colloquium-journal

ISSN 2520-6990

Międzynarodowe czasopismo naukowe

# Economic sciences

№14(101) 2021
Część 5

colloquium-journal

ISSN 2520-6990

ISSN 2520-2480

Colloquium-journal №14 (101), 2021

Część 5

(Warszawa, Polska)



«Colloquium-journal»
Wydawca «Interdruk» Poland, Warszawa
Annopol 4, 03-236
E-mail: info@colloquium-journal.org
http://www.colloquium-journal.org/

# CONTENTS
## ECONOMIC SCIENCES

6. Beaver W. H. Financial Ratios as Predictors of Failure, Empirical Research in Accounting: Selected Studies, Supplement [Журнал] // Journal of Accounting Research 5. - 1966 г.. - стр. 71-127.

7. Jodi L. Bellovary Don E. Giacomino and Michael D. Akers A Review of Bankruptcy Prediction Studies: 1930 to Present [Журнал] // Journal of Financial Education. - 2007 г.. - стр. 1-42.

8. Platt H. Platt B., Pedersen G. Bankruptcy discrimination with real variables [Журнал] // Journal of Business Finance & Accounting . - 1994 г.. - стр. 491 - 510.

Приложение:

Таблица 4

**Независимые переменные модели.**

| Группа переменных | Название переменной | Пояснение |
|---|---|---|
| Финансовые, показатели платёжеспособности | *Cashtodeb* | Отношение денежного потока к долгу |
| | *Currentratio* | Коэффициент текущей ликвидности |
| | *Debttoebitda* | Долг / EBITDA |
| Финансовые, показатели рентабельности | *DDebt* | Дефлированный долг компании на процентную ставку |
| | *DAssets* | Дефлированные активы компании на цены на нефть |
| | *ROA* | Рентабельность активов |
| | *ROE* | Рентабельность собственного капитала |
| | *Grossmargin* | Валовая прибыль |
| Нефинансовые показатели | *Currchange* | Стандартное отклонение национальной валюты относительно доллара. И доллара относительно индекса доллара. |
| | *Rreserve* | Реальная стоимость доказанных запасов |
| | *Accmethod* | Метод учета FC, SE. Где FC =0, SE=1. |
| | *RES* | Процент возобновляемой энергии в стране |

UDC 631.1

***Kysh L.M.***

*Candidate of Economic Sciences, Associate Professor of the Department of computer sciences and economic cybernetics Vinnytsia National Agrarian University*

DOI: 10.24412/2520-6990-2021-14101-32-39

## USE OF INFORMATION SYSTEMS AND TECHNOLOGIES BY AGRICULTURAL ENTERPRISES: CURRENT TRENDS AND PROBLEMS

***Abstract.***

*The main purpose of the study is to determine the benefits and functions of business information systems, which are important support for management and decision-making in agricultural enterprises, using accounting data. In the short and medium term, agriculture must respond to a number of challenges arising from the final transformation economy, changes in the world economy and access to the common market of the European Union. The agricultural sector belongs to the main sectors, mainly depending on natural resources. Although it is usually less important, it plays an indispensable role in the economy. Reproduction processes are typical for duplicate information systems and information technologies. The introduction of information systems that provide competitive advantages in domestic and foreign markets through the effective provision of information is becoming a crucial factor for successful development and sustainable market position. Agricultural enterprises are also affected by the trend of computerization. ICTs have a clear positive impact on income growth in developing and developed countries. Risk analysis for agricultural enterprises differs in some way from the same work for other areas of economic activity. In addition to certain general macroeconomic risks, different clusters of other types of risks are inherent in different sectors of the economy. Information technology and agriculture were considered incompatible ten years ago, but now the scenario has changed. Today, the information system is widely integrated with agriculture. Information technology has always been able to improve the quality of agriculture and agricultural products, but requires efficiency and information in every field of agriculture. Process virtualization with the help of cloud computing creates a single modern and complex system of agricultural intelligent enterprises supported by ICT. Effective business software is becoming inevitable for agricultural enterprises. Agricultural management systems can process farm data in such a way that the results are organized to address individual decisions for each agricultural enterprise. Agricultural enterprises are facing a growing trend of computerization in all areas of crop, livestock and management. ICTs digitalize the following processes: seed selection, soil preparation, sowing, harvesting, processing, storage and distribution.*

***Keywords:*** *ICT, agrarian entities, risk analysis, agriculture, development, preconditions.*

**Introduction.** Implementation of information systems that provide competitive advantages in domestic and foreign markets through the effective provision of information, becomes a crucial factor for the successful development and sustainable market position. Agricultural enterprises are also affected by the computerization trend. ICTs have a clear positive impact on income growth both in developing and developed countries. In rural areas, ICTs can increase profits by raising agricultural productivity and introducing income channels other than traditional farm work. Studies support the conclusion that ICTs improve incomes and quality of life among rural people. The idea that wider access to and use of ICTs across the country will reduce income and life standards inequalities between rural and urban residents seems to be compelling. Thus, it was taken as the basis for large-scale policy initiatives to ensure equal access to ICTs in all areas. Since late 1990s, an information systems boom in the agricultural sector have been observed, when the unified system of business and mid-level management was gradually supplemented by a large number of new products provided by software companies. Today, software products of domestic and foreign companies show a tendency to qualitative improvement. The processes of globalization significantly affect the methods of practical management as well. The need for relevant information and detailed knowledge of the internal and external environment of the enterprise come to the fore. Ukraine has opened up new opportunities for positioning itself in foreign markets within the European Union. This has led to the increased requirements for information security. The information systems of agricultural entities should also reflect the new conditions and demands of the European Union [1-5].

Information policy defines the measures to be implemented in the field of information technologies in the entities and the reasons for their implementation.

**Recent research and publications**. L.N. Bolshev, V.P. Borovikov, B.V. Gnedenko, S.V. Dronov, A.M. Yerin, N.V. Smirnov, G.A. Kimble, A.I. Kobzar, N.Sh. Kremer, A.T. Opria and others devoted their works to the research of the problems of introduction the information technologies at the agricultural enterprises.

**Purpose of the article.** The main objects of the study are the benefits and functions of information systems that give an important support for the process of management and decision-making in agricultural enterprises.

**Presentation of the main material**. In the short and medium term, agriculture is to respond to a number of challenges arising from the final transformation of the economy, changes in the world economy and access to the European Union's common market. Agriculture due to the natural conditions belongs to the main sectors in Ukraine and plays a critical role in its economy.

Farm businesses are aware of the value of information; however their corporate information systems do not meet the required level. In order to ensure steady competitiveness, it is necessary to make changes to existing information systems and link them to the external environment. Computerization is also the issue of the government policy. To ensure a systematic and integrated approach to the responsibilities associated with creating effective information systems, the Ministry has developed a set of documents which define the necessary tasks that should be implemented in the field of agriculture in accordance with the global development of the information society. Development and implementation of the Concept of Agrarian Policy and Computerization Program will be considered strategic both from the point of view of public administration and creation of the necessary information and communication links. The documents present the sector concepts focused on information systems and communication technologies in favor of building information systems and other necessary tools. The structure and content of the projects were derived from the goals and priorities of the sector, as well as from the tasks related to the EU integration strategy. Management is a complex process, and the right decisions must be based on available objective and reliable data. At the same time, it is necessary to differentiate operational, tactical and strategic management. The best solution is to have data to meet all the needs of managers and their provision in real time. At first glance this is a difficult task. However, the introduction of appropriate information systems and technologies makes it possible to store large amounts of data, process them in a short time and provide managers with the results in the necessary formats (calculations, graphs, multidimensional analysis). The business information system that provides relevant data should take into account the nature of the enterprise business activities, information flows, implemented soft- and hardware, and ensure implementation of modern tools to support financial management [6-10].

The current governance and decision-making of senior management is influenced by a turbulent and sometimes very unpredictable environment, which is associated with large-scale globalization and critical factors in the financial and banking markets.

In addition to the previously mentioned effects of globalization on the economy, we also face other problems: rapid change, a huge increase in structured and especially unstructured data, operativeness, etc. Top managers who want to maintain the competitiveness of their organization must deal with the reality by qualitatively new ways; that is, use the latest management technologies in combination with IT tools. First of all, they need to use the enterprise resource planning (ERP) and business intelligence (BI) systems as inevitable management tools. These problems are also closely linked to agriculture. ERP systems automate and integrate important business processes such as receiving orders, planning processes, registration of deliveries and financial data. ERP systems help increase business efficiency. The most important advantages of such systems are:

– assistance in defining and ensuring business processes throughout the supply chain,

– protection of important business data by the appropriately defined access policy,

– planning of working hours on the basis of existing orders, as well as forecasts,

– providing clients with tools at a high level of services,

– transformation of business data into a form convenient for flexible decision-making.

Modern ERP solutions cover a crucial part of business processes; therefore, it can be stated that one of the most important tasks in determining the information strategy of the enterprise is to pay sufficient attention to determining the most appropriate ERP system.

The most important reasons for implementing ERP systems are:

– providing the enterprise with a wide range of functions, covering a great variety of core activities,

– support of internal and external processes and ability to optimize them,

– the feature to reduce the number of operating systems,

– ERP is a foundation stone of corporate IT architecture,

– globalization requires the introduction of a unified ERP system,

– effective corporate strategy based on aggressive and effective use of information technology,

– competitive advantage or being equal competitors [11-13].

Requirements for system functions, links, or criteria for solution providers are important and should be clear. Business analytics helps refine results, optimize operating models and maintain a flexible and fast decision-making process. The following definition of business intelligence (BI) is generally accepted: it is a set of targeted procedures, processes and technologies for effective and expedient support of decision-making processes in corporations. It represents a set of programs that support analytical and planning activities of enterprises and organizations based on specific, the so-called OLAP technologies, and their modifications. Recently, the term Business Intelligence has been used to replace the term MIS (Management Information System). The areas covered by BI are not clearly defined; e.g., it is used to support business strategy and marketing. Competitive intelligence (competition and competitive environment analysis), expert systems or DSS (decision support system) are examples of areas often included in BI; however, they can also be considered as separate units.

There is still a low level of implementation of business intelligence among enterprises, what can be explained by the low level of information about the available software. Business intelligence programs are also important for agricultural enterprises. Modern business intelligence programs focus, in particular, on flexibility, interactivity and the ability to obtain the most accurate information in the shortest possible time and in the easiest way in order to obtain new facts from it and thus create the added value for decision-making. The most accurate and complex data that can detect background effects that lead to undesirable deviations, are necessary for the daily operational and tactical decision-making, as well as for some important strategic resolutions. Business analytics applications help managers find answers to many questions [14-16].

Business intelligence applications are useful for improving efficiency of activities in corporations, while enhancing independent thinking. Access to information is not available without the use of new technological, software and organizational tools aimed at information processing. Each company has a set of information contained in files, databases and documents. This information is vital for decision-making at all levels of management. To make the most masterly decisions, managers need to have access to the right, accurate and consolidated information at the right time. Each company does it a little differently and chooses different strategies. It is important to constantly develop and adapt the management system to the external conditions and new vision, which the company has decided to apply with the use of the state-of-the-art management technologies provided by IT tools. An important factor for the successful development, i.e. maintaining the competitiveness of economic entities, is the introduction of economic information systems that provide competitive advantages in domestic and foreign markets through the effective use of information. The economic information system is an important part of the corporate information system. It is primarily focused on collecting, processing and providing information that illustrates the real economic condition of the corporation. It is necessary that the accounting software application provides databases that meet operational, tactical and strategic needs – this is the basis of a properly designed business information system. Accounting system should be understood as an integral part of the business information system. Automated processing of accounting information can be considered routine. In this regard, the software solution is important. Firstly businesses could choose from desktop versions, but the trend in this area is leading to cloud ones. Cloud computing is considered to be the conceptual in provision information technology services over the Internet. Electronic information is processed and stored on external servers in large data centers. The current trend of ICT development, the demand for early and relevant information forces companies to use cloud solutions and integrate the accounting module into existing IS or implement complex ERP systems. In our opinion, in order to make the processes more efficient, it is expedient to choose the option which leads to the increased competitiveness of the enterprise, although cloud computing also has certain risks. The most important risk is associated with information security, access to confidential data and reliability of the provider.

It can be said that information and communication technologies are important for increasing the competitiveness of agricultural enterprises as well as agri-tourism businesses. They create a competitive advantage and offer the opportunity to change the market situation, strengthen market positions and attract new customers. Information and communication technologies are powerful tools for strengthening competitiveness in agriculture and rural development, even in developing countries [14-16].

Fixed capital is influenced by technical, technological and managerial innovations aimed at acquisition and use of energy and resource-saving technologies and

management systems meant to production process automation. Working capital is related to biological, chemical, managerial and commodity innovations, including high-yielding varieties and breeds, plant and animal protection, inventory and product quality management.

Intellectual capital is influenced by technological, managerial and marketing innovations that facilitate the definition of strategic guidelines in production and marketing activities of the enterprise. Human capital is based on the introduction of technological, managerial and marketing innovations aimed at the staff professional development. Social capital is formed under the influence of management and marketing innovations that help improve the image and business reputation of the enterprise and increase its value in rural community development.

The information components of technical, technological, chemical and biological innovations are methodological and guiding documents that reflect the peculiarities of their implementation and application, warranty obligations, quality certificates for consumables, production licenses, patents, right to use plant and animal breeds, databases and electronic services of innovators with their proposals (veterinary drugs, plant protection agents).

Information components of management are a set of information flows of the enterprise and the adequate software for data collection, processing and transmission between management units and investors, automated means of production process management, in particular, information systems in accounting, decision support, electronic document management tools etc. The information components of marketing innovations are automated databases of customers, license agreements for sales, analytical reviews and forecasts for industry markets, contracts for the products supply, warehousing lease or freight services contracts, electronic means of sale.

Besides, the significant influence of seasonal factors in agriculture should be pointed out. On most other human activities seasonality has almost no effect. However, it is seasonality that creates new types of risks in agriculture. One example of this is the large time gap between works that require the use of all types of resources, including financial, to obtain income from the sale of products, as these incomes can be obtained only after the harvesting. The situation is complicated by the fact that the impact of certain common macroeconomic risks on agriculture in Ukraine has different character and different dimension compared to those in other countries. For example, the degree of risk in the agricultural sector of Ukraine is so high that it threatens investors. In some cases, foreign investment in Ukrainian agriculture becomes impossible. Therefore, the direct use of automated information systems for the risks analysis, forecasting and optimal management actions, which are successfully used in other countries, is impossible in Ukraine. As the experience of adapting such systems to Ukrainian conditions has shown, despite the significant amount of money spent on it, the use of such systems in Ukraine is extremely low [11-12].

A negative factor, which is not typical of most other countries, is that Ukrainian agribusiness is more susceptible to macroeconomic stress than, for example, the banking sector. That is why the degree of some risks in agriculture is so threatening for the producer that it puts agricultural production on the verge of bankruptcy, what negatively affects the entire economy. Agriculture is one of the most important industries in the country, forming its own budget. And the largest share in the commodity production of the industry belongs to small enterprises, whose condition is the most sensitive to these stressful situations. In addition, this is a decisive factor for the emergence of other problems, such as employment ones.

Automatic information systems for the risk analysis and assessment are not able to work without accumulation, evaluation and processing of information about the factors influencing the risks. The work should be performed continuously and, preferably, automatically. This is primarily due to the large amounts of unstable information, ever-changing trends that sometimes change to the opposite, etc. In developed countries, database of factors influencing the risks of agricultural production has been formed over many decades. These bases are formed not only at the state level, but also in individual regions. Unfortunately, in Ukraine the only database that is systematically filled in and maintained at the state level is the database of weather factors. Thus, there is an urgent need both to use the analysis automatic information system (hereinafter – AIS), and to assess risks and their impact on the economic activity of Ukrainian agribusiness enterprises, as well as to develop databases of various types of risk factors.

For the other types of non-agricultural business, there exists some different set of risks. This complicates the use of risk analysis tools that have shown themselves successful in other sectors. The relative weight of risks that have a greater impact on the activities of the enterprise is different for agribusiness, e.g. the risk of uneven cash flows, which, in most cases, due to seasonal character is inherent for agriculture. This creates certain requirements for cost planning, the need to take into account the risks associated with the seasonal nature of production. Such a tool as futures sales is not yet common in the economic activity of agribusiness, so it does not eliminate the problem of the revenue seasonal nature [7-11].

Economic system of an agricultural enterprise consists of systems that, in combination with the technical, technological and organizational system of production, form the integrity of the enterprise. The main task of the enterprise in current business conditions is the search for the ways of transition to modern methods of production management and improving the economic condition of the organization, automation of production accounting and reporting, search and development of strategic advantages over competitors, what induces the use of modern information systems and technologies in agricultural production. Introduction of information technologies in the economic system of an agricultural enterprise occurs mainly according to the design methodology. Implementation of the project in

the economic system consists of two phases: design and implementation of the technology in production. It should be noted that the implementation process is closely associated with significant costs.

Agricultural information resources can be divided into two categories: one is for the traditional use of natural resources for agricultural production; the second contains features of modern agricultural production, which characterizes it as socio-economic information. The first category of information includes information on natural resources, including climate, information on soils, water resources, crop growth, pests and diseases, and natural disasters. The socio-economic information provides data on the functioning of agricultural markets, legal and administrative information, showings of agricultural science and education. Information on the use of natural resources is a major part of agricultural information resources, and, regardless of traditional agricultural production and the use of long-term information, is a modernization of basic information needed for agricultural production. Socio-economic information differs from the information on traditional agricultural implements for production efficiency increasing and improving its structure. Information technologies and systems that improve the quality of information to ensure the economic stability of enterprises are encouraged.

Today, the information technology market can offer a range of full-featured personnel management systems that are not inferior to Western counterparts in terms of functionality or technology. These systems allow to perform the following tasks: management structure and staffing of the enterprise; human resources management; personnel records; time management; time cards management; calculation and accrual of wages, bonuses, taxes, single social tax; administrative work process of personnel management and accounting work, certification and identification of needs (education, training) of employees; generation of statistical data, forms and various reports for internal and external use.

The requirements of the system of organizational processes to its information system are as follows:

– the information system should, as far as possible, support all business process activities, i.e., it should be covered by their functionality;

– the information system must support the business processes management;

– the information system should, as far as possible, support all structures of the relevant business, so its functioning should be exercised in compliance with all restrictions and rules of the business;

– the information system must provide a natural transformation of business processes, so it is not able to prevent its conceptual or other structural changes.

Farmers have different types of information needs at each stage of the production process. This need may be conditioned by pest attacks, weather forecasts, cultivation practices, raw materials, prices and disease control. Information systems are designed to provide farmers with information on those issues. Farmers can receive information from a number of different sources, including fellow farmers, members of the same social network, etc. Although traditional economic theory assumes that information is invaluable, information in developing countries is rarely symmetrical or invaluable. This happens partly due to the high cost of obtaining information through traditional means such as travelling, radio or newspaper. As a result, information asymmetry can be a significant barrier to the introduction of agricultural technologies in developing countries. The role of ICT in agriculture is also to overcome information asymmetries and create an equal playing field for the parties concerned. The information systems play an important role in coordinating the activities of agricultural enterprises and providing farmers with reliable information from reliable sources [1-4].

Information systems can be used in various fields of agriculture, as many researchers assert. Some of them have made the lists of areas of application of ICT in agriculture. Some of them are:

I. Information systems should be used to monitor supply and demand for agricultural resources. Based on the annual production plan, it is possible to assess the costs, and accordingly provide their control. Information on the availability of seeds, fertilizers and pesticides in some other region may become accessible to farmers. This will help them to make rapid purchase of raw materials at a lower price.

II. Information on the availability of quality planting material in various public nurseries and agricultural universities should also be regularly reported to farmers through information systems.

III. Agricultural universities and other national institutions regularly produce improved varieties of different crops. The main features of these varieties, such as their productivity, disease resistance and adaptability, should be announced to farmers through IS.

IV. Timely detection and control of pests and plant diseases is important to reduce further damage to crops.

V. Weather plays a significant role in the incidence of certain pests and diseases. A disease forecasting module needs should be developed to identify possible pests and diseases in advance and to take prevention measures to reduce economic losses.

VI. In agriculture primary data can be obtained by remote sensing, where attributes such as ownership, soil fertility, crop character, etc. can be added to the survey maps. This data can be integrated and analyzed at different levels to facilitate decision making. This data can also be transferred to different departments.

VII. Integrated information systems should be developed for the various components of watershed development programs, which can be controlled at different levels if appropriate monitoring and evaluation software has been developed.

VIII. The use of satellite imagery data information should be used to predict rainfall, crop area, yield estimates, and soil properties.

IX. It is necessary to prepare an interactive module to help farmers prepare a harvest budget, what will help them to document data on the production costs and profits [9, 16].

Application of new and modern information and communication technologies (ICT) for rural development and agriculture has progressed quite rapidly over

the last ten years. Current analysis recognizes that ICTs used in agricultural and rural development processes include equipment, software and applications for digital content creation, management and presentation (for the user), knowledge management and sharing, as well as aspects of institutional management and organizational structures that are related to the exchange of information, data and knowledge. This mix of practices and processes can be called information and communication management (ICM), where digital technologies play a significant, if not dominant, role.

ICT infrastructure components include hardware, software, networks, wireless networks, computer systems, Internet access, mail systems, servers, video conferencing equipment, etc., plus human resources that manage and operate the ICT infrastructure. In the economically developed countries, these components are fully accessible, while in developing countries, these tools are poorly advanced, which clearly indicates the need for improvement in the basic ICT infrastructure in the less developed countries. Important new ICT technologies, such as video conferencing, which previously were available only in the developed national systems, are becoming an important communication tool in most less developed countries. They play an important role in disseminating information to communities in remote and rural areas, which are managed by the communities themselves and are mainly initiated by the civil society organizations with the financial support of international development agencies. The use of cell or mobile phones is almost ubiquitous and has become an important way of transmitting the content adapted to local use that meets the needs of local agricultural communities and individuals. It can be used in conjunction with printing, postal services, radio (medium-wave broadcast), TV (cable, direct home or broadcast) and newer ways to access the Internet using 4G+ technology. This approach, namely the opening of diverse and mixed communication channels, has even greater potential to supply services to agricultural communities in rural areas.

Agricultural research management is highly dependent on high-quality information about projects, project locations, experts, funding sources and research priorities. These are components of the research management information system. This information is crucial for the process of institutional change, project monitoring and evaluation, results management, etc. It is intended to guide and monitor needs-based research, plan and prioritize investments, build capacity, aggregate thematic focus, and be effective in collaboration and partnership. Such information is not available openly and publicly, which hinders the involvement of various actors and stakeholders in formal research processes and inhibits collaboration within and outside research systems. This may be due to a mismatch between investments and the high level of human experience and support systems needed to generate such information for decision-making. Intensive cooperation between different subject experts is not so easy to be achieved in the less developed countries. Without clear policy guidance, there is likely to be a lack of appropriate structures, workflow tools, and applications to generate and manage this information [14-16].

Information and computer technology (ICT) is changing rapidly. Digital technology allows people to connect around the world at high speed at any time. Even those in remote developing regions are increasingly able to connect to the Internet through telephone and ISPs. The capabilities of satellites and drones can provide remote real-time sensing of data on seasonal growth and crop development, soil moisture and other dynamic variables. High-performance computing can be used to process large amounts of data in a short period of time, to comprehend large amounts of structured and unstructured data collected using new sounding technologies, and to scale and test models in ways that were not previously possible. Internet and cloud technologies allow these capabilities to be available to a large number of end users with convenience and cost that were previously unthinkable. As a result of these and some other events, society expects that more and better information will be provided to support daily decision-making. Our enthusiasm for these new technologies in the agricultural sciences must be dampened by the realization that our modeling and decision support systems do not keep pace with technology. Indeed, many of the frameworks used in these systems date back to the 1980-90s, to the time of emergence of modern data collection, computing, storage, access, processing technologies, software languages, and coding standards. Thus, we see two different possibilities of using modern ICT for modeling agricultural systems. First, advances such as big data, crowdsourcing (i.e., obtaining data and information through distributed networks of respondents), remote sensing, and high-performance computing can be used to improve the science of agricultural systems modeling. Second, new technologies can be used to transform the practice and application of agricultural systems modeling, making it much more common, widespread, flexible and accessible.

The science of agricultural systems modeling is steadily advancing and introducing various new ICT technologies to improve science in each specific case. However, the practice and application of agricultural systems modeling is not developing so fast, which leads to the lack of applications using agricultural systems models. Thus, there is no feedback from the application, and it must be established for the processing systems models. Thus, the focus of this review is not on relevant ICT technologies for the scientists working at the university or research institute, but on ways to promote the involvement of actors outside the academy. Such participation will result in the NextGen modeling community, which includes not only models and model developers working in different industries, spatial and time scope aimed at using new data sources and creating and applying new models, but also developers of software for creating NextGen modeling platforms, data processing applications and visualization tools [10-13].

Information technology and agriculture were considered incompatible ten years ago, but now the scenario has changed. Today, the information system is widely integrated in agriculture. Information technol-

ogy has always been able to improve the quality of agriculture and agricultural products, but requires efficiency and information in every field of agriculture. The World Trade Organization has recently made commendable efforts to promote information technology as an integral part of agriculture around the world.

ITs should play a significant role in all aspects of Ukrainian agriculture. In addition to promoting and improving the efficiency of farmers' productivity in agriculture and related activities; using the potential of IT to improve the quality of life of farmers by providing timely data and entering data for decision-making is inevitable.

Farmers working for the benefit of Ukrainian do not always have access to the latest agricultural practices, which hampers their ability to serve the community effectively. Recent developments and changes in the structure of IT in rural Ukraine contribute to the effective penetration of IT for information needs. They examine possible bottlenecks that may arise in rural Ukraine in connection with the WTO system requirements, as well as solutions for them.

Information and communication technologies (ICT) are usually related to the expansion of a set of technologies used to process information and provide assistance in communication. These include hardware, software, storage media for the collection, storage, processing, transmission and presentation of information in any format (i.e., voice, data, text and images), computers, the Internet, CD-ROM, e-mail, telephone, radio, television, video, digital cameras, etc. The advent of personal computers, the Internet, and the mobile phone over the past two decades has provided a much wider choice of collecting, storing, processing, transmitting, and presenting information in a variety of formats to meet the diverse demands and skills of people. It is believed that ICTs contribute to social and economic development by creating favorable conditions. Almost every single activity in the modern world is becoming increasingly dependent on the use of ICT for a particular use. The benefits of ICT reach even those who do not have first-hand access to it. For example, with the help of ICT, a doctor in a rural village can obtain up-to-date information on certain diseases and can use this information to consult and treat patients; the agricultural worker can study new technologies, precipitation forecasts, commodity prices and use this information in order to advise farmers in rural areas, etc. The use of ICT in development has long been recognized very important and access to ICT has even been identified as one of the goals of sustainable development, which emphasizes the benefits of new technologies, especially ICT in the fight against poverty [14-16].

The agricultural sector is undergoing a transformation due to new technologies, which seems very promising, as it will allow this predominant sector to move to the next level of productivity and profitability. Precise agriculture, which is the use of input (what is needed), when and where it is needed, has become the third wave of the modern agricultural revolution (the first was mechanization, and the second – the green revolution with its genetic modification), and today it is intensifying due to the increase of knowledge in farming systems due to the availability of larger amounts of data. In addition, when considering environmental issues, farms are increasingly using new technologies to maintain the sustainability of agricultural production. However, the introduction of these technologies involves uncertainty and balancing. According to the market analysis, factors that would promote the adoption of sustainable agricultural technologies include better education and training of farmers, exchange of information, easy availability of financial resources and increased consumer demand for organic food. Using these new technologies is aimed at getting something holistic and valuable information, as the data itself is not useful, it's just numbers or images. Farms that have chosen to be managed by IT-technology revealed valuable benefits, such as saving money and labor, increasing production or reducing costs with minimal effort, producing quality food with more environmentally friendly practices. For example, raw measurements of basic crop parameters need to be processed efficiently so that numbers or images become valuable information. Precision farming that came into being thirty years ago has certainly been transformed in the modern digital information age. Traditional field management is a visual inspection of crop development to establish diagnosis by which farmers make decisions and carry out various treatments for their crops. This approach is based on field experience and information perceived through the eyes of farmers. In addition, associate manufacturers may follow the recommendations of cooperative technicians or engineers hired by the company to which they belong. In farms with advanced technologies, field management depends on the operating cycle. This management system is based on objective data in the field and sensible decision-making. Data include information obtained directly from the parameters conditioned by yield, soil or environment. There are several ways to retrieve data from sensors, from inserting a drive into a USB port to receive files to retrieving data from software programs that are synchronized with the Internet. The relationship between data and decision-making stage involves filtering artificial intelligence procedures and algorithms to obtain only the right data and help the manufacturer make the right decisions. Finally, operation refers to the physical execution of the action ordered by the decision-making system, and is usually carried out using advanced equipment that can receive orders from a computerized control unit [4-7].

**Conclusions**. Agricultural management systems can process data in such a way that the results are organized to address individual decisions for each agricultural enterprise. Agricultural enterprises are facing a growing trend of computerization in all areas of crop production, animal husbandry and management. ICTs digitalize the following processes: seed selection, soil preparation, sowing, harvesting, processing, storage and distribution. They are included in the management system and are ultimate for receiving, processing and storing data. Modern technological tools, machines, devices and mechanisms work due to the software applications and systems. Process virtualization with the help of cloud computing creates a single modern and

complex system of agricultural smart enterprises supported by ICT. Effective business software is becoming an integral feature of agricultural enterprises.

**Reference**

1. UDC 631.153:621.311Armbrust, M., Fox, A., Griffith, R., Joseph, AD., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I. and Zaharia, M. (2010) "A view of cloud computing", Communications of the ACM, Vol. 53, No. 4, pp. 50–58. DOI 10.1145/1721654.1721672.
2. Basl J. and Blažíček R. (2008) "Podnikové informační systémy" (in Czech), Grada Publishing, Prague. ISBN 978–80–247–4307–3.
3. Forestier, E., Grace, J. and Kenny, C. (2002) "Can Information and Communication Technologies Be Pro–Poor?", Telecommunications Policy, Vol. 26, No. 11, pp. 623–646. ISSN 0308–5961. DOI 10.1016/S0308–5961(02)00061–7.
4. Goyal, A. (2010) "Information, Direct Access to Farmers, and Rural Market Performance in Central India", American Economic Journal–Applied Economics, Vol. 2, No. 3, pp. 22–45. ISSN 1945–7782. DOI 10.1257/app.2.3.22
5. Hamranová, A. (2013) "Aspekty implementácie Business Intelligence v slovenských podnikoch" (in Slovak), Ekonóm, ISBN 978–80–225–3603–5.
6. Havlíček, Z., Lohr, V., and Benda, P. (2009) "ICT and agritourism in Czech Republic", APSTRACT: Applied Studies in Agribusiness and Commerce, 3, [Online]. Available: http://agecon-search.umn. edu/bitstream/53541/2/10_ICT_Apstract.pdf.
7. Jensen, R. (2007) "The Digital Provide: Information (Technology), Market Performance, and Welfare in the South Indian Fisheries Sector", Quarterly Journal of Economics, Vol. 122, No. 3, pp. 879–924. E–ISSN 1531–4650, ISSN 0033–5533. DOI 10.1162/qjec.122.3.879.
8. Kokles, M. and Romanová, A. (2007) "Informačný systém podniku" (in Slovak), Ekonóm, Bratislava. ISBN 978–80–225–2286–1.
9. Kuncova, M., Hedija, V. and Fiala, R. (2016) "A Comparison of Specialised Agricultural Companies Performance", International Scientific Conference on Quantitative Methods in Economics – Multiple Criteria Decision Making XVIII. ISBN 978–80–972328–0–1.
10. Lio, M. and Liu M.–Ch. (2006) "ICT and Agricultural Productivity: Evidence from Crosscountry Data", Agricultural Economics, Vol. 34, No. 3, pp. 221–28. E–ISSN 1574–0862. DOI 10.1111/j.1574–0864.2006.00120.x.
11. Maumbe, B. M. and Okello, J. (2010) "Uses of Information and Communication Technology (ICT) in Agriculture and Rural Development in Sub–Saharan Africa: Experiences from South Africa and Kenya", International Journal of ICT Research and Development in Africa (IJICTRDA), Vol. 1, No. 1, pp. 1–22.
12. Novotný, O., Pour, J. and Slanský, D. (2005) "Business Intelligence" (in Czech), Grada Publishing, Prague. ISBN 80–247–1094–3.
13. Röller, L.–H. and Waverman, L. (2001) "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach", The American Economic Review, Vol. 91, No. 4, pp. 909–923. ISSN 0002–8282. DOI 10.1257/aer.91.4.909.
14. Scheps, S. (2008) "Business Intelligence for dummies", John Wiley and Sons Ltd, Chichester. ISBN 978–1–118–05141–2.
15. Sirota, M., Juanchich, M., Kostopoulou, O. and Hanak, R. (2013) "Decisive Evidence on a SmallerThan–YouThink Phenomenon: Revisiting the "1–in–X" Effect on Subjective Medical Probabilities", Medical Decision Making, Vol. 34, No. 4, pp. 419–429, E–ISSN 1552–681X, ISSN 0272–989X. DOI 10.1177/0272989X13514776.

Stuchly, P. and Krutakova, P. (2015) "Analysis of a process in relation to the enterprise information system", ICABR 2015. 1st ed. Mendel University, Brno. [Online]. Available at: http://www.icabr. com/fullpapers/icabr2015.pdf.

UDC: 657:339.5

***Koval Lyubov Vitaliyivna***
*Associate Professor of Accounting*
*Vinnytsia National Agrarian University*
*Vinnytsia, Ukraine*
*ORCID: 0000-0001-6986-5350*
DOI: 10.24412/2520-6990-2021-14101-39-45

## ORGANIZATION OF CONTRACTUAL WORK IN THE CONDITIONS OF FEA OF THE ENTERPRISE

***Abstract.***

*The article reveals the economic essence and significance of the foreign trade agreement as a guarantee of economic security of the business entity. The basic conditions of deliveries of 2010 and 2020 are considered, their comparison is carried out. The admissibility and legality of the use of the rules of 2010 are established, with the mandatory fixation of such a choice in the relevant order of the enterprise. On the basis of the processed array of information the general information according to Incoterms rules is formed.*

*The risks that arise when concluding foreign economic contracts are considered and ways to minimize them are proposed.*

***Keywords:*** *organization, contract work, risks, foreign economic activity, economic security, terms of deliveries, Incoterms rules.*

Colloquium-journal №14(101), 2021

Część 5

(Warszawa, Polska)

ISSN 2520-6990

ISSN 2520-2480

Czasopismo jest zarejestrowany i wydany w Polsce. Czasopismo publikuje artykuły ze wszystkich dziedzin naukowych. Magazyn jest wydawany w języku angielskim, polskim i rosyjskim.
Częstotliwość: co tydzień

Wszystkie artykuły są recenzowane.
Bezpłatny dostęp do elektronicznej wersji magazynu.



Czasopismo jest publikowane i indeksowane na portalu eLIBRARY.RU,
Umowa z RSCI nr 118-03 / 2017 z dnia 14.03.2017.

Redaktor naczelny - **Paweł Nowak, Ewa Kowalczyk**

«Colloquium-journal»
Wydawca «Interdruk» Poland, Warszawa
Annopol 4, 03-236
Format 60 × 90/8. Nakład 500 egzemplarzy.

E-mail: info@colloquium-journal.org

http://www.colloquium-journal.org/