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ADVANCE IN INFORMATION SUPPORT FOR BUSINESS MANAGEMENT IN THE CONTEXT OF DIGITAL ECONOMY

РОЗВИТОК ІНФОРМАЦІЙНОГО ЗАБЕЗПЕЧЕННЯ УПРАВЛІННЯ БІЗНЕСОМ У КОНТЕКСТІ ЦИФРОВОЇ ЕКОНОМІКИ

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Розвиток інформаційного забезпечення управління бізнесом у контексті
цифрової економіки. Оглядова стаття.*

У статті подані основні напрями розвитку інформаційного забезпечення управління бізнесом у контексті формування цифрової економіки. З'ясована сутність інформаційних процесів та їх роль в управлінні бізнесом. Уточнені тенденції інформаційного забезпечення управління бізнесом: збільшення обсягів даних; застосування штучного інтелекту для аналітичної роботи в бізнесі; розвиток аналітичних інструментів і платформ; створення персоналізованих пропозицій та рекомендацій для лояльних споживачів за допомогою інформаційних систем; розробка та впровадження продуктів та послуг для забезпечення безпеки даних; розвиток дистанційної роботи та віртуальних офісів в бізнесі. На основі проведених досліджень виокремлено актуальні питання розвитку інформаційного забезпечення управління бізнесом, що вимагають вирішення. Запропоновано методичні підходи щодо вирішення зазначених проблемних питань.

Ключові слова: інформація, інформаційне забезпечення, управління бізнесом, цифрова економіка

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Advance in Information Support for Business Management in the Context of
Digital Economy. Review article.*

The article presents the main directions of advance in information support for business management in the context of formation of the digital economy. The essence of information processes and their role in business management has been clarified. There have been specified trends in information support for business management: increase in data volumes; application of artificial intelligence for analytical work in business; development of analytical tools and platforms; creation of personalized offers and recommendations for loyal consumers by means of information systems; development and implementation of products and services to ensure data security; rise in remote work and virtual offices in business. On the basis of the carried out research, the relevant issues of advance in information support for business management which require solutions have been identified. Methodical approaches to solving these problematic issues have been proposed.

Keywords: information, information support, business management, digital economy

The issues of information support for business management are related to the increase in data volumes, changes in the external environment and growth of cyber threats. Development of new methods of data collection, its processing and analysis is an important scientific task. This should allow managers to use information effectively in order to make strategic decisions. The practical task is to implement new technologies in the processes of information support for business management. These technologies are to meet modern requirements for information security and efficiency of business management. The search for answers to these questions is necessary for further development of business.

Effective economic analysis and informed decision-making in business are possible if there is up-to-date information about the real state of the external environment. Modelling of effective management processes in the field of manufacturing and sales of products is also impossible without the use of digital technologies. In addition, it is worth considering that implementation of the main directions of the development of the state economy is possible due to the active digitization of the public management system.

Since digitization, development of the digital infrastructure of the information environment is an

important element of the evolution of business management, this determines the feasibility of scientific research in the specified direction.

Analysis of recent research and publications

The analysis of recent publications on advance in information support for business management in the context of the digital economy shows the relevance of this issue. In this area of scientific research, there have been emerging new approaches to data collection, its processing and analysis aimed at improving business management. The focus is on development and implementation of innovative information technologies, such as artificial intelligence, data analytics, cloud solutions, blockchain. These technologies open up new opportunities for optimizing information processes and increasing business competitiveness.

A number of scientific works published recently have been devoted to the issues of advance in information support for business management. In particular, in their works, Yu.M. Hrybovska [2], A.L. Pravdiuk, T.Yu. Prutska, M.V. Pravdyuk [4] highlight the theoretical and practical aspects of formation of the information environment. The scientific sources [6; 7] give the results of the study on the use of information technologies. The relevant information is covered on the websites of the research companies focusing on analyzing technologies and their impact on business. Economics and management journals have published articles on the state of digital transformation and other aspects of information support for business management. Judging by scientific publications, there is an evolution of the field of information support for business processes and improvement of technologies to achieve strategic goals in business

Unsolved aspects of the problem

The aim of the article is to structure directions and trends of information support for business management in the context of the digital economy. The tasks of achieving the set aim are: to analyze the relevance of advance in information support for business management in modern conditions of economic development and its prospects; to determine the role of information support for business management in the field of decision-making, analysis of resource use, marketing support, productivity improvement, ensuring data security; to highlight the components of information support for business management (information systems, databases, information technologies, human resources, processes and methods of working with the information environment); to analyze the prospects of information support for managing the efficiency of industrial and commercial activities and possibilities of increasing its efficiency.

The main part

The digital economy is a system of economic interactions of production, distribution, exchange and consumption, based on the use of information and communication technologies in business. In the digital economy, the main resource is information.

Such a type of digital economy as the Internet economy covers the sphere of economic relation although products and services are produced and consumed outside the Internet.

Another type of digital economy is the virtual economy, in which the results of business activities are stored and exist in the online environment.

There is also a kind of economy known as the "smart economy". It assumes that the main actions and processes are carried out via the Internet (smart home, smart city, e-government, direct democracy, etc.).

Another type of economy is the information and network economy. This kind of economy is a form of industrial and commercial relations in which connections and interaction between counterparties are carried out due to a decentralized network. In this economic system, information and data play a key role in business. Here, all processes, from decision-making to production and customer service, are based on the exchange and analysis of information that comes through the network [10]. In such an economy, not only the quantity of information is important, but also its quality and availability. Blockchain technologies, distributed computing and other innovative solutions make it possible to create safe, fast and reliable networks for exchanging data and resources.

The concept of "business" within the scope of this study is considered as production and commercial activities of its owners and managers with the aim of obtaining profit. In our opinion, business management includes the following management functions: a) determination of business objectives and strategies; b) forecasting, planning and control of business processes; c) motivation of owners, managers, other personnel.

Information support for business process management is an integral element of modern business. It involves collecting, processing, storage and analysis of information related to industrial and commercial activities.

Table 1 shows the areas of use of information technologies and functions of information support for business management.

Table 1 illustrates the directions of information support for business management in modern conditions, when timely access to quality information is a key factor of competitiveness.

One of the important aspects in business management is information resource support. It is aimed at the rational use of information resources and technologies exploited to achieve business objectives and perform its tasks. Information resource support includes administration of both material and human resources related to the information environment.

The main components of business information resource support are: computer equipment planning; procurement of equipment for computer networks and their installation; software maintenance and updates. Effective management of material and technical resources of this kind leads to a high level of their working capacity. As a result, computers and other technical equipment work at a steady pace.

Table 1. Directions of information support for business management

Sphere of use of information technologies	Functions of information support for business management
Support for decision-making	Providing up-to-date and reliable information for analyzing economic indicators and making strategic decisions
Resource management	Management of financial, human, material and technical resources, optimization of resource costs to achieve strategic business objectives
Market analysis	Analysis of data on product markets, clarification of market trends, determination of strengths and weaknesses of competitors in order to develop competitive business strategies
Marketing and sales support	Providing marketing and sales departments with the necessary information about consumers, their preferences, forming purchase history, developing personalized marketing campaigns, attracting new customers
Labour productivity management	Automation of business processes, in particular, in the environment of procurement, production, transport, warehouse and distribution logistics
Ensuring data security	Cyber security measures to protect data from unauthorized access

Source: compiled by authors on materials [7, 9]

Monitoring and measuring the performance of information systems in business is aimed at timely detection of certain deficiencies in the use of information resources. Therefore, elimination of these shortcomings in the process of information resource support contributes to the availability, reliability, security of information resources as well as achievement of strategic and operational business objectives.

It is advisable to focus on the fact that human resource management processes are of primary importance in business information support. This applies to the recruitment, training and development of staff using information systems and technologies. This is relevant from the point of view of acquisition of necessary competencies, i.e. knowledge, abilities and skills, by computer users. It is worth noting that management of access rights and information security is important here.

Along with problems of personnel development in business, the issues of budget and cost management are currently important, as well as budgeting and control of costs for information resources in order to optimize them.

Ensuring the effective use of information resources requires commitment to new approaches in innovation management. Therefore, business owners and managers should be focused on the introduction of new information technologies. This includes the study of new opportunities for information support for achieving business objectives and planning the use of such innovations.

The key components that indicate the need for information support for business management include providing information for decision-making processes and resource support controlling. Therefore, information support for business management is a unique factor of competitiveness in the modern business environment.

Effective information support of business management provides wide opportunities for obtaining data that are used for the following: formulation of business strategies; development of production and commercial activity tactics; justification of optimal options for operative measures taken by managers. Real-time monitoring of the dynamics of business

processes and results with the help of an information system makes it possible to detect anomalies and unfavourable trends in a timely manner. This makes it possible to undertake endeavors for their correction.

Management activities of personnel (as a component of the information system) should be aimed at optimizing resources – human resources, finances, materials, technical equipment. Ensuring their rational utilization helps to reduce costs and to increase business efficiency.

Fig. 1 shows the components of information support for business management. They ensure the availability and quality of information for decision-making, control and optimization of business processes.

The specified components of information support for business management (Fig. 1) allow managers to get access to the necessary information, to carry out its processing, to use it, in particular, for making strategic decisions.

Work in the information environment includes a number of processes. These processes are aimed at ensuring the availability and quality of information use for the purpose of effective business management (Table 2).

Information support for business management has wide prospects as technologies and methods of information analysis are constantly developing.

It is confirmed by such trends in the advance in information support for business management as:

- increase in data volume (amounts of information is growing rapidly due to the development of modern technologies and the increase in the number of data sources, in particular such as sensors, social media, mobile applications, etc.);
- application of artificial intelligence for analytical work in business (it helps to analyze large data volumes and highlight those connections that are difficult to establish using traditional methods);
- development of analytical tools and platforms (as tools for visualization and real-time analytics for big data analysis are becoming more powerful and accessible, it allows for improvements in data analysis);
- information support for business allows for the creation of personalized offers and

- recommendations for loyal consumers, which is important for marketing services;
- development and implementation of products and services to ensure data security (since data volumes are growing, information security issues are becoming more relevant);
 - rise in remote work and virtual offices in business (opportunities for staff to work with data and to conduct analysis remotely, which allows expanding the geography of activities and attracting specialists from different regions of the country and the world).

Components of information support for business management

<i>Information systems of management</i>	<i>Databases</i>	<i>Information technologies</i>	<i>Human resources</i>	<i>Processes and methods</i>
<ul style="list-style-type: none"> - resource management - consumer management - production management - inventory management - project management - logistics management - personnel management - financial management - quality management - business process management - data analysis management - supplier relationship management 	<ul style="list-style-type: none"> - relational - non-relational - columnar - geographic - graph - specialized - vector - integrated - object-oriented - document-oriented - blockchain - time series 	<ul style="list-style-type: none"> - programming - artificial intelligence - data analytics - Internet technologies - databases - cyber security - 3D-technologies and virtual reality - project management systems - networks and telecommunications - robotics - mobile technologies 	<ul style="list-style-type: none"> - personnel - training and development - recruiting and employment - organizational culture - performance management - career management - motivation and encouragement - cooperation and communication - conflict management - HR analytics - health and safety 	<ul style="list-style-type: none"> - analytical methods - business process modelling - project management - planning and strategic management - decision-making methods - standardization and regulations - quality management systems - logistic processes - market and competitors analysis - management of changes - search for innovative solutions - risk management - sales and marketing management

Figure 1. Components of information support for business management

Source: compiled by authors on materials [1-3]

Table 2. Characteristics of information processes, used for business management

<i>Information process</i>	<i>Essence of information process</i>	<i>Purpose of information process</i>
Collecting information	Process of collecting business-related information	Formation of a database for business management
Storage of information	Creating a place and way to store data	Ensuring data availability and security
Data processing and analysis	Use of analytical tools for data analysis	Highlighting essential economic information and establishing business development trends
Data visualization	Visual representation of the necessary business data	Ensuring availability of information for the purpose of its further use
Decision-making	Decision-making based on analysis of results of business activities	Responding to changes in the business environment to achieve business goals
Monitoring and optimization of business processes	Control and correction of business processes	Support of efficiency of business processes
Innovations	Using analytical results to develop new products and services	Ensuring business competitiveness
Data security	Measures to ensure data security and confidentiality	Protection of information from external interference and unauthorized access

Source: compiled by authors on materials [2, 6, 7]

Unsettled issues of functioning of the economic environment related to the information support for business management can be quite diverse. Table 3

presents some problematic points of information support for business management that hold back its advance.

Table 3. Topical issues of advance in information support for business management

<i>Problem situation</i>	<i>Directions for solving problem situation</i>
Unauthorized access to confidential data	Ensuring confidentiality, integrity and availability of data
Technological obsolescence, use of old versions of an operating system	Use of modern versions of software and hardware
Inefficient data management, duplication of data, disorganized customer accounting	Planning, storage, processing and display of data in order to optimize processes
Lack of automation of management processes, manual accounting of data	Use of information technologies to automate management processes
Low-quality information, receipt of unverified information	Ensuring data quality and reliability
Insufficient integration of accounting and logistics information systems	Interaction of accounting and logistics information systems in order to ensure data exchange between them
Insufficient use of data analytics for decision-making	Use of analytical tools for decision-making
Issue of access to information	Management of access rights and information security
Low level of personnel training, lack of information technology knowledge among employees	Training and development of workers' information technology skills

Source: compiled by authors on materials [7, 10]

Solving the topical issues of information support for business management should be put into practice as follows:

- implementation of cyber security measures, in particular, directly through an information security audit;
- software and hardware updates;
- implementation of ERP and CRM systems, automation of production and logistics;
- establishing a data quality control system, verifying reliability of information sources;
- implementation of business intelligence (BI) systems;
- training of staff in analytical skills;
- organization of education and training for personnel, involvement of external experts and consultants.

In other words, in order to solve problematic issues of information support of business management, it is worth: focusing on the implementation of modern information systems; investing in cyber security; training staff; developing information management strategies, etc. This will ensure business efficiency and competitiveness.

Digital transformation provides ample opportunities for adaptation to the dynamics of changes in the business environment and corresponding technological innovations. However, at the same time, the issue of implementing effective methods of information support for business risk management arises. It is important for their timely establishment and analysis, as well as prompt adoption of appropriate organizational measures. The implementation of these

approaches creates the necessary prerequisites for increasing business efficiency and competitiveness.

Conclusions

Information support for business management is becoming increasingly important in the context of the formation of the digital economy. The concept of "business" in this study is understood as the production and commercial activities of its owners and managers with the aim of obtaining profit. Information support for business management should be focused on the following functions: definition of business objectives and strategy; forecasting, planning and control of business processes; motivation of owners, managers, other personnel. This requires clarifying the essence of information processes and their role in business management, determining the main directions and systematizing the components of information support for business management.

The work has specified the trends in information support for business management: increase in data volumes; application of artificial intelligence for analytical work in business; development of analytical tools and platforms; creation of personalized offers and recommendations for loyal consumers by means of information systems; development and implementation of products and services to ensure data security; rise in remote work and virtual offices in business. The carried out research have made it possible to identify relevant issues of advance in information support for business management which require solutions and propose methodical approaches to solving the specified problematic issues.

Abstract

The article presents the main directions of advance in information support for business management in the context of formation of the digital economy. The concept of "business" in this study is understood as the production and commercial activities of its owners and managers with the aim of obtaining profit.

The essence of information processes and their role in business management has been clarified, the main directions the components of information support for business management have been determined. Information support for business management should be focused on the following functions: definition of business objectives and strategy; forecasting, planning and control of business processes; motivation of owners, managers, other personnel.

It has been focused on the fact that human resource management processes are of primary importance in business information support. This applies to the recruitment, training and development of staff using information systems and technologies. Along with problems of personnel development in business, the issues of budget and cost management are currently important, as well as budgeting and control of costs for information resources in order to optimize them.

There have been specified trends in information support for business management: increase in data volumes; application of artificial intelligence for analytical work in business; development of analytical tools and platforms; creation of personalized offers and recommendations for loyal consumers by means of information systems; development and implementation of products and services to ensure data security; rise in remote work and virtual offices in business.

On the basis of the carried out research, the relevant issues of advance in information support for business management which require solutions have been identified. In order to solve problematic issues of information support of business management, it is worth: focusing on the implementation of modern information systems; investing in cyber security; training staff; developing information management strategies, etc. This will ensure business efficiency and competitiveness.

At the same time, the issue of implementing effective methods of information support for business risk management arises. It is important for their timely establishment and analysis, as well as prompt adoption of appropriate organizational measures. The implementation of these approaches creates the necessary prerequisites for increasing business efficiency and competitiveness.

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