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# CONTENT

# Directions for improving e-commerce business models on the 4.0 Industrial platform

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**Abstract:** The level of application of digital trade and commercial technologies, which play a key role in the formation of the global information society, is growing day by day. In particular, during the pandemic, the Internet has had an impact on the trade life of countries, making e-commerce one of the key factors in economic development. The rapid development of Internet technology has accelerated the transition from traditional to e-commerce. Various ICT technologies have led to the emergence of new global trends in e-commerce. These innovations have raised the issue of the application of modern ICT in the development of e-commerce on the 4.0 Industrial Platform. The presented article discusses the issues of improving the relevant business models of e-commerce systems through modern high technologies such as the Internet of Things, artificial intelligence, big data, cloud. Recommendations were given on the development of methods and technologies for the modernization of e-commerce systems and business models with the application of the latest ICT technologies.
**Keywords:** e-commerce, digital transformation, 4.0 Industrial technologies, artificial intelligence, new business models

## 1. Introduction

The 4.0 Industrial Revolution of the 21st century has had a profound effect on economic relations and led to the emergence of a number of new trends in e-commerce. Currently, the world's fastest-growing Internet of Things (IoT), 5G, robotics, cybersecurity technologies, and artificial intelligence are the main ways to modernize e-commerce systems. In modern times, the fact that the vast majority of the world's population is an active Internet user and access to the Internet not only through personal computers but also smartphones, which have become an integral part of human life, has made it necessary for companies to use the Internet to promote their products. Thus, enterprises use e-commerce systems to create demand for each product offered, provide customer support at all stages of the sales process, and provide trade and logistics links between businesses and customers through computer networks. The introduction of e-commerce systems helps an enterprise to present its products to more buyers in a more profitable way, automatically manage transactions related to goods, orders, and payments within the enterprise, and thus remain competitive in a market economy. Taking into account these factors, there is a need to study the factors that stimulate the development of e-commerce systems and the benefits of the application of these systems. At the same time, attention should be paid to the further development of the general architecture of e-commerce systems, updating the subsystems that make up the system and its functions. 4.0 Taking into account the impact of the industrial revolution on the development of e-commerce systems, the modernization of e-commerce systems should be carried out on the basis of emerging new technologies.

## 2. Materials and Methods

Today, society is experiencing a period of 4.0 Industrial Revolution. This period is characterized by full digitalization with the application of modern ICT, the use of

modern ICT tools such as cyber-physical systems in various fields of activity, artificial intelligence, the Internet of Things, big data, three-dimensional printers, robots, and cloud technology. Along with the development of technology, the recent introduction of a global quarantine regime in connection with the COVID-19 pandemic and various closures in many countries have led people to change their shopping habits and prefer e-commerce [Bakunovich, 2021; Omarova, 2020; Aliyev, 2021]. Of course, the sharp increase in the number of people turning to e-commerce, in turn, has led to an increase in consumer expectations of e-commerce companies, the formation of new trends in this sector, and the modern concept of competition.

*Application of the latest ICT technologies in improving the functioning of modern e-commerce systems.* In such a situation, the only way to continue to compete is to introduce innovations. The application of modern ICT technologies has become necessary to achieve the establishment of e-commerce systems that meet modern standards and improve their performance. These technologies include:
*Modernization with the application of artificial intelligence technologies.* One of the broadest areas of computer science, artificial intelligence is the study of the application of human logic to machines. The application of artificial intelligence in e-commerce allows organizations to optimize intra-enterprise operations, make better decisions, improve existing products and produce new products based on the analysis of market demand [Zhang, 2021]. One of the most modern requirements for e-commerce systems today is to provide an individual approach to consumers. With the use of artificial intelligence, each consumer's actions on the e-commerce system (for example, website visit times, search habits, preferred product types, especially what time of day they shop, etc.) are recorded. The collected data is then analyzed using artificial intelligence technology, and on the next visit to the customer's shopping site, the content that suits his interests is automatically presented. This ensures that those customers become loyal customers. An example of the successful application of artificial intelligence in e-commerce is Alibaba's "Smart Warehouse" technology, a world-renowned e-commerce system. According to this technology, the operation process of "Smart Warehouse" is divided into 3 separate stages [Zhang, 2021]: "Input of products into the warehouse", "Collection of orders from the warehouse", and "Packaging of orders". Because each stage has different tasks, different technologies are used at each stage to manage employees and automate processes. This classification of the implemented processes allows to automate the entry of products into the warehouse system, accelerate the process of collecting orders from the warehouse, and improve the process of packing orders.

## 3. Findings

As a result of the development and improvement of e-commerce business models on the 4.0 Industrial platform, it is possible to expect certain economic benefits in the field of production and services, marketing and sales. For this, the latest ICT tools and modern technologies of production organization should be widely applied in this field.
*Modernization with the application of Big Data technologies.* The application of artificial intelligence and big data technologies in e-commerce allows e-commerce systems to improve customer service and business services. One of the main global trends in e-commerce today is to provide an individual approach to customers. Big Data technology provides a high level of information support for e-commerce systems. As a result, firms have the opportunity to monitor their customers, suppliers, and competitors in real-time [Ilieva, 2015; Kostin, 2020]. At the same time, the big data technology allows companies to build a user-centric sensitive marketing system and

thus minimize marketing costs. Thus, different companies engaged in e-commerce on different platforms collect, classify and store the personal data of customers and their dynamic search skills in databases. In the same way, other companies that analyze customer behavior form such databases and then combine these databases. Artificial intelligence technologies analyze the emerging big data and ensure the formation of a unified marketing strategy that meets the needs of users. In order to provide an individual approach to customers, artificial intelligence technology analyzes the big data collected about customers (this includes data on customer shopping habits, what products and services they prefer, etc.), ensures that customers are provided with content that suits their interests and thus made them become loyal buyers. In addition, the use of big data to track each customer's order patterns - ordering frequencies and addresses to which orders are sent - also helps the company prevent fraud in e-commerce.

Big Data technology, which provides a high level of information support for e-commerce systems, allows businesses to track their customers, suppliers, and competitors in real-time. At the same time, it allows companies to minimize marketing costs and build a user-centered marketing system. The application of big data also helps to control the order model of each customer (information about customer ordering frequencies, the permanent address where orders are delivered, shopping card where the cost of the order is paid, etc.).

At present, the application of modern ICT technologies in e-commerce is based on the concept of big data. For example, the applied IoT technology creates a separate database by dynamically recording the status of orders, in order to provide an individual approach to customers, various information about them is recorded and analyzed through artificial intelligence, and so on.

As the amount of data collected daily in e-commerce systems increases, their use becomes more complex and costly. Thus, such a big amount of data makes it impossible to analyze them by standard programs, and because most of this data is unstructured, its collection becomes a difficult process [Ilieva, 2015; Aisha, 2021]. Therefore, the acquisition of useful information - knowledge - that supports the decision-making process from big data makes it necessary to use more sophisticated analytical methods. In this regard, the solution of data storage, processing and analysis requires the application of modern technologies that provide greater memory capacity and a higher level of computing power [Kostin, 2020].

An example of such technology is the Big Data Analytics system owned by IBM. The system uses different software platforms. One of these platforms is Watson Analytics. The Watson Analytics platform provides data retrieval, automatic forecasting based on available data, and the creation of infographics in the control panel [Joma, 2020]. The use of such infographics can be of great benefit to e-commerce companies in identifying successful operations and marketing strategies.

*Improving with the application of Internet of Things technologies.* The main issue in the e-commerce system is the problem of creating the necessary ICT infrastructure. Today, the development of ICT-based e-commerce enterprises depends on the level of application of ICT in improving the products and services provided, workflow management, decision-making process, the implementation of computational operations of the enterprise. In particular, small and medium-sized enterprises face challenges in building the necessary technical infrastructure in the process of creating

their own e-commerce platforms. Because the creation of such an infrastructure is a very expensive operation for small and medium-sized businesses.

IoT is a dynamically distributed environment that incorporates intelligent devices capable of understanding the processes taking place in the environment. These devices constantly monitor the external environment, collect information about events in the environment and provide processing of this information collected on sensors in the computing system. This technology can be used to improve the logistics services of e-commerce systems. The application of tracking systems in e-commerce, one of the areas of IoT technology, allows companies to provide consumers with "Smart Logistics" services [Aisha, 2021; Vikas, 2021]. Thanks to this, customers can get real-time information about the status of their cargo through connected electronic chips and sensors. When using this technology, special labels (for example, RFID - radio frequency identification) are affixed to each ordered product. These labels transmit this information to the sensors, marking all stages of the order delivery procedure. Thus, the customer can get real-time information about the status of the order through surveys. It should be noted that some of the world's leading e-commerce companies, which currently use this technology, offer this service to users as a premium service when ordering products. IoT, which is also used in modern smart home, transport, health, agriculture, military, trade and other fields, is a dynamically distributed environment that includes intelligent devices that can understand the processes taking place around them. These devices monitor the state of the environment, collect information about what is happening, and provide processing of this data collected on sensors in the computing system. The application of IoT technology in e-commerce facilitates the improvement of supply chain services of e-commerce systems. Through tracking systems that track the physical location of facilities, businesses can provide customers with "smart" logistics services. These systems not only locate the customer for timely and complete delivery, but also allow real-time communication with customers through connected devices such as electronic chips and sensors [Aisha, 2021]. Thus, special labels on goods (for example, RFID - radio frequency identification) record information about all stages of the product delivery procedure, so the customer can get real-time information about the status of the order with the appropriate inquiries. The application of IoT in e-commerce not only provides customers with a better shopping experience, but also allows businesses to ensure transparency in logistics and prevent potential problems.

*Modernization with the application of cloud computing technology*. Many problems in e-commerce systems can be solved with the application of Cloud Computing technology. Cloud technologies enable the virtual creation and use of IT infrastructure and software in a direct network environment (Table 1). Cloud technology allows server computers located in enterprises to transfer the memory system and software resources to the cloud, ie allows them to be grouped together [Jignesh, 2014]. With the help of cloud technology, all the data of the enterprise is stored in cloud systems, processed and the processing results are reviewed. The application of this technology allows enterprises to save on the cost of building IT infrastructure, to ensure constant access to data, to manage the flow of information within the enterprise and to control the operation of the established system. It should be noted that cloud technologies are also widely used in solving the problems mentioned in the above paragraph, which require high computing and memory resources.

**Table 1 Business models based on cloud technology**

| Architecture | Types of services | Users | Provision of services | Appointment |
|---|---|---|---|---|
| SaaS (Software as a Service) | Software | Business users | Email, office applications, virtual desktop, CRM | Perform work assignments |
| PaaS (Platform as a Service) | Platform | Project workers and programmers | Testing, development, integration and deployment of services and offers | Creation, deployment, development of application programs and rendering of user services |
| IaaS (Infrastructure as a Service) | Infrastructure | System manager | Virtual machines, operating systems, data queue, network, storage, processor, memory, backup services | Creating a platform for testing, development and integration of services and applications |

Business models of cloud technology are characterized by the regular provision of digital goods and services on a regular basis, or a combination of digital and tangible products (software services) and payments [Zakharov, 2019]. As shown in Table 1, cloud technology is a service model that provides customers with access to various computing resources at any convenient time, such as software, memory capacity, network and online computing power.

"Infrastructure as a Service" (IaaS) refers to the provision of services such as hardware computing infrastructure (computing services, database storage and delivery of applications in the form of network capabilities).

“Platform as a Service” (PaaS) is a cloud technology method. With its help, this platform works on the Internet. This service model allows customers to pay only for part of the resources they use.

“Software as a Service” (SaaS) is a model that enables the delivery and management of software online using centralized hosting. Access to the selected software is provided for individuals and legal entities on a subscription basis.

## 4. Results

Research shows that the formation of the information economy is developing faster on the basis of e-business, e-commerce, e-commerce and digital economy technologies

that will form the basis of the new economy. The society is at the stage of effective development based on technology-oriented knowledge, highly qualified specialists, advanced science, education system and improving the welfare of the population. The modern development of the information economy requires the widespread use of e-commerce technologies and payment systems, which reflect the main economic processes, the analysis and solution of problems associated with them. The study of e-commerce technologies and payment systems regulation mechanisms and development problems, identification of development trends in this field, development of solutions to existing problems are considered to be topical issues of modern times. Improving the mechanisms of regional regulation of e-commerce technologies, developing perspective development directions, substantiating the need for a single payment system and developing directions for the formation of new business models have become urgent issues. The solution of my problems, such as the identification of problems in the development of modern e-commerce technologies and payment systems and the development of directions for their solution, will play a special role in the development of the country's economy. Integration of e-commerce systems with new technologies such as IoT, Big Data, 3D modeling, artificial intelligence, etc. is one of the important directions in the development of e-commerce. They can be improved by ensuring the integration of e-commerce systems, building an efficient mechanism for e-commerce, applying innovations with big data and other components of the 4.0 Industrial Revolution platform. The introduction of new ICT technologies will create additional opportunities to further increase efficiency in the development of e-commerce and payment systems.

## References


- Aisha Mohdhar, Khaled S. (2021). “The Future of E-Commerce Systems: 2030 and Beyond”, In book: Recent Advances in Technology Acceptance Models and Theories. pp.311-330.
- Aliyev A.G. (2021). Research of problems of formation of information economy sectors and assessment of innovative perspectives. Abstract of the doctoral dissertation.
- Bakunovich V.D. (2021). Vliyaniye pandemii COVID-19 na elektronnuyu kommertsiyu. Innovatsii. Nauka. Obrazovaniye, №37, s.310-314.
- Ilieva G. et al. (2015). Big Data based system model of electronic commerce. Journal of Sciences, vol. 13, suppl. 1, pp.407-413.
- Jignesh P.S. et al. (2014). Desai Commerce College, “Role and Challenges in Cloud Computing and E-commerce in SME’s”, International Multidisciplinary Research Journal, volume 1, Issue 3, pp.2349-7637.
- Joma H.Norian et al. (2020). Data-driven e-commerce techniques and challenges in the era of the Fourth Industrial Revolution. Scientific Journal of Informatics, vol.7, No.2, pp.291-30.
- Kostin K.B. et al. (2020). Sovremennyye biznes-modeli elektronnoy kommertsii. Voprosy innovatsionnoy ekonomiki, Tom 10, №3, str.1624-1642.
- Omarova KH. et al. (2020). Osnovnyye tendentsii razvitiya, strategii i novyye biznes-modeli elektronnoy kommertsii. Ekonomika i predprinimatel'stvo, №6(119), s.696-698.
- Vikas S. et al. (2020). Internet of Things (IoT) on E-commerce logistics: A Review. ICACSE-2020. Journal of Physics: Conference Series. IOP Publishing. 1964 (2021) 062113.

- Zakharov V.YA. et al (2019). Mekhanizmy integratsii i kooperatsii slozhnykh ekonomicheskikh sistem v sootvetstvii s kontseptsiyey «Industriya 4.0». Voprosy innovatsionnoy ekonomiki, №4, str.13411356.
- Zhang D., Pee L.G., Cui L. (2021). Artificial intelligence in e-commerce fulfillment: A case study of resource orchestration at Alibaba's Smart Warehouse. International Journal of Information Management, volume 57, pp.102-304.