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**BIG DATA MARKET AS A MODERN TOOL FOR SYSTEMATIZATION OF  
KNOWLEDGE ON THE DEVELOPMENT OF SOCIO-ECONOMIC  
SYSTEMS**

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**Abstract.** The authors prove that evolution of systematization of knowledge on the development of innovation of socio-economic systems took place during several stages, the first of which was the development of enterprise applications and data warehouses, which later was transformed into ERP-systems, and eventually took the form of big data.

The study shows that the market for information technology, built on the basis of Big Data, is developing rapidly, and ensures the development of innovation in socio-economic systems, in particular, primarily through the automation of retail, securities transactions and investment services, which are one of the key components of the socio-economic sphere. The results of analysis that there are the following 5 leading industries in the sphere of Big Data: banking sector, discrete production,

specialized services, continuous production and central government. Besides, Big Data analysis technology is the most commonly implemented technology among domestic companies: 68% of organizations had already tested the introduction of Big Data Analysis tools.

**Keywords:** Big Data market, socio-economic systems, ERP-systems, systematization of knowledge.

**Introduction.** The direction of systematization of knowledge on the development of innovation of socio-economic systems based on the use of Big Data can be applied in cases where the data is too much to be processed by traditional means, including a server with a relational database. However, the exact quantitative values of the information at which the data become "large" are not defined. The scope of the technology depends on the computing hardware capacity and the number of records in the database, i.e. in some cases gigabytes of data can already be considered as Big Data, because the computer system cannot handle their timely processing, and in others - petabytes of information are processed using classic methods and, therefore, are not "big". Big Data is often associated with the Hadoop framework, although this technology is also based on the concept of NoSQL data warehouses and the technique of parallel processing of distributed MapReduce data.

### **Literature analysis.**

Big Data technologies have been investigated by many scientists and practitioners over the past years. In particular, Big Data has been used successfully in various fields.

For example, the purpose of the article (Jihad Saidali, Hassane Rahich, Yassine Tabaa & Abdellatif Medouri, 2019) is to find a solution that Big Data Analytics offers to solve the problem of lack of success in production. Thus, this article makes a distinction between Big Data Analytics and classic marketing analytics. The authors also suggest a theoretical study to build the best marketing strategies to promote

production. This theoretical study combines Big Data Analytics and classical analytics to gain more valuable information to improve production success by making a real-time business decision, scrutinizing that analytics, and choosing the high scale of complexity and customization of that combination. In addition, the study data demonstrate the availability of prediction knowledge that tests the impact of marketing behavior on production development. In addition, the article describes the combined impact of marketing behavior and marketing turbulence on improving production by identifying customer needs and interests, as well as early decision-making.

The article (Kaur, Manjit & Aggarwal, Kavita, 2022) shows that the modern era is flooded with large amounts of information. This caused changes in e-commerce, as it allows you to predict a model of client behavior, as well as to ensure the democratization of commercial activities in accordance with the needs of buyers. In addition, it becomes possible to present indicators to assess the adequacy of customer satisfaction. This article analyzes large amounts of information in e-commerce and various achievements that allow you to get a variety of information about buyers.

The author of the article (Gomathy, C K., 2023) thinks that Big data is a whole new word nowadays. The stock market is an ever-evolving, volatile, uncertain and intriguing potential niche that is an important option in finance and business forecasting. The stock market has to deal with a lot of vast and distinct data to provide meaningful results. Trends in the stock market as a whole depend on two types of analysis: technical and fundamental ones. In particular, technical analysis is carried out using historical trends and market value. On the other hand, fundamental analysis is carried out on the basis of sentiments, values and responses from social networks. Because it's about large, complex, and exponentially growing data, the authors use Big Data analysis that can help to predict and compile accurate business decisions and enable profitable investments.

The authors of the work (Ian W.R. Martin & Stefan Nagel, 2022) assume that modern investors face the challenge of high-dimensional forecasting: thousands of observed variables are potentially relevant to forecasting. The authors revise the traditional view on market performance taking into account this fact. In the equilibrium model proposed in this article, assets are characterized by cash flows, linear in characteristics, with unknown coefficients. Risk-neutral Bayesian investors study these ratios and determine market prices based on Big Data technology.

As part of the work (Xiao, YongLin, 2022), the application of Big Data in real estate was studied to solve the problem of analyzing accurate estimates of the value of real estate. In particular, the following questions were to be investigated: what are the advantages of using of Big Data in the real estate market; what are the trends of Big Data in the real estate market; what problems arise when applying Big Data to the real estate market; what are the methods and processes for applying Big Data to real estate asset valuations.

**Methodology.** The article uses the following research methods:

- hypothetical and deductive one – to clarify the essence of the research subject;
- system and analytical – to assess the structure and specifics of Big Data technologies used by domestic organizations;
- analysis and comparison of trends – to track the dynamics of changes of the current trends in the systematization of knowledge;
- process approach – to determine the structure of the Big Data market as a system.

### **Main Part**

The scope of possible application of Big Data technologies as a means of systematizing knowledge on the development of innovation of socio-economic systems is quite wide. With the help of Big Data, companies can learn about customer preferences, find new markets, identify the effectiveness of marketing

campaigns, find out information about the current state of affairs of competitors, conduct risk analysis. Currently, about 53% of companies use Big Data in the field of customer service, 40% to ensure operational efficiency, and the rest - in the field of risk management.

In 2018, the volume of the Global Big Data and Business Analytics Market reached 168.8 billion dollars USA. According to the IDC, in 2019 the volume of the global big data market increased by 12% compared to the previous year, and reached 189.1 billion dollars USA. In addition, in the period 2018-2022, the market is expected to grow at an average annual rate (CAGR) of 13.2%. Thus, the market volume may increase to \$ 274.3 billion by 2022 (figure 1).

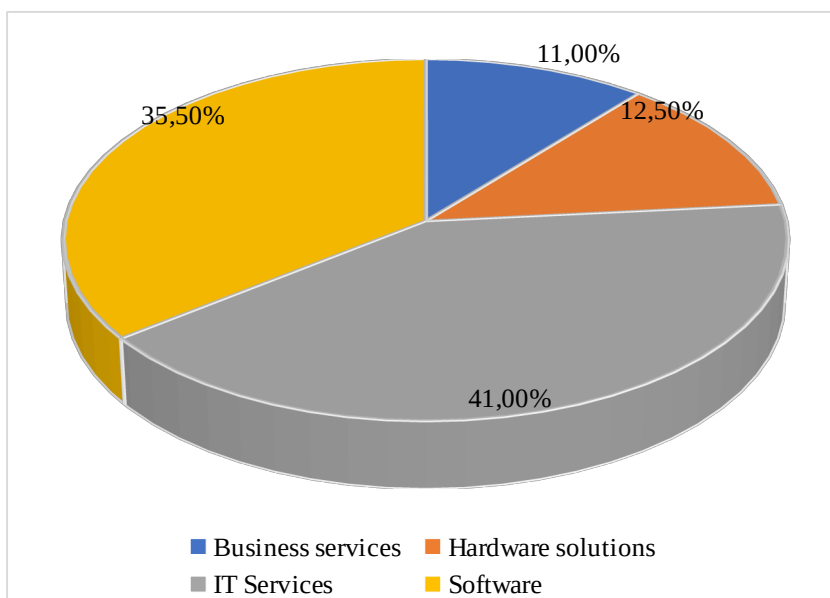


Figure 1. Dynamics of growth of the world Big Data market

Source: Big Data: prospects for development, trends and volumes of the big data market, <https://delprof.ru/press-center/open-analytics/big-data-perspektivy-razvitiya-trendy-i-obemy-rynka-bolshikh-dannykh/>

Research and Markets predicts possible growth rates of the global Big Data market at 19.7% annually for the period 2019-2025.

In 2018, revenue in the Big Data software market amounted to \$ 60.7 billion. At the end of 2019, more than half of BD's revenue came from IT and business services \$ 77.5 billion and \$ 20.7 billion, respectively (figure 2).

Revenues in the hardware segment amounted to about \$ 23.7 billion. Revenue from big data software reached \$ 67.2 billion. According to the IDC, the expected growth rate (CAGR) in the period 2018-2023 in this segment will rise to 12.5%. Accordingly, it will significantly increase the level and quality of systematization of knowledge on the development of innovation in socio-economic systems.

According to a study by Fortune Business Insights, the size of the global Big Data technology market, estimated at \$ 38.6 billion in 2018, will increase to \$ 104.3 billion by 2026, showing a growth rate (CAGR) of 14% over the period from 2019 to 2026.

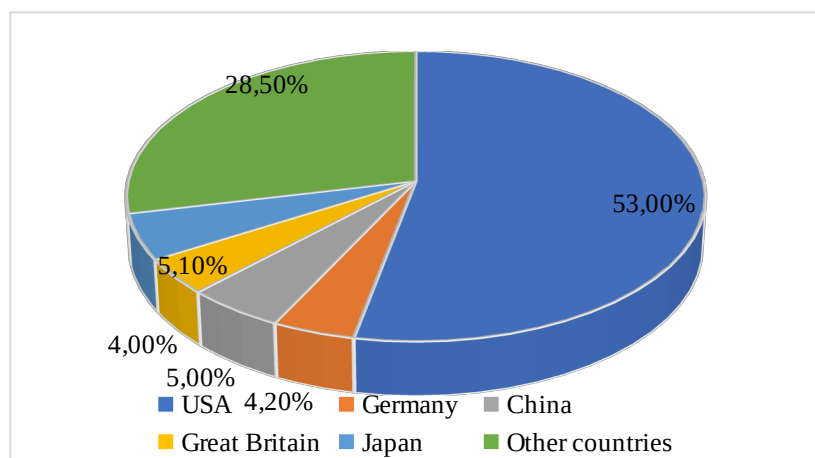


Figure 2. Shares of world market segments Big Data in total revenue, %

Source: Big Data: prospects for development, trends and volumes of the big data market, <https://delprof.ru/press-center/open-analytics/big-data-perspektivy-razvitiya-trendy-i-obemy-rynka-bolshikh-dannykh/>

From a geographical point of view, according to the results of 2019, the largest market was the United States with revenues of \$ 100 billion. The second and third places in terms of volume were taken by Japan (9.6 billion US dollars) and Great

Britain (9.2 billion US dollars), respectively. Also in the top five markets are China (\$ 8.6 billion) and Germany (\$ 7.9 billion).

Argentina and Vietnam have the highest growth rates over a five-year period (CAGRs - 23.1% and 19.4%). The third place in terms of CAGR was taken by China (19.2%), which by 2022 may ensure the emergence of this country in second place in terms of income (figure 3).

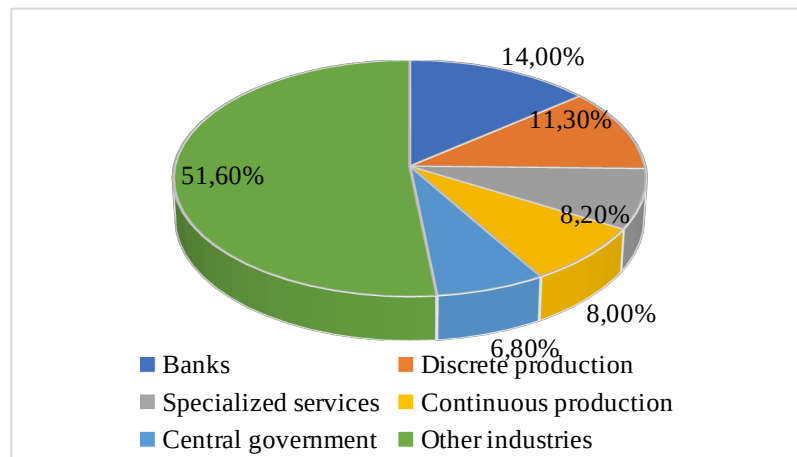


Figure 3. The share of leading countries in the total market of Big Data, %

Source: Big Data: prospects for development, trends and volumes of the big data market, <https://delprof.ru/press-center/open-analytics/big-data-perspektivy-razvitiya-trendy-i-obemy-rynka-bolshikh-dannykh/>

The drivers of the Big Data market and business analysts are 5 industries, which, according to the IDC, account for about half of the investment (\$ 91.4 billion):

- banking sector;
- discrete production;
- specialized services;
- continuous production;
- central government.

At the same time, the largest market growth in the future will be provided by such areas as retail trade (15.2% CAGR), as well as securities transactions and investment services (15.3% CAGR).

According to the Wikibon report (2018 Big Data and Analytics Market Share Report), in 2018 (according to 2017) the five largest solution providers in the Big Data market included companies such as IBM, Splunk, Dell, Oracle and AWS. And, according to the study Global Big Data Market Forecast 2019-2027, conducted by Inkwoodresearch in 2019, these companies maintained their positions as market leaders.

Today, the leaders in the introduction of technologies in domestic companies are such digitalization tools as robotic automation of business processes, the use of chatbots, Big Data analysis tools and predictive analytics (table 1).

From the table 1 you can see that big data analysis technology is the most commonly implemented technology among domestic companies: 68% of organizations by the end of 2019 had already tested the introduction of big data analysis tools.

Thus, summarizing the review of current trends in the systematization of knowledge on the development of innovation of socio-economic systems, it should be noted that these processes primarily needed automation due to the large amount of data that needed to be processed.

Accordingly, the evolution of systematization of knowledge on the development of innovation of socio-economic systems took place during several stages, the first of which was the development of enterprise applications and data warehouses, which later was transformed into ERP-systems, and eventually took the form of big data.



Table 1. Big Data technologies used by domestic organizations

Name of technology	Percentage of companies using the technology, %
Blockchain	19
VR/AR	21
Internet of Things	24
OCR	36
Robotization	50
Chat bots	51
Database analysis	68

Source: Big Data: prospects for development, trends and volumes of the big data market, <https://delprof.ru/press-center/open-analytics/big-data-perspektivy-razvitiya-trendy-i-obemy-rynka-bolshikh-dannykh/>

It should be noted that the market of information technology, built on the basis of big data, is developing rapidly, and ensures the development of innovation in socio-economic systems, in particular, primarily through the automation of retail, securities transactions and investment services, which are one of the key components of the socio-economic sphere. In this context, it is necessary to focus on methods of systematizing knowledge on the development of innovation of socio-economic systems, given that they are the basis for building platforms for the implementation of interactive tools for consolidating information about the socio-economic sphere in modern conditions.

**Conclusions.** Trends in the systematization of knowledge on the development of innovation in socio-economic systems are mostly represented by the development of corporate applications, which in the long run have become data warehouses. Among the alternative representations of data warehouses are ERP systems, focused on the organization of highly integrated solutions for the development of innovation

of socio-economic systems, based on the use of common databases, i.e. all the necessary information had to be stored in a single database. However, Big Data is now used - a modern direction of systematization of knowledge on the development of innovation of socio-economic systems, which includes a number of methods, tools and technologies for collecting and analyzing large amounts of various structured and unstructured data to obtain effective results in the distribution of information nodes of the computer network and its constant updating. The large-scale distribution of Big Data tools is confirmed by the active growth dynamics of the world market in this area.

### **Discussion**

Big data owes its appearance and strengthening of positions in the business world to the increased flow of digital information. To a large extent, its excess and inability to manage such a flow made us think about how to do it in the most rational way. On the other hand, the obvious needs of companies to obtain additional information about markets, consumers, competitors, employees, and the business environment lead to the search for new sources of information. Great analytics should be provided with serious and convenient tools, both software and directly analytical. It is obvious that the need for qualified personnel will increase. But if it is possible to attract trained IT specialists for the information technology development of Big Data services, then specially trained professionals will be needed for big analytics. They combine, in a certain way, knowledge and experience of information technologies with knowledge and experience of subject areas. Despite major changes in the field of machine information processing up to now and in the future, it is impossible to do without specialists who will intensively research data and will be able to formulate tasks that are understandable from the point of view of the analysis algorithm. Finding and eliminating errors in data is an obvious and urgent problem that such professionals solve. Undoubtedly, big data will form different markets — from those where data is sold in lots of different volume and quality, to those where high-tech

services are provided with the machine time of supercomputers. The transition to the collection and processing of information in volumes exceeding traditional ones can be a good reason for specialized or broad reengineering of business processes (and the business objects involved in them).

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