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USE OF INNOVATIVE INFORMATION TECHNOLOGY IN E-COMMERCE AND DIGITAL ECONOMY

The article considers the use of modern innovative information technology (IT) in general in the digital economy and in e-commerce, as its most sensitive part. First of all, the paper shows that since the beginning of the XXI century one of the main trends in the economy and society in general is the penetration of innovative information technologies in various fields of human activity, which entails global digitalization of both economy and society as a whole. E-commerce, as part of the digital economy, has been shown to be a driving force in accelerating global economic development and creating new markets. E-commerce also opens up new opportunities for inclusive and sustainable innovation growth. It is argued that the rapid development of e-commerce became possible only after the percentage of global Internet penetration exceeded some critical level, which led to its availability to the general public. In turn, the emergence of more and more new users on the Internet, the widespread use of various social networks and the rapid growth of internet of things (IoT) has led to the data explosion and the emergence and spread of technology such as Big Data. The main advantages of using Big Data in modern analytics in comparison with traditional methods are considered in the work. The place and role of Big Data technologies and tools in the digitalization of the Ukrainian economy are analyzed. It is proved that the intensive development and spread of the use of Big Data in all spheres of modern society leads to the active use of innovative IT. Based on the analysis, the main areas of use of Big Data are identified, namely: credit scoring, segmented or personalized services, risk management, anti-fraud system and using blockchain technology. The use of these technologies, in turn, will minimize customer effort and increase the efficiency of B2B and B2C models in both the digital economy and e-commerce.

Keywords: innovation, digital economy, e-commerce, information, digitalization, Big Data, blockchain

JEL classification: D02, O30, O17

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1. INTRODUCTION

In recent decades, one of the main trends in the economy and society as a whole is the penetration of innovative information technologies in various fields of human activity. Informatization is becoming such an important factor in increasing productivity and improving the quality of life that the changes that occur are seen by researchers as the beginning of a new era of economic development, which in the literature is characterized by the term "digital or information economy" [1, 2]. In turn, e-commerce is one of the areas of the digital economy that is actively developing. E-commerce covers all financial and trade transactions carried out through computer networks, and business processes related to such transactions. E-commerce includes: e-information exchange, e-capital movement, e-commerce, e-money, e-marketing, e-banking, e-insurance services and more. Most of the tools used by e-

commerce are based on the use of technology such as Big Data. The spread of Big Data technology has significantly changed the format of interaction in e-commerce in the B2B model, and especially in the B2C model [3,4]. Banking, medicine, transport, insurance, sales of any goods and services - the more the company knows about the consumer, the faster and more profitable can sell their services or goods. Big data analysis helps to learn more about customer preferences, makes it possible to make a personalized offer and recommend a product or service that the customer needs at the moment, which is especially important for the B2C model.

Thus, today in the world there is a problem of the need to integrate innovative IT into business processes. The digitalization of the economy is already embracing an overwhelming number of enterprises and companies. The continuous development of IT requires a quick

adaptation of the business to the digital space. The world economy is increasingly going digital, and above all it concerns e-commerce.

2. ANALYSIS OF THE LAST SCIENTIFIC RESEARCH AND PUBLICATION

The article [5] presents the conclusions on the analysis of the state of informatization of organizations, systematizes the advantages and risks of the main segments of the digital economy ecosystem; the factors hampering the digitization activities at industrial enterprises are updated.

In the article [6] the modern indicators of digital technologies development are analyzed and the peculiarities of the digital technologies development in the world countries are substantiated.

Regarding the concepts of digital economy and its digital transformation, these concepts are widely considered by the author [7]. Also in article analysis of trends of development of digital technologies is carried out and their role in development of domestic economy is defined.

The article [8] is devoted to determine the features of the development of information and communication technologies to ensure rational public administration in the context of the formation of the global digital economy. Also, in this research found that the cost of IT, corporate software and IT services are growing. In addition, the article shows that, countries are striving to support the national economy system and are attracting the latest technologies, helping to develop digital platforms and solutions for the Big Data.

But, despite the research carried out, the issues of using innovative IT based on Big Data in the digital economy and e-commerce, as its part, remain insufficiently disclosed.

3. FORMULATION OF THE OBJECTIVES OF THE ARTICLE

The aim of the article is to develop approaches to the use and description of the impact of innovative IT based on big data on the development of the digital economy and e-commerce as its most sensitive component.

4. PRESENTATION OF THE MAIN MATERIAL OF THE RESEARCH

The digital transformation of the economy is an ongoing process involving the development of various IT sectors in order to stimulate the creation of innovative technologies for

cooperation and development at the international level. The key advantage of the digital economy over the traditional one is the realization of the possibility of automatic control of the whole system or individual components). Another advantage is its virtually unlimited scaling without loss of efficiency, which can significantly increase the efficiency of economic management at the micro and macro levels.

Digital economy significantly changes the process of using traditional communication and information technologies in innovation and finance. Today, the development of informatization is primarily associated with the introduction of digital communication and information technologies (CIT) and platforms for which the Internet is the basis and the costs of which are steadily growing from year to year (Table 1) [9].

The rapid development of such a type of commerce as e-commerce became possible only after the percentage of the global network exceeded a certain critical level, which led to its accessibility to the general public (Fig. 1).

The level of development and spread of e-commerce in the world market today depends directly on the level of coverage of the global network in individual countries and regions, as well as around the world. According to the Digital Economy Report [2], the volume of global traffic based on the Internet Protocol, which provides a rough idea of the scale of data flows, increased from about 100 gigabytes per second per day in 1992 up to 46000 GB / s in 2017. According to the forecast until 2022 global IP traffic will reach 150700 GB / s as a result of the growing number of new Internet users, the widespread use of various social networks and the rapid growth of the Internet of Things (IoT). This led to a data explosion on the Internet (Fig. 2) and the emergence and spread of technology such as Big Data.

The term "Big Data" was coined by the editor of the magazine "Nature" Clifford Lynch in 2008 [3], who described the rapid growth of global information and noted that only new tools and more advanced technology could help analyze, classify, and use it effectively.

Big Data is not just big data - it is a series of tools and methods for processing and analyzing structured and unstructured data of huge volumes and considerable variety to extract useful information from them.

Table 1

Estimated values of global spending on digital CIT by 2023

Technology costs, USD	2018	2019	2020	2021	2022	2023
digital communication and information technologies	3808	766521	891760	1030455	1189208	1362017

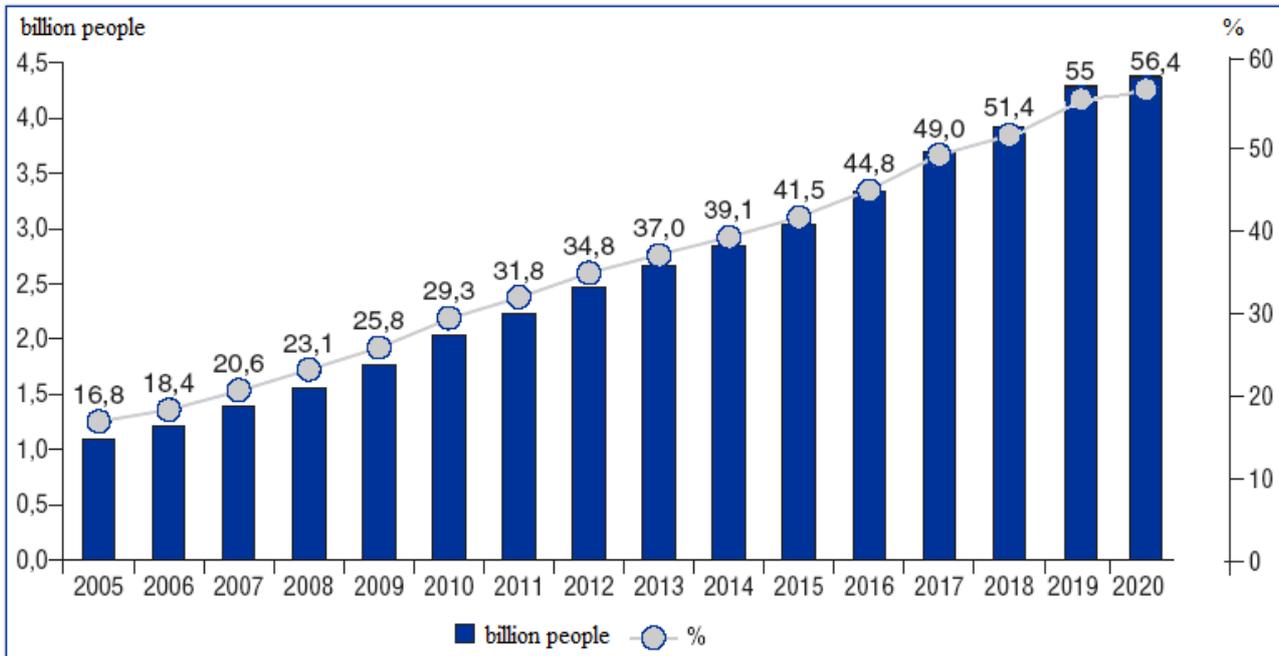


Fig. 1. The number of internet users in the world (compiled on the basis 2, 10, 11)

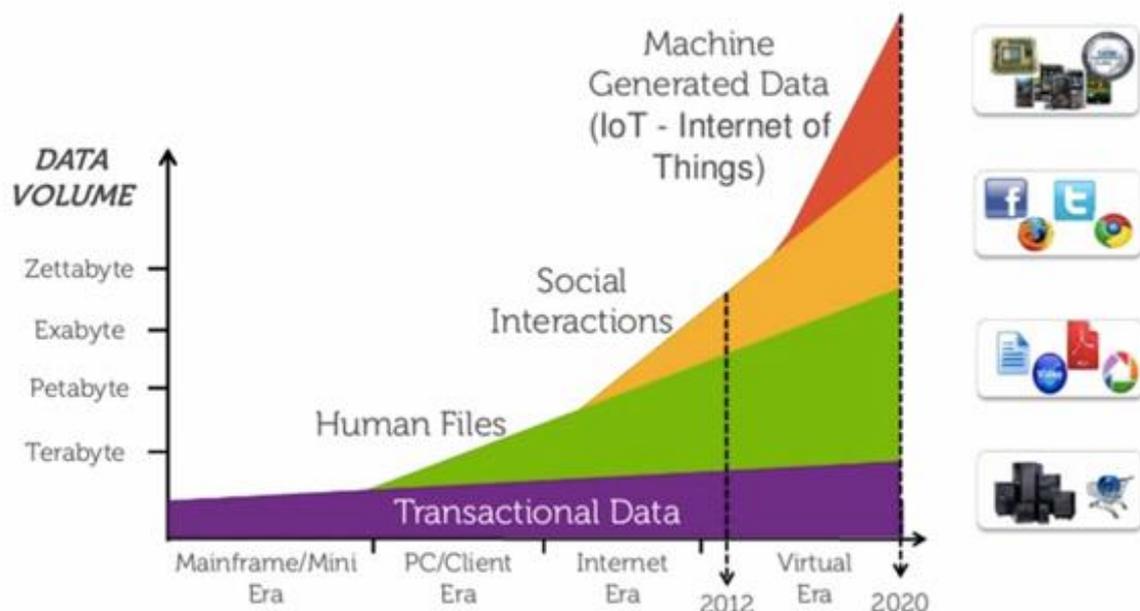


Fig. 2. Data explosion in the Internet

Big data is a set of technologies designed to perform three main operations:

1. Process larger amounts of data than "standard" scenarios.

2. Be able to work with fast data in very large volumes. That is, the data is not just a lot, but they are constantly becoming more and more.

3. Be able to work with structured and poorly structured data in parallel and in different aspects.

The basic principles of Big Data are easy to understand on the example of a social rating in China, where all actions of citizens are carefully recorded: when they wake up and fall asleep, how to get to work, what purchases are made offline and online, whether they have regular partners who spend money on publishing photos, their activity in groups on social networks, lists of friends, reposts and even likes [12,13]. Every little thing is another touch to a digital portrait of a person, on the basis of which various Big Data tools are used to draw conclusions, such as lending to a client in a bank, opening a visa or renting an apartment, etc.

In today's world, Big data technologies and tools are used almost everywhere [3,4], many companies use them to solve their business problems, along with automation and CRM. In the Ukrainian economy, the use of Big data tools is one of the fastest growing areas and affects the speed of its digitalization. So, Big data is called large unstructured volumes of various data. This means that they can not be taken and entered into a regular database, where everything is stored in order. Big data includes voice recordings, images, video and audio, geolocation, machine (automatically generated) data, search queries and much more. Big data appears every millisecond - it's queries on Google, Instagram, YouTube and Facebook, etc., generated by their users.

Thus, Big data is a large array of unsorted data, as well as a set of tools for their processing, this term defines arrays of information that can not be processed or analyzed using traditional methods using human labor and desktops. The peculiarity of Big Data is that the data set continues to grow exponentially over time, so for the operational analysis of the collected materials requires computing power supercomputers.

Big data analytics is used to understand the attractiveness of goods and services, predict market demand and response to an advertising campaign. Working with Big data helps companies attract more potential customers and increase revenue, use resources wisely and build a competent business strategy. Big data analysis also allows you to create personalized offers ranging from targeted advertising on various

social networks and ending, for example, an offer to buy your dream home to your liking, which is created without your direct participation, based only on Big data analysis.

Technological progress has radically changed the field of financial services. The use of innovative financial technologies in e-commerce has gone beyond online transactions, banking applications and online banking. The development of many areas of e-commerce, as well as the digital economy in general, would be impossible without the use of Big Data. The use of Big Data technology is central to e-business. On the one hand, they allow you to effectively provide customers with better services, and on the other - give businesses the opportunity to improve their business and its protection.

If we talk about the use of Big Data in the digital economy and e-commerce, it is necessary to identify the following most relevant areas [3, 14]:

1. Scoring is a tool to identify customers who will repay the loan, potential fraudsters and more. Scoring helps to improve the forecast for specific operations [15].

Credit scoring for financial institutions is a service that allows you to predict the probability that a customer will repay the loan. The simulation results allow us to assess the risks of non-repayment of loans and at the same time not to deny those who potentially repay the money. Scoring on the basis of Big Data is more relevant than the data of the Credit Bureau, because the data from it may be outdated and contain information about the period when the client was insolvent; or not to provide information at all, because the client has not previously applied to banks and has no credit history. Credit scoring helps to improve the situation with lending to small and medium-sized businesses.

Currently, financial institutions analyze not only traditional data: socio-demographic characteristics of the client, his credit history, discipline of repayment of previous loans and salary, but also analyze the behavior of users on social networks, and conclusions about social status, education and qualifications vocabulary after analyzing his posts. When assessing legal entities applying for a loan, financial institutions analyze, in addition to financial indicators, the frequency of the company's mentions in the media and the "whiteness" of materials. A classic example of using Big Data tools is

American Express, which has increased the cost of credit for borrowers who are regular visitors to discount centers. The decision was based on the following conclusion: a secured customer can afford to shop in regular stores, and a customer who lives on the principle of constant discounts is financially unstable and therefore potentially dangerous in terms of repaying the bank loan.

2. Segmented or personalized services - segmentation is grouping customers together according to identifiable characteristics [16]. Often, these are demographic characteristics such as age, geography, or gender. Personalization is the optimizing of experiences and messages to individuals themselves — not the group they belong to.

The main difference between segmentation and personalization is that segmentation allows to create content for specific customer groups, while personalization means looking more in-depth into each customer within a segment individually. There's a time and place for both of these strategies. Combining them maximizes the effectiveness of any brand's strategy.

It is important for financial institutions and enterprises to analyze a variety of customer information not only from the standpoint of credit scoring, but also to provide segmented or personalized offers. Analysis of information using Big Data allows you to select target groups, ie segment customers. Accordingly, companies can easily adapt their services to meet the demand and needs not only of each customer segment, but also make personalized offers for each customer available or potential with minimal time. Big Data allows you to create individual offer packages, more convenient service infrastructure. With Big Data, you can provide, for example, recommendations for reducing costs to help the customer save more money, which will attract potential customers and expand the customer base, which is especially important for companies in fierce competition. Also, analyzing the movement of funds in the account, the bank sees that the customer pays by card in different cities, the system concludes that the customer travels a lot, and therefore he may be relevant bank card with the ability to accumulate kilometers for flights or other useful for the constant traveler bonuses.

3. Management of risks is the process of identifying, assessing and controlling threats to an organization's capital and earnings [17]. These risks stem from a variety of sources including financial uncertainties, legal liabilities, technology issues, strategic management errors, accidents and natural disasters. In the financial and innovation sectors, Big Data has a huge advantage in identifying potential risks of failed investments or unreliable payers, and although the use of Big Data tools may not yet fully prevent such risks, it can identify them early and prevent further development.

4. Anti-fraud system (AFS) [3,18]. Big Data gives companies another advantage - the ability to detect fraud, as with the development of Internet banking and online transactions, both companies and their customers have become too vulnerable. Big Data helps both banks and other financial institutions better understand each customer's habits and behavior.

The AFS is a complex solution ensuring the protection of web internet banking applications and their users against cybercrime, fraud detection in the online environment, and the logging of users' activities.

The AFS detects the activity of financial malware, account takeover attempts, phishing, fraudulent operations, unauthorized accesses to functions, unsecured users' configurations and networks, attempts of web applications' attacks, attempts of automatization, etc.

The anti-fraud system analyzes a large number of parameters (country of operation, payment size, recurrence, filters by IP address, number and amount of transactions, number of failed payments, etc.) to identify potential fraudsters. Big Data helps to create the profile of the average payer and on its basis the level of potential danger of fraudulent operation is assigned. Thus, fraudulent transactions are detected and blocked. Also, banks and companies are not only analyzing their own data flow, but also begin to share information about users with each other. And in the future, companies will be more active in sharing data with each other to see a fuller picture of customer behavior.

Using blockchain technology – a decentralized transaction system, where each transaction is checked by each element of the network. A blockchain is a distributed database that is shared among the nodes of a computer network. As a

database, a blockchain stores information electronically in digital format. Blockchains are best known for their crucial role for maintaining a secure and decentralized record of transactions. The innovation with a blockchain is that it guarantees the fidelity and security of a record of data and generates trust without the need for a trusted third party [19]. The popularity of the technology predicts an increase in the amount of transactional data recorded in the registers, in a geometric progression. By 2030, the information contained in the blockchain register is projected to account for up to 20% of the global Big Data market and will generate up to \$ 100 billion in annual revenue [1, 3].

5. CONCLUSIONS

Thus, the digital economy is not individual industries or IT companies that are digital. This is, first of all, the existing economy - all traditional industries and companies, which under the influence of digital transformation due to technological evolution revolutionize their production and business processes and gain new opportunities to increase productivity and efficiency of existing business.

E-commerce, as part of the digital economy, is a driving force in accelerating global economic development and creating new markets. It also opens up new opportunities for inclusive and sustainable innovation growth. The rapid development of e-commerce became

possible only after the percentage of the global Internet exceeded some critical level, which led to its accessibility to the general public. In turn, the emergence of more and more new users on the Internet, the widespread use of various social networks and the rapid growth of IoT has led to the data explosion and the emergence and spread of technology such as Big Data.

Intensive development and dissemination of Big Data in all spheres of modern society leads to the active use of innovative IT. Among the most popular in the digital economy and e-commerce are credit scoring, segmented or personalized services, risk management, anti-fraud system and using blockchain technology. The use of these technologies, in turn, minimizes customer effort and increases the efficiency of the B2C model. All the usual payment instruments (cash, bank cards, e-wallets) are gradually becoming a thing of the past, as are outdated customer verification systems. As for financial institutions and various companies, due to the rapid digitalization of businesses, they will increasingly be forced to use a variety of modern technologies, which will be based on the use of Big Data tools. This situation will eventually lead to a significant improvement in the quality of services for B2B and B2C consumers in both the traditional and digital economies.

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Анотація

НИКИФОРОВА Лілія Олександрівна. ВИКОРИСТАННЯ ІННОВАЦІЙНИХ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ В ЕЛЕКТРОННІЙ КОМЕРЦІЇ ТА ЦИФРОВІЙ ЕКОНОМІЦІ

В статті розглядаються питання використання сучасних інноваційних інформаційних технологій (ІТ) як в цілому в цифровій економіці, так і в електронній комерції, як її найбільш чутливій частині. Перш за все, в роботі показано, що з початку ХХІ століття однією з головних тенденцій розвитку економіки і суспільства загалом є проникнення інноваційних інформаційних технологій у різні сфери діяльності людини, що тягне за собою глобальну діджиталізацію як економіки, так і суспільства в цілому. Доведено, що електронна комерція, як частина цифрової економіки є рушійною силою прискорення глобального економічного розвитку та створення нових ринків. Електронна комерція також відкриває нові можливості для інклюзивного та сталого інноваційного росту. Обґрунтовано, що бурхливий розвиток електронної комерції, став можливим лише після того, як відсоток поширення глобальної мережі Інтернет перевищив деякий критичний рівень, що призвело до його доступності широким масам населення. В свою чергу, поява дедалі більшої кількості нових користувачів в Інтернет-мережі, широкое використання різноманітних соціальних мереж та стрімкий ріст Інтернету речей (ІоТ) призвів до data explosion і виникнення та поширення такої технології як Big Data. В роботі розглянуто основні переваги використання Big Data в сучасні аналітиці у порівнянні із традиційними методами. Проаналізовано місце і роль технологій та інструментів Big Data в діджиталізації української економіки. Доведено, що інтенсивний розвиток та поширення використання Big Data у всіх сферах життя сучасного суспільства призводить до активного використання інноваційних ІТ. На основі проведеного аналізу виокремлено основні напрями використання Big Data, а саме: credit scoring, segmented or personalized services, risk management, anti-fraud system and using blockchain technology. Використання даних технологій, в свою чергу, призведе до мінімізації зусиль з боку клієнта та підвищення ефективності моделей B2B і B2C в як цифровій економіці, так і в електронній комерції.

Ключові слова: інновації, цифрова економіка, електронна комерція, інформація, цифровізація, Big Data, блокчейн

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