

UNIVERSITY OF INSURANCE AND FINANCE (VUZF), SOFIA

Department of Finance

ABSTRACT

of the scientific dissertation on the topic:

**MECHANISM OF INNOVATIVE DEVELOPMENT IN THE
AGRICULTURAL FOOD SECTOR IN THE CONTEXT OF
REGIONAL ECONOMIC INTEGRATION**

**for the award of the scientific degree "Doctor of Economic Sciences"
in the direction 3.8 Economics**

**Doctoral Candidate:
Robert Jurczak**

**SOFIA
2023**

The dissertation on the topic "Mechanism of innovative development in the agricultural food sector in the context of regional economic integration" consists of 325 pages, including the introduction, four chapters, conclusions, list of references and 20 appendices. 55 tables and 65 figures are presented. The bibliography contains 178 sources (including books, articles, periodical and non-periodical statistical and other publications, reports and online sources). The results of the study are presented in 35 publications (including 1 collective and 1 individual monographs).

The dissertation will be defended at the University of Insurance and Finance (VUZF) at a meeting of the Academic Council, appointed by order of the Rector of VUZF. Defence materials are available to interested parties.

Thesis defense will take place on at at the University of Insurance and Finance (VUZF) at a meeting of the Academic Council, appointed by order of the rector of VUZF. Defense materials are available to interested parties.

THE CONTENT OF THE ABSTRACT

I. GENERAL CHARACTERISTICS OF THE WORK	4
1. Relevance of the study	4
2. Purpose and objectives of the study	6
3. Research methods	7
4. Research information base	7
5. Scientific novelty of the results obtained.....	7
6. Limitations of the study	10
7. Practical significance of the results obtained.....	11
8. Personal contribution of the applicant	11
9. The content of the dissertation.....	11
II. THE MAIN CONTENT OF THE WORK.....	12
III. SYNTHESIZED DISSERTATION PRESENTATION.....	133
1. Theoretical and methodological foundations for creating the economic mechanism of innovative development in the agricultural food sector.....	13
2. State and main trends in the development of the European Union agricultural sector.	19
3. Methodological tools for assessing and regulating the regional food and logistics market.....	21
4. Conceptual model of innovative development of the agricultural food sector in the context of digital transformation.	26
IV. CONCLUSIONS.....	34
V. LIST OF SCIENTIFIC PUBLICATIONS.....	35

I. GENERAL CHARACTERISTICS OF THE WORK

1. Relevance of the study

At the present stage, the common agrarian policy is a set of forms and methods for the orderly activity of the states of the European Union (hereinafter referred to as the EU) and their institutions aimed at shaping the rational and sustainable development of agriculture and its territories within the European community. The Common Agricultural Policy (hereinafter CAP) ensures efficient agricultural production and food security through the use of subsidies and stable food prices (at a minimum level). It defines the main role of the EU in world food production and trade: EU countries account for 17% of world food exports; The EU ranks second as a global exporter of dairy products, pork, and third in poultry and grains. The EU agricultural sector continues to expand agricultural production to meet the growing global demand for food, which, according to forecasts by the Food and Agriculture Organization (FAO), will increase by 70% by 2050.

Each European country has its own characteristics: geographical location, natural and climatic conditions, population density, factors of agricultural production, organizational and legal forms, the achieved level and development potential, competitiveness in food markets, forms of state support for the agricultural sector, etc.

The objectives of the development of agriculture in the countries of the European Union are to ensure the food security of the EU countries; increasing the productivity of the agricultural sector with the optimal use of production factors (for example, labor, the introduction of scientific and technological progress); ensuring a normal standard of living for rural residents, in particular, increasing the level of individual incomes; market stabilization; providing opportunities for the supply of products; guaranteeing fair living standards for the rural population; creating secure access to food supplies; providing consumers with food at affordable prices.

The agro-food sector of European countries in the 21st century should be innovative and environmentally friendly, with a large number of "green" technologies, which can satisfy the population's needs for high-quality food and alternative fuels, while maintaining competitiveness in world markets. The FAO system successfully operates international information monitoring systems for the analysis and forecasting of agricultural production, the food industry, food markets and agribusiness. One of the

directions of this study is the development of the theory and methodology for studying the unified agricultural policy, the creation of modern tools for analytical and forecasting developments in modern conditions. Of particular importance is the theoretical and methodological substantiation of the globalization of agri-food markets, the integration of various industries that ensure food security, the development of exports and imports of agricultural products, and the equalization of food consumption levels by various social strata of the population. Research into the problems of food security and independence of European countries is necessary to assess the state agricultural policy, to substantiate the strategy for the development of the agro-food sector, including its innovative development. This study uses an integrated approach that includes the study of economic, social, environmental processes, innovative factors in the development of a common agricultural policy of the member countries of the European Union in the context of globalization and regional integration.

The study of the problems of innovation as a special factor in economic growth, as well as the construction of national models of innovative development of the economy, was carried out by Aghion F., Aizard U., Acemoglu D., Bright J., Hoover E., Jonkers K., Jones C., Diner K. Drucker P., Castele M., Krugman P., Muldar W., Meister K., Mendell S., Mensch G., Romer P., Santo B., Thiess D., Friedman J., Freeman Kr., Hayek P., Hartmann H., Howitt P., Hiruka M., Schumpeter J., Ennis D., Jansen F. et al.

The issues of studying the cluster concept, their evolution, determining the conditions for the formation and functioning are given considerable attention in the works of M. Porter, G. Lindqvist, K. Ketels, M. Muro, P. Krugman, B. Harrison, E. Bergman, E. Fezer and others.

Despite a significant number of scientific developments and the accumulated experience of the functioning of organizations, the essence of the economic mechanism of innovative development of the agro-food sector in theoretical terms has not yet been sufficiently disclosed. Thus, in the methodological aspect, the conditions, principles and methods for the formation of a comprehensive assessment of the level of food security require clarification; in practice, no recommendations have been developed on the implementation of the economic mechanism for the innovative development of the agro-food sector. In this regard, an objective need arose for an indepth study of the theoretical, methodological and practical aspects of the economic mechanism of innovative development of the agro-food sector in various countries. The need to

improve existing and search for new approaches to solving this complex problem determined the topic, purpose and objectives of this study.

2. Purpose and objectives of the study

The purpose of the dissertation research is to develop a conceptual model for the formation of an economic mechanism for the innovative development of the agro-food sector in various countries of the European Union, aimed at ensuring food security and further integrating the economy into the world modern system. In accordance with the goal, the following tasks were set and solved:

- the theoretical foundations for the formation of a common agricultural policy of the EU countries have been developed;
- essence, classification and types of innovations have been disclosed and deepened;
- methodological approaches to the formation of cross-network innovative cluster structures have been researched;
- the world experience and directions of innovative development of the economy have been studied;
- a systematic analysis of the functioning of the agro-food sector of the EU countries was carried out (on the example of Poland);
- the factors influencing the state, provision and monitoring of food security of the EU countries are substantiated;
- the features of the formation of the market for organic products and the consumer choice of innovative food products were revealed;
- directions for the development of a common market of logistics services have been developed;
- program for managing commercial risks in the food market has been developed;
- an institutional mechanism for the development of regional public-private partnerships in the digital economy has been developed;
- forecast of sustainable development of the agro-food sector in the countries of the European Union have been substantiated;
- promising directions for the development of the innovation process in the agro-food sector have been developed.

The object of the study was the economic mechanism of innovative development of the agro-food sector of the countries of the European Union. The economic mechanism of

innovative development of the agro-food sector of the countries of the European Union was studied by the author as a set of tools, methods, techniques, models and algorithms that provide an impact on innovation to increase efficiency and competitiveness, achieve strategic goals. The subject of the study is the system of organizational and economic relations that arise during the formation and improvement of the economic mechanism for the innovative development of the agro-food sector.

3. Research methods

In the course of the study, the following methods of scientific research were applied:

- systems theory, operations research, economic-mathematical and statistical methods (comparison, analysis, synthesis, grouping, etc.) in the implementation of economic analysis of the functioning of the agro-industrial sphere;
- questionnaire survey – in the study of elements of the information system and types of risks in the process of making managerial decisions in the agricultural sector;
- points system – when evaluating information sources that are proposed to be used in the process of monitoring the food security of the European Union countries;
- economic and mathematical modeling - in forecasting the innovative development of the agro-food sector in the context of regional economic integration;
- graphical methods using information technologies and the capabilities of Microsoft Excel spreadsheet software products in determining the dynamics of economic indicators and the dependence of various factors and conditions.

4. Research information base

The information base of the research consists of the scientific achievements of domestic and foreign researchers on the issues of improving the mechanism of innovative development of the agro-food sector in the context of regional economic integration. The provisions of normative legal acts, statistical and analytical information of the Food and Agriculture Organization of the United Nations (FAO) and the Ministry of Agriculture and Rural Development of Poland, various organizations of the agro-food sector are taken into account.

5. Scientific novelty of the results obtained

The *scientific hypothesis* is to develop the theoretical and methodological foundations for the formation of an economic mechanism for innovative development of the agri-food sector in the countries of the European Union; development of a methodology for analyzing and assessing the functioning of the agri-food sector of the EU countries in the context of the need to increase its competitiveness in various markets; developing a concept for innovative development of the agri-food sector that ensures food security, increasing its efficiency in conditions of uncertainty and risk with the aim of integrating it into the world economy.

At work for the first time:

- the concept of innovative development of the agro-food sector in modern conditions is substantiated, which is a complex use of knowledge-intensive production factors and conditions (effective use of scientific and technical potential; integration of science, education and production; technological modernization based on advanced innovative technologies; management system), substantiation of forms, types and directions for the development and implementation of innovations, institutional frameworks that ensure the food security of countries and contribute to sustainable economic growth of the national economy;
- a strategy for innovative development on a cluster basis has been developed as a fundamental factor in the mechanism of formation, functioning and innovative development, which optimally combines a sustainable system for the dissemination of new technologies, knowledge, products (the so-called technological network), which is based on a joint scientific base, and cluster organizations have competitive advantages due to the ability to carry out smart specialization, minimize the cost of introducing innovations, which ensures that the agri-food sector reaches a qualitatively new level;
- proposed measures and recommendations for the formation of an institutional mechanism for the development of public-private partnerships in a digital economy, which includes, along with an electronic platform, a center of competence for the formation of network links and an intelligent electronic platform, which ensures openness, transparency, accessibility, stimulation,

optimization of interaction state and private business in the implementation of innovative network projects at the regional level.

Improved:

- an approach to understanding the category "innovative food product", on the basis of which its understanding is proposed as the presence of new consumer properties (novelty, improvement, modification), which improves the quality properties of the food product, production technology and is aimed at the possibility of its application in the formation of a promotion strategy and positioning of healthy foods;
- classification of innovations according to various criteria: by the nature of relations and the field of activity, by the scope of distribution and by subject-content structure, which together reflects the capabilities of producers and the attitude of consumers to innovations in the agri-food sector;
- an approach to understanding the innovation process as a constant transformation of technical (or technological) ideas into new technologies (or their individual components) and bringing them to implementation in the agro-food sector in order to obtain new, innovative products;
- methodological tools for a comprehensive assessment of modern models of sustainable development of agriculture in the countries of the European Union, including Poland, which corresponds to the implementation of the UN goals and ensuring national food security;
- a mechanism for the formation and functioning of the information support system for economic analysis, assessment and monitoring of the food security of countries, which contributes to obtaining initial information, determining the quality and sufficiency, providing the results to the management system for making rational management decisions in the agro-food sector at various levels;
- methodological tools for assessing the logistics services market, including a set of measures, directions and tools for creating a common logistics market in the European Union and innovative development of logistics infrastructure as a method of doing business, contributing to the promotion of agricultural products and food to wholesale and retail consumers, which ensures sustainability and purposeful functioning of the agrologistic system in the conditions of regional economic integration;

- methodological tools for building trend models, which contributes to the implementation of dynamic analysis and identification of the main trends in the innovative development of the agro-food sector, the market for organic products and forecasting their sustainable production in the future;
- a methodological approach to commercial risk management, which includes the substantiation and implementation of the developed stages, approaches to using the information system to assess three groups of risks that may arise in the process of collecting, processing information and taking into account their impact on the activities of agro-food organizations.

Have been further developed:

- a categorical-conceptual apparatus on the problem of innovative development of the agro-food sector in the context of regional economic integration through the provision of definitions of "common agricultural policy", "innovation", "economic mechanism for innovative development of the agri-food sector", as a complex characteristic, reflecting a set of tools, systems, methods, methods, models and algorithms to ensure efficiency, sustainability and competitiveness, achieve strategic goals, which requires an integrated approach to its analysis and evaluation;
- a methodological approach to a comprehensive analysis of the mechanism of innovative development of organizations in the agro-food sector from the standpoint of ensuring food security, improving the level and quality of life;
- a methodology for a comprehensive assessment of the innovative development of the agro-food sector, which allows you to take into account the impact of innovative potential, innovative activity and innovative activity on improving production efficiency, which is based on the calculation of an integral indicator - the coefficient of innovative development of organizations;
- a mechanism for the formation and creation of cross-network innovative cluster structures based on the use of key enabling technologies, which makes it possible to increase the competitiveness of products and the export potential of the agri-food sector.

6. Limitations of the study

The main limitation in the framework of this study is the focus of proposals exclusively on the organizations of the agri-food sector of the European Union

countries. In particular, the improvement of the functioning of agri-food organizations in the context of regional economic integration, since the activities of these business entities differ significantly from industrial production, trade, construction, services and other sectors of the national economy. Also, proposals to improve the mechanism of sustainable development of agriculture in Poland, taking into account the innovative provision of the technological process, are focused on business entities that have their own financial resources or the possibility of attracting external sources in order to update the material and technical base and introduce modern resource-saving technologies.

Only an integrated approach to the concept of the mechanism of innovative development of the agro-food sector in modern conditions allows us to substantiate aspects of its formation and functioning, to specify its structural elements and approaches to evaluation taking into account the types of activities, and then to develop a conceptual model.

7. Practical significance of the results obtained

The proposals and recommendations proposed in the dissertation are aimed at improving the mechanism of innovative development of the agro-food sector in the context of regional economic integration, forming and functioning of an effective system of information provision and monitoring of food security, developing measures to ensure the stable functioning and sustainable development of agriculture in the European Union, including Poland.

8. Personal contribution of the applicant

The dissertation is an independent, holistic and completed research. Theoretical and practical developments, conclusions and recommendations given in the work and submitted for defense, received by the author independently. Of the scientific papers published in co-authorship, only those provisions that are the result of personal scientific research are used in the dissertation.

The author's contribution to collective scientific works is specified in the list of publications.

9. The content of the dissertation

The dissertation, totalling 328 pages, consists of the introduction, four chapters, conclusions, a list of references, 20 appendices. 45 tables and 65 figures are presented. The bibliography contains 163 sources (including books, articles, periodical and non-periodical statistical and other publications, reports and online sources). The results of the study are presented in 133 publications (including 2 collective and 2 individual monographs).

II. THE MAIN CONTENT OF THE WORK

Introduction

Chapter 1. Theoretical and methodological foundations for creating the economic mechanism of innovative development in the agricultural food sector.

1. Common Agricultural Policy of the European Union: evolution and development trends.
2. Concept, classification and types of innovations in the agricultural food sector.

Chapter 2. State and main trends in the development of the European Union agricultural sector.

1. World experience and directions of innovative economic development.
2. Contemporary models of agricultural development in the European Union countries.
3. Modern trends in sustainable development of agriculture in Poland.

Chapter 3. Methodological tools for assessing and regulating the regional food and logistics market.

1. Assessment of the state, provision and monitoring of food security in the countries of the European Union.
2. Features of the formation of the market for organic products and consumer choice of innovative food products.
3. Directions of development of the common market of logistics services.

Chapter 4. Conceptual model of innovative development of the agricultural food sector in the context of digital transformation.

1. Development of a commercial risk management programme in the agri-food sector.
2. Formation of an institutional mechanism for the development of regional public-private partnerships in the digital economy.
3. Conceptual model of sustainable innovative development of the agricultural food sector.

Conclusion

III. SYNTHESIZED DISSERTATION PRESENTATION

INTRODUCTION

In the introduction, the relevance of the topic of the dissertation research is substantiated, the purpose and objectives of the research are formulated, the personal contribution of the applicant is determined, data on the approbation of the obtained scientific results are given.

Chapter 1. Theoretical and methodological foundations for creating the economic mechanism of innovative development in the agricultural food sector.

The first chapter examines the evolution and development trends of the unified agricultural policy of the European Union, reveals the essence, classification and types of innovations in the agro-food sector, summarizes methodological approaches to the formation of cross-network innovative cluster structures.

The study of the experience of supporting agriculture in the countries of the European Union shows that improving the mechanism for its use is the main goal of the agrarian reform of the Common Agricultural Policy of the Community. According to the programs for the rational development of agriculture and rural areas adopted by almost all EU member states, the main priority areas for using state support are: increasing the competitiveness of agricultural production, environmental protection, and the development of rural infrastructure.

Effective competition in agriculture is understood as its high intensity resulting from the absence of barriers to entry into the market and the presence of a significant number of competing entities entering into state-controlled partnership (cooperation) relations in order to minimize parallel costs, choose the best business strategies available to partners, and abandoning rivalry, leading to the loss of the weakest market participants. The expected results are economies of scale, new trade flows, increased competition considering the interests of consumers.

The main factor determining the development of agriculture in developed countries has become scientific and technological progress with the industrialization of agriculture. About two thirds of the increase in agricultural production is provided by innovations with the appropriate government support.

The essence of the Common Agriculture Policy can be interpreted as concerted actions of the EU countries to ensure stability and availability of agricultural supplies at sustainable prices, increase agricultural efficiency, maintain the living standards of agricultural producers, farmers and their families, guarantee reasonable price levels for consumers.

The world concept of successful development of economic systems at various levels is characterized as follows: "innovation = economic success". The performed comparative analysis of the essence of the category "innovation" allows us to note that it is based on the characteristics of individual properties of the object under study, the area of application and the effectiveness of use. The main differences in the definitions of the concept of "innovation" are expressed as in the manifestation of the gradation of novelty when the object changes under the influence of innovation, which manifests itself in the creation of a fundamentally new, previously unknown product (service), to the improvement of the properties, parameters and characteristics of the product available on the market (services), and in the expression of the field of applied application of innovations by business entities (technological, organizational, marketing innovations), thirdly, in recognizing the need to ensure the economic efficiency of the introduction of innovations.

The main feature of considering innovations in practice is the following: the scale of consideration and assessment of innovations and innovative activities is carried out at the micro-, meso- and macrolevels; expression of the "novelty" in the levels: "new for the market", "new for the enterprise", "new for the consumer". This approach to the study and assessment of innovation allows you to provide flexibility in the process of

innovation, to respond quickly to market conditions in order to make optimal management decisions.

Currently, under the conditions of the modern concept of social development, the process of formation of an integrated approach to the study of the concept of "innovation" as a system, mechanism, combining the following factors is taking place: change, process and result in the field of new products and processes with commercial application.

The author's definition of "innovation is a complex result of the practical activities of business entities in the creation and implementation of new products, new technology and management in order to increase the competitiveness and efficiency of various activities of agricultural organizations.

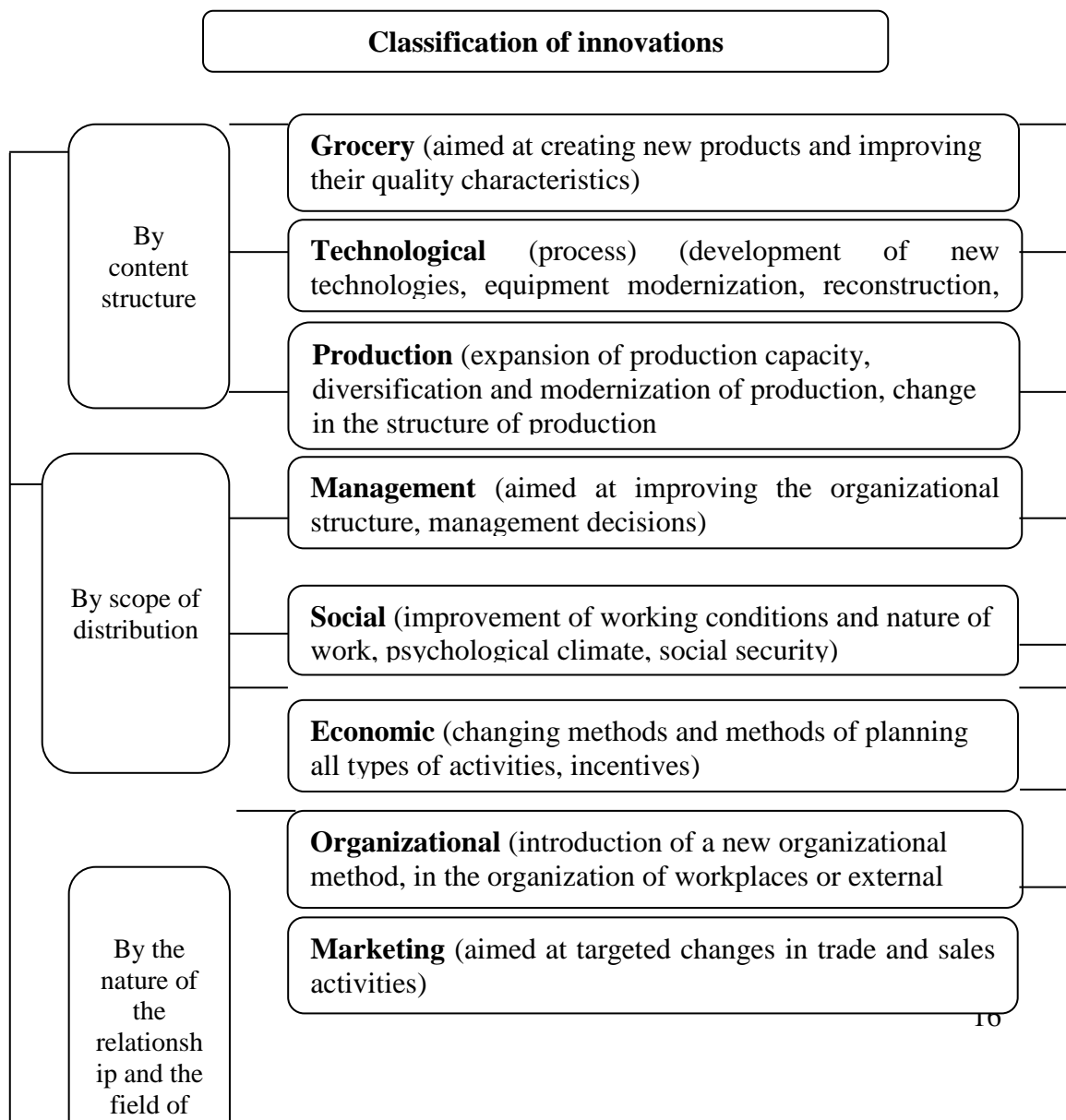
An important element of the theoretical and methodological substantiation of the essence of the concept of "innovation" is their classification. The classification of innovations is the division of innovations into certain groups according to specific characteristics. The construction of classification models of innovations should be based on the following criteria: the complexity of the set of considered classification characteristics for analysis and coding; the possibility of quantitative (qualitative) determination of the criterion; scientific novelty and practical value of the proposed classification feature.

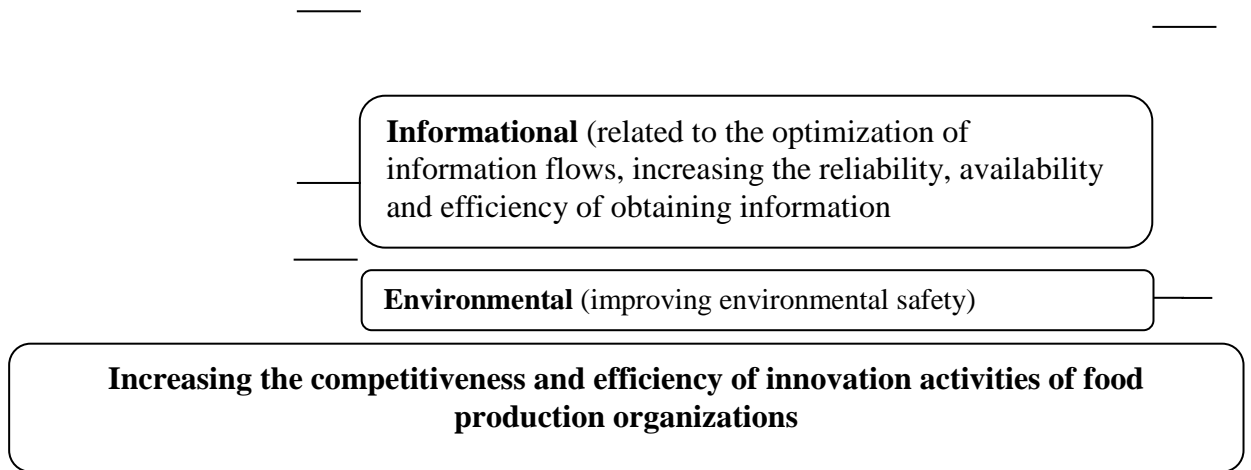
As the analysis has shown, the peculiarity of the application of innovations in agri-food organizations is as follows:

- the main type of innovation is technological innovation, including innovation-product and innovation-process,
- innovation in the agricultural sector is characterized by the principle of combination (combination): technological, organizational and marketing innovations,
- innovative technologies are developing in various directions, which include the production direction: modification of the production technology, storage and quality control of the product, changing the component composition of the food product, using new raw materials, improving the packaging of the food product; organizational direction: improvement of the system of planning, organization, control and motivation; marketing direction: using marketing strategies, benchmarking, branding technologies,

– the result of the physical expression of the innovative activity of agri-food organizations are: new or improved types of food products; new or improved services; new or improved production processes and technologies, machinery, equipment; new or improved production systems, new or improved approaches to the organization of marketing activities of the enterprise, new or improved organizational forms of management. However, innovation is not an end in itself, as it must be carried out in order to increase the competitiveness of the organization. innovations that affect the competitiveness of agricultural organizations have been classified according to the following criteria: by the nature of relations and the field of activity (social, economic, organizational, marketing and informational innovations); by the scope of distribution (production and management innovations); by subject-content structure (product and technological (process) innovations) (Fig. 1.1).

Figure 1.1 - Classification of innovations in the agri-food sector.





Source: Own creation.

Based on the above classification, the main directions of the impact of innovation on improving the competitiveness and efficiency of agricultural organizations are determined.

The innovative core of agri-food organizations is the following types of innovations: technological, marketing and organizational. Consideration of the features of the manifestation of innovations in agri-food organizations allows us to reflect the relationship between the basic and resulting variables of the activities of the subjects of the market environment, in the context of the implementation of innovative activities. The following are identified as the basic components of the activities of agri-food organizations: natural resources, production resources, labor resources, financial resources, information resources, which, subject to the development of the innovative core of the enterprise (technological innovations aimed at the development and production of new and/or improved products, the use of energy and resource-saving technologies; marketing - the development of new sales markets, the development and application of new sales and promotion strategies, the timely development and application of marketing concepts; organizational innovations - strategic planning, business processes, standardization, certification), can have a positive impact on the effectiveness of the variable components of the enterprise's activity, namely, to increase the market share through the production and sale of food products that meet the requirements of consumers and are characterized by high quality indicators, to increase the market share the sustainability of the products, through the use of new technologies and methods of production and packaging, which in turn will contribute to improving

the quality of nutrition and the formation of a healthy nutrition system for the population.

The author's definition of “innovation is a complex result of the practical activities of business entities in the creation and implementation of new products, new technology, management in order to increase the competitiveness and efficiency of various activities of agricultural organizations. In the agrarian sphere, innovations are carried out in almost all spheres of activity and are considered as an element of innovative development, innovative activity is the practical implementation of scientific, technical and intellectual potential in order to obtain new (or improved) products, more advanced technology, a method of organizing production and management. Innovations are classified according to the following characteristics:

- by the nature of relations and field of activity (social, economic, organizational, marketing and informational innovations),
- by the scope of distribution (production and management) innovations),
- on the subject-content structure (product and technological (process) innovations).

In economics, the concept of clusters is very diverse. They are understood as network formations of completely different kinds - from innovation systems to value chains.

The determining factor in creating an innovation cluster is the ability to maintain the continuity of the process of creating and mastering innovations through the integration of subjects of at least three institutional spheres: business, universities and the state. This requires the creation of a system of relationships and interactions capable of self-management and obtaining a synergistic effect.

It should be noted that, despite the existence in world practice of unified universal approaches to the creation, management and development of clusters, the governments of different countries regularly develop their own tools to support them. Thus, the EU can use the experience of developed countries in conducting a cluster approach and cluster policy, however, it is necessary to take into account the institutional and mental characteristics of the domestic economy. As evidenced by the European experience, regional and professional business associations make it possible to realize such a need, forming the basis of a model for the development of network interactions at the regional level.

To the synergistic effects of the cluster, it is necessary to add the synergy of investments and the synergy of innovation. The combination of various organizational

structures into a cluster forms a strictly oriented system for the dissemination of new knowledge, technologies and innovations. At the same time, the formation of a network of stable ties between all participants in the innovation cluster is the most important condition for the effective transformation of inventions into innovations, and innovations into competitive advantages. Clusters create a new product or service through the efforts of several enterprises or universities, which can accelerate their distribution across the network of business relationships. The innovative structure of the cluster helps to reduce the total costs of research and development of innovations with their subsequent commercialization due to the high efficiency of the production and technological structure of the cluster. This allows the cluster members to consistently carry out innovative activities for a long time.

Chapter 2. State and main trends in the development of the European Union agricultural sector.

In the second section of the dissertation, the world experience and directions of innovative economic development are summarized, modern models of agricultural development in the countries of the European Union and the main trends in the sustainable development of agriculture in Poland are studied.

At this stage, the main directions of development of the innovation policy of the countries of the European Union are: the development of a unified antimonopoly legislation, direct financing of organizations (firms) in order to encourage innovation in the field of advanced technologies, active stimulation of cooperation between scientific organizations and production and the development of small science-intensive business. Foreign experience of innovative development is of interest to the countries of the European Union as a benchmark that can be adapted in accordance with world approaches. In different countries, the starting conditions and factors that determine the possibilities of innovative transformations (economic, scientific, intellectual, personnel, technological potential; socio-cultural characteristics that affect the specifics of management decisions) differ significantly.

For the successful implementation of innovative activities, it is necessary to provide a set of conditions that act as the main factors and prerequisites that affect the level of innovativeness of production, management, commercial activities in all spheres

and links of the national economy. The main conditions that characterize innovative development are:

1. An environment conducive to the emergence and implementation of innovations.
2. Scientific production and technical support of high-tech innovations.
3. Organizational and legal basis for the implementation of innovative activities.
4. Investments, financial support of innovations.
5. Human resources and intellectual potential.
6. Information support of innovation activity, openness of access to information resources.
7. Risks.

The choice of strategy in the implementation of innovation processes, the degree of readiness of organizations (firms), individuals to innovate and, ultimately, the result of innovative development, depend on the specific state and combination of the above factors.

At this stage, the EU is a leader in the development of the bioeconomy in the world, the features of which are the following key characteristics. First, the bioeconomy is an important part of the image of the economy of the future EU. One of the priorities of the current European strategy is to strengthen the sectors of the bioeconomy, including attracting additional investment and creating markets. Also, this strategy involves the deployment of technological and economic solutions based on biotechnologies and nature-like technologies. The investment platform should play an important role in the early stages of production or in situations where market mechanisms do not provide sufficient incentives for the transition to biotechnology. The bioeconomy is expected to create new jobs in the European Union. Secondly, the bioeconomy is considered in the EU as an effective tool for solving environmental problems, as it makes it possible to reduce the negative impact on the environment and make more efficient use of available resources. It is important that the implementation of the bioeconomy policy leads to synergistic effects together with the environment. The bioeconomy is in line with the low-carbon development paradigm of minimizing climate impact in line with the goals of the Paris Climate Agreement and the UN Sustainable Development Goals. Considering the environmental aspects of the bioeconomy, it should be noted that the EU strategy updated in 2018 in this area is called "A sustainable bioeconomy or Europe: Strengthening the connection between economy, society and the environment").

At the same time, the strategy closely integrates the tasks of the circular economy, the official slogan of bioeconomics in Europe is “Bioeconomy: the European way to use our natural resources” (“Bioeconomy: the European way to use our natural resources”). Thirdly, the bioeconomy for the EU is an important element of the contribution to ensuring energy security and self-sufficiency in resources, including agricultural ones. Fourthly, the bioeconomy in the EU is a tool for European integration and the fulfillment of common European tasks by each member country. The bodies of the European Union are actively working on the formation of legislation and the development of recommendations in the field of bioeconomy. These recommendations are further implemented at the national level. In turn, many EU countries form their own concepts and approaches related to the bioeconomy and biologization of the economy. Examples are Finland, where a “forest-based bioeconomy” is implemented, or Germany, where the terms “biologization of the economy” and “biological transformation of industry” are used in official documents. Also at the level of regional strategies, the concept of “bioregion” (Lodz Declaration of Bioregions) appeared. The EU adopted a strategy aimed at the development of biocommunities, including biovillages, biocities and bioregions. In general, the role of the bioeconomy in the EU is expected to increase. The bioeconomy will contribute to the achievement of social, environmental and economic goals through the creation of new products and technologies with high added value. It should also help increase competition in the energy generation and raw materials extraction market (due to the emergence of medium and small enterprises processing biomass), as well as an increase in the diversity of economic activities. The development of the bioeconomy is inextricably linked with the use of new technologies and management, which should lead to an increase in the competitiveness of both individual companies and the European economy as a whole.

In general, the interaction of various countries should take into account the close coordination of common actions of the participating states in the field of foreign trade, antimonopoly, investment and sectorial industrial policy. In these conditions, innovative activity gets the opportunity to be realized on the basis of national and intercountry advantages and synergies from cooperation.

Special attention should be paid to such aspects of the experience of developed countries in stimulating the innovation process, such as the concentration of resources and funds on priority innovative projects of competitive technologies in certain

industries; formation of a cluster of innovative technologies that ensure the formation of competitive knowledge-intensive industries.

Chapter 3. Methodological tools for assessing and regulating the regional food and logistics market.

In the third section of the dissertation, an assessment of the state, provision and monitoring of food security of the countries of the European Union is given, the peculiarities of the formation of the market of organic products and consumer choice of innovative food products are determined, the directions of development of the common market of logistics services are substantiated.

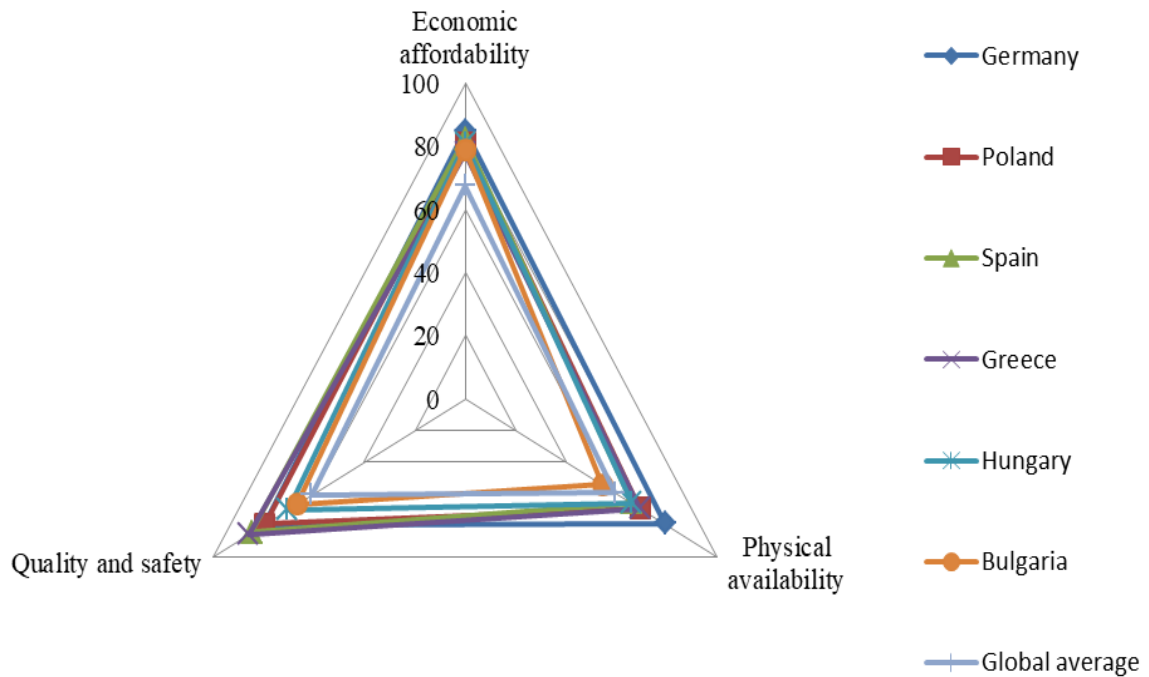
The food system is a set of socio-economic relations between people and such key components as:

- production of agricultural raw materials,
- processing of livestock and crop products for further consumption,
- infrastructure, the interaction of elements of which (transport, wholesale trade, retail trade, marketing) ensures the delivery of food to the consumer,
- disposal of packaging and food waste,
- research and study of the food market in the context of the quality of life of the population (quality and safety of food consumed), the blocks (elements) of the system (economic, political, socio-cultural, etc.) are interconnected, interdependent and determine the degree of balanced functioning of the food system.

The data given in Table 3.1 show that Hungary, Poland, Spain and Germany have a very good level of food security; Greece and Bulgaria have a good level.

Based on the calculation of the Global Food Security Index (GFSI), the level of food security of various countries of the world is assessed using indicators of the economic and physical accessibility, quality and safety (Fig. 3.1).

Figure 3.1 - An integral indicator of the level of food security of various countries of the world.



Source: Own creation.

The system of indicators according to the FAO methodology consists of four directions for assessing the state of food security:

- availability of food products to meet food needs (possibilities of own production, losses, stocks, imports, etc.),
- affordability of food products of the proper volume and quality for all social groups of the population (the ability to buy products in the right volume and in the right place),
- stability of food supply (analysis of changes in prices and production volumes, the negative impact of social conflicts on food security in order to make timely decisions),
- food consumption (full value and balance of nutrition in terms of calorie content, protein, microelements, as well as taking into account the spread of anemia, growth retardation, as well as obesity as a result of unbalanced nutrition, etc.).

The global food supply system requires improvement in order to improve human health and environmental stability. A major shift to sustainable, healthy diets by 2050 will require significant changes, including doubling the intake of plant-based foods rich in vitamins such as fruits, vegetables, legumes and nuts, while simultaneously sharply reducing (more than 50% from current levels) global food consumption. with excess

sugar and red meat (mainly due to reduced consumption in high-income countries). The organic food segment is expected to become one of the key growth drivers for the healthy food market in the near future.

In the process of research, it was established that in world practice there is no definition of the concept of "innovative food product", classification signs and criteria for this group of products have not been determined.

Promotion of innovations is a set of measures aimed at communicating information about the merits of innovation to potential consumers and stimulating their desire to acquire an innovation through the use of an information product, advertising, sales promotion tools.

The purpose of using tools for promoting an innovative food product to the market is to inform consumers about an innovative product and its properties, to form an image of an innovative food product, to change stereotypes of product perception and to stimulate participants in the sales system.

Thus, the system for promoting innovative food products to the consumer market is the state, manufacturer, trade, consumer, forming an information space in order to implement elements of communication impact on the object and subject of promotion in order to stimulate the process of forming demand and supply of innovative food products.

The definition of the concept of "innovative food product" is given - a food product obtained through the use of technological innovations, which is characterized by the presence of new consumer properties (novelty, improvement, modification), which improves the quality properties of the food product, production technology.

The study of the categories "innovation" and "innovative food product" makes it possible to substantiate the classification of this group of food products. The following features should be used as the basis for the classification scheme for innovative food products:

1. By appointment: products of daily use, functional purpose, specialized purpose, fortified organic products and combined products.
2. Depending on the food group: dairy products, meat products, fish products, fruits and vegetables, confectionery products, bakery products, alcoholic and other products.
3. By the field of innovative transformation: food products obtained through the use of innovative production technologies, food products with previously unused

prescription components, food products with altered organoleptic quality indicators, food products produced taking into account the physiological needs of various categories of the population, new packaging.

4. Depending on the modification of the food component: foods with a modified carbohydrate component, foods with a modified fat component, foods with a modified protein component, foods with a modified content of vitamins, foods with a modified content of macro - and microelements.
5. In relation to the subject of the market: products that are new for the consumer, for the manufacturer, for the domestic market and new for the foreign market.

The proposed classification of innovative food products allows us to note that the development, production and sale of an innovative food product performs as an economic function for food industry enterprises, allowing to expand sales markets, enter new segments, increase competitiveness, maximize profits, and a social function for society and the consumer. ensuring the consumption of food that meets the physiological needs of the body and contributes to vital functions and a healthy lifestyle.

The study made it possible to substantiate the conditions for ensuring the logistics process in the agri-food sector:

- organizational, which includes the conclusion of interregional agreements on the supply of agricultural and food industry products, assistance in the creation and operation of trade and purchasing organizations, commodity exchanges, integrated agro-industrial associations,
- regulatory legal, which involves the development, adoption and implementation of laws, regulations and other documents regulating production and logistics activities; a system of regulatory documents governing the country's domestic and foreign trade policy (pricing, taxation, insurance, financial support, etc.),
- scientific and methodological, which is based on the development and implementation of effective and modern methods and technologies of logistics in the agri-food sector, training of qualified specialists, information support of commercial operations, the formation of a material flow planning system.

During the research, it was found that the most important characteristic of logistics systems is an integral set of elements interacting with each other and taking into account the whole complex of factors that affect both the size of stocks and the

intensity of intra-production logistics flows (intra-production, managerial, sectoral and regional).

A certain trend in the development of logistics formations in the EU member states is the formation of a common European system of commodity circulation. It provides for the presence of several main logistics centres and a significantly larger number of regional centres interacting with them. This decision is intended to optimize trade flows and reduce the process of promoting agricultural products and foodstuffs to the EU internal market, as well as to develop projects at the interstate level for the development of a European network of logistics centres.

One of the modern trends in the development of logistics in the agricultural sector is the strengthening of the role of information and consulting services, the purpose of which is to timely convey to farmers high-quality information necessary for making management decisions. In the EU, the consultancy market accounts for approximately 4–5% of GNP and 3-4 million jobs. With all the variety of options for agrarian information services, the following most common models of consulting services can be distinguished:

- a system of training and visits based on the formation of pilot enterprises that subsequently pass on experience to neighbours,
- agricultural consulting services providing consulting services to organizations,
- centres of assistance, established at colleges and universities, which carry out agricultural research and provide advisory services to farmers.

With regard to the conditions for the development of regional integration, the directions for the development of the logistics infrastructure as a method of doing business and a type of economic activity that contribute to the promotion of agricultural products and food to wholesale and retail consumers are determined. The novelty lies in the expression of the laws of the market mechanism, taking into account which the stability, efficiency and purposeful functioning of the logistics system is ensured.

Chapter 4. Conceptual model of innovative development of the agricultural food sector in the context of digital transformation.

In the fourth section of the dissertation, a program for managing commercial risks in the agri-food sector was developed, the formation of an institutional mechanism for the development of regional public-private partnership in the digital economy was

substantiated, a conceptual model of sustainable innovative development of the agri-food sector of the European Union countries was developed.

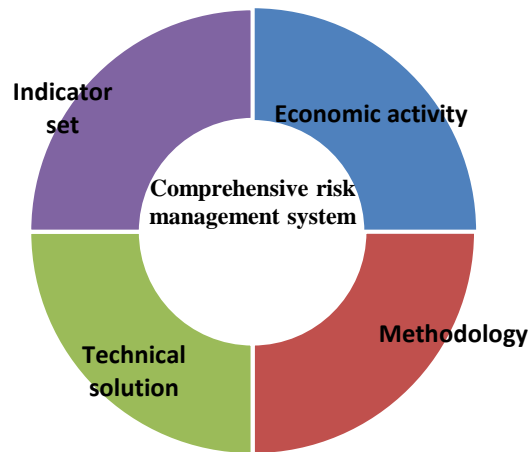
In order for organizations (companies, firms) to function effectively in the agri-food sector under conditions of uncertainty and risk, we will explore options for managing commercial risks. The methodological approach to risk management is to develop and implement sequential stages.

1. Clarification of the company's development strategy for the future in order to determine the threshold values of criteria and indicators that determine the possibility of using the main procedures for managing commercial risks.
2. Pre-selection of commercial risks.
3. Formation of a plan of preventive measures.
4. Analysis of commercial risks after the formation of a plan of preventive measures.
5. The final formation of the risk management programme (in order to highlight the plan of preventive measures, as well as to present for each of the risks the values of their main characteristics - the probability of damage and its possible size, homogeneity and the number of similar risks). The result of the final formation of the risk management programme should be the values of the maximum possible, most probable and expected losses recalculated based on the results of the implementation of the risk management programme.
6. Analysis of the effectiveness of the risk management programme (in order to assess the feasibility of its development and implementation).

This methodological approach to risk management aims to reduce the risk of erroneous decision-making at the time of its adoption and to reduce the possible negative consequences of decisions made at subsequent stages of their implementation.

Organizations in the agri-food sector need to create an integrated risk management system that covers all types of risks. An integrated risk management system for organizations in the agri-food sector (IRMS) is a combination of activities, methodology, specification of indicators and technological solutions (Fig. 4.1).

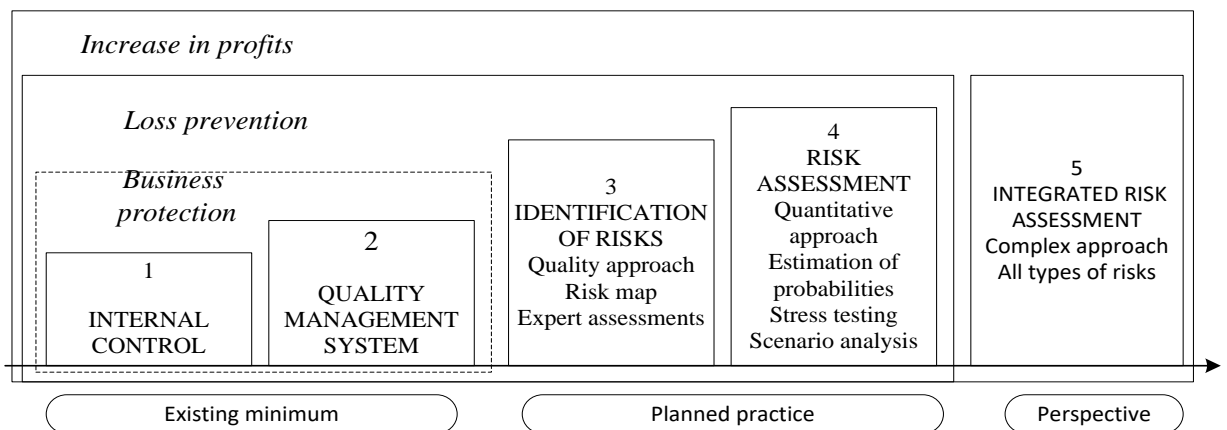
Figure 4.1 - Concept of an integrated risk management system.



Source: Own creation.

Consider the existing risk management system and compare it with the proposed integrated risk management system (Fig. 4.2).

Figure 4.2 - Comprehensive risk management system



Source: Own creation

Figure 4.2 shows that the risk management system in organizations in the agri-food sector is represented by minimal measures (internal control and quality management system) that ensure business protection from risks.

It is advisable for organizations in the agri-food sector to apply a risk identification system based on a qualitative approach, that is, using such risk identification methods as a risk map and an expert assessment method. After identifying risks, it is recommended to assess them using a quantitative approach, including an assessment of probabilities, stress testing and scenario analysis. Thus, the implementation of these measures will raise the risk management system in the agri-food sector to a higher quality level, which will prevent losses caused by various risks.

An important factor in the innovative development of the economies of European countries is the development of foreign trade.

The forecast of the share of food exports from various European countries (Poland, Germany, Greece and Bulgaria) in the overall structure of exports of goods is shown in (Table 4.1).

Table 4.1 - Forecast of the share of food exports from various European countries in the total structure of exports of goods.

Country	2023	2024	2025	Growth rate, % 2025/2023
Poland	15,2	16,5	17,9	117,7
Germany	7,3	8,4	8,9	121,9
Greece	23,3	23,9	24,6	102,9
Bulgaria	18,0	19,7	21,1	117,2

Source: The table is based on FAO data

According to calculations, by 2025, the projected value of the share of food exports in Poland will reach 17.9% in the total structure of exports of goods and services; in Germany - 8.9%; in Greece - 24.6% and in Bulgaria - 21.1%.

Using the matrix modelling method, we will carry out a forecast of the innovative development of organizations in the agri-food sector. The following quantitative indicators were taken as the initial data:

- indicators reflecting innovative potential: intangible assets, R&D expenditures (software products), number of R&D projects,
- indicators characterizing innovation activity: the volume of costs for technological innovation, profit from innovation,
- indicators related to innovative activity: the volume of innovative products, the volume of export products.

Conceptual model for assessing innovative development creates a holistic view of the level of organizations in the agri-food sector and allows you to use a systematic approach to building generalized indicators of innovative development.

We assess the efficiency of the functioning of organizations in the agri-food sector using the indicators:

- B₃₁ – profitability of innovative products,
- B₄₁ – profitability of export innovative products,
- B₅₁ – profitability of intangible assets,

- B_{61} – profit per R&D employee,
- B_{71} – profit for 1 monetary unit of R&D costs,
- B_{32} – innovative return on export products,
- B_{42} – innovative return of intangible assets,
- B_{52} – volume of innovative products per i-th R&D employee,
- B_{62} – return on R&D costs,
- B_{72} – return on cost of technological innovation.

The coefficient of effective development of organizations in the agri-food sector (Iir) has the following form

$$Iir = \sqrt[10]{\prod_{j=1}^2 \prod_{i=3}^{11} B_{ij}} = \sqrt[10]{B_{31} B_{41} B_{51} B_{61} B_{71} B_{32} B_{42} B_{52} B_{62} B_{72}}, \quad (4.1)$$

where B_{ij} – the index of changes in a particular indicator located in the i-th row, j-th column; $i = \overline{3,1}$, $j = \overline{1,2}$;

Π – product sign.

Using the matrix, it is possible to assess the impact of each structural element of the innovative development of organizations in the agri-food sector on the integral indicator, to perform a generalized assessment of them and, on this basis, to develop promising directions. To improve the efficiency of innovation, generalizing indices of the second level are used. Their formation and analysis are carried out using "element" matrices, each of which is built on the basis of the initial volume indicators (Tables 4.2 - 4.4).

In the presented matrices, to construct a generalizing index for assessing the effective development of organizations in the agri-food sector, the ratio of innovation potential, innovation activity and innovation activity is used.

The calculation of the second level indices:

$I_{op} = \sqrt{B_{42} B_{52}}$ for the matrix model "volume of innovative products - resources of innovative activity";

$I_{ps} = \sqrt{B_{61}B_{71}}$ for the matrix model "profit from the sale of innovative products - the cost of innovation";

$I_{pi} = \sqrt{B_{21}B_{31}}$ for the matrix model "profit from the sale of innovative products - the volume of innovative products".

Table 4.2 - Matrix model for assessing effective development (volume of innovative products - resources of innovation)

Indicators		Volume of innovative products (IP)	Intangible assets (IA)	Number of R&D employees
	Symbols	IP	IA	NRD
Volume of innovative products	IP		X24=IA/IP	X25=NRD/IP
Intangible assets (IA)	IA	X42=IP/IA		X45=NRD/ IA
Number of R&D employees	NRD	X52=IP/NRD	X54=IA/NRD	

Source: Own creation

Table 4.3 - Matrix model for assessing effective development (profit from the sale of innovative products - costs of innovative activities)

Indicators		Profit from the sale of innovative products	R&D costs	Costs of technological innovation
	Symbols	PRO	RD	CTI
Profit from the sale of innovative products	PRO		X16=RD/ PRO	X17= CTI /PRO
R&D costs	RD	X61=PRO/ RD		X67= CTI /RD
Costs of technological innovation	CTI	X71=PRO/ CTI	X76=RD/ CTI	

Source: Own creation

Table 4.4 - Matrix model for assessing effective development (profit from the sale of innovative products - the volume of innovative products)

Indicators		Profit from the sale of innovative products	Volume of innovative products	Export production volume
	Symbols	PRO	IP	EPR
Profit from the sale of innovative products	PRO		X12= IP / PRO	X13= EPR / PRO
Volume of innovative products	IP	X21= PRO /IP		X23= EPR / IP
Export production volume	EPR	X31= PRO / EPR	X32= IP / EPR	

Source: Own creation

In organizations of the agri-food sector, the second-level indices are equal:

- for the model "volume of innovative products - resources of innovative activity" are equal: 2018 - 0.559; 2019 - 1.255; 2020 - 1.227, which indicates an increase in the efficiency of resource use, which causes a corresponding increase in the volume of production of innovative products,
- for the model "profit from the sale of innovative products - costs of innovative activities" are: 2018 - 0.602; 2019 - 0.563; 2020 - 1.312. The calculations show that during the study period, the costs of innovative activities increased, which, accordingly, influenced the innovative development of organizations,
- for the model "profit from the sale of innovative products - the volume of innovative products" are equal: 2018 - 0.817; 2019 - 0.254; 2020 - 1.021, which indicates an increase in the innovative activity of organizations, which contributes to an increase in performance indicators due to the modernization of production, the introduction of new products and technologies.

At this stage, in the agri-food sector, there is a further deepening of cooperation in the field of R&D and an increase in the efficiency of innovation and the level of innovation potential, which contributes to the strengthening of competitive positions in various markets. In the study, the author's definition is given: the innovative potential of companies in the agri-food sector as a set of structural elements (financial, production, managerial and intellectual) that affect the innovation process. The system of estimated indicators of the innovative potential of companies is shown in (Table 4.5).

The set of generalized and given in (Table 4.5) estimated indicators of the innovative potential of companies in the agri-food sector, depending on the goals and objectives of the analysis, can be changed and supplemented.

Taking into account the diversity of the internal resources of the organization and the level of efficiency of their use to assess the innovative potential, it is advisable to apply an integral assessment and calculate the coefficient of innovative potential (CIP) according to the geometric mean formula:

$$CIP = \sqrt[4]{K_1 \times K_2 \times K_3 \times K_4} \quad (4.2)$$

where K_1, K_2, K_3, K_4 – values of indicators of structural elements of innovation potential.

Table 4.5 - The system of estimated indicators of the innovative potential of companies in the agri-food sector

Name	Calculation method
------	--------------------

Financial (K1)	
Current liquidity coefficient	$\frac{\text{Short – term assets}}{\text{Short – term liabilities}}$
Financial stability coefficient	$\frac{(\text{Equity} + \text{Long – term liabilities})}{\text{Total amount of funds}}$
Funding coefficient	$\frac{\text{Equity capital}}{\text{Loan capital}}$
Production (K2)	
Return on assets	$\frac{\text{Production volume}}{\text{Average annual cost of fixed assets}}$
Update rate	$\frac{\text{The value of the fixed assets entered}}{\text{Fixed assets value at the end of the year}}$
Fixed assets depreciation rate	$\frac{\text{The amount of depreciation of fixed assets}}{\text{The cost of fixed assets at the beginning of the year}}$
Managerial (K3)	
Property real value coefficient	$\frac{\text{Fixed assets} + \text{Raw materials} + \text{Work in progress production}}{\text{Total amount of funds}}$
Capital turnover coefficient	$\frac{\text{Revenue from product sales}}{\text{Total amount of funds}}$
Return on sales	$\frac{\text{Profit from product sales}}{\text{Revenue from product sales}}$
Intelligent (K4)	
Share of employees engaged in R&D	$\frac{\text{Number of R\&D employees}}{\text{Average number of employees}}$
Intellectual property security coefficient	$\frac{\text{Value of intangible assets (patents, trademarks)}}{\text{Long – term assets}}$
Coefficient of efficiency of scientific research	$\frac{\text{R\&D expenses, software products}}{\text{Short – term assets}}$

Source: Own creation

Depending on the obtained value of the integral indicator of the innovative potential of companies in the agri-food sector, its level (low, medium and high) and the types of innovative activities that they are able to carry out are determined.

The classification of the level of innovation potential and types of innovation activities of companies is shown in (Table 4.6).

Table 4.6 - Classification of the level of innovation potential and types of innovation activities of companies in the agri-food sector

<i>CIP</i> integral indicator value	Innovation level potential	Types of innovation
0-0.15	low	Low ability of the process industry companies to innovate

0.16-0.30	medium	Ability of the process industry companies to implement the acquired product, process, organizational and marketing innovations
0.31-0.5	high	Ability of the process industry companies to create (develop) and implement innovations

Source: Own creation

The conducted studies have shown that when studying the innovative potential of companies, it is necessary, taking into account the diversity of internal resources, to substantiate the factors influencing the increase in the efficiency of its use. We will assess the innovative potential of companies in the agri-food sector on the basis of an integral approach, which consists of the following stages:

- We define and calculate the indicators characterizing the effectiveness of the proposed structural elements of the innovative potential and present them in tabular form.
- We calculate the coefficient of innovative potential (*CIP*) according to the formula (4.2).
- We rank companies by groups, based on the obtained values of the coefficient of innovative potential, and determine the corresponding types of their innovative activities.
- Approbation in companies of the agri-food sector.

Thus, innovative activity is a complex characteristic of the innovative development of companies in the agri-food sector, which includes the results of innovative activities (economic, scientific, etc.), which affects the increase of their innovative potential. Consequently, the effectiveness of innovation activities of companies in the agri-food sector is determined by the degree of transformation of innovation potential into the final results of their activities.

V. CONCLUSIONS

The main scientific results of the dissertation:

1. The author's definition of the concept of "innovation" is given as a complex result of the practical activities of business entities in the creation and implementation of new products, new technology, management in order to increase the competitiveness and efficiency of agricultural companies.
2. The concept of innovative development of the agro-food sector in modern conditions is substantiated, which is a complex use of knowledge-intensive

production factors and conditions, substantiation of forms, types and directions for the development and implementation of innovations, institutional frameworks that ensure the food security of countries and contribute to sustainable economic growth of the national economy.

3. The methodological approaches to the formation of cross-network innovative cluster structures are investigated, the features are highlighted: biotechnology, information and computer technologies.
4. A methodology for the dissemination and consumer choice of innovative food products has been developed. In the study, the definition of "innovative food product" is given - it is a food product obtained through the application of technological innovations, which is characterized by the presence of new consumer properties (novelty, improvement, modification), which improves the quality properties of the food product, production technology.
5. A programme for managing commercial risks in the agri-food sector has been developed. The methodological approach to risk management is decided in the design and implementation of reality.
6. An institutional mechanism for the formation and development of a regional public-private partnership has been developed.
7. A forecast of sustainable innovative development of agribusiness in the EU countries has been made.
8. Prospective directions for the development of the innovation process in the agro-food sector are substantiated, including a comprehensive assessment methodology that allows you to take into account the impact of innovation potential, innovation activity and innovation activity on improving production efficiency.
9. Have been proposed measures and recommendations for the formation of an institutional mechanism for the development of public-private partnerships in a digital economy, which includes, along with an electronic platform, a center of competence for the formation of network links and an intelligent electronic platform.

V. LIST OF SCIENTIFIC PUBLICATIONS

1. **R. Jurczak.**, Etyka zawodowa funkcjonariuszy służb państwowych. Bezpieczeństwo wewnętrzne – wybrane aspekty praktyczne. Red. K. Przybyszewska, W. Nowiak, s. 135-161. Akademia Nauk Stosowanych w Koninie. Poznań-Konin 2023. ISBN 978-83-67287-57-9, ISBN 978-83-65038-48-7
2. **R. Jurczak.**, A. Ciastowicz., Ochrona i bezpieczeństwo ludzi, mienia i przestrzeni. Bezpieczeństwo wewnętrzne – wybrane aspekty praktyczne. Red. K. Przybyszewska, W. Nowiak, s. 163-187. Akademia Nauk Stosowanych w Koninie. Poznań-Konin 2023. ISBN 978-83-67287-57-9, ISBN 978-83-65038-48-7
3. Мицкевич Б., Мицкевич П., **Юрчак Р.** Развитие биоэкономики в условиях цифровой трансформации. ЦИФРОВИЗАЦИЯ: ЭКОНОМИКА И УПРАВЛЕНИЕ ПРОИЗВОДСТВОМ. Материалы докладов 87-й научно-технической конференции проф.,ско-преподавательского состава, научных сотрудников и аспирантов 31 января - 17 февраля 2023 года., с. 102-105. «Белорусский государственный технологический университет», Минск 2023.
ISBN 978-985-897-105-2
4. **R. Jurczak**, MECHANISM OF INNOVATIVE DEVELOPMENT IN THE AGRICULTURAL FOOD SECTOR IN THE CONTEXT OF REGIONAL ECONOMIC INTEGRATION. Monograph. Scientific Publisher. Scientific Association Institute of Economy and Market, s. 4-326. Szczecin 2023. ISBN 978-83-89393-48-7
5. **R. Jurczak**, Rozwój i monitorowanie jakości usług publicznych. Gospodarka i administracja publiczna – wybrane aspekty praktyczne. Red. R. Piechota, R. Rogaczewski, s. 137-165. ANS w Koninie. Poznań-Konin 2022. ISBN 978-83-67287-44-9
6. **R. Jurczak.**, M. Zawidzki., Organizacja i funkcjonowanie jednostek samorządu terytorialnego. Gospodarka i administracja publiczna – wybrane aspekty praktyczne. Red. R. Piechota, R. Rogaczewski, s. 191-219. ANS w Koninie. Poznań-Konin 2022. ISBN 978-83-67287-44-9
7. B. Mickiewicz., E. Volkova., **R. Jurczak.**, The Global Market for Potato and Potato Products in the Current and Forecast Period, *European Research Studies Journal Volume XXV*, Issue 3, 2022, pp. 740-751. ISSN 1108-2976, DOI: 10.35808/ersj/3062
8. B. Mickiewicz., P. Mickiewicz., **R. Jurczak.**, РЕАЛИЗАЦИЯ МОДЕЛИ УСТОЙЧИВОГО РАЗВИТИЯ АГРОБИЗНЕСА ПОЛЬШИ В УСЛОВИЯХ ЦИФРОВОЙ ЭКОНОМИКИ. ТЕХНИКА И ТЕХНОЛОГИЯ ПИЩЕВЫХ ПРОИЗВОДСТВ. Материалы XIV Международной научно-технической

- конференции. Том 2. 21–22 апреля 2022 года. Могилев 2022, s. 208-209. ISBN 978-985-7281-25-1
9. B. Mickiewicz., P. Mickiewicz., **R. Jurczak.**, РЕЙТИНГ УРОВНЯ ЦИФРОВОЙ ТРАНСФОРМАЦИИ ЭКОНОМИКИ РАЗЛИЧНЫХ СТРАН. СОВРЕМЕННЫЕ ТЕХНОЛОГИИ СЕЛЬСКОХОЗЯЙСТВЕННОГО ПРОИЗВОДСТВА. Гродно, 27 мая 2022 года. Гродно 2022., s. 108-110. ISBN 978-985-537-184-8
10. W. Brocki., B. Mickiewicz., **R. Jurczak.**, Economic and environmental aspects of industrial fishery in the Baltic. Homo Sapiens an Environment. Monograph. W. Wawrzyniak, T. Zaborowski. Gorzów Wlkp. – Poznań 2021., s. 41-55. ISBN 978-83-66246-37-9
11. B. Mickiewicz., **R. Jurczak.**, Barriers to the Development of Green Economy in Rural Areas of Selected Districts of the Greater Poland Province. *European Research Studies Journal Volume XXIV, Issue 2, 2021. pp. 314-324 (Submitted 05/03/21, 1st revision 09/04/21, 2nd revision 02/05/21, accepted 20/05/21).* ISSN 1108-2976, DOI: 10.35808/ersj/2128
12. **R. Jurczak.**, F. Szmatuła., T. Rudnicki., J. Korentz., Wpływ mielonego szkła z recyklingu na wytrzymałość i trwałość betonów o niskiej klasie wytrzymałości. *Czasopismo: Materiały Budowlane*, Tom. nr 11, s. 41-46. 2021. ISSN 0137-2971
DOI [10.15199/33.2021.11.07](https://doi.org/10.15199/33.2021.11.07)
13. **R. Jurczak.**, Dynamic analysis and forecast of effective development of the agri-food sector of European countries, 2021. *VUZF Review*, 6 (2), s. 182-189. <https://doi.org/10.38188/2534-9228.21.2.21>
14. **R. Jurczak.**, Methodology for assessment of food security of countries, 2021. *VUZF Review*, 6(3),c. 30-36. <https://doi.org/10.38188/2534-9228.21.3.04>
15. J. Korentz., **R. Jurczak.**, F. Szmatuła., T. Rudnicki., Właściwości nawierzchni betonowej autostrady A18 po 82 latach eksploatacji. *Czasopismo: Stowarzyszenie Producentów Cementu. Budownictwo, Technologie, Architektura*. Tom 2021/4, s. 68-71. ISSN: 1644-745X.
16. M. Jurczak-Imperowicz., **R. Jurczak.**, Neuroedukacja a niespecyficzne problemy w nauce dzieci i dorosłych. *Roczniki Pedagogiczne* 11(47) NS 2019. [w:] *Wyzwania współczesnej pedagogiki resocjalizacyjnej – od teorii do praktyki*. Red. n. ks. Prof. Marian Nowak. Towarzystwo Naukowe KUL. Katolicki Uniwersytet Lubelski 2019, s. 173-181.
DOI: [10.18290/rped.2019.11s-12](https://doi.org/10.18290/rped.2019.11s-12)
17. **Роберт Юрчак.**, Приоритеты Программы развития сельских районов на 2014–2020 гг. в сфере применения инструментов государственной поддержки. Актуальные проблемы устойчивого развития агропромышленного комплекса. Материалы XII Международной научно-практической конференции. Под редакцией академика В. Г. Гусакова, р. 273-280. Минск: Институт системных исследований в АПК НАН Беларуси, 2018. ISBN 978-985-7149-29-2

18. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, Performance characteristics of activities in priority 3 of Rural Development Program 2014-2020. Economic Sciences for Rural Development. 2018, Zeszyt: 47, s. 203-212. ISSN 1691-3078
19. **R. Jurczak.**, D. Wiliński., M. Budkowska., Wspieranie przedsiębiorczości elementem kreowania rozwoju lokalnego na przykładzie miasta Konina w latach 2015-2017. [w:] Konkurencyjność i rozwój regionów w warunkach integracji europejskiej i globalizacji. Red. n. A. M. Horodecka, M. Odlanicka-Poczobutt. Politechnika Śląska – zeszyty naukowe. Gliwice 2018., s. 169-186. DOI: [10.29119/1641-3466.2018.129.12](https://doi.org/10.29119/1641-3466.2018.129.12)
20. Мицкевич А., Мицкевич Б., **Юрчак Р.**, Институциональная поддержка охраны окружающей среды в сельском хозяйстве и в сельских районах. Современные технологии сельскохозяйственного производства: сборник научных статей по материалам XX Международной научно-практической конференции. Министерство сельского хозяйства и продовольствия Республики Беларусь, УО "Гродненский государственный аграрный университет". - Гродно, 2017. - с. 126-134. ISBN 978-985-537-100-8
21. A. Zimny., **R. Jurczak.**, Higher Education in the European, All-Polish and Supraregional Strategies of Socio-Economic Development, "Zeszyty Naukowe Wyższej Szkoły Ekonomiczno-Społecznej w Ostrołęce" 2017, nr 24, s. 389-405. ISSN 2391-9167
22. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, Консультативная система в сельском хозяйстве в новой финансовой программе на 2014-2020 годы. Современные технологии сельскохозяйственного производства: сборник научных статей по материалам XX Международной научно-практической конференции, s. 134-139, 2017. ISSN 2225-5796
23. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, S. Lisiak., Process of shaping of institutional support for agricultural sector in Poland. Proceedings o the 2017 International Conference "ECONOMIC SCIENCE FOR RURAL DEVELOPMENT" No 44 Jelgava, LLUESAF, 27-28 April 2017, pp. 116-125, ISSN 1691-3078. ISSN 2255-9930 on line, ISBN 978-9984-48-260-6
24. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, The new phenomena in the organic farming in the context of actions included in the 2014-2020. Rural Development Programme (RDP). Proceedings o the 2016 International Conference "ECONOMIC SCIENCE FOR RURAL DEVELOPMENT" Volume 41, Page 114-122, Jelgava. Published 2016, ISSN 1691-3078
25. B. Mickiewicz., **R. Jurczak.**, Comparative Analysis of Means for Financial Support of the Common Agricultural Policy in 2007-2013 as in Relation to 2014-2020. WSPÓŁCZESNE PROBLEMY EKONOMICZNE. Zeszyt: 12, Strony: 59-71. 2016. DOI: [10.18276/wpe.2016.12-05](https://doi.org/10.18276/wpe.2016.12-05)
26. A. Zimny., **R. Jurczak.**, Multidimensional Analysis of Sustainable Development in Countries of Central and Eastern Europe, "Journal of Agribusiness and Rural Development" 2016, nr 1 (39) s. 207-214. DOI 10.17306/JARD.2016.24

27. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, Характерные черты новой программы развития сельских районов на 2014-2020 гг. CHARACTERISTIC FEATURES OF THE NEW PROGRAM OF RURAL DEVELOPMENT FOR 2014-2020. Сельское хозяйство - проблемы и перспективы. Т. 34. Научная редакция V. K. Pestis - Экономика (Вопросы аграрной экономики), с. 174-179. 2016. Гродно: ГГАУ 2016. ISBN 978-985-537-094-0
28. **R. Jurczak.**, S. Lisiak., Możliwości stworzenia klastrów i innych powiązań interesariuszy szansą na rozwój Obszaru Funkcjonalnego Aglomeracji Konińskiej. Marketing i Rynek 2016, nr 10, Red. nauk. I. Rutkowski. Polskie Wydawnictwo Ekonomiczne, Uniejów, s. 215-229. ISSN 1231-7853
29. A. Zimny., **R. Jurczak.**, *Szkolnictwo wyższe w europejskich, ogólnopolskich i ponadregionalnych strategiach rozwoju społeczno-gospodarczego*, Międzynarodowa Konferencja Naukowa „Ekonomiczne wyzwania zrównoważonego i stabilnego rozwoju gospodarczego w Polsce w latach 2015-2020”, Zachodniopomorski Uniwersytet Technologiczny w Szczecinie, s. 168-180 Szczecin, 2016 r. ISBN/ISSN [978-83-7663-339-8](#)
30. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, *Process of Expanding the European Union Through Accession of New Member States*. Сельское хозяйство - проблемы и перспективы: сборник научных трудов/Учреждение образования "Гродненский государственный аграрный университет". Научная редакция V. K. Pestis - Гродно, 2015. - Т. 28: Экономика (Вопросы аграрной экономики). - с. 249-260. ISBN: 978-985-537-073-5
31. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, Historical Conditions of the Functioning of Agricultural Cooperatives in Poland. Сельское хозяйство - проблемы и перспективы: сборник научных трудов/Учреждение образования "Гродненский государственный аграрный университет". Научная редакция V. K. Pestis - Гродно, 2015. - Т. 28: Экономика (Вопросы аграрной экономики). - с. 238-248. ISBN: 978-985-537-073-5
32. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, West Pomeranian University of Technology Process of Expanding the European Union Through Accession of New Member States, Vestnik Belorusskoj Gosudarstvennoj Sel'skohożajstvennoj Akademii Bulletin of the Belarussian State Agricultural Academy No 3. Gorki, 2015. ISSN 2225-5796
33. A. Mickiewicz., B. Mickiewicz., **R. Jurczak.**, Charakterystyka obśestvenno-professional'nych organizacji krest'an, dejstvuuśih v sel'skoj mestnosti v Pol'se, [w:] Sel'skoe hazajstvo: problemy i perspektivy: sbornik naučnych trudov. Т. 28. Экономика (Voprosy Agrarnoj Ekonomiki), red. V. K. Pestisa Grodno: Grodnenskij Gosudarstvennyj Agrarnyj Universitet. Grodno, 2015. ISBN 978-985-537-184-8
34. B. Mickiewicz., **R. Jurczak.**, Characteristics of the multiannual financial framework within the context of the common agricultural Policy. Economic Science for Rural Development, Issue 39, Page 68-78, Published 2015. ISSN 1691-3078

35. A. Mickiewicz., A.N. Kostaev., **R. Jurczak.**, B. Mickiewicz., Transgranicnoe sotrudnicestvo kak mehanizm razwyitia prigraničnych sel'skih territorij, Agrarnaja Nauka Evro-Severo Yostoka, no. 2 (39). Sankt Petersburg 2014. ISSN 2072-9081
36. A. Zimny., **R. Jurczak.**, Statistical analysis of the allocation of EU funds in the Greater Poland Province [w:] Folia Pomeranae Universitatis Technologiae Stetinensis 314 Oeconomica 77/4 Wydawnictwo Uczelniane Zachodniopomorskiego Uniwersytetu Technologicznego w Szczecinie, s. 177-188. Szczecin, 2014. Identyfikator YADDA bwmeta1.element.agro-1340f33c-dd17-4b37a4591ec78e6827bc.
37. A. Mickiewicz., **R. Jurczak.**, Comparison of prices for agricultural land before and after the Polish accession to the European Union. Сельское хозяйство - проблемы и перспективы: сборник научных трудов/Учреждение образования "Гродненский государственный аграрный университет". - Гродно, 2014. - Т. 27: Экономика (Вопросы аграрной экономики). - с. 294-299. ISBN 978-985-537-063-6
38. A. Zimny., **R. Jurczak.**, The socio-economic conditions of the development of rural border areas [w:] Folia Pomeranae Universitatis Technologiae Stetinensis 306 Oeconomica 73, Wydawnictwo Uczelniane Zachodniopomorskiego Uniwersytetu Technologicznego w Szczecinie, s. 109-119. Szczecin 2013. Identyfikator YADDA bwmeta1.element.agro-748dde81-b925-4d26-ad8f7f7d02ecdd6d.
39. A. Zimny., **R. Jurczak.**, Management of rural areas in the light of functioning of local action groups [w:] Polska wieś w aspekcie rozwoju zrównoważonego – Europa inwestująca w obszary wiejskie pod red. B. Mickiewicza, Wydawnictwo Stowarzyszenia Naukowego Instytut Gospodarki i Rynku, Szczecin 2013. ISBN: 83-89393-20-4
40. A. Mickiewicz., **R. Jurczak.**, Ekonomiczno-społeczne uwarunkowania rozwoju przygranicznych obszarów wiejskich na przykładzie euroregionu "Niemen", Współpraca transgraniczna na obszarach pogranicza, pod red. Z. Tomczonek, Politechnika Białostocka, Białystok, 2013 s. 134-156. ISBN 8362582413, 9788362582419
41. **R. Jurczak.**, Ekonomiczno-społeczne procesy zmian na obszarach wiejskich północno-wschodniej Polski. Monografia. Wydawnictwo Naukowe. Towarzystwo Naukowe Instytut Gospodarki i Rynku., s. 275. Szczecin 2013. ISBN: 978-83-89393-03-6.

AUTHOR'S DECLARATION

I, the undersigned

Robert Jurczak, Doctoral Candidate, Department of Finance,

DECLARE

that my dissertation and abstract on the topic:

MECHANISM OF INNOVATIVE DEVELOPMENT IN THE
AGRICULTURAL FOOD SECTOR IN THE CONTEXT OF REGIONAL
ECONOMIC INTEGRATION

presented before the Academic Council were written entirely by me.
All literary sources that I have used are cited in accordance with the rules.

Sofia
2023