, changing production technologies, improving the technological component of the production process. The implementation of infrastructure projects by enterprises and the modernization of equipment, production and industrial capacities are a consequence of improved financing conditions.

Due to the change and improvement of agrarian policy in the fields of science, education, innovation, the quality of training of specialists involved in the agrarian sector will be improved, which will provide enterprises with another competitive advantage – skilled labour. The development of industry advisory and research services will ensure the improvement of the technological component. The efficiency and implementation of information technologies and innovations in agriculture depends on the quality and safety of products.

Management of the agricultural market and production will allow developing the export of Ukrainian agro-products, to organize commodity producers, to provide food security, manage the domestic market, and solve a number of topical issues of the industry. Market development will involve creating competition in the market for certification of products and laboratory tests, resulting in economic benefits not only for farmers, but also for newly established enterprises – centres of certification and quality assurance.

Taxation and state support for agricultural enterprises, which will improve the state support system for agricultural producers, reduce administrative pressure by simplifying the industry taxation procedure.

Rural development, which will be the key to establishing a small farm support program, implementing an initiative to improve the quality of life in rural areas, and enhancing the effectiveness of local self-government.

The gradual transition of agriculture to sustainable development through the introduction of incentives for organic production, bioenergy, the rational use of water and land resources [65].

Thus, the competitiveness of Ukrainian agrarian enterprises will depend on compliance with the norms of Ukrainian legislation with EU standards, taxation system, market regulation, pressure of regulatory authorities on market activity, rural development, state financing and support, innovation, information technologies, the level of development of organic production.

In recent years, Ukraine has adopted a number of regulations in the field of agriculture and rural development, in particular as a result of the signing of the Agreement (see Appendix O, P).

Summing up a number of legislative acts, it is possible to state that significant measures are being taken to reform the agroindustrial complex of Ukraine. For further improvement, it is necessary to increase state subsidies, reduce interest rates, and increase state financing of enterprises. After all, the adopted regulations and laws only beginning to establish an efficient agricultural market.

Land reform, food safety and quality, and the development of organic production were identified as the main areas of agribusiness in the framework of the project "On approval of the Government's mid-term priority action plan to 2020 and the Government's priority action plan for 2017". In the context of land reform, the legislative support of the land market should be implemented according to the model defined through national discussion and simplification of the procedure for land registration. Particular attention will be paid to the fact that the land should belong to Ukrainians (individuals) and not to legal enti-

ties, foreigners or agro holdings. In the area of improving the quality and safety of food, work will continue on the harmonization of national legislation with EU standards, directives and regulations. In particular, this applies to veterinary and phytosanitary safety. Organic market development should be ensured by proper state control in the organic production, circulation and labelling of organic products. This should simplify the entry of Ukrainian "organic" into foreign markets and enable the export potential to be developed in this area. It is also planned to improve mechanisms for stimulating the development of agroindustrial complex. This should be done by ensuring food security, predictability and stability of the commodity markets by enhancing the competitiveness of small and medium-sized farmers [38].

Thus, we can distinguish the main areas of improvement of the agrarian market, which should relate to the first organic production (fig. 3.1).

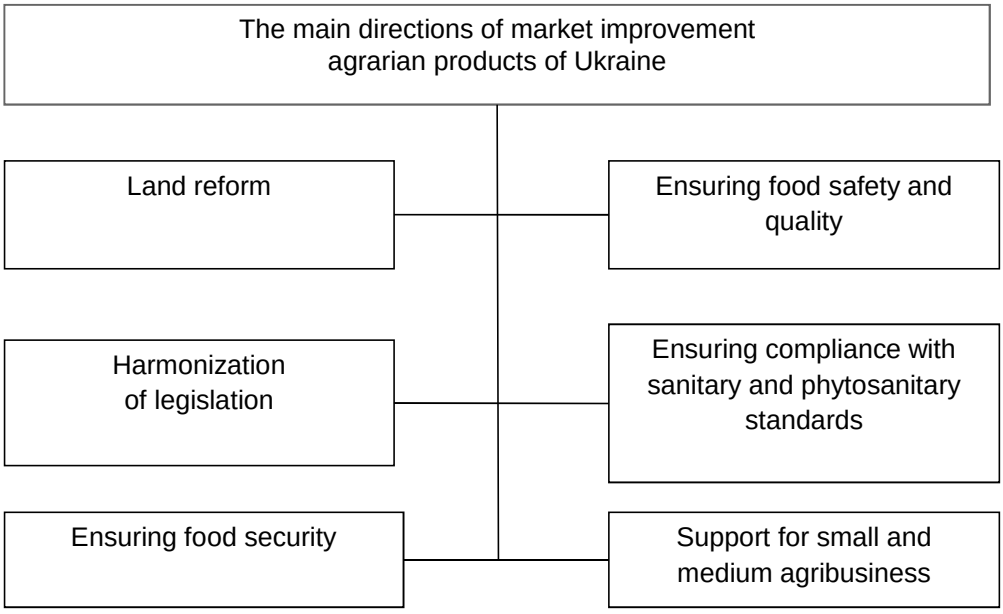

Figure 3.1 – Directions for improving the agroindustrial complex of Ukraine

Undoubtedly, it is very difficult to implement all areas at the same time, so priorities must be prioritized: from improving the legislation

first and foremost to innovating. At the same time, the actions must be comprehensive and must be performed within the prescribed time.

Agrarian sector reform must be ensured through the development of rural areas, which requires land reform, expansion of product markets, including organic production and the filling of niche crops, and the introduction of safety and quality standards that meet EU standards.

The "3+5" strategy should be used to develop and approve the National Target Program for the Development of the Agricultural Sector for the Economy until 2020. Some priorities, such as institutional reform in the Ministry for Development of Economy, Trade and Agriculture of Ukraine, should be implemented in the near future. Today, the institution's priority should be to modernize the agency, review its functions and regional divisions, which will ensure qualitative changes in state policy regarding the agrarian sector.

Another area of improvement of the agroindustrial complex should be a detailed development strategy for the 10–15 years ahead, which would cover the implementation of a free trade agreement with the EU, would contain binding proposals regarding changes to this agreement taking into account interest of representatives of agrarian sector, enterprises and farmers.

Necessary measures for the reform of the agroindustrial complex are to reduce the interest rates on loans, change the taxation, change the system of state subsidies, and insure the risks of agricultural producers. An institutional measure for these areas should be the creation of a state budgetary institution of the Agrarian Fund, which will specialize in state regulation of the market and conducting financial and commodity interventions.

Also among the directions of improving conditions of associate membership of Ukraine in the EU it is worth mentioning the Common Agricultural Policy of the EU, which now prioritizes competitive production, rural development, support of organic production, rational use of nature. In view of these trends, the Law on State Support for Agriculture of Ukraine should be improved and updated today [65].

The CAP will allow Ukrainian farmers to respond more quickly to market needs, providing competition for small and large Ukrainian producers who will begin to struggle to obtain quotas, surcharges or preferences. As a result, the process of increasing labour productivity, introduction of new technologies will start, prices will be more affordable, and quality will be better, and the sanitary norms of Ukrainian enterprises will adapt to the norms of European countries. The process of adaptation of the agrarian market of Ukraine to the conditions of functioning of the agroindustrial market in Europe should be thought out in advance, as the possible decline of rural territories, which will prove to be non-competitive, despite all efforts. There will be a so-called "filtering" of agricultural enterprises according to their adaptation conditions and the ability to satisfy consumers in European countries.

One of the measures to stimulate and improve the activity of the agroindustrial complex of Ukraine should also be to determine the priority of financing of enterprises. Today, in Ukraine, these are organic production companies. Such financing tactics should be maintained further, as organic produce is one of the competitive ones on the European market. It is necessary to clearly define what kind of activity, what area or products and what fixed amount can be obtained by the agricultural enterprise and during which period. The determination of Ukrainian agricultural enterprises in this direction will contribute to the confidence of the Ukrainian agricultural producer in the future.

Separate direction in improving the agrarian market should be the withdrawal from the food intervention fund of forage crops, namely corn and barley. The situation on the buckwheat market by the Ministry for Development of Economy, Trade and Agriculture of Ukraine and the involvement of the Antimonopoly Committee should also be clearly analysed. In this case, the current legislation clearly defines the procedure of the Government of Ukraine, as well as the tools to avoid situations of price increases for these products, including the procedure for granting a temporary budget subsidy for producers of one object of state regulation based on a metric unit area of sowing. That is, to regulate prices in the buckwheat market and increase the area of sowing of this crop, it is

necessary to introduce subsidies per hectare of sown area. The gradual increase in demand for this crop and its products justifies these measures. Domestic production will be an incentive for the export of buckwheat.

After the agreement was signed, many laws and programs in the agricultural sector lost their force. Examples are support programs for viticulture, the state program for agricultural development, wholesale markets, rural areas, cooperatives. It is therefore advisable to improve the legal field in which the agricultural sector operates. A land relations development program and a nationwide land use and protection program need to be put in place.

Since 2012, the Ukrainian government has stopped budgeting for anti-erosion, soil-protection measures. The safety of agricultural products is one of the main requirements and conditions for the functioning of the EU agroindustrial complex. Therefore, funding for these activities is also needed. It is worthwhile to draw on the experience of European countries. For example, in Germany, Slovakia has experience in managing state-owned land through agencies. An institutional event can be of such agencies in Ukraine on the basis of the State Land Bank of Ukraine.

Improvement of the agroindustrial complex of Ukraine is possible through the involvement of foreign managers for the inventory of state-owned land, which is one of the gaps in the Ukrainian government. For example, the Agricultural Property Agency of Poland (Agencja Nieruchomości Rolnych) is able to take an inventory of state-owned land. It is advisable to involve agricultural experts to prioritize these activities.

One of the pressing problems in the agricultural market today is taxation and partial abolition of the special Value Added Tax (VAT) tax regime from January 1, 2017. This is especially true for small and medium-sized businesses, which are favoured in Europe, because the special tax regime is the only state support that operated in Ukraine. Such an event will reduce the incomes of farmers who are forced to invest in the development of the industry. As a consequence, enterprises will be eliminated, jobs will be reduced, unemployment will increase, produc-

tion volumes will be reduced, and the area of untreated land will increase. In particular, this will have a significant impact on small producers, as large companies and agroholdings will lose a small portion of their revenues and return VAT through export of products.

It is advisable to use reduced VAT rates for businesses that do not export products, such as dairy or horticultural producers, where they receive investment returns after two to three years. A possible way out is also to introduce reduced rates for certain types of goods, which is largely practiced in EU countries.

Another option could be the introduction of direct grants, which would be a form of state support for enterprises specifying the forms and types of enterprises eligible to receive them in order to prevent corruption schemes. On the other hand, direct subsidies are a factor in the unjustified receipt of public funds and shadowing of the agrarian sector.

The issue of land market liberalization in Ukraine remains one of the topical issues. Removing the restrictions that exist today will stimulate investment, be an impetus for lending and financing agrarian businesses. The Land Code of Ukraine currently provides for a moratorium and additional restrictions for foreign nationals. Therefore, it is advisable to introduce optimal restrictions that will ensure the transparency of civil-state relations while protecting the rights of owners. Minimum restrictions should be envisaged to support smallholder and national producers, implement land acquisition financing and consolidation tools.

It is advisable to introduce the following restrictions in order to prevent the purchase of land by large companies: the establishment of legal restrictions on the maximum area of land purchased; ensure territorial communities' control over land acquisition; financing and lending to small businesses for the purchase of land; preventing foreign companies and citizens from buying land in Ukraine; set the limit for purchased lands. Irrigation systems of land in Ukraine need updating and financing. Therefore, in 2017, the first step in this direction was made and a strategy was prepared to prepare an agreement with the World

Bank to fund irrigation restoration and improvement work. Thus, the basis for increasing agricultural production and increasing the yield of Ukrainian lands is laid.

Therefore, the signing of the Association Agreement between Ukraine and the EU has radically changed the conditions of functioning of the agrarian market. Henceforth, Ukrainian products must be safe, environmentally friendly, and comply with sanitary standards. In addition, in order to ensure the quality of goods, Ukrainian enterprises need to attract considerable credit for technological re-equipment of enterprises, seek qualified personnel, and implement research developments. In order to increase the competitiveness of products, it is necessary to solve the issues of land reform, logistics and infrastructure, distribution networks, and reduction of the cost of production. To do this, it is necessary to implement the approved regional ones and state development programs in a timely manner, facilitate the financing of enterprises at the state level by reducing interest rates, using special taxation regimes for enterprises in certain areas of agriculture, address issues of conservation and irrigation of land, provide government grants and facilitate the fight with corruption to increase investment.

3.2. Assessment of competitive advantages of the agrarian sector of Ukraine in entering of the European market

Unlike most developed European countries, agriculture in Ukraine is the most capacious sector for attracting foreign investment into the economy. This is facilitated by both market advantages and the problems of other industries. Among the positive factors are favourable natural conditions and the country's advantageous location on the world agribusiness map, cheap local resources and historical inclination to agriculture, developed infrastructure and agricultural machinery, proximity to the world's leading consumer markets: the EU and the Middle East. All this is the main competitive advantage of the agrarian sector.

Among the competitive advantages of Ukrainian enterprises in the agrarian sector are a significant range of products, natural resource potential, climatic conditions, qualified staff, low prices relative to EU prices, mass demand for some product groups (table 3.2).

Table 3.2

Factors influencing the level of competitiveness of the agrarian sector of Ukraine

Indicators	Year							Deviation, 2018-2012
	2012	2013	2014	2015	2016	2017	2018	
The volume of gross agricultural output (billion UAH)	216,6	246,1	251,4	239,5	254,6	249,2	269,4	52,8
The quantity of agroindustrial enterprises (thousand units)	68,5	71,1	75,7	79,3	74,6	76,6	76,3	7,8
The quantity of employed population in APC (thousand people)	751,4	726,3	733,4	642,6	658,7	635,6	626,1	-125,4
Labour productivity in agroindustrial enterprises (thousand UAH per 1 employee)	159,6	201,2	227,7	223,3	275,3	271,5	313,6	154
The level of profitability of all agroindustrial enterprises activities (%)	20,5	11,2	25,8	37,1	32,1	-	-	11,6
Price indices of sales of agricultural products (%)	106,8	97,1	124,3	154,5	109,0	111,5	109,3	2,5
Net profit of enterprises APC (billion UAH)	26,9	14,9	21,5	102,3	90,6	68,9	71,1	44,216
Capital investments in agroindustrial complex (UAH million)	19,2	18,9	18,6	29,8	50,3	64,1	66,6	47,37
Inflation rate in Ukraine (%)	-0,2	0,5	24,9	43,3	12,4	113,7	9,8	10

The production of agricultural products in Ukraine on an industrial scale requires less cost than in the EU. This is due to the presence in Europe of small farmers, the cost of agricultural products is high.

Therefore, in order to enhance this competitive advantage, Ukraine needs to be supplied with duty-free agricultural products. Customs payments significantly reduce the competitiveness of goods, as customs rates vary for different product groups and can reach up to 20 %.

The largest investment projects in the agrarian and related industries are mainly related to agrarian infrastructure. According to in of agricultural economy, in 2016 in the Ukrainian agroindustrial complex received 44.2 million UAH capital investments. Elevator capacities, transhipment terminals, entire logistics complexes are the direction in which global traders are actively working in Ukraine. In recent year's only Bunge terminals (US $ 180 million), Cofco (US $ 75 million), Risoil SA (US $ 70 million), Allseeds (US $ 200 million) have grown in Ukrainian ports. The largest exporter of Ukrainian grain among foreign companies – LouisDreyfus Ukraine, together with Brooklyn-Kyiv, is implementing a $ 99 million grain-transfer terminal project. USA. In order to retain and further attract investors, government action is needed to combat corruption and facilitate business conditions.

In addition, the NCH Agro Holding unit is operating in Ukraine (USD 36 million in 2015 investments), and the DuPont Pioneer US Seed Plant has been successfully operating (USD 51 million since the plant was launched in 2013). It can be concluded that, for the most part, foreign companies invest in Ukrainian business and make profits in the development of technologies. At the same time, Ukrainian agricultural holdings are benefiting from this, as the infrastructure of the agrarian market is improving and technologies are developing.

The key exporters in the grain market, which occupy the largest share in Ukrainian exports, are companies "Nibulon", "Kernel-Trade", "Granum-Invest", PJSC "DPZKU". In the flour and cereals market, the French company Malthurope Ukraine holds a leading export share of almost 14 % in 2016. The advantage of these companies is that they

own a land bank of more than 200000 hectares, the possibility of introducing innovations and considerable experience from work in the field of export of products.

In order to further attract investments in the agrarian sector and thereby create industry competitiveness, since the investments involved contribute to improving the agroindustrial complex, Ukraine needs to ensure ease of interaction of investors and enterprises with local authorities, as well as the mood of local representatives of law enforcement agencies. Foreign investors as well as international finance institutions focus on the prospects of the agrarian sector of Ukraine. For example, the European Bank for Reconstruction and Development (EBRD) plans for 2017 to invest EUR 150-200 million in the Ukrainian agroindustrial complex. The International Finance Corporation plans to invest the same funds.

Considering the GDP structure of the EU and Ukraine (table 3.3), one can identify another competitive advantage of the Ukrainian agroindustrial complex: agriculture increases its output annually, thus increasing its share in the GDP structure of Ukraine, in particular in 2016 it is 11.63 %. Whereas in the structure of GDP of European countries agriculture occupies no more than 3 %. Therefore, it can be said that the agrarian sector is a leading sector of the Ukrainian economy, unlike in Europe.

At the same time, it is possible to trace the tendency of agricultural production to increase over the GDP of Ukraine, which indicates that the agrarian sector is one of the priority sectors of the Ukrainian economy. Therefore, in 2015, the growth rate of agricultural production was 48.81 %, while GDP – 12.06 %.

In general, EU countries reduced the share of agricultural products in GDP from 3.14 % in 2013 to 2.7 % in 2016, which will have a positive impact on the competitiveness of domestic products.

In spite of the considerable increase in the number of lands under the authority of many countries (Belgium, Bulgaria, Estonia, Croatia, Cyprus, Latvia, Lithuania, Poland, Serbia), their share in the total remains quite low. The developed countries of Spain and France show not

only a significant increase in the area of organic land, but also a large share of the EU's land structure. Therefore, these countries are the main competitors in relation to Ukraine, although their total area does not exceed the area of Ukraine. The insignificant volume of agricultural production in Germany and the steady decline in this country's share of GDP are explained by the small proportion of land under organic farming and the absence of a significant increase in land volume.

Table 3.3

Dynamics of GDP and agricultural production of Ukraine in 2007-2018

Indicator	Gross Domestic Product	Agro, forest and fisheries	GDP growth rate,%	The growth rate of agriculture, %	The share of agriculture in GDP,%
2007	720731	109539	32,45	-11,06	15,20
2008	948056	65148	31,54	-40,53	6,87
2009	913345	65758	-3,66	0,94	7,20
2010	1079346	80385	18,18	22,24	7,45
2011	1299991	106555	20,44	32,56	8,20
2012	1404669	109785	8,05	3,03	7,82
2013	1465198	128738	4,31	17,26	8,79
2014	1586915	161145	8,31	25,17	10,15
2015	1988544	239806	25,31	48,81	12,06
2016	2383182	279701	19,85	15,59	11,63
2017	2983882	303949	25,21	8,67	10,19
2018	3560596	361173	19,33	18,83	10,14

Summing up, we can speak about the significant prospects of countries' reorientation towards organic production, given the overall positive trend of increasing land. Increasing the competitive advantages will also be facilitated by marketing activities on a national scale, since after signing an agreement with the EU; Ukrainian products have more opportunities to enter the markets abroad because of a greater awareness of European consumers about domestic products.

Ukraine has significant potential for organic agricultural production, exports and domestic consumption. Some results have been

achieved in the development of Ukrainian organic production. For example, the area of certified Ukrainian agricultural land used for organic production is over 400000 hectares, making Ukraine 20th in the world of organic production. However, the relative indicators need to be improved, since the share of organic land in the total agricultural area is about 1 %. At the same time, Ukraine is a leader in the Eastern Eu-ropean region in the area of certified organic arable land and speciali-zes mainly in the production of legumes, grains, oilseeds. As of Decem-ber 31, 2016, not 550 thousand hectares of wild animals. All this willfurther increase the volume of land for organic products.

Foreign investors as well as international financial institutions are focusing on the prospects of agrarian direction. For example, the EBRD plans for 2017 to invest EUR 150–200 million in the Ukrainian agroindustrial complex. Similar figures are operated by representatives of the International Finance Corporation (IFC).

Ukraine intends to increase the grain shaft. Over the next five years, it is planned to increase the shaft to 100000 tonnes from the current 60000 tonnes. The grain storage and transportation infrastructure is worn out and often does not meet the requirements of international companies.

According to the World Bank, every year, because of the poor state of logistic facilities, Ukrainian farmers get under $ 600 million up to $ 1.6 billion USA. This is 20–50 % of the current volume of bank loans to agriculture. Therefore, the issue of investing in logistics and infrastructure for profit generation is urgent.

The organic market of Ukraine grows by about 25 % annually. According to experts, the Ukrainian precision farming market reaches about $ 50 million US per year (autopilot, equipment, software, sensors, units, services, consulting). The potential of the market is quite large, with an annual growth of 15 %. In addition, precision farming, land monitoring systems is being introduced not only by large agricultural enterprises but also by mid-level and small-scale farms. The further introduction of such technologies will have a positive impact on product quality and will contribute to enterprise development.

According to the Ministry for Development of Economy, Trade and Agriculture of Ukraine exports 80% of its organic production. In 2016 165000 tonnes of organic matter went abroad, bringing farmers nearly EUR 46 million. The largest importers of Ukrainian products in 2016 were Germany, Switzerland, the Netherlands, Italy, Poland, the United Kingdom, Austria, France, Belgium, and Hungary. Ukrainian producers also export organic produce to the United States, Canada, Australia and some Asian countries [38]. It opens up great prospects in the future, as the country will be the main supplier of agricultural mass production to Europe, which at the present time lacks such capacity and capacity to increase production due to the lack of natural resource potential.

The small and medium-sized business in Ukraine's agricultural sector, which produces high-quality organic produce in accordance with all relevant EU rules, has achieved remarkable success in foreign markets and internationally. The variety of organic products presented in Ukraine is attracting more and more attention from the global organic community. Due to consolidation, cooperation between public authorities and the organic sector, greater product promotion is possible. Newly established companies are joining the international market-small and medium-sized enterprises, which do not have large capacities, but can bring unique products to the world organic market.

Therefore, in order to stimulate the development of a new business, it is necessary to develop appropriate draft laws on quality, food safety, state control and supervision, baby food, feed production and more. Each industry must be governed by appropriate legislative acts tailored to its specific needs.

A positive trend is the active filling of the domestic market with its own organic matter through the introduction and regulation of its own processing of raw materials for organic products. It is primarily flour, cereals, dairy, meat products, syrups, juices, apparently, oil, teas, honey, and medicinal herbs. Such a trend will further transform Ukraine from a supplier of raw materials to a supplier of products.

Table 3.4 reflects the dynamics of production of basic crops in Ukraine in 2006–2018.

Table 3.4

Dynamics of basic agricultural crops production in Ukraine in 2006–2018

Year	Production of major crops, thousand tons						Total, thousand tons	Growth rate,%
	cereals and legumes	sugar beet factory	sunflower	potato	vegeta-bles	fruit and berry crops		
2006	34258	22421	5324	19467	8058	1114	90642	-
2007	29295	16978	4174	19102	6835	1470	77854	-14,11
2008	53290	13438	6526	19545	7965	1504	102268	31,36
2009	46028	10068	6364	19666	8341	1618	92085	-9,96
2010	39271	13749	6772	18705	8122	1747	88366	-4,04
2011	56747	18740	8671	24248	9833	1896	120135	35,95
2012	46216	18439	8387	23250	10017	2009	108318	-9,84
2013	63051	10789	11051	22259	9873	2295	119318	10,16
2014	63859	15734	10134	23693	9638	1999	125057	4,81
2015	60126	10331	11181	20839	9214	2153	113844	-8,97
2016	66088	14011	13627	21750	9415	2007	126898	11,47
2017	61917	14882	12236	22208	9286	2048	122577	-3,41
2018	70057	13968	14165	22504	9440	2571	132705	8,26

As we can see, the dynamics of production in 2018 is positive, which indicates further possibilities for growth of the share of agriculture in the GDP of Ukraine. Only in times of crisis did the volume of agricultural production decrease. In the absence of crisis and investment in the development of enterprises, Ukrainian manufacturers have every chance to increase production and, accordingly, to increase exports of products.

Table 3.5 shows the dynamics of acreage in Ukraine in 2006-2018.

At the same time, the number of organic farms increased from 80 units to 182 units in 2014 and doubled after signing the agreement to 390 units. The official IFOAM statistical reports confirm that if in 2002 there were 31 organic enterprises registered in Ukraine, then in 2016 there were 390 certified organic enterprises with a total area of certified organic agricultural land in volume 421200 ha. This leads to

further prospects for the development of land for organic land and growth of their area.

Table 3.5

Dynamics of sown areas in Ukraine in 2006–2018

Year	Total, million hectares	Growth rate,%	General area of organic agricultural land, thousand, ha	Part of the area of organic agricultural lands in the total area of agricultural crops, %	Tempo growth of organic agricultural lands, %	The share of sown areas of major crops, %					
						cereals and legumes	sugar beet factory	sunflower	potato	vegetable outdoor soil	fodder crops
2006	24,5	-	242,1	0,99	-	59,24	3,33	16,18	5,97	1,91	13,37
2007	24,3	-0,99	249,0	1,03	3,24	62,30	2,51	14,86	5,99	1,86	12,48
2008	24,9	2,82	269,9	1,08	8,05	62,68	1,52	17,26	5,66	1,84	11,03
2009	24,9	-0,14	270,2	1,08	0,08	63,58	1,29	16,99	5,66	1,81	10,67
2010	24,6	-1,11	270,2	1,10	0,01	61,26	2,03	18,56	5,72	1,88	10,55
2011	25,4	3,15	270,3	1,06	0,03	61,88	2,09	18,65	5,66	1,96	9,75
2012	25,5	0,40	272,9	1,07	0,94	60,56	1,80	20,36	5,64	1,94	9,70
2013	25,7	0,75	393,4	1,53	44,18	63,07	1,09	19,65	5,40	1,88	8,91
2014	24,3	-5,45	400,7	1,65	1,87	60,91	1,36	21,63	5,55	1,91	8,65
2015	23,8	-2,05	410,6	1,72	2,44	61,92	1,00	21,45	5,42	1,85	8,36
2016	24,5	2,73	421,2	1,72	2,59	58,89	1,19	24,84	5,37	1,81	7,90
2017	24,3	0,93	-	-	-	59,73	1,3	24,3	5,41	1,8	7,46
2018	24,7	1	-	-	-	60,1	1,13	24,52	5,34	1,75	7,15

Table 3.6 shows the dynamics of Ukraine's livestock production in 2006–2018 in Ukraine. As the data in table 3.6, the share of livestock production in Ukraine in the GDP structure is quite significant, which indicates the leadership among the sectors of this sector? At the same time, the industry is growing every year, increasing the volume of production. The market can be expected to grow in the future.

Most Ukrainian organic farms are located in Odesa, Kherson, Kyiv, Poltava, Vinnytsia, Zakarpatia, Lviv, Ternopil, and Zhytomyr regions. Ukrainian certified organic farms different sizes from several hectares, as in most European countries, to several thousand hectares of arable land [47]. Such a situation is explained by the excellent and favourable

climatic conditions, the concentration in these areas of the best black soil, which is used as acreage. The conservation and preservation of the fertility of the lands will facilitate their further efficient use.

Table 3.6

Dynamics of gross livestock production of Ukraine in 2006-2018

Year	Gross livestock products, UAH million	Gross domestic product, UAH million.	Livestock growth rate, %	The share of livestock in GDP, %
2006	184095,00	544153,00	-	33,80
2007	172129,00	720731,00	-6,50	23,90
2008	201564,00	948056,00	17,10	21,30
2009	197935,00	913345,00	-1,80	21,70
2010	194886,00	1079346,00	-1,54	18,10
2011	223560,00	1299991,00	14,71	17,20
2012	281685,60	1404669,00	26,00	20,10
2013	340276,20	1465198,00	20,80	23,20
2014	446442,38	1586915,00	31,20	28,10
2015	534837,97	1988544,00	19,80	26,90
2016	671756,49	2383182,00	25,60	28,20
2017		2983882,00		
2018		3560596,00		

Research by the Federation of Organic Movement of Ukraine shows that the modern domestic consumer market for organic products in Ukraine began to develop from the early 2000s, making: in 2010 – EUR 2.4 million, in 2011 this figure increased to EUR 5.1 million, in 2012 – to EUR 7.9 million, in 2013 – to EUR 12.2 million, in 2014 – up to EUR 14.5 million, up to EUR 17.5 million in 2015, and up to EUR 21.2 million in 2016 [35]. Such positive dynamics have been the result of numerous political and economic measures that have been implemented to encourage agricultural producers to produce. Therefore, in the future it is possible to predict the growth of the organic market of Ukraine.

Leaders of the organic sector in Ukraine are LLC "Organic Milk" (TM "OrganicMilk") and LLC "Staryy Porytsk" (TM "Staroporitskoe"), dairy producers. In the third place – LLC "EthnoProduct" (TM "Eth-

noProduct") – meat, milk, grain. The fourth is occupied by LLC "Organic original" (TM "Ekorod") – groceries, fifth – "Galex-Agro" – exporto-riented grain producer [5]. These manufacturers use advanced technologies in production, ensuring the quality and conformity of products to the standards, contributing to the expansion of activities and prospects of this market.

As of June 1, 2016, there are 239 registered enterprises in the organic sector, of which 162 are agricultural producers. The consumption market is tied to big cities – Kyiv, Odesa, Lviv, Kharkiv, and Dnipro. In addition, the Kyiv region leads both in processing and consumption [137]. This is due to the presence of a well-developed logistic structure in the large geographical centers of Ukraine, which facilitates the delivery of products to customers, the concentration of offices of large companies in the centers, where it is easy to find qualified staff and investments for business.

Organic products are imported into Ukraine, mainly from EU countries. Imported products are sold in Delight, Goodwine, FozzyGroup, Natur Boutique, Organic Era, Pareco, HIPP, GlossaryOrganicProducts, and others [35]. Most of these products are not available on the Ukrainian market, so they are imported from abroad.

Along with imported organic products on the shelves of stores you can find Ukrainian organic products from the following manufacturers: LLC "Fabryka Bakaliinykh Produktiv", TM "Zhmenka" (organic cereals, flour, sugar), LLC "Organic Original", TM "Ekorod" (organic cereals, flour, watermelons) , melons, sunflower oil, honey), TM "EthnoProduct" (organic milk, kefir, sour cream, meat, honey), "Pan Eco" (organic jams, syrups, juices, dried fruits, pork meat products), LLC "Wels Organic" (organic vegetables), TM "Imperial Gardener" (organic vegetables), TM "Hlibio" (baked goods), LLC "Food company Ecoproduct" (organic teas TM "Carpathian Tea"), LLC "Ekohlib Plus" (organic bread), LLC "Galka" (organic coffee), etc. [79]. Such diversity of products indicates that there is a great potential for further development of the industry and will positively affect the accessibility of Ukrainian consumers to quality,

varieties, displacing more expensive imported goods due to their higher costs.

Organic producers are not afraid of competition. All contracts for the supply of raw materials abroad are signed several years in advance and there are clear development strategies [16]. The organic market of Ukraine in 2016 showed an increase of EUR 20 million (an increase of 17% compared to 2015). Compared to Germany, where the organic market in 2016 amounted to 8 billion, this is a small amount but the market has considerable capacity to grow. In European countries, consumption of organic products is just beginning to develop, a large proportion of the products are exportable. For example, every fourth ton of wheat shipped to Europe comes from Ukraine. Frozen berries, fruit products (apples), fresh and processed are in great demand abroad. Such a market as fresh vegetables, fruits, dairy products, greens finds consumers in the domestic market. Therefore, it is necessary to find markets for these products.

A striking example of successful agrarian business is the enterprise-breeding grounds of the subsidiary company "HollandPlant Ukraine", which is located on the territory of Uzhgorod district and has been operating since 2004. Now the company is an advanced producer of planting material for fruit and energy crops in the region.

The nursery produces 600000 seedlings each year that are resistant to disease of apple varieties and other fruit crops. The company cooperates with numerous research institutes and universities in Europe and Ukraine. One of the new activities of the nursery is organic gardening [19]. Thus, this enterprise not only produces organic products, but also conducts research works in order to further expand its activities.

In Ukraine, new organic enterprises are constantly being created and developing. For example, the private enterprise "Agroecology" of the Poltava region created the International Training Centre for Organic Farming. The Centre was created with the aim of spreading many years of experience in the use of soil-based organic technologies, restoration of the frequent soil promotion of environmentally friendly and safe nut-

rition, harmonious coexistence with the environment and environmental protection. In addition, the PE "Agroecology", which operates in the agrarian market, is engaged in the cultivation of cereals, industrial crops, dairy and beef cattle, and since 1976 has made the transition to unmanned cultivation of soil, abandoning pesticides. Mineral fertilizers have been replaced by a sufficient amount of organic matter and the organic farming system has been used for 40 years, and twenty-one patents for the invention have been obtained. The farm has 6200 heads of cattle, 2000 cows and 600 heads of cattle, 300 pigs [23]. Therefore, the company serves as an example of organic farming and production, despite all the legal and market conditions.

The Development Strategy of APC "3+5" of the Ministry for Development of Economy, Trade and Agriculture of Ukraine has made organic development a priority. That is why the Law No. 5448 "On Basic Principles and Requirements for Organic Production, Circulation and Labelling of Organic Products" was developed and supported by the Cabinet of Ministers of Ukraine. The law stipulates that the area of agricultural land that will be used for organic production and certified will increase to 5 %, the number of farms and farmers producing organic product will be three times larger.

In addition, organic development can help address environmental problems in the country, strengthen the environmental component of agriculture and solve social problems such as job creation in rural areas, the activation and growth of farms as an alternative to large holdings and corporations.

Not only domestic experts consider the Ukrainian organic potential to be very large. Europe also shares this view. The European Bank for Reconstruction and Development is convinced that Ukraine has the prerequisites for significantly larger volumes of organic production. In the European neighbour, organics occupy a larger share in the overall agricultural production. For example, Austria uses 19.4 % of all arable land in the EU, this proportion is 5–10 %. These data and the positive experience of Europe indicate that Ukraine has a place to go. Due to the favourable geographical location of our country, a domestic pro-

ducer is able to meet the needs of the EU, where the organic food market has grown four times in the last 10 years. The European organic buyer is spending twice as much as a decade ago, and it is estimated that subsequent demand growth can be expected. With such optimistic trends, the EU does not have enough land to increase its share of organic farming to meet growing domestic demand. Therefore, European imports include more than 130 suppliers of organic products located outside the EU, and our country is one of them. For example, Europe can buy soybeans in Ukraine in large enough volumes, some of which are grown from soybean seeds of the Trading House "Soeviy Vic". The main benefits of a company product are high quality and organic origin [66].

The stimulation of organic production of the Ministry for Development of Economy, Trade and Agriculture of Ukraine is also foreseen. Together with the State Geocadastre, the Office develops a mechanism to support viticulture and stimulate the production of organic products through specialized land auctions [18]. Such anti-corruption actions will help to revitalize farms and enable access to the land-based businesses, encourage producers to develop new production programs.

Fertile and environmentally friendly soils, the climate contributes to the enormous export potential of organic production in Ukraine.

On January 9, 2014, the Law "On Production and Circulation of Organic Agricultural Products and Raw Materials" came into force in Ukraine, which should be the main normative act governing the organic market sector. At the same time, Ukrainian standards of organic production were not adopted, rules of certification and accreditation of certification bodies were not approved. Therefore, Ukrainian manufacturers will continue to be certified in accordance with the regulations of foreign countries. It is necessary to consider the legislation of foreign countries, which are the main trading partners of Ukraine, and to develop, approve their own unified standards that will take into account all the requirements of exporters, will prescribe the entire certification procedure, and in case of inaccuracies, regulate the market through the acts of the respective countries.

The most widespread in Ukraine are regulations and standards of organic production based on: European Union legislation: Council Regulation (EC) 834/2007 (former EU Regulation 2092/91) and additional regulations: Commission Regulation (EC) 889/2008; Commission Regulation (EC) No. 1235/2008; legislation of the United States of America: National Organic Program (NOP); Legislation of Japan: JAS Standards; legislation of Switzerland, Israel, Argentina, Australia, governed by organic regulations equivalent to Council Regulation (EC) 834/2007.

In countries that are not members of the European Union, a standard equivalent to EU Council Resolutions 834/2007 and 889/2008 is used.

Table 3.7 shows the key indicators of the organic market in the world in 2016.

Table 3.7

Key indicators of the organic market in the world in 2016

Indicator	World	Leading countries
1	2	3
Countries with data on certified organic agriculture	2014: 172 countries	New countries: Republic of Kiribati, Puerto Rico, Republic of Suriname, US Virgin Islands
Organic agricultural area	2014: 43,7 million ha (1999: 11 million ha)	Australia (17.2 million hectares; 2013), Argentina (3.1 million ha), United States (2.2 million hectares; 2011)
The share of organic agricultural area from the total agricultural area	2014: 0,99 %	Falkland Islands (Malvinas) (36.3 %), Liechtenstein (30.9 %), Austria (19.4 %)
Non-agricultural organic areas (mostly wild)	2014: 37,6 million ha (1999: 4.1 million hectares)	Finland (9.1 million hectares), Zambia (6.8 million hectares), India (4 million hectares)
Producers	2014: 2,3 million producers (1999: 200,000 producers)	India (650000; 2013), Uganda (190552), Mexico (169703; 2013)

Continuation of table 3.7

1	2	3
The size of the organic market	2014: 80 billion US dollars (1999: 15.2 billion US dollars)	The United States ($ 35.9 billion; € 27.1 billion), Germany ($ 10.5 billion; € 7.9 billion), France ($ 6.8 billion) and 4.8 billion euros)
Consumption of organic products per person	2014: 11 dollars United States (14 euros)	Switzerland (221 euros), Luxembourg (164 euros), Denmark (162 euros)
Number of countries that have legislation on organic production	2015: 87 countries	

Thus, there is high competition in the organic market, new competitors are emerging, the area of organic land is increasing, but the share in the total area remains low. The share of arable land remains high. However, competition is intensifying with the advent of new producers, and the size of the organic market is expanding significantly, reaching billions. In developed countries, the consumption of organic matter is increasing, which contributes to the demand for quality products. Competition is also intensified by the legislative regulation of the organic produce market. Table 3.8 summarizes the key indicators of the organic market in the world in 2017.

So, more and more countries are getting product certification. Organic agriculture around the world is gaining momentum, the proportion of land under organic farming is growing again, but with the advent of new producing countries, the proportion of wild animals is increasing. The number of producers of products and the volume of the market are growing rapidly. At the same time consumption increases again. All these conditions will contribute to the development of the organic market and competition, and accordingly the presence of barriers to entry into the industry. Therefore, it is important not to waste time on implementing reforms. In 2016, 283 Ukrainian organic enterprises were entitled to export to the EU markets (103 food producers, 180 inedible products).

Table 3.8

Key indicators of the world market of organic products in 2017p.

Indicators	World	Leading countries
Countries with data on certified organic agriculture	2015: 179 countries	New countries: Brunei Darussalam, Cabo Verde, Hong Kong, Kuwait, Monaco, Sierra Leone, Somalia
The total area of land occupied by organic agriculture, ha	2015: 50,9 million ha (1999: 11 million ha)	Australia (22.7 million hectares), Argentina (3.1 million hectares), United States (2 million hectares)
Share of organic agricultural lands in the total area of agricultural lands,%	2015: 1,1 %	Liechtenstein (30.2 %), Austria (21.3 %), Sweden (16.9 %)
Land under wildflowers and other non-agricultural lands, %	2015: 39, 7 million ha (1999: 4.1 million ha)	Finland (12.2 million hectares), Zambia (6.6 million hectares), India (3.7 million hectares),
Producers	2015: 2,4 million (1999: 200 000 producer)	India (585,200 producer), Ethiopia (203,602 producer), Mexico (200,039 producer)
Organic market	2015: 81.6 billionUS dollars (approximately 75 billion euros) (2000: 17.9 billion US dollars)	USA (39.7 billion US dollars or 35.8 billion euros), Germany (9.5 billion US dollars or 8.6 billion euros), France (US $ 6.1 billion or EUR 5.5 billion)
Consumption per person	2015: 11.1 US dollars (10.3 euros)	Switzerland (USD 291 or EUR 262), Denmark (USD 212 or EUR 191), Sweden (USD 196 or EUR 172)
Number of countries with legislation in the field of organic production	2016: 87 countries	

The 1.69 thousand Ukrainian farms were granted the right to supply their products to foreign markets, of which 734 were food producers. As a result of fruitful cooperation between the state and business, the geography of export of Ukrainian products will expand, the number of enterprises that will be eligible to export to international markets will increase. At present, the number of Ukrainian enterprises that have received the right to supply their products to the world markets is 1693 units. Export of production is envisaged for 280 producers of meat, meat products, 96 producers of fish, 198 producers of milk, 66 producers of honey, 64 egg producers. Also, the list of enterprises that can export animal food products includes producers of mayonnaise and sauces, gelatine, and shellfish. So we can talk about the extraordinary variety of agricultural products.

According to the results of 2016, exports of Ukrainian agricultural products increased by 4.5 % compared to 2015 and amounted to $ 15.5 billion (42.5 % of all Ukrainian exports). The main export products have traditionally been cereals, vegetable oil and oilseeds, soybeans, sugar and meat. The key markets were Asian countries (45.9 % of exports, $ 7 billion), the European Union (27.5 %, $4.2 billion), Africa (15.7 %, $2.4 billion), the CIS (7.7 %, $ 1.2 billion), and the United States (0.9 %, $ 45 billion) [30]. This reaffirms the great potential of Ukrainian agroindustrial complex in exporting products and proves its competitiveness.

For full-fledged trade with the EU Ukraine needs to switch to European standards of production. However, in order for products to be recognized abroad, the state must not only adopt new technical standards, but also create a full-fledged non-corruption system of certification and quality control. The path to the European Union for Ukraine lies not only through the harmonization of existing legislation and the adoption of missing regulations. One of the points of the Association Agreement is to bring the technical regulations of production of products in Ukraine to European standards. This means that for ten years our country is obliged to abandon the old methods of production that have survived from the Soviet times. Just like the newer ones, which do not meet the European standards. Reform of the technical regulation

sphere will allow Ukrainian manufacturers to open the way to world markets, which is difficult for most companies to find today. The consumer will receive higher quality goods made according to European standards, but in Ukraine. However, the transition process will take a long time. And the degree of inconvenience will depend on how effectively the state can provide work to abolish the old and adopt new standards. Last but not least, that of the controlling and conformity assessment bodies so that foreign partners are confident in the Ukrainian quality control system [21]. Therefore, the effectiveness of the Ukrainian government and its assistance in the implementation of projects and laws, in this case, become decisive factors for changes in the agroindustrial complex.

The government adopted a decision to cancel the old state standard of Ukraine ("GOST") in December 2014. At that time, Ukraine intended to abandon the Soviet standardization system and switch to European standards by 2016. In January 2015, the Verkhovna Rada passed a law on the adaptation of Ukrainian legislation to European Union rules in the field of technical regulations and conformity assessment. And the Ministry for Development of Economy, Trade and Agriculture of Ukraine provided an estimate of 15000 standards ("GOST") to be abandoned (standards developed before 1992). At the same time, since the beginning of 2014, 860 harmonized standards have been adopted [21]. According to the government program, in 2016, its institution has to harmonize one thousand Euro standards. In order to avoid collapse in the activity of enterprises, all standards should be implementted gradually without interfering with the functioning of companies. Therefore, the choice of step-by-step implementation and change of legislation in the field of standardization by January 1, 2019 was the right one.

An important area for improving organic production creating an effective and efficient legal field that meets EU requirements. The Cabinet of Ministers of Ukraine approved the Resolution No. 587 of August 31, 2016 "On Approval of Detailed Rules for the Production of Organic Products (Raw Materials) of Vegetable Origin". The Rules approved by a

government decree established the requirements for the production of organic products of plant origin, determined the agro-technological features during its production. The basis for the production of organic agricultural products – exclusion from the manufacturing process of the use of chemical fertilizers, genetically modified organisms, pesticides, their derivatives, products made from genetically modified organisms or preservatives. Today, it also causes poor quality and compliance with European requirements.

During the production of organic products, the general rules for the production of organic products (raw materials) rope origin in accordance with the requirements of the Law of Ukraine "On production and circulation of organic agricultural products and raw materials", taking into account the requirements established by these Regulations. The decree came into force on 16 September 2016 [15]. This Resolution is an example of compliance with the EU legislation regarding the safety of organic production. That is, in fact, the first steps in implementing legislation on the organic produce market have already been made. In the future, it is necessary to monitor the effectiveness of the mechanisms created by approving regulations and laws in the field of organic market regulation, to improve problem areas and introduce new rules.

It is advisable to further improve the legal framework that would promote organic production and be clear to ordinary farmers, transparent and stimulate the export of agricultural products. For example, it is important to introduce an e-administration [232, 234] procedure in the area of obtaining licenses and permits for organic exports, which would facilitate the conduct of organic market businesses.

Therefore, it is essential to identify the main goals of the development of the agricultural market stimulation, which will not change as a result of changes in government structures. According to the goals, to prescribe the directions of the market development and to use the appropriate tools on that basis. Competitiveness can only be ensured by the quality and safety of products, the rational use and expansion of land, the gradual implementation of changes for each sub-sector. The enterprise research will stimulate investments and ensure their coop-

eration with foreign companies, creating prerequisites for attracting qualified personnel. The needs of each agribusiness sector must be clearly understood and the instruments in each market should be used in the form of grants, financing, cost reimbursement and interest on loans.

In this case, it is necessary to set the following basic goals in order to formulate an effective agrarian policy of promoting exports: diversify the commodity structure of agricultural exports by increasing the share of value-added products (processed food); diversify geographic export markets for agro sustainable production by opening up new markets and expanding the nomenclature supplied to certain countries; expand the range of exporters of food and agricultural products by increasing the number of small and medium-sized producers and processors capable of exporting; to increase the level of competitiveness of producers and processors in order to enter the foreign market.

Therefore, the main competitive advantages in the Ukrainian agricultural market are the growing EU demand for products, including organic production, the lack of opportunities to expand acreage to organic products in EU countries, and at the same time the opportunity to expand such areas in Ukraine, quality and compliance of Ukrainian products with EU standards, the possibility of expanding organic production in Ukraine, filling niche industries, and exporting to EU countries certain product groups, such as birch sap, Ukrainian agricultural market appeal to different groups of tori investor, opportunities to form a cluster farmers for different regions, promoting funding production outside investors. At the same time, in order to increase competitiveness, Ukraine needs to introduce a number of legislative changes [233, 235], invest in logistics facilities, develop transport infrastructure, invest in equipment that will improve the quality of products, and fight corruption.

3.3. Economic-mathematical modelling and forecasting of competitiveness level of agrarian sector of Ukraine under conditions of integration into European market

The estimation and forecasting of the level of competitiveness of the agrarian sector of Ukraine is based on the use of complex indicators characterizing each of its components, namely: production and economic, financial, spatial (table 3.9).

To solve this problem, we propose to use new-type economic and mathematical models that allowed conducting problem-oriented search, analyze information, and provide factual information to the user in an accessible form. Currently, these problems are solved by applying modern methods of economic and mathematical modeling, namely the theory of fuzzy sets.

To develop an economic and mathematical model for assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine, we propose to use the most modern mathematical apparatus – the theory of fuzzy logic, which is successfully used in other fields of human activity [159, 228, 223]. The theory of fuzzy logic in technical systems was investigated by L. Zade [56], O. Rothstein [157], O. Kozachko, S. Shtovba [136] and others.

Table 3.9

Classification of factors influencing the level of competitiveness of the agrarian sector of Ukraine

№	Indicator	Unit
1	2	3
Classification of production and economic factors (v)		
1.	Gross production volume of agroindustrial complex	billion UAH
2.	Number of enterprises in agroindustrial complex	points
3	Number of employed population in agroindustrial complex	thousand people
4.	Labor productivity of agroindustrial complex enterprises	UAH for 1 worker
5.	Activities profitability level of agroindustrial complex enterprises	%

Continuation of table 3.9

1	2	3
6.	Production quality level of agroindustrial complex (generalized)	points
Classification of financial factors (f)		
7.	Price indices of agroindustrial production	%
8.	Net profit of agroindustrial complex enterprises	UAH million
9.	Capital investment in agroindustrial complex	UAH million
10.	Inflation level in Ukraine	%
Classification of spatial factors (p)		
11.	Social space development level in agroindustrial complex	points
12.	Level of information and cyberspace development in agroindustrial complex	points
13.	Level of infrastructure development in agroindustrial complex	points
14.	The level of innovative technologies application in agroindustrial complex	points
15.	The level of economic sustainability of Ukraine	points
16.	The level of political sustainability of Ukraine	points
17.	Level of international impact on development of agroindustrial complex	points

We propose to address the works of S. Kozlovskyi, who first applied fuzzy logic theory to describe economic processes and develop effective economic and mathematical models based on it [81–92]. The followers of the theory of fuzzy sets in Ukraine were A. Matviychuk [115], J. Herasymenko [83], G. Pchelyanska [84], V. Kozlovskyi [91], H. Kaletnik [67], O. Baltremus [81], and others, however, it is proposed for the first time to model and predict the level of competitiveness of the agrarian sector of Ukraine. Advantages of fuzzy logic theory over other mathematical methods are given in [83, p. 53], which once again confirms the effectiveness of using the theory of fuzzy logic to solve the given problem of this work.

The general methodology of modelling based on the theory of fuzzy logic implies the gradual solution of the following tasks [91]: identification of the main factors of influence that characterize the competi-

tiveness of the agrarian sector of Ukraine; formalizing the relationships between the factors of influence in a generalized form; identifying and formalizing linguistic assessments of impact factors; building a fuzzy knowledge base that identifies relationships between factors of influence; inference of fuzzy logical equations based on linguistic assessments and fuzzy knowledge base; optimization of fuzzy model parameters. The basic principles of fuzzy set theory and fuzzy logic, which are needed for further study, are given in Appendix Q.

Considering the need to comply with the basic principles of modelling the level of competitiveness of the agrarian sector of Ukraine and the current conceptual apparatus of fuzzy logic theory, the input parameters of the model for assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine will be indicators summarized in table 3.10 [236].

Table 3.10

Input factors (variables) of the model and their linguistic assessment

Input parameter	Name of the input parameter (variable)	Input parameter change range	Linguistic evaluation of input parameters (terms)
1	2	3	4
x_1	Gross production volume of agroindustrial complex	200-900 billion UAH	Low, 200-300, (H) Medium, 300-700, (C) High, 700-900 (B)
x_2	Number of enterprises in agroindustrial complex	10-100 thousand units	Low, 10-30, (H) Medium, 30-50, (C) High, 50-100, (B)
x_3	Number of employed population in agroindustrial complex	0,5-7 million people	Low, 0,5-2, (H) Medium, 2-4, (C) High, 4-7, (B)
x_4	Labor productivity of agroindustrial complex enterprises	100-800 thousands UAH per 1 worker	Low, 100-200, (H) Medium, 200-400, (C) High, 400-800, (B)
x_5	Activities profitability level of agroindustrial complex enterprises	0-100%	Low, 0-20, (H) Medium, 20-50, (C) High, 50-100, (B)
x_6	Production quality level of agroindustrial complex (generalized)	0-100 points	Low, 0-30, (H) Medium, 30-60, (C) High, 60-100, (B)

Continuation of table 3.10

1	2	3	4
x_7	Price indices of agroindustrial production	0-100 %	Low, 100-105, (H) Medium, 105-110, (C) High, 110-130, (B)
x_8	Net profit of agroindustrial complex enterprises	10-200 billion UAH	Low, 10-30, (H) Medium, 30-60, (C) High, 60-200, (B)
x_9	Capital investment in agroindustrial complex	5-100 billion UAH	Low, 5-30, (H) Medium, 30-60, (C) High, 60-100, (B)
x_{10}	Inflation level in Ukraine	1-50%	Low, 1-3, (H) Medium, 3-8, (C) High, 8-50, (B)
x_{11}	Social space development level in agroindustrial complex	0-100 points	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)
x_{12}	Level of information and cyberspace development in agroindustrial complex	0-100 points	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)
x_{13}	Level of infrastructure development in agroindustrial complex	0-100 points	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)
x_{14}	The level of innovative technologies application in agroindustrial complex	0-100 points	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)
x_{15}	The level of economic sustainability of Ukraine	0-100 points	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)
x_{16}	The level of political sustainability of Ukraine	0-100 points	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)
x_{17}	Level of international impact on development of agroindustrial complex	0-100 points	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)

To establish hierarchical links between the factors influencing the level of competitiveness of the agrarian sector of Ukraine, it is advisable to group them into the following groups (according to table 3.10): production and economic (*v*); financial (*f*); spatial (*p*). These groups of influencing factors in the form of "output tree" are shown in fig. 3.2–3.4.

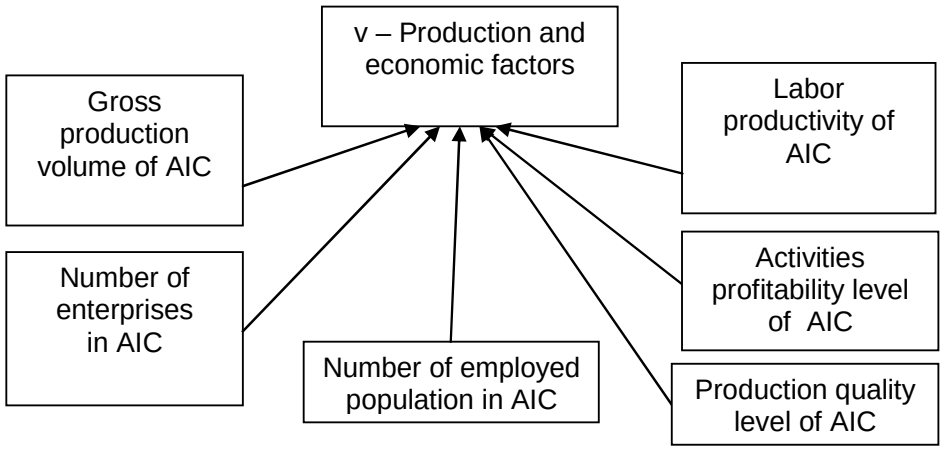

Figure 3.2 – Classification of production and economic factors

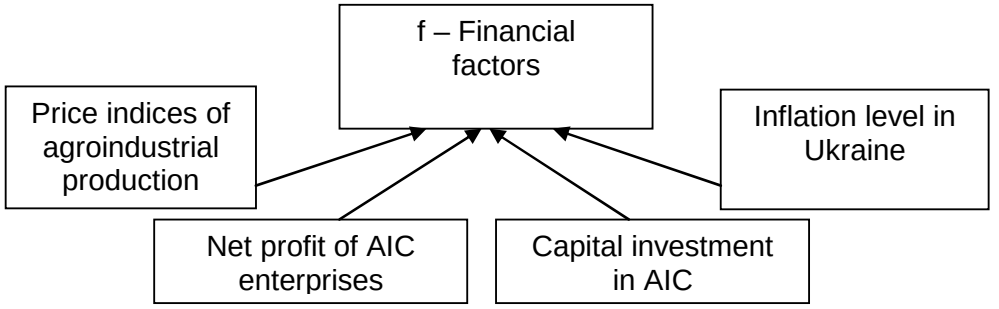

Figure 3.3 – Classification of financial factors

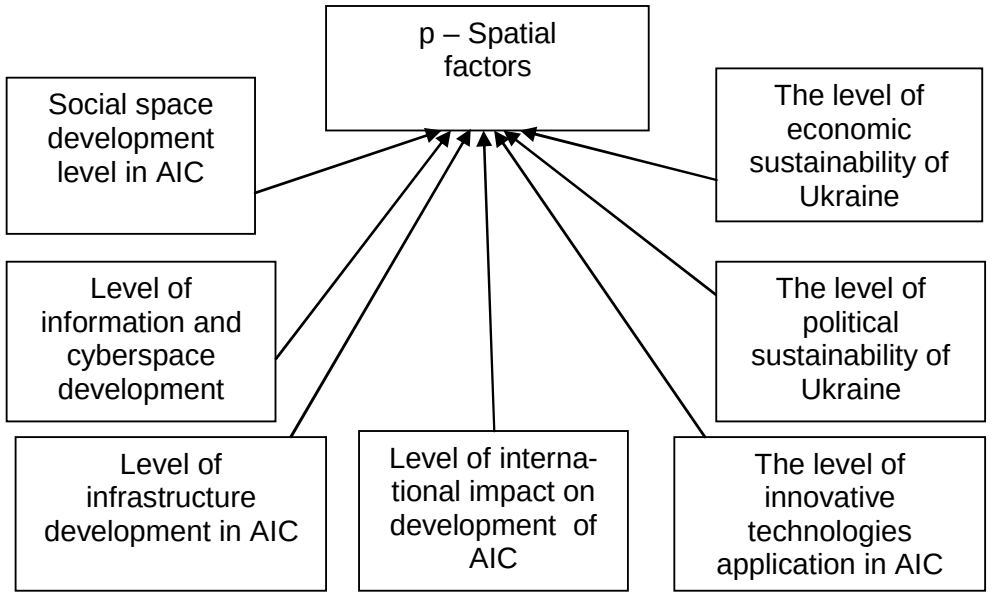

Figure 3.4 – Classification of spatial factors

Using the block diagrams shown in fig. 3.2–3.4, denote the linguistic variables of factors *v*, *f*, *p* using the following relations:

$$\mathrm{v} = \mathrm{f_v}(\mathrm{x_1}, \mathrm{x_2}, \mathrm{x_3}, \mathrm{x_4}, \mathrm{x_5}, \mathrm{x_6}), \tag{3.1}$$

$$\mathrm{f} = \mathrm{f_e}(\mathrm{x_7}, \mathrm{x_8}, \mathrm{x_9}, \mathrm{x_{10}}), \tag{3.2}$$

$$\mathrm{p} = \mathrm{f_p}(\mathrm{x_{11}}, \mathrm{x_{12}}, \mathrm{x_{13}}, \mathrm{x_{14}}, \mathrm{x_{15}}, \mathrm{x_{16}}, \mathrm{x_{17}}), \tag{3.3}$$

where $x_1 \ldots x_6$ – production and financial factors; $x_7 \ldots x_{10}$ – financial factors; $x_{11} \ldots x_{17}$ – spatial factors.

The initial value, i.e. the level of competitiveness of the agrarian sector of Ukraine, can be determined by the formula (3.4):

$$\mathrm{K} = \mathrm{f_K}(\mathrm{v}, \mathrm{f}, \mathrm{p}, \mathrm{t}), \tag{3.4}$$

where *v*, *f*, *p* and *t* – linguistic variables that describe, respectively, production and economic, financial, spatial factors of influence and the forecasting period. Forecasting period t further will be encoded with two characters according to the pattern: (*6M*, *1R*, *2R*, *3R* where the letters *M* and *R* denote the month and year).

Using expert advice [133] and according to the specific economic situation in the agrarian sector, the level of competitiveness of the agrarian sector of Ukraine can be characterized by the following levels (on a scale from "0" to "100"):

- K_1 (85-100) – High competitiveness grade (class 1);
- K_2 (66-84) – Medium competitiveness grade (class 2);
- K_3 (51-65) – Satisfactory competitiveness grade (class 3);
- K_4 (31-50) – Unsatisfactory competitiveness grade (class 4);
- K_5 (0-30) – No competitiveness (class 5).

Table 3.1 shows the universal sets and estimation terms of the factors of influence $x_1 \ldots x_{17}$, and the estimation of the generalized indicators *v*, *f*, *p* is carried out on a single scale with a range from "0" to "100" points (table. 3.11).

Table 3.11

Generalized input indicators and their linguistic evaluation

Indicator	Indication	Inputs	Inputs linguistic evaluation (terms)
Production and economic factors	v	x1…x6	Low, 0-30, (H) Medium, 30-60, (C) High, 60-100, (B)
Financial factors	f	x7…x10	
Spatial factors	p	x11…x17	
Status determination period (or forecasting)	t	t	t_1=6 months; t_2=12 months; t_3=12 months; t_4=36months

The structure of the economic model for assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine will be presented in the form of the so-called "logical conclusion tree". The tree of logical conclusion is a graph that shows the logical relationships between the forecast indicator *K* and the factors $\{x_1…x_{17}\}$ that affect this forecast indicator *K* in compliance with the relations given in formulas (3.1)–(3.3). The structural model for assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine will be as shown in fig. 3.5.

The vertices of the "logical inference tree" are interpreted as follows: the root of the tree f_K - corresponds to the level of competitiveness of the agrarian sector of Ukraine; terminal vertices $x_1…x_{17}$ are the corresponding factors of influence; nonterminal vertices f_v, f_f, f_p (double circles) are a set of partial factors of influence in their set. Terminal and nonterminal vertices of the "logical" conclusion tree are linguistic variables of the universal set, which are given in table 3.1 and table 3.2.

It should be noted that when building the model, we operated with input quantitative and input qualitative parameters simultaneously. The input parameters $\{x_1…x_5, x_7…x_{10}\}$ are quantitative, and statistics were used to describe them; parameters $\{x_6, x_{11}…x_{17}\}$ – qualitative, so to describe them used a score scale from "0" to "100" points.

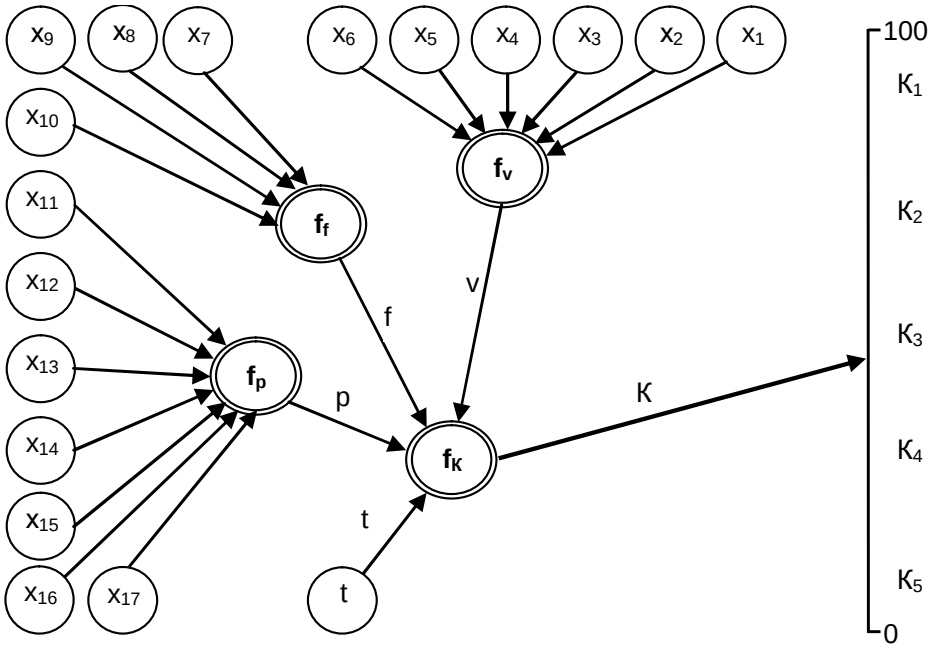

Figure 3.5 – Structural model for assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine

Since the theory of fuzzy sets involves determining the levels (terms) of changes in the initial indicator, according to our model, we obtained three initial indicators, for the evaluation of which fuzzy terms are used with the scales given in table 3.11. Each term is given by a fuzzy set with a corresponding membership function.

To describe the terms, we use the method described in [91]. The terms are given in the form of fuzzy sets, using the model of the membership function (MF):

$$\mu^{T}(x) = \frac{1}{1 + \left[\frac{x - b}{c}\right]^{2}}, \tag{3.5}$$

where *b* and *c* are the parameters of the membership function (MF); *b* is the coordinate of the maximum of the function; *c* is the coefficient of tensile concentration. The values of the coefficients *b* and *c* for the variables x_1 and x_{17}, *v*, *f*, *p*, *K* are given in table 3.12

Table 3.12

Values of parameters *b* and *c* of membership functions variables $x_1 \ldots x_{17}$, *v*, *f*, *p*, *K*

Input parame-ter	Name of the input parameter (variable)	Linguistic evaluation of input parameters (terms)	b	c
1	2	3	4	5
x_1	Gross production volume of agroindustrial complex	Low, 200-300, (H) Medium, 300-700, (C) High, 700-900 (B)	220 350 800	100 150 120
x_2	Number of enterprises in agroindustrial complex	Low, 10-30, (H) Medium, 30-50, (C) High, 50-100, (B)	15 40 75	20 30 25
x_3	Number of employed population in agroindustrial complex	Low, 0,5-2, (H) Medium, 2-4, (C) High, 4-7, (B)	1 3 5	2 3 2
x_4	Labor productivity of agroindustrial complex enterprises	Low, 100-200, (H) Medium, 200-400, (C) High, 400-800, (B)	150 300 600	100 180 150
x_5	Activities profitability level of agroindustrial complex enterprises	Low, 0-20, (H) Medium, 20-50, (C) High, 50-100, (B)	10 35 75	10 25 20
x_6	Production quality level of agroindustrial complex (generalized)	Low, 0-30, (H) Medium, 30-60, (C) High, 60-100, (B)	15 45 80	10 15 20
x_7	Price indices of agroindustrial production	Low, 100-105, (H) Medium, 105-110, (C) High, 110-130, (B)	102 107 120	12 12 15
x_8	Net profit of agroindustrial complex enterprises	Low, 10-30, (H) Medium, 30-60, (C) High, 60-200, (B)	15 45 140	30 50 65
x_9	Capital investment in agroindustrial complex	Low, 5-30, (H) Medium, 30-60, (C) High, 60-100, (B)	15 45 80	20 25 20
x_{10}	Inflation level in Ukraine	Low, 1-3, (H) Medium, 3-8, (C) High, 8-50, (B)	2 6 25	3 10 20

Continuation of table 3.12

1	2	3	4	5
x_{11}	Social space development level in agroindustrial complex	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)	15 45 75	20 25 20
x_{12}	Level of information and cyberspace development in agroindustrial complex	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)	15 45 75	20 25 20
x_{13}	Level of infrastructure development in agroindustrial complex	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)	15 45 75	20 25 20
x_{14}	The level of innovative technologies application in agroindustrial complex	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)	15 45 75	20 25 20
x_{15}	The level of economic sustainability of Ukraine	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)	15 45 75	20 25 20
x_{16}	The level of political sustainability of Ukraine	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)	15 45 75	20 25 20
x_{17}	Level of international impact on development of agroindustrial complex	Low, 0-30, (H) Medium, 31-60, (C) High 61-100, (B)	15 45 75	20 25 20
v,f,p	Production and economic, financial, spatial factors	Low, 0-30, (H) Medium, 30-60, (C) High, 60-100, (B)	15 45 75	20 25 20
K	The level of competitiveness of the agrarian sector of Ukraine	1 class, (1) 2 class, (2) 3 class, (3) 4 class, (4) 5 class, (5)	90 70 60 40 15	10 12 15 20 25

The choice of the membership function of this type (formula 3.5) is due to the fact that this function is quite flexible and simple, as it is set by only two parameters, and is more convenient for further debugging of the model.

Linguistic estimates of the input parameters of membership functions are given in table 3.12, and their graphs for all x_i variable factors

of influence and generalized input indicators *v*, *f*, *p*, *K* are shown in fig. R.1–R.12 of Appendix R.

The next step in modelling the level of competitiveness of the agrarian sector of Ukraine is to compile a hierarchical knowledge base. To build the knowledge base we used information obtained from specialists of the Department of Agricultural Development, the Department of Regional Economic Development of Vinnytsia Regional State Administration and the Main Department of Statistics in Vinnytsia region, as well as factual information of central executive bodies of Ukraine and information of specialists in this field.

Let`s consider the relation (3.4). To assess the value of linguistic variables that show the causal relationship between the level of competitiveness of the agrarian sector of Ukraine *K* and production-economic, financial, spatial factors, we use the system of term sets, which is given in table. 3.10. Then the knowledge base for the variable *K*, which characterizes the level of competitiveness of the agrarian sector of Ukraine, will have the form given in table 3.13.

Table 3.13

Knowledge base of variable *K*

v	f	p	t	K	w
H	H	H	t_1	K_5	w_1
H	C	C	t_2	K_5	w_2
C	H	C	t_4	K_5	w_3
H	C	H	t_2	K_4	w_4
C	C	H	t_3	K_4	w_5
C	H	C	t_1	K_4	w_6
C	C	C	t_4	K_3	w_7
B	H	C	t_1	K_3	w_8
B	H	B	t_2	K_3	w_9
C	B	C	t_3	K_2	w_{10}
B	C	C	t_2	K_2	w_{11}
B	B	B	t_1	K_2	w_{12}
B	B	B	t_3	K_1	w_{13}
B	C	B	t_4	K_1	w_{14}
C	B	B	t_2	K_1	w_{15}

It is known that each rule of the knowledge base is a statement "IF-THEN". Rules that have the same output parameter are combined in

the rows of the table by the logical statement "OR". The weight of the rule w expresses the subjective confidence of the expert in this rule. At the stage of forming the structure of the fuzzy weight model of all the rules of the knowledge base we take equal units [68, 6, 221]. To implement a fuzzy inference, it is necessary to make the transition from logical statements to fuzzy logical equations [158, 154]. Such equations can be obtained by replacing linguistic values with the values of membership functions, and operations "AND" and "OR" – fuzzy logical operations of intersection $\wedge$ and union $\vee$. The weight of the rules in the knowledge base is taken into account by multiplying the fuzzy expression corresponding to each line of the knowledge base by the corresponding weight value.

Then given in table 3.13 the following vague logical equations will correspond to the linguistic statement (see formulas 3.6–3.10):

$$\begin{aligned}\mu^{\text{К}_5}(\text{К}) = {} & w_1 \cdot [\mu^{\text{Н}}(v) \cdot \mu^{\text{Н}}(f) \cdot \mu^{\text{Н}}(p) \cdot \mu^{t_1}(t)] \vee \\ & w_2 \cdot [\mu^{\text{Н}}(v) \cdot \mu^{\text{С}}(f) \cdot \mu^{\text{С}}(p) \cdot \mu^{t_2}(t)] \vee \\ & w_3 \cdot [\mu^{\text{С}}(v) \cdot \mu^{\text{Н}}(f) \cdot \mu^{\text{С}}(p) \cdot \mu^{t_4}(t)];\end{aligned} \tag{3.6}$$

$$\begin{aligned}\mu^{\text{К}_4}(\text{К}) = {} & w_4 \cdot [\mu^{\text{Н}}(v) \cdot \mu^{\text{С}}(f) \cdot \mu^{\text{Н}}(p) \cdot \mu^{t_2}(t)] \vee \\ & w_5 \cdot [\mu^{\text{С}}(v) \cdot \mu^{\text{С}}(f) \cdot \mu^{\text{Н}}(p) \cdot \mu^{t_3}(t)] \vee \\ & w_6 \cdot [\mu^{\text{С}}(v) \cdot \mu^{\text{Н}}(f) \cdot \mu^{\text{С}}(p) \cdot \mu^{t_3}(t)];\end{aligned} \tag{3.7}$$

$$\begin{aligned}\mu^{\text{К}_3}(\text{К}) = {} & w_7 \cdot [\mu^{\text{С}}(v) \cdot \mu^{\text{С}}(f) \cdot \mu^{\text{Н}}(p) \cdot \mu^{t_4}(t)] \vee \\ & w_8 \cdot [\mu^{\text{В}}(v) \cdot \mu^{\text{Н}}(f) \cdot \mu^{\text{С}}(p) \cdot \mu^{t_1}(t)] \vee \\ & w_9 \cdot [\mu^{\text{В}}(v) \cdot \mu^{\text{Н}}(f) \cdot \mu^{\text{В}}(p) \cdot \mu^{t_2}(t)];\end{aligned} \tag{3.8}$$

$$\begin{aligned}\mu^{\text{К}_2}(\text{К}) = {} & w_{10} \cdot [\mu^{\text{С}}(v) \cdot \mu^{\text{В}}(f) \cdot \mu^{\text{С}}(p) \cdot \mu^{t_3}(t)] \vee \\ & w_{11} \cdot [\mu^{\text{В}}(v) \cdot \mu^{\text{С}}(f) \cdot \mu^{\text{С}}(p) \cdot \mu^{t_2}(t)] \vee \\ & w_{12} \cdot [\mu^{\text{В}}(v) \cdot \mu^{\text{В}}(f) \cdot \mu^{\text{В}}(p) \cdot \mu^{t_1}(t)];\end{aligned} \tag{3.9}$$

$$\begin{aligned}\mu^{\text{К}_1}(\text{К}) = {} & w_{13} \cdot [\mu^{\text{В}}(v) \cdot \mu^{\text{В}}(f) \cdot \mu^{\text{В}}(p) \cdot \mu^{t_3}(t)] \vee \\ & w_{14} \cdot [\mu^{\text{В}}(v) \cdot \mu^{\text{С}}(f) \cdot \mu^{\text{В}}(p) \cdot \mu^{t_4}(t)] \vee \\ & w_{15} \cdot [\mu^{\text{С}}(v) \cdot \mu^{\text{В}}(f) \cdot \mu^{\text{В}}(p) \cdot \mu^{t_2}(t)].\end{aligned} \tag{3.10}$$

The values of the degrees of membership functions in equations (3.6)–(3.10) are determined by fuzzy knowledge bases that characterize the production and economic, financial, spatial factors of influence.

Fuzzy knowledge bases of these indicators and their fuzzy logical equations are given in Appendix S.

Fuzzy logical equations (3.6)–(3.10) are a mathematical implementation of the model for assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine.

The defasification procedure is the last stage of modelling and is the inverse transformation of the found fuzzy logical statement (conclusion) into the initial estimation or prediction parameter to be modelled and predicted. There are different methods of defasification, the choice and application of which depends on the object of modelling [91, 157].

Based on the characteristics of the modelling object and the nature of the output parameter, to solve logical equations, we choose the method of defasification, which is called "extended centre of gravity method" [158, 159]. In this case, to determine the "centre of gravity" you need to artificially expand the range of the output parameter (variable). The centre of gravity will be the value of the abscissa, which determines the position "centre of gravity", which lies below the graph of its membership function.

In our case, when the output parameter (variable) has "n" terms, the calculation of the centre of gravity is reduced to solving equation 3.11:

$$K = \frac{\sum_{i=1}^{n}\left[K_E+(i-1)\cdot\frac{K_A-K_E}{n-1}\right]\cdot\mu^{K_i}}{\sum_{i=1}^{n}\mu^{K_i}} \qquad (3.11)$$

where n – number (discrete values) of variable terms "K";

$K_E(K_A)$ – lower (upper) limit of the range of the variable «K»;

μ^{Ki} – function of belonging of the variable "K" to a fuzzy term "K_i".

In the mathematical package Matlab 6.1 [227] an experiment was performed using the above methods. In fig 3.6 shows the results of assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine until 2025. The results were obtained on the basis of the analysis of the values of factors of influence (development) for 2012–2018.

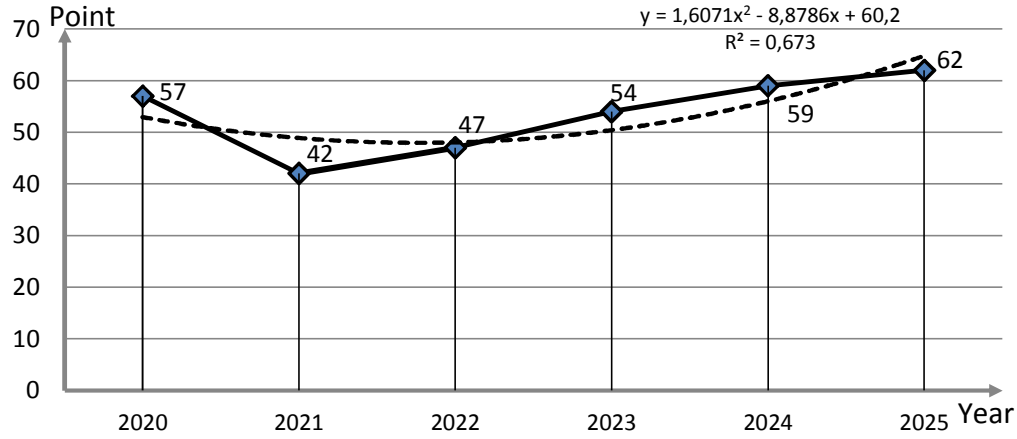

Figure 3.6 – Assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine

Analysing the results of modelling the level of competitiveness of the agrarian sector of Ukraine for 2020–2025, we can make the following forecast: in 2020, the level of competitiveness of the agrarian sector of Ukraine will be assigned to class 3 – "satisfactory level of competitiveness". In 2021–2022, the projected level of competitiveness of the agrarian sector of Ukraine will deteriorate to grade 4 – "unsatisfactory level of competitiveness". From 2023–2025 there is a tendency to increase the level of competitiveness of the agrarian sector of Ukraine and classify it as 3. Based on the modelling, it is determined that it is important to implement comprehensive measures aimed at increasing the level of institutional support for the competitiveness of the agrarian sector of Ukraine in order to reduce the negative effects of fluctuations in world economic conditions.

In order to improve the reliability of the forecast of the level of competitiveness of the agrarian sector of Ukraine, it is necessary to optimize (adjust) this model, but this task is beyond the scope of this study. As noted earlier, the advantage of economic and mathematical models based on fuzzy logic is the ability to use the input parameters of linguistic statements (conclusions) by experts, which largely compensates for the lack of analytical dependencies between input and output parameters (changes) of prediction [149].

CONCLUSIONS

This study generalizes the theoretical propositions and elaborates practical recommendations for the development of competitiveness of the Ukrainian agrarian sector under conditions of integration into the European market. Summarizing the results of the study allowed us to formulate the following conclusions and make suggestions that are of considerable theoretical and practical importance.

On the basis of theoretical and methodological approaches to the analysis of the economic essence of competitiveness of the agrarian sector of Ukraine, it is determined that it is a complex of actions as a form of response to economically, socially and politically significant factors of influence of endogenous and exogenous environment in the conditions of integration into the European market and the turbulence of world processes, which becomes the catalyst for the speed of movement of money, capital, information, innovation, scientific knowledge and technology. Research and generalization of the main interpretations of the concept of competitiveness established that it lies in the ability of the entity to ensure the sustainable development of its activities in the current and long term, and its level results in the value of the main types of agroindustrial products per capita, their positive and creating conditions for sustainable development of the national economic system.

In today's dynamic markets, it has been proved that an important determinant of the competitiveness of economic systems is the ability to respond quickly to changes in the external and internal environment. The concept of innovative competitiveness of the national economy, based on the adoption of effective production, marketing and financial strategies, is characterized. The analysis of the research results confirmed that innovations intensify competition and contribute to the strengthening of market dynamics. The determinants of the competitiveness of the national economy are determined, taking into account the fundamental characteristics of the business environment, specific elements of the macroeconomic policy of the state to ensure innova-

tion development and scientific and technological progress, cluster approach to analysis of production capacities of national producers in the context of globalization processes and transformational transformations. Competitiveness is presented as a set of institutions and factors that determine the level of productivity of the country's economy.

In order to increase the ability of export of products of the national agroindustrial complex of Ukraine in the international markets and to have a positive impact on food security, modern conceptual approaches to the concept of "Smart Competitiveness" of the agrarian sector of Ukraine ("Smart Competitiveness"), which can be implemented through regulation, have been formed and control of the rules of functioning of economic entities in the agricultural market. The expediency of realization of the following directions within the framework of control over the components of the block is substantiated: land reform, harmonization of legislation, ensuring of food safety, quality and safety of foodstuffs, compliance of sanitary and phytosanitary norms, support of small and medium agricultural business. The necessity of improvement of the legislation, introduction of innovations, state support and use in the production of modern measures to achieve competitiveness in the agrarian market have been determined. Such actions should be comprehensive and should be carried out within clearly defined timeframes.

Methodological bases of estimation of the level of the international competitiveness of the agrarian sector of Ukraine are systematized, which make it possible to increase the efficiency of determining the competitive advantages of national producers on the basis of a complex analysis of internal and external factors of competitiveness, the links between them, characteristics of institutional support for the functioning of markets openness of economic systems. In order to effectively evaluate the competitiveness to be verified, it is necessary to use a whole set of analytical, statistical and graphical indicators that will reflect the processes taking place in the market. Therefore, only an integrative combination of methods, techniques and principles of competitiveness assessment will be able to accurately reflect the situation

in the competitive market and identify priority areas for improvement systems of regulation of agroindustrial complex. Conducting PESTEL-analysis and combining it with the results of SWOT-analysis made it possible to form a conceptual basis for the development of relevant organizational and economic measures both by the management of the enterprises operating in the organic produce market and the state authorities in order to increase the competitive advantages of the national agroindustrial complex.

Approaches to the formation of a factor system of affecting the competitiveness of the agrarian sector of Ukraine have been developed, which will allow ensuring a qualitative level of management of competitive advantages at all stages of production. It is revealed that ensuring the competitiveness of the agrarian sector of Ukraine involves determining the competitive advantages of producers by analysing and managing the elements of their production, resource, raw materials, innovation, investment, scientific, export-import, organizational and structural potential. Characterization of the basic elements and mechanisms of improving the functional structure of comparative advantages has been carried out, which will allow increasing the level of competitiveness of the agrarian sector of Ukraine both in the short and long term.

The experience of using elements of the institutional environment of the EU market is systematized, which will help to strengthen the effectiveness of national competitiveness management by improving the state planning and forecasting of the development of the agrarian sector of Ukraine, methods of tariff and non-tariff regulation, use of preferential regimes and sectoral support. Important in this case is the mechanism of functioning of the institutional environment of competitiveness, which has a direct impact on economic growth, investment decisions and organization of production, distribution of profits and costs for the implementation of programs and strategies for the country's development. The stages of the formation and development of the common agricultural policy of the EU are characterized, which is inextricably linked to the processes of integration of European economies

from simple to more complex forms – from the zone of preferential trade in foodstuffs to the common economic mechanism of regulation of the agrarian sector. It is determined that the architect of agrarian policy should shape the institutional conditions for the functioning of an effective mechanism for influencing economic competition, rural development, and improving the well-being of the population.

The conceptual bases of formation of the model of competitiveness of the agrarian sector of Ukraine are defined, based on the use of opportunities to grow, produce and sell goods that are more attractive in quality characteristics, do not pose a threat to the consumer, and in the technology of their production. They employ methods that reduce the negative impact on the environment of non-analogous goods, which will allow achieving a long-term positive effect of the functioning of the agricultural market of the country. The efficiency of the development of specialization, cooperation and agroindustrial integration processes is argued. It is stated that the improvement of the system of interconnections between all participants of the production process can occur provided that such a system of regulation, which through its mechanisms, would have an effective impact on the entire agroindustrial complex. The necessity of purposeful influence on the natural resource, innovative, investment, scientific, production, organizational, structural and export-import potential of competitiveness of the agrarian sector of Ukraine has been proved. It is advisable to diversify the management system of the agroindustrial complex adapted to real conditions, which provides opportunities for improving the level of well-being of the population through the effective use of the socio-economic potential of the country.

Provisions on the functioning of the institutional environment of the agricultural market are substantiated, which, taking into account the competitive advantages and harmonization of standards for agricultural products with the world ones, perfection of the system of assessment of compliance with the World Trade Organization criteria, will ensure effective interaction of economic and technological, regulatory and social levers and indicators of financial support for the agrarian

sector of Ukraine. It is determined that the functional interconnections of institutional actors such as agricultural and food producers, they provide the proper level of development of economic and social potential of the country and create preconditions for expanded reproduction and economic growth.

Using the general methodology of modelling on the basis of the theories of fuzzy logic, the following tasks were gradually solved: the main factors of influence, which reflect the competitiveness of the agrarian sector of Ukraine, were identified; formalizing the relationship between the factors of influence in a generalized form; identified and formalized linguistic impact factors; a fuzzy knowledge base that identifies relationships between factors of influence is built; fuzzy logical equations based on linguistic assessments and fuzzy knowledge base; fuzzy model parameters optimized. This allowed to develop an innovative model for assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine, which when using the input parameters of linguistic statements (conclusions) of experts significantly compensates for the lack of analytical relationships between input and output parameters (variables) of the forecast object. This model allows determining the level of competitiveness of the agrarian sector of Ukraine with a dynamic change of linguistic parameters of the model.

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Appendix A.
The essence of the category "competition"

Table A.1

Views on the definition of "competition"

Research	Features
A. Smith "Research on the nature and causes of the wealth of nations", 1776	
He considered competition – as a specific form of conscious action of market counterparties, aimed at achieving their own interests, namely – their rivalry. He called competition the engine of economic growth.	He studied the influence of competition on the pricing mechanism of goods, taking it as a basis for competition in the market. He did not deny the influence of supply and demand on competitive relations.
D. Ricardo "On the principles of political economy and taxation", 1817	
Competition is a path through which there is a "wealth of goods and a decrease in their exchange value, from which society will benefit".	He considered unlimited free competition, the principles of free trade. Competition is a decisive factor in pricing.
E. Chamberlin "Theory of monopolistic competition", 1933	
Competition is a situation in which control is offered over the supply of goods and their price, which is achieved by the presence of existing and potential goods – substitutes.	Considered monopolistic competition. Formed non-price factors of competition: quality, advertising, technological equipment and customer service.
P. Samuelson "Monopolistic competition revolution", 1966	
Competition is a complex mechanism of easy coordination of production through a system of prices and markets, and it combines knowledge and action millions of individuals.	Competition satisfies the first requirement – "Ability to survive".
M. Porter "Competition Strategy", 1980	
Competition is interpreted as a mechanism for regulating social production, as a form of mutual rivalry of market economy entities and as a process of promotion.	For the first time he put forward the idea of competition in the world market not of countries but of firms.
R. Campbell, R. McConnell "Economics", 1999	
Competition is the presence on the market of a large number of independent buyers and sellers, an opportunity to merchants and sellers are free to enter the market and leave it.	It was determined that competition is the main mechanism that regulates the capitalist economy. Competition encourages firms to use new production methods while reducing costs.

Appendix B.
The essence of the category "agroindustrial complex"

Table B.1

Approaches to defining the concept of agroindustrial complex

Cherevik N.V., Vitchenko M.V., Titarenko A.O.	– is a set of interconnected branches of the breed economy, united by a kind of objective function (providing the population with food and consumer goods of agricultural origin), which develop in accordance with the specific natural-geographical and socio-geographical features of the territory.
Land Code of Ukraine	– is a holistic economic system of interconnected industries, which provide the production of agricultural raw materials and food, their procurement, storage, processing and sale to the population.
Vorobyov E.M., Gela T.Y.	– is a large intersectoral entity, an organic part of the country's economy, which includes a set of industries linked by the process of reproduction, the main task of which is to ensure food security, optimal nutrition of the population of Ukraine, creating export potential of raw materials and food.
Economic dictionary of agroindustrial complex	– a set of industries, organizationally and economically united by the unity of goals and objectives for solving the food problem.
Kurilo V.I.	– a set of three groups of branches of the state economy: industries that produce machinery, fertilizers and other means of production for agriculture; agriculture itself; industries that provide processing, storage and sale of agricultural raw materials and manufactured products.

Appendix C.
The level of profitability of livestock production in Ukraine

Table C.1

The level of profitability of production livestock in agrarian enterprises of Ukraine in 2002-2018, %

Years	Agricultural products	Including						
		livestock products	particularly					
			beef	pork	sheep and goat meat	poultry meat	milk	eggs
2002	4,9	-19,8	-40,5	-16,9	-26,7	-1,1	-13,8	14,6
2003	12,6	-18,8	-44,3	-33	-37,8	11	9,9	18,5
2004	8,1	-11,3	-33,8	-14,4	-44,3	3,8	-0,4	15,2
2005	6,8	5	-25	14,9	-32,1	24,9	12,2	23,5
2006	2,8	-11	-38,4	-9,2	-34,3	12,1	-3,7	-6,8
2007	15,6	-13,4	-41	-27,6	-46,4	-19	13,8	9,1
2008	13,4	0,1	-24,1	0,3	-38,6	-11,3	4,1	13
2009	13,8	5,5	-32,9	12,1	-31,8	-22,5	1,4	13,1
2010	21,1	7,8	-35,9	-7,8	-29,5	-4,4	17,9	18,6
2011	27	13	-24,8	-3,7	-39,6	-16,8	18,5	38,8
2012	20,5	14,3	-29,5	2	-40	-7,2	2,3	52,6
2013	11,2	11,3	-43,3	0,2	-42,8	-10	13,6	47,6
2014	25,8	13,4	-35,9	5,6	-52,2	-15,4	11	58,8
2015	13,2	10,9	–17,9	12,7	–29,6	–6,1	12,6	60,9
2016	15,6	11,5	–24,8	–4,5	–35,2	5	18,2	0,5
2017	-	-	3,4	3,5	-39,6	7	26,9	-9
2018	-	-	-17,7	6,9	-16,6	5,7	16,1	5,4

Appendix D.
The level of crop production profitability in Ukraine

Table D.1

The level of crop production profitability agricultural enterprises of Ukraine for 2002-2018, %

Years	Agricultural products	Including					
		Plant products	particularly				
			grain	sun-flower seeds	sugar beet (farm produc-tion)	potatoes	vegeta-bles (outdoor soil)
2002	4,9	22,3	19,3	77,9	-8,6	24,2	8,9
2003	12,6	41,7	45,8	64,3	6,2	33,5	30,9
2004	8,1	20,3	20,1	45,2	-0,8	-0,7	-5
2005	6,8	7,9	3,1	24,3	4,8	17,8	16,1
2006	2,8	11,3	7,4	20,7	11,1	56,2	14,8
2007	15,6	32,7	28,7	75,9	-11,1	24,7	14,1
2008	13,4	19,6	16,4	18,4	7,1	7,9	11,1
2009	13,8	16,9	7,3	41,4	37	12,9	19,1
2010	21,1	26,7	13,9	64,7	16,7	62,1	23,5
2011	27	32,3	26,1	57	36,5	17,7	9,9
2012	20,5	22,3	15,2	45,8	15,7	-21,5	-6,8
2013	11,2	11,1	1,5	28,5	2,7	23	7
2014	25,8	29,2	25,8	36,5	17,9	9,2	16,7
2015	13,2	-	43,1	80,5	28,2	24,2	47,5
2016	15,6	-	37,8	63	24,3	–3,2	19,7
2017	-	-	25	41,3	12,4	10	15,6
2018	-	-	24,7	32,5	-11,4	6,8	16,7

Appendix E.
Aggregate index of costs for agricultural production

Table E.1

Aggregate index of production costs of agricultural products in 2018, %

	Aggregate index of costs for agricultural production	Including		Price index on material technical resources of industrial origin consumed by agriculture
		crop products	livestock products	
in% to the corresponding period of the previous year				
January	116,7	117,3	114,9	118,3
January February	114,6	114,3	115,6	115,9
January-March	113,8	112,9	116,2	114,9
January-April	113,4	112,2	116,5	113,9
January-May	113,6	112,4	116,9	114,4
January-June	113,9	112,7	117,1	115,2
January-July	113,9	112,9	117,1	115,6
January-August	114,3	113,4	117,1	116,2
January-September	114,6	113,8	117,2	116,6
January-October	114,7	114	117,1	116,8
January-November	114,6	113,9	116,8	116,7
2018	114	113,2	116,2	115,9

Appendix F.
Commodity structure of foreign trade

Table F.1

Commodity structure of foreign trade of agroindustrial complex in 2018

Code and name of goods according to the Ukrainian classification of goods of foreign economic activity	Export			Import		
	thousand dollars USA	% to the total	% to the total	thousand dollars USA	% to the total	% to the total
1	2	3	4	5	6	7
Total	47334987	109,4	100	57187578	115,3	100
including:						
Live animals; products of animal origin	1210638,3	109,2	2,6	917988,8	125,5	1,6
live animals	45786,6	100,2	0,1	71823,6	125,1	0,1
meat and edible offal	645982,3	121,6	1,4	167663,2	149,7	0,3
fish and crustaceans	24981,4	94,7	0,1	549534,7	120,7	1
milk and dairy products, poultry eggs; natural honey	480947,4	97,3	1	106458	125,4	0,2
other products of animal origin	12940,6	115,3	0	22509,3	103,4	0
Products of plant origin	9886060,4	107,3	20,9	1529221,1	111,8	2,7
live trees and other plants	4442,8	112,3	0	33977	125,1	0,1
Vegetables	235682,7	100,1	0,5	106191,3	139,7	0,2
edible fruits and nuts	228564,1	117	0,5	526707	110,4	0,9
coffee, tea	12059,2	88,6	0	209046,6	107,7	0,4
grain crops	7240558,1	111,4	15,3	191116,7	108,1	0,3
products of the flour and cereal industry	175811,2	96,7	0,4	34228,8	106,5	0,1
seeds and fruits of oilseeds	19541149,8	94,9	4,1	397429,2	110,9	0,7
natural shellac	1090,7	185,7	0	29653,9	117,5	0,1
plant materials	33701,9	141,9	0,1	760,7	77,5	0

Continuation of table F.1

1	2	3	4	5	6	7
fats and oils of animal or vegetable origin	4496511	97,6	9,5	267350,2	100,3	0,5
ready-made food	3018600,8	106,8	6,4	2340898	121	4,1
meat and fish products	21747	139,8	0	97280,7	118,5	0,2
sugar and sugar confectionery	366878,1	87,9	0,8	67116,7	141	0,1
cocoa and cocoa products	204076,5	111,1	0,4	306699,2	129,8	0,5
finished grain products	268310	90,5	0,6	153608,4	130,4	0,3
vegetable processing products	172289,8	97,6	0,4	181369,3	127,4	0,3
various foods	131984,3	109,0	0,3	408113,9	112,2	0,7
alcoholic and soft drinks and vinegar	229841,7	109,8	0,5	489773,3	131,4	0,9
residues and waste from the food industry	1224764,2	116,5	2,6	216176,5	128,9	0,4
tobacco and industrial	398709,1	112,1	0,8	420759,9	104,0	0,7

Appendix G.
Characteristics of the common agricultural policy of the European Union

Table G.1

Characteristics of the common agricultural policy of the European Union

Purpose	1. To increase the productivity of agriculture through the promotion of technological progress, ensuring the rational development of agricultural production and the optimal use of production factors, including labour; 2. To ensure a proper standard of living of the agricultural community, in particular by increasing the personal income of people working in agriculture; 3. To stabilize markets; 4. To ensure the availability of supply; 5. To ensure the supply of goods to consumers at reasonable prices.
Prerequisites and restrictions	1. The special nature of agricultural activity, which follows from the social structure of agriculture and from the structural and natural differences between different agricultural regions; 2. The need to make appropriate improvements gradually; 3. In the Member States, agriculture is a sector closely linked to the whole economy.
Measures and solutions	Introduction of a joint organization of agricultural markets. The main forms of joint organization of the market depending on the type of product: common rules of competition; mandatory coordination of various organizations of national markets; organization of the European market.
	Price regulation.
	Production assistance.
	Storage and transportation measures.
	Joint mechanism for stabilizing imports or exports.
	Prevention of discrimination between producers and consumers.
	Pricing policy is based on common criteria and unified calculation methods.
	It is allowed to create one or more agricultural management funds and guarantees.
	Effective coordination of efforts in the fields of vocational training, research and dissemination of agricultural knowledge.
	Co-financing of projects or institutions.
CAP principles	The principle of market unity: free trade in agricultural goods between the countries party to the agreement; abolition of quantitative restrictions, duties and taxes, as well as the establishment of uniform prices for old products.
	Giving preference to products produced in member countries before imported; adherence to this principle allows to protect producers from cheap imports and price fluctuations for agricultural products on world markets.
	The principle of financial solidarity implies the joint responsibility of all Member States for the financial consequences of the CAP.

Appendix H.
The main stages of implementation of the common agricultural policy

Table H.1

The main stages of implementation of the common agricultural policy

Stage	Years	Problems	Actions and methods	Effects
1	2	3	4	5
I	1962-1973	The need to provide the EU population with food.	1) purchase prices were recorded at a high level; 2) unlimited imports; 3) subsidies for agricultural entities; 4) the costs of the general EU budget for economy in this period exceeded 65%.	The high level of support for the production of certain agricultural products has led to overproduction.
II	1978-1992	Overproduction of products.	1) strict regulation of purchase prices, which limited the overproduction of agricultural products and their supply to the market; 2) export subsidies, which in combination with other measures, 3) quotas for the production of certain types of products (milk); 4) subsidies depended on fixed production volumes.	Creating favourable price conditions for the sale of goods in foreign markets.
III	1992-2000	The need to stimulate producers to rationally use material, financial and natural resources.	1) abolition of the system of regulation of purchase prices; 2) introduction of direct payments per hectare of agricultural land; 3) producers have the opportunity to independently choose strategies for the development of their own economy (determine the volume and range of products grown); 4) new methods of financial support have been introduced (subsidies for early retirees; assistance to farms located in regions with unfavourable climates for high yields); 5) requirements have been set for farmers regarding mandatory crop rotations, mandatory standards for natural restoration of land yields (annually 10% of agricultural land should remain under steam).	Use of financial and organizational mechanisms to support agricultural production.

Continuation of table H.1

1	2	3	4	5
IV	2000-2007	Ensuring the sustainable functioning of the EU agricultural sector.	1) agenda 2000 Action Plan (Agenda 2000): 2) financing of rural development; 3) strengthening the requirements for environmental protection and safety of agricultural products; 4) liberalization of the agricultural sector; 5) adoption of new principles of CAP; 6) simplified rules for regulating rural development; 7) a significant number of instructions were eliminated, in particular those related to the production of grain crops.	Adherence to new principles: "Multifunctionality" (recognition of an agricultural producer as the centre of social, cultural and natural systems) (the socio-cultural approach has replaced the functional-production one); the principle of forming a special "European model of agricultural activity". Rural development, use of methods that provide greater interaction between rural development and pricing policy on the market within the CAP.
V	2007-2013	The need to strengthen the competitiveness of agriculture.	1) restructuring and modernization of the agricultural sector; 2) support of integration and food relations; 3) ensuring access to scientific and technical achievements and supporting their implementation; 4) providing access to information and implementation of information technologies; 5) support for the production of new agricultural products 6) support for cooperation of producers; 7) environmental protection in rural areas. 8) state support was focused on the introduction of energy saving technologies; conservation of natural resources; reducing the harmful effects of the agricultural sector on the climate; improving the quality of life in rural areas and stimulating non-agricultural employment.	The development of small business and crafts in rural areas needed state support; tourism development; development of education for the needs of the rural economy; modernization of rural infrastructure; creation of conditions for innovative use of renewable energy sources with the use of agricultural products, etc.

Continuation of table H.1

1	2	3	4	5
VI	2014-2020	Ensuring environmental protection. Protection of consumer rights and protection of animals.	All actions are aimed at the production of safe food; sustainable management of natural resources and climate; balanced territorial development.	Food production; sustainable management of natural resources and climate; actions on balanced territorial development.

Appendix I.
Principles of the EU common agricultural policy

Table I.1

Principles of the EU common agricultural policy

№	Principles	Content	Suggestions for Ukraine
1	2	3	4
1	Uniform prices for agricultural products within the EU and a single mechanism to support them.	The minimum allowable prices for the most important agricultural products are determined in advance. When market prices fall by more than 10%, the EU authorities guarantee the purchase of this product, thus ensuring the maintenance of the price level. The EU's common agricultural policy uses several main types of prices, namely: – indicative prices that EU countries maintain in national markets in intra-regional turnover; – intervention prices at which surpluses of agricultural products are bought or sold, if fluctuations in their prices reach the established limits from the level of the approximate price; – foreign trade (sales prices on the foreign market).	Implementation of relevant legislation in the field of food safety, sanitary and phytosanitary measures, as well as legislative regulation of a number of issues (transition to European norms of marking and labelling).
2	Free trade in agricultural products within the EU and the absence of tariff and quantitative restrictions.	There are common rules for foreign trade in agricultural goods with third countries and a single customs tariff. Agricultural products move within the European Union under conditions similar to those of the internal market.	Reducing the pressure of state regulatory authorities on the industry through the revision, revision and repeal of a number of regulatory regulations; reforming relations in the field of state property and activities state-owned enterprises.

Continuation of table I.1

1	2	3	4
3	When exporting agricultural products to third countries, producers receive subsidies from EU bodies.	For certain types of goods, an agreement has been concluded with external suppliers, under which they undertake not to export these products to the countries of the European Union at prices below the established level.	The introduction of subsidies will sell a certain type of product at prices below world prices.
4	The only financing of agriculture.	Carried out through the European Agricultural Guarantee Fund, which accounts for almost half of the EU budget. In particular, in the 1970s this amount was about 70 % of the EU budget, today (2010) it is within 45 % of the budget, which is almost 40 billion euros annually, while the share of agriculture in the EU's gross domestic product is only about 2 %. At the same time, almost 80 % of all European Union expenditures go to subsidies to keep prices and incomes of farmers.	Revision and improvement of the system of state support for agricultural producers; reduction of administrative pressure due to simplification of the industry taxation system.
5	Increasing productivity and modernizing production in agriculture.	There are funds for orientation, which are intended to increase productivity and modernization of production in agriculture, and guarantee funds, which amount to about 3/4 of the fund. They are aimed directly at maintaining prices. The European Agricultural Guidance and Guarantee Fund is formed by direct contributions from the EU budget, VAT revenues, compensatory fees levied on imports of agricultural products from third countries, deductions from customs duties on imported industrial goods.	Simplification of agribusiness access to finance and credit, land reform, implementation of infrastructure and logistics projects, as well as assistance in the renewal and modernization of production and processing facilities of the agro-industrial complex.

Continuation of table I.1

1	2	3	4
6	The principle of superiority of goods produced in EU countries over imported goods.	The principle makes it possible to support our own agricultural producers.	Development of export of Ukrainian agricultural products; Internal market management.
7	The principle of joint responsibility of member countries for market and pricing policies.	The principle makes it possible to support consumers of goods.	The implementation of the principle in Ukraine is extremely important for food security.

Appendix J.
Volumes of agricultural production in the EU

Table J.1

Volumes of agricultural production in prices producers in 2005-2016, billion euros

Countries	Years														Growth rates 2018 / 2005, %
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
EU (28 countries)	289,6	298,1	330,4	348,7	306,9	335,8	367,1	378,6	388,8	383,3	376,6	366,5	390,2	391,9	1,4
EU (27 countries)	287,5	295,9	328,1	346,1	304,5	333,4	364,7	376,3	386,7	381,4	374,6	364,6	388,3	389,9	1,4
Eurozone (19 countries)	220,9	226,6	250,4	258,9	233,5	253,9	271,8	282,5	289,2	283,9	280,5	274,7	289,8	291,6	1,3
Belgium	6,4	6,8	7,2	7,3	6,6	7,6	7,8	8,6	8,4	7,9	8,0	7,8	8,2	8,1	1,2
Bulgaria	2,7	2,8	2,7	3,7	3,1	3,2	3,7	3,7	3,7	3,7	3,5	3,4	3,6	3,7	1,3
Czech Republic	3,2	3,3	4,1	4,5	3,4	3,8	4,6	4,6	4,7	4,7	4,4	4,5	4,7	4,8	1,5
Denmark	7,3	7,7	8,5	8,4	7,8	9,1	10,1	11,1	10,4	10,3	9,4	9,2	10,4	9,5	1,3
Germany	37,3	38,6	44,5	48,3	41,9	47,6	53,3	54,5	56,8	55,9	49,7	48,7	52,9	49,3	1,3
Estonia	0,5	0,4	0,6	0,6	0,5	0,6	0,7	0,8	0,8	0,8	0,8	0,6	0,7	0,7	1,4
Ireland	5,0	5,2	5,7	5,9	4,8	5,5	6,2	6,5	7,3	6,9	7,1	7,1	8,1	8,2	1,6
Greece	9,8	9,1	9,7	9,5	9,1	9,4	9,2	9,3	9,3	9,4	9,8	9,6	10,1	9,7	0,9
Spain	3,4	3,4	3,9	3,8	3,4	3,8	3,8	3,9	4,2	4,2	4,3	4,5	4,8	4,9	1,4
France	5,2	5,3	5,9	6,1	5,6	6,1	6,6	6,9	6,7	6,7	6,7	6,3	6,6	6,9	1,3
Croatia	2,1	2,2	2,4	2,6	2,5	2,4	2,4	2,4	2,2	1,8	1,8	1,9	1,9	2,1	1,0

Appendix K.
Dynamics of organic crop production in EU countries

Table K.1

Dynamics of organic crop production in EU countries
by types of crops, million tons

Indication	Year								Deviation, 2018-2012, tones	Deviation, 2018-2007, tones
	2007	2012	2013	2014	2015	2016	2017	2018		
1	2	3	4	5	6	7	8	9	10	11
Grain crops for the production of grain (including seeds)	1375,1	1685,4	1598,8	2290,5	2481,1	2801,1	3134,8	1853,1	1676,8	4780,7
Cereals (excluding rice) for the production of grain (including seeds)	1367,3	1599,2	1589,9	2238,4	2420,4	2717,5	3036,2	1837,1	2379,6	4697,5
Wheat and rye	4839,6	7397,9	5693,6	9340,1	1071,1	1350,1	1430,1	5974,9	-1423,	1135,4
Rye and mixtures of winter cereals	59,7	103,4	108,6	119,6	121,3	107,2	111,3	120,9	175,2	612,3
Barley	151,2	296,1	267,9	355,1	327,3	388,6	442,1	364,3	683,3	213,1
Oats and cereal mixtures in the spring (mixed grain except olives)	208,6	297,2	239,8	321,6	385,1	445,7	569,5	502,9	205,7	294,3
Corn grain	175,3	270,8	184,5	265,2	242,9	315,8	441,6	333,4	626,6	158,1
Rice	4,9	5,3	8,9	52,1	60,6	83,6	112,9	27,6	-23,7	22,5
Dry beans and protein crops for grain production (including seeds and mixtures of cereals and legumes)	99,2	195,8	145,9	259,3	206,1	297,3	342,2	197,6	1,741	98,4
Root crops	57,3	75,1	108,0	202,3	209,2	245,4	268,7	127,9	52,7	70,7

Continuation of table K.1

1	2	3	4	5	6	7	8	9	10	11
Technical crops	82,7	101,9	147,6	235,4	290,1	367,6	459,6	400,6	298,7	317,9
Fresh vegetables (including water-melons)	317,6	194,9	567,1	1003,1	1353,7	1441,0	1399,9	1001,6	806,4	684
Strawberry	10,5	15,1	18,8	20,6	22,5	27,9	21,2	22,9	7,8	12,4
Grape	220,0	774,5	392,9	637,6	906,2	1617,4	1174,6	563,3	-211,2	343,3
Total:	4613,5	8154,7	5948,4	8934,8	10097,9	12206,3	12945,2	7950,9	-203,7	3337,4

Appendix L.
Dynamics of crop production in EU countries

Table L.1

Dynamics of crop production in countries EU in 2007-2016, million euros

Country	Years							Deviation, 2018-2010	Deviation, 2018-2007
	2007	2010	2014	2015	2016	2017	2018		
Belgium	3305,04	3618,48	3461,39	3626,37	3596,12	3569,65	3581,66	-36,82	276,62
Bulgaria	1511,47	2117,71	2698,55	2520,02	2572,88	2718,69	2824,48	706,77	1313,01
Denmark	3582,75	3473,62	3460,50	3691,48	3206,14	3635,94	3314,36	-159,26	-268,39
Germany	23566,25	24880,82	28175,01	25139,67	25223,40	25903,62	23612,65	-1268,17	46,4
Estonia	322,43	274,25	384,39	467,22	317,75	369,28	348,97	74,72	26,54
Ireland	1632,69	1669,99	1747,49	1737,28	1767,43	1824,62	2090,19	420,2	457,5
Greece	6966,19	6596,11	6741,09	7201,69	6996,67	7568,43	7293,48	697,37	327,29
Spain	25134,63	24587,12	25370,64	26890,47	29098,22	29684,21	31185,30	6598,18	6050,67
France	36783,50	38808,90	41355,30	42222,07	38963,46	40203,52	44043,80	5234,9	7260,3
Croatia	1489,48	1541,32	1114,23	1177,38	1256,92	1225,39	1372,30	-169,02	-117,18
Italy	27322,02	26330,12	28710,97	30998,48	29382,85	29344,57	31396,96	5066,84	4074,94
Cyprus	327,39	324,10	263,02	289,32	247,29	285,04	278,72	-45,38	-48,67
Latvia	499,88	473,69	649,39	776,70	693,78	715,32	622,88	149,19	123
Lithuania	1013,70	923,66	1367,06	1588,66	1371,10	1483,07	1327,89	404,23	314,19
Luxem-bourg	147,88	141,38	207,02	168,77	168,16	154,19	165,16	23,78	17,28
Hungary	3706,31	3472,51	4702,26	4605,52	4938,50	4791,16	4811,50	1338,99	1105,19
Malta	43,74	47,01	47,26	53,98	51,66	47,72	46,33	-0,68	2,59
Nether-lands	12076,38	12621,15	12674,39	13314,20	13466,23	13816,90	13882,69	1261,54	1806,31
Austria	2735,82	2795,89	2887,68	2935,90	3060,65	3069,01	3188,35	392,46	452,53
Poland	9464,08	8782,42	10890,21	10086,81	10240,88	11379,87	10680,05	1897,63	1215,97
Portugal	3343,78	3622,06	3720,61	4109,93	4048,07	4385,08	4441,93	819,87	1098,15
Romania	8596,12	10311,17	11039,97	9802,07	10055,94	11647,86	13153,46	2842,29	4557,34
Slovenia	588,06	586,20	655,07	727,36	676,76	585,73	793,55	207,35	205,49
Slovakia	890,62	867,78	1273,06	1126,63	1356,32	1265,65	1227,95	360,17	337,33
Finland	1484,60	1376,50	1415,89	1375,18	1361,80	1348,96	1437,79	61,29	-46,81
Sweden	2401,58	2307,09	2769,06	2774,74	2610,31	2868,51	2578,96	271,87	177,38
England	8710,77	8616,44	11358,39	11787,50	9925,12	10475,57	10471,87	1855,43	1761,1
Iceland	87,01	79,31	132,27	114,34	119,79	133,45	122,22	42,91	35,21
Norway	1284,03	1451,36	1701,36	1741,59	1773,72	1730,29	1415,78	-35,58	131,75
Total:	189018,2	192698,2	210973,5	213051,3	208547,9	216231,3	221711,2	29013,07	32693,03

Appendix M.
Factors influencing the development of enterprises EU organic market

Table M.1

Factors influencing the development of enterprises EU organic market

Politics (P)	Economics (E)	Ecology (E)
P1. Future changes in legislation; P2. State support for regional development; P3. Government policy; P4. State regulation of competition; P5. Trade policy; P6. Strict state control and penalties; P7. Funding, grants and initiatives, government procurement; P8. Lobbying / market pressure groups; P9. Anti-inflation policy; P10. Other influence of the state in the juniper sphere; P11. Level of corruption government agencies.	E1. The state of the country's economy; E2. Inflation rate; E3. Investment business climate; E4. Problems of the taxation system; E5. The scale of economic support for organic products; E6. Pricing system; E7. Unemployment rate; E8. Dynamics of income of the population; E9. Exchange rates; E10. Basic external costs; E11. General market conditions; E12. Lack of skilled frames.	E1. Environmental friendliness of applied technologies; E2. Ecological situation of the region; E3. Environmental friendliness of the materials used; E4. Noise factor; E5. Chemical factor; E6. Change of physical parameters of the environment; E7. Electromagnetic effects on the environment; E8. Radiation impact on the environment; E9. Ecologically clean natural and anthropogenic environment.

Continuation of table M.1

Social sphere (S)	Technology (T)	Law (L)
S1. Demography; S2. Structure of income and expenses; S3. Basic values; S4. Lifestyle trends; S5. Healthy Lifestyle; S6. Models of consumer behaviour; S7. Educational level; S8. Cataclysms and force majeure; S9. Consumer preferences; S10. Media representation; S11. Advertising and public relations.	T1. Development of new technologies; T2. Scientific funds; T3. Reduction or extension of the "life cycle" of technologies; T4. Scientific and technical level of production, which ensures the competitiveness of enterprises; T5. Adaptation of new technologies; T6. Information and communications; T7. Consumer benefits of innovative technologies; T8. The level of qualification of personnel of high-tech productions; T9. Technology transfer.	L.1. Legislation; L.2. Regulatory bodies and regulations; L3. Changes in legislation affecting social factors; L4. Technology legislation; L5. The difficulty of allocating land; L6. Blurring of the legal framework; L 7. Features of regional legislation; L8. Legislative base of local self-government.

Appendix N.
The main areas of cooperation between the parties to the Agreement in the field of agriculture

Table N.1

Main areas of cooperation between the parties to the Agreement in the field of agriculture and rural development

№	Direction of cooperation	Activities within the direction	Advantages for Ukrainian enterprises
1	2	3	4
1	Promoting mutual understanding of policies in the field of agriculture and rural development.	Appointment of meetings, conferences, development and approval of rural development programs.	Stimulating the development of business activity of rural enterprises.
2	Strengthening administrative capacity at the central and local levels for policy planning, evaluation and implementation.	Approval of regional agroindustrial development programs.	Development of sheep breeding, fisheries, forestry, horticulture, conservation and rational reproduction of soils, support of farms, development of logistics for the needs of agriculture, development of a network of agricultural service cooperatives. Financial support for the development of organic production.
3	Promoting modern and sustainable agricultural production, taking into account the need to protect the environment and animals, in particular the spread of the use of organic production methods and the use of biotechnology, through the implementation of best practices in these areas.	Financing the purchase of technologically new equipment, re-equipment of enterprises, construction of new production facilities.	Facilitating business conditions through government support through funding.

Continuation of table N.1

1	2	3	4
4	Exchange of knowledge and best practices on rural development policy in order to promote economic welfare of rural communities.	Monitoring and verification of the implementation of advisory services, EU experience and research in the agricultural sector by EU.	Transparency of doing business by disseminating knowledge and experience of foreign countries.
5	Improving the competitiveness of the agricultural sector and the efficiency and transparency of markets, as well as investment conditions.	Administrative changes at the local level, incentives for the authorities to facilitate the conditions for raising funds and simplify the procedures for obtaining them.	No corruption schemes.
6	Dissemination of knowledge through training and information activities.	Preparation of the Instruction "Financial Agrarian Receipt" together with the EBRD and Ukrainian experts.	The instruction allows companies to obtain all information about the use of financial agricultural receipts in order to attract credit funds from the decision to use it to taxation and accounting. Such an information event promotes awareness of agricultural producers and additional investment opportunities.
7	Promoting innovation through research and promoting an advisory system to farmers.	Involvement of qualified specialists from abroad and within Ukraine, including students, for development.	New technologies that will improve product quality.
8	Strengthening harmonization on issues discussed within international organizations.	Primer analytical preparation for meetings held with international organizations.	Opportunities for the development of new markets that operate under the auspices of international organizations.

Continuation of table N.1

1	2	3	4
9	Exchange of best practices on support mechanisms for agriculture and rural development.	Conferences and their funding at the state level.	Gaining foreign experience.
10	Promotion of agricultural product quality policy in the areas of product standards, production requirements and quality schemes.	Conducting public awards, assigning at the state level of product quality marks to enterprises-manufacturers of products.	Incentives to improve product quality.

Appendix O.
The main legal acts in the field of agriculture and rural development

Table O.1

The main regulations in the field of agriculture and rural development

№	Type of legal act	Document	Number and date of acceptance	The essence of the document
1	2	3	4	5
1	Laws of Ukraine	About modification of the Budget code of Ukraine (concerning improvement of drawing up and execution of budgets).	from December 20, 2016 №1789-VIII	1. The law amends the Budget Code of Ukraine, according to which in 2017-2021 the annual amount of state budget funds allocated for state support of agricultural producers must be at least 1% of agricultural output. 2. It is established that 20% of budget support should be directed by agricultural producers to purchase from domestic producers of agricultural machinery and equipment data (in 2017 – 10 %, in 2018 – 15 %).
2		On amendments to the Tax Code of Ukraine to ensure the balance of budget revenues in 2017.	from December 20, 2016 №1791-VIII	1. From January 1, 2018, limited the amount of agricultural budget subsidies, which are not must exceed UAH 150 million per one agricultural producer. 2. At the same time, the law increased the rent for subsoil use, water and forest resources by 10.4 %, the normative monetary value of non-agricultural land increased by 6 %, the fixed agricultural tax – by 14 %, at the same time, the tax on agricultural land remained at the same level.

Continuation of table O.1

1	2	3	4	5
3		About the State Budget of Ukraine for 2017.	from 21.12.2016 №1801-VIII	According to the main programs to support the development of agro-industrial enterprises, the law provides for expenditures in the amount of UAH 3,686.8 million, including 2,138.0 million UAH from the general fund at the expense of the special fund – UAH 1,548.8 million.
4	Orders of the Ministry for Development of Economy, Trade and Agriculture of Ukraine	On approval of the Regulations on the Department of International Integration in the Field of Technical Regulation, Sanitary and Phytosanitary Measures in the AIC.	from November 7, 2016 №447	The department of international integration in the field of technical regulation, sanitary and phytosanitary measures in the sustainable trial complex has been established.
5		About modification of the distribution of the budgetary appointments provided in the state budget for 2016 for financial support of actions in an agroindustrial complex by reduction in price of credits.	from December 9, 2016 №534	The total amount of budget allocations amounted to UAH 285 million.

Appendix P.
The main goals, directions and tools to stimulate the development of the agrarian sector of Ukraine

Table P.1

The main goals, directions and tools to stimulate development of agrarian sector of Ukraine

№	The name of the stimulus element	The essence of the stimulation element
1	Goals	1) ensuring food security, creating conditions for the competitiveness of Ukrainian products in the domestic and foreign markets; 2) ensuring the predictability of the development of the agricultural sector of the economy; 3) priority development of production and realization of export potential of products with high added value; 4) priority access of small agricultural producers to state support; 5) rational use of agricultural lands starting and reducing the technogenic load of the agricultural sector on the environment.
2	Directions	Stimulating the development of the agroindustrial complex of Ukraine by introducing: 1) measures of a general nature, which include research and research activities; training, preparation of specialists; veterinary, sanitary, phytosanitary measures; information, consulting work, advisory activities; logistics, infrastructure; agroecological and environmental protection in agriculture; 2) measures for market development and production support, which include: support for the production of certain types of agricultural products (goods); income support for agricultural producers; price stabilization in the agricultural market; 3) non-production incentives, which include: regional payments in depressed, mountainous and disadvantaged regions; compensation to agricultural producer's construction of social facilities in rural areas.

Continuation of table P.1

№	The name of the stimulus element	The essence of the stimulation element
3	Tools	1) state agrarian interventions; 2) financial support for agroindustrial production: direct payments to producers made per: hectare of agricultural land under cultivation; the head of owned farm animals; unit of output; unit of sold products; 3) partial compensation of capital and current expenses; 4) partial compensation of interest rates on bank loans; 5) compensation for agricultural insurance costs risks, including income insurance; 6) providing funds to agricultural producers on a revolving basis.

Appendix Q.
The main provisions of the theory of fuzzy logic

When developing macroeconomic models based on the theory of fuzzy logic (fuzzy sets), the following concepts and definitions are used:

1. Universal set. The universal set *U* is a definite set that covers the entire field of knowledge under study.

2. Fuzzy set. A fuzzy set *F* on a universal set *U* is a set of pairs {*μF(u), u*}, where *μF(u)* is a function of the membership of the element $u \in U$ to the fuzzy set *F*.

3. The membership function. The membership function *μF(u)* reflects the degree of belonging of each element of the universal set to the fuzzy set *F*. The membership function takes values from 0 to 1. The higher the degree of membership, the more the element of the universal set corresponds to the properties of the fuzzy set.

If the universal set consists of a finite number of elements $U = \{u1, u2,\ldots, u_n\}$, then the fuzzy set *F* is written as:

$$F = \sum_{i=1}^{n} \mu_A(u_i)/u_i. \qquad (Q.1)$$

If the universal set consists of an infinite number of elements *U*, then the fuzzy set *F* is written as:

$$F = \int_U \mu_A(u)/u. \qquad (Q.2)$$

4. Linguistic variable. A linguistic variable is a variable whose meanings are words and phrases written in human or artificial languages.

2. Therm-set. A term set is a set of all possible values of a linguistic variable.

3. Term. A term is an element of a term set. In the theory of fuzzy sets, the term is given by the membership function.

The basic operations (rules) of fuzzy set theory used for modeling are defined as follows:

a) the operation of complementing sets:

$$\bar{F} = \sum_{i=1}^{n} (1 - \mu_F(u_i))/u_i, \qquad (Q.3)$$

$$\mu_{\bar{F}}(u) = 1 - \mu_F(u); \qquad (Q.4)$$

b) set join operation:

$$F \cup G = \sum_{i=1}^{n} \{\mu_F(u_i) \cup \mu_G(u_i)\}, \quad (Q.5)$$

$$\mu_{F \cup G}(u) = \mu_F(u) \cup \mu_G(u); \quad (Q.6)$$

where ∪ is the sign of the operator "taking the maximum";

c) the operation of intersection of sets:

$$F \cap G = \sum_{i=1}^{n} \{\mu_F(u_i) \cap \mu_G(u_i)\}, \quad (Q.7)$$

$$\mu_{F \cap G}(u) = \mu_F(u) \cap \mu_G(u), \quad (Q.8)$$

where ∩ is the sign of the operator "taking the minimum".

With the help of these operations (rules) fuzzy logical equations are written. The operations of "taking the minimum" and "taking the maximum" correspond to the operations of logical "and" and logical "or" in clear logic.

Having information about the causal relationship between two parameters (for example, "if *R*, then *G*"), using fuzzy sets $R \in U$, $G \in V$, it is possible to draw a fuzzy logical conclusion "$R \rightarrow G$, $R' \rightarrow G'$". This means that if the fact *G* derives from the fact *R*, then the fact *G*' will come from the fact *R*', where *R*, *G*, *R*', *G*' are fuzzy sets. This operation is an operation of compiling a knowledge base.

Using the fuzzy knowledge base, we can approximate the dependence $y = f(x_1, x_2, \ldots x_n)$, which is called "fuzzy inference". In order to perform the operation of fuzzy inference, it is necessary to know the fuzzy relationship between sets.

The fuzzy relation between the sets $R \in G$ and $G \in V$, which are given on the universal sets $W = \{w_1, w_2, \ldots w_i\}$ and $V = \{v_1, v_2, \ldots v_m\}$, is determined by a matrix that has the form:

$$Y = R \times G = \sum_{i=1}^{l} \sum_{j=1}^{m} \{\mu_R(w_i) \cap \mu_G(v_j)\}. \quad (Q.9)$$

In the matrix we obtained, the element standing at the intersection of the *i*-th row and the *j*-th column is defined as:

$$\mu_y(w_i, v_j) = \mu_R(w_i) \cap \mu_G(v_j). \quad (Q.10)$$

To calculate the fuzzy inference *G*'uses the formula:

$$G' = R' \circ Y = R' \circ (R \times G), \qquad (Q.11)$$

where o - operation "min-max composition".

Substituting the formula (Q.11) in the expression (Q.9), we obtain the formula for the formulation (calculation) of a fuzzy logical statement (conclusion):

$$G' = \sum_{j=1}^{m} \cup w_i \subset W\{\mu_{R'}(w_i) \cap \mu_Y(w_i, v_i)\} . \qquad (Q.12)$$

Defasification is the last stage of modeling and is the inverse transformation of the found fuzzy logical statement (conclusion) into the original predictive parameter (variable) *Y**. The number *Y**, which corresponds to a fuzzy set (Q.1), can be calculated as follows:

$$Y^* = \frac{u_1 \cdot \mu_F(u_1) + u_2 \cdot \mu_F(u_2) + \ldots + u_n \cdot \mu_F(u_n)}{\mu_F(u_1) + \mu_F(u_2) + \ldots + \mu_F(u_n)}. \qquad (Q.13)$$

In the probabilistic interpretation of the degrees of affiliation, formula (Q.13) is analogous to the mathematical expectation of a discrete random variable.

Appendix R.
Membership functions of linguistic variable factors of influence on the level of competitiveness of the agrarian sector of Ukraine

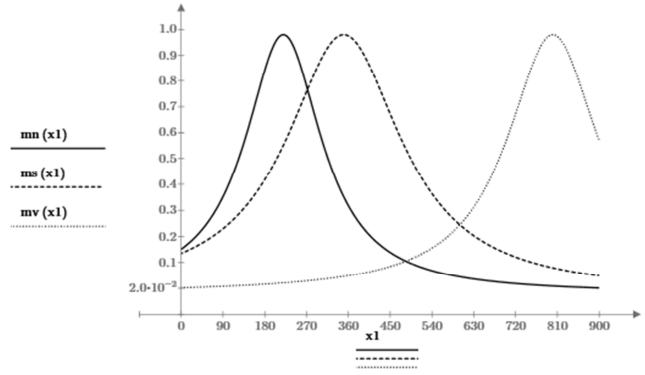

Figure R.1 – Membership function for variable x_1

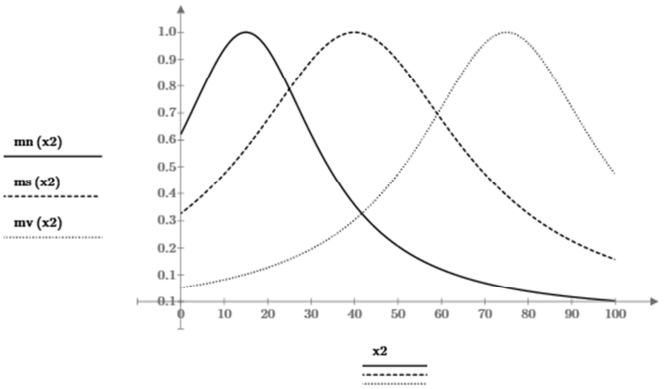

Figure R.2 – Membership function for variable x_2

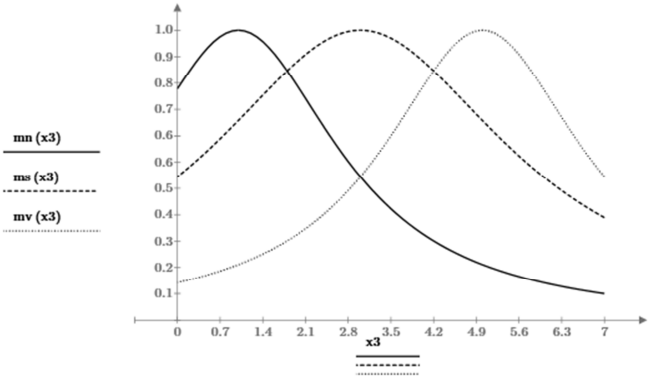

Figure R.3 – Membership function for variable x_3

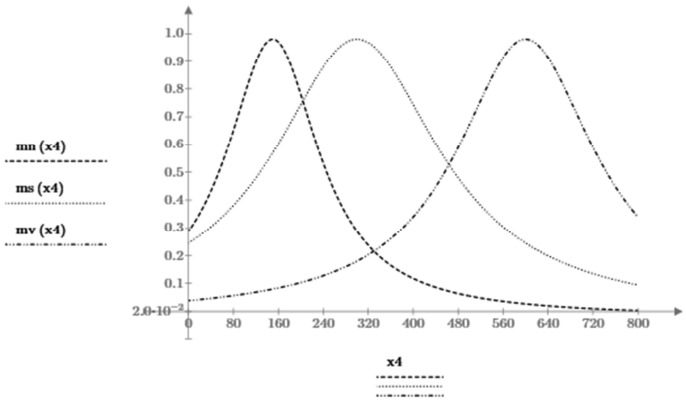

Figure R.4 – Membership function for variable x_4

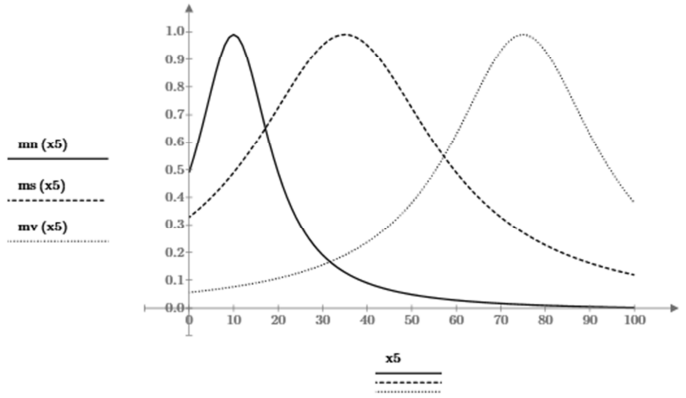

Figure R.5 – Membership function for variable x_5

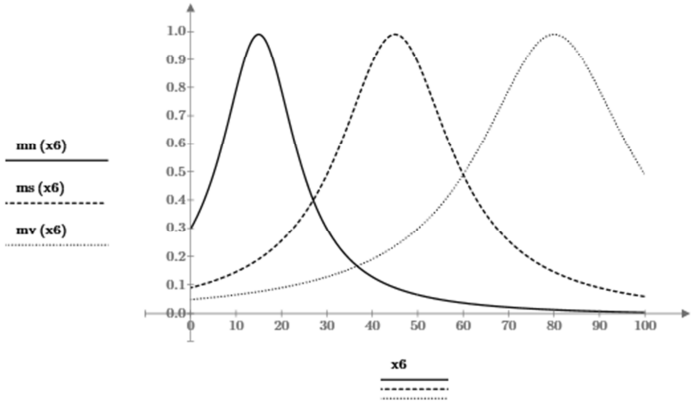

Figure R.6 – Membership function for variable x_6

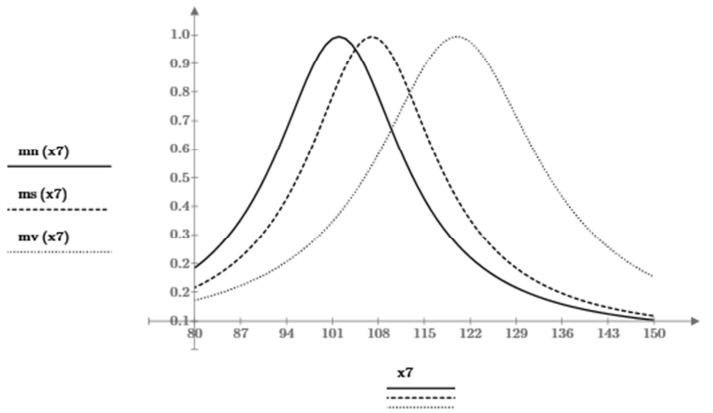

Figure R.7 – Membership function for variable x_7

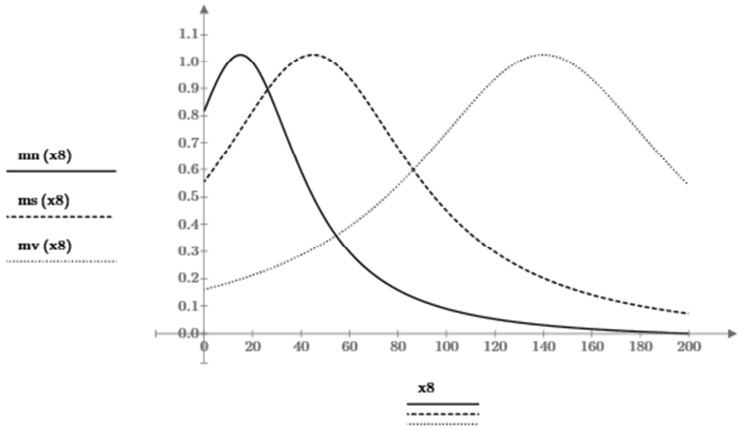

Figure R.8 – Membership function for variable x_8

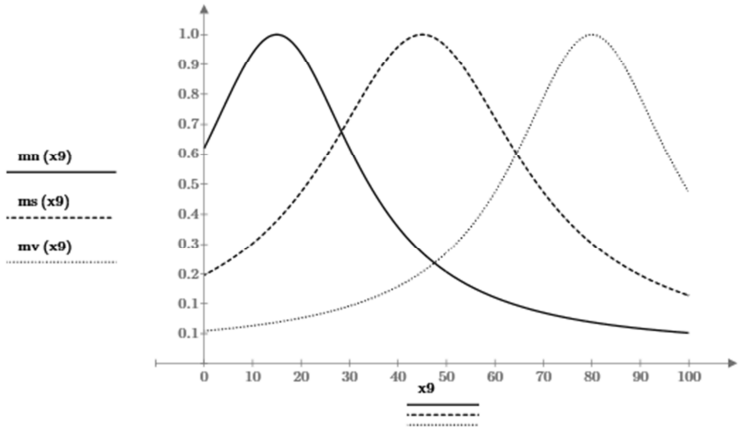

Figure R.9 – Membership function for variable x_9

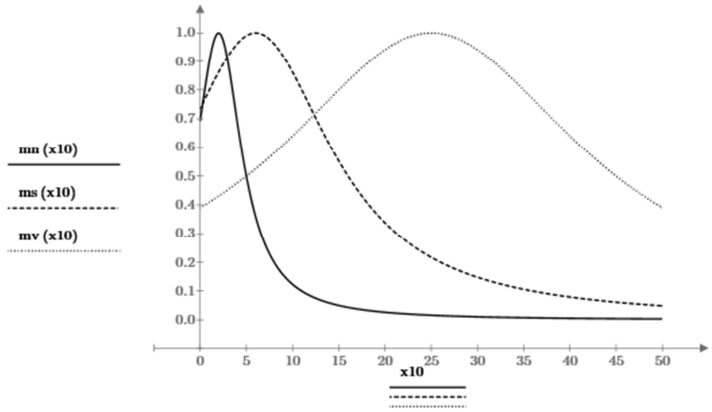

Figure R.10 – Membership function for variable x_{10}

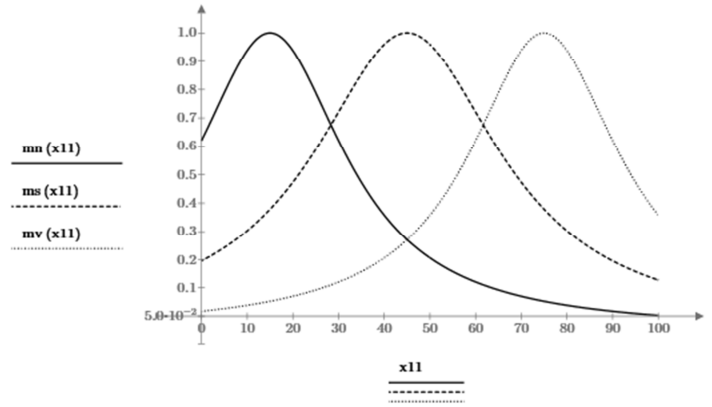

Figure R.11 – Membership function for variable $x_{11}…x_{17}$, *v*, *f*, *p*

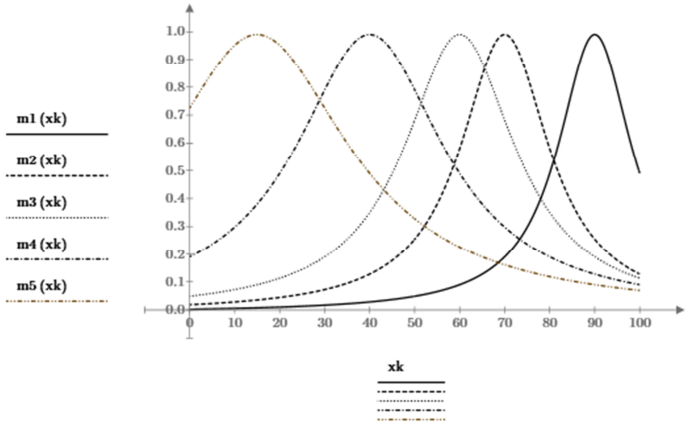

Figure R.12 – Membership function for variable *K*

Appendix S.
Fuzzy knowledge bases and fuzzy logical equations of the model assessing and forecasting the level of competitiveness of the agrarian sector of Ukraine

S.1. Economic and financial factors

Table S.1

Knowledge base of production and economic factors (*v*)

x_1	x_2	x_3	x_4	x_5	x_6	v	w
H	H	H	H	H	H	H	w_{16}
C	H	C	H	H	C	H	w_{17}
H	C	C	H	H	H	H	w_{18}
C	C	C	C	C	C	C	w_{19}
C	H	H	B	C	C	C	w_{20}
H	B	H	C	C	B	C	w_{21}
B	B	B	B	B	B	B	w_{22}
C	B	B	B	C	B	B	w_{23}
B	H	B	C	C	C	B	w_{24}

Fuzzy logical equations:

$$\mu^{H}(v) = w_{16} \cdot [\mu^{H}(x_1) \cdot \mu^{H}(x_2) \cdot \mu^{H}(x_3) \cdot \mu^{H}(x_4) \cdot \mu^{H}(x_5) \cdot \mu^{H}(x_6)] \vee w_{17} \cdot [\mu^{C}(x_1) \cdot \mu^{H}(x_2) \cdot \mu^{C}(x_3) \cdot \mu^{H}(x_4) \cdot \mu^{H}(x_5) \cdot \mu^{C}(x_6)] \vee w_{18} \cdot [\mu^{H}(x_1) \cdot \mu^{C}(x_2) \cdot \mu^{C}(x_3) \cdot \mu^{H}(x_4) \cdot \mu^{H}(x_5) \cdot \mu^{H}(x_6)]; \quad (S.1)$$

$$\mu^{C}(v) = w_{19} \cdot [\mu^{C}(x_1) \cdot \mu^{C}(x_2) \cdot \mu^{C}(x_3) \cdot \mu^{C}(x_4) \cdot \mu^{C}(x_5) \cdot \mu^{C}(x_6)] \vee w_{20} \cdot [\mu^{C}(x_1) \cdot \mu^{H}(x_2) \cdot \mu^{H}(x_3) \cdot \mu^{B}(x_4) \cdot \mu^{C}(x_5) \cdot \mu^{C}(x_6)] \vee w_{21} \cdot [\mu^{H}(x_1) \cdot \mu^{B}(x_2) \cdot \mu^{H}(x_3) \cdot \mu^{C}(x_4) \cdot \mu^{C}(x_5) \cdot \mu^{B}(x_6)]; \quad (S.2)$$

$$\mu^{B}(v) = w_{22} \cdot [\mu^{B}(x_1) \cdot \mu^{B}(x_2) \cdot \mu^{B}(x_3) \cdot \mu^{B}(x_4) \cdot \mu^{B}(x_5) \cdot \mu^{B}(x_6)] \vee w_{23} \cdot [\mu^{C}(x_1) \cdot \mu^{B}(x_2) \cdot \mu^{B}(x_3) \cdot \mu^{B}(x_4) \cdot \mu^{C}(x_5) \cdot \mu^{B}(x_6)] \vee w_{24} \cdot [\mu^{B}(x_1) \cdot \mu^{H}(x_2) \cdot \mu^{B}(x_3) \cdot \mu^{C}(x_4) \cdot \mu^{C}(x_5) \cdot \mu^{C}(x_6)]. \quad (S.3)$$

S.2. Financial factors

Table S.2

Knowledge base of financial factors (*f*)

x_7	x_8	x_9	x_{10}	f	w
B	H	H	B	H	w_{25}
C	C	H	B	H	w_{26}
H	H	H	C	H	w_{27}
C	C	C	C	C	w_{28}
C	B	H	B	C	w_{29}
H	B	C	C	C	w_{30}
H	B	B	H	B	w_{31}
C	B	B	C	B	w_{32}
B	C	B	H	B	w_{33}

Fuzzy logical equations:

$$\mu^{H}(f) = w_{25} \cdot [\mu^{B}(x_7) \cdot \mu^{H}(x_8) \cdot \mu^{H}(x_9) \cdot \mu^{B}(x_{10})] \vee w_{26} \cdot [\mu^{C}(x_7) \cdot \mu^{C}(x_8) \cdot \mu^{H}(x_9) \cdot \mu^{B}(x_{10})] \vee w_{27} \cdot [\mu^{H}(x_7) \cdot \mu^{H}(x_8) \cdot \mu^{H}(x_9) \cdot \mu^{C}(x_{10})]; \quad (S.4)$$

$$\mu^{C}(f) = w_{28} \cdot [\mu^{C}(x_7) \cdot \mu^{C}(x_8) \cdot \mu^{C}(x_9) \cdot \mu^{C}(x_{10})] \vee w_{29} \cdot [\mu^{C}(x_7) \cdot \mu^{B}(x_8) \cdot \mu^{H}(x_9) \cdot \mu^{B}(x_{10})] \vee w_{30} \cdot [\mu^{H}(x_7) \cdot \mu^{B}(x_8) \cdot \mu^{C}(x_9) \cdot \mu^{C}(x_{10})]; \quad (S.5)$$

$$\mu^{B}(f) = w_{31} \cdot [\mu^{H}(x_7) \cdot \mu^{B}(x_8) \cdot \mu^{B}(x_9) \cdot \mu^{H}(x_{10})] \vee w_{32} \cdot [\mu^{C}(x_7) \cdot \mu^{B}(x_8) \cdot \mu^{B}(x_9) \cdot \mu^{C}(x_{10})] \vee w_{33} \cdot [\mu^{B}(x_7) \cdot \mu^{C}(x_8) \cdot \mu^{B}(x_9) \cdot \mu^{H}(x_{10})]. \quad (S.6)$$

S.3. Spatial factors

Table S.3

Knowledge base of financial factors (*p*)

x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	p	w
H	H	H	H	H	H	B	H	w_{34}
C	H	H	H	H	H	C	H	w_{35}
H	C	H	C	H	H	C	H	w_{36}
C	C	C	C	C	C	B	C	w_{37}
H	C	C	C	C	C	C	C	w_{38}
C	C	H	C	B	C	C	C	w_{39}
B	B	B	B	B	B	H	B	w_{40}
C	B	B	B	B	B	C	B	w_{41}
B	B	C	B	C	B	H	B	w_{42}

Fuzzy logical equations:

$$\mu^{H}(p) = w_{34} \cdot [\mu^{H}(x_{11}) \cdot \mu^{H}(x_{12}) \cdot \mu^{H}(x_{13}) \cdot \mu^{H}(x_{14}) \cdot \mu^{H}(x_{15}) \cdot \mu^{H}(x_{16}) \cdot \mu^{B}(x_{17})] \vee w_{35} \cdot [\mu^{C}(x_{11}) \cdot \mu^{H}(x_{12}) \cdot \mu^{H}(x_{13}) \cdot \mu^{H}(x_{14}) \cdot \mu^{H}(x_{15}) \cdot \mu^{H}(x_{16}) \cdot \mu^{C}(x_{17})] \vee w_{36} \cdot [\mu^{H}(x_{11}) \cdot \mu^{C}(x_{12}) \cdot \mu^{H}(x_{13}) \cdot \mu^{C}(x_{14}) \cdot \mu^{H}(x_{15}) \cdot \mu^{H}(x_{16}) \cdot \mu^{C}(x_{17})]; \quad (S.7)$$

$$\mu^{C}(p) = w_{37} \cdot [\mu^{C}(x_{11}) \cdot \mu^{C}(x_{12}) \cdot \mu^{C}(x_{13}) \cdot \mu^{C}(x_{14}) \cdot \mu^{C}(x_{15}) \cdot \mu^{C}(x_{16}) \cdot \mu^{C}(x_{17})] \vee w_{38} \cdot [\mu^{H}(x_{11}) \cdot \mu^{C}(x_{12}) \cdot \mu^{C}(x_{13}) \cdot \mu^{C}(x_{14}) \cdot \mu^{C}(x_{15}) \cdot \mu^{C}(x_{16}) \cdot \mu^{C}(x_{17})] \vee w_{39} \cdot [\mu^{C}(x_{11}) \cdot \mu^{C}(x_{12}) \cdot \mu^{H}(x_{13}) \cdot \mu^{C}(x_{14}) \cdot \mu^{B}(x_{15}) \cdot \mu^{C}(x_{16}) \cdot \mu^{C}(x_{17})]; \quad (S.8)$$

$$\mu^{B}(p) = w_{40} \cdot [\mu^{B}(x_{11}) \cdot \mu^{B}(x_{12}) \cdot \mu^{B}(x_{13}) \cdot \mu^{B}(x_{14}) \cdot \mu^{B}(x_{15}) \cdot \mu^{B}(x_{16}) \cdot \mu^{H}(x_{17})] \vee w_{41} \cdot [\mu^{C}(x_{11}) \cdot \mu^{B}(x_{12}) \cdot \mu^{B}(x_{13}) \cdot \mu^{B}(x_{14}) \cdot \mu^{B}(x_{15}) \cdot \mu^{B}(x_{16}) \cdot \mu^{C}(x_{17})] \vee w_{42} \cdot [\mu^{B}(x_{11}) \cdot \mu^{B}(x_{12}) \cdot \mu^{C}(x_{13}) \cdot \mu^{B}(x_{14}) \cdot \mu^{C}(x_{15}) \cdot \mu^{B}(x_{16}) \cdot \mu^{H}(x_{17})]. \quad (S.9)$$

Scientific monograph

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COMPETITIVENESS OF THE AGRARIAN SECTOR OF UKRAINE IN THE CONDITIONS OF INTEGRATION TO THE EUROPEAN MARKET

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