

Blockchain in Trade in the Digital Economy

Svetlana Viktorovna Panasenکو¹; Irina Borisovna Stukalova¹; Victoria Petrovna Kurenkova¹;
Alexander Vladimirovich Mironov¹; Anzhela Alexandrovna Bezvesilnaya²

¹Plekhanov Russian University of Economics, 36 Stremyanny Lane, Moscow, Russia.

²Civil Defence Academy EMERCOM of Russia, MKR Novogorsk, Gorodskoy Okrug Khimki, Moscow Region, Russia.

Abstract

The study is devoted to innovative technologies in trade in the digital economy. To perform all operations using blockchain, jobs must be created and appropriate programs developed, which is impossible without qualified, well-trained personnel. The possibilities of using blockchain are huge, but it is difficult for enterprises to integrate it into their systems. Blockchain will be necessary for those companies that intend to track the implementation of the supply chain and want to be more transparent in their business operations. Blockchain is not a universal solution, suitable for any enterprise, and the imperfection of the legal framework for the functioning of new technological approaches is a serious obstacle to the implementation of blockchain technology.

Key-words: Technology, Blockchain, Trade, Digitization, Synchronization, Information, Transaction, Register.

1. Introduction

The widespread introduction of robots, automated workplaces, additive manufacturing technologies, and blockchain technology is the basis of the economy's digitization. Its essence is the use of distributed information storage technology on several computers, resulting in the sharing and synchronization of digital data and geographical distribution of equivalent copies in different locations around the world, with an absence of a central administrator.

As a form of distributed ledger technology, blockchain gives opportunities to improve the reliability and security of trading. At its core, blockchain is a cryptographic protocol that allows

individual parties to improve the reliability of a transaction, since accounting records in a database cannot be easily falsified. This immutability is due to a combination of factors including the cryptography used in the blockchain, its consensus mechanism, and distributed nature.

The issues of trade development were considered in detail in the works of M.Ya. Veselovsky and T.V. Pogodina (2020), E.Y. Deputatova (2020), M.A. Ivanova (2017), A.N. Klenina (2019), A.S. Neustrueva and Iu.V. Petrenko (2020), L.T. Snitko (2020), and others. However, despite a significant amount of research in modern economic literature, not enough attention is paid to blockchain in trade in the digital economy.

2. Methods

The theoretical and methodological basis of the research is an abstract-logical method and methods of induction, deduction, analysis, synthesis, and systematization used to substantiate approaches to the development of commercial enterprises. We also used the graphical method to study the impact of blockchain on trade.

The information base of the study is the data of state bodies, legislative and regulatory documents regulating the functioning of commercial enterprises, and results of scientific research (Bragin et al., 2019; Kosareva et al., 2019; Panasenکو et al., 2020; Ramazanov, Strungar, 2018; Shakhmametev et al., 2018; Zavalko et al., 2017).

In the course of the study, it is planned to systematize the economic aspects of commercial enterprises' functioning, develop measures to coordinate activities between the main participants in trade, and develop ways for improving blockchain in trade in the digital economy.

3. Results

Blockchain can help simplify trading procedures due to the immutability of the entered data (it is almost impossible to change entered data after the transactions are recorded), automation (actions can be automatically performed), and provision of the history of transactions (it has a complete history of transactions that can be used for its tracking).

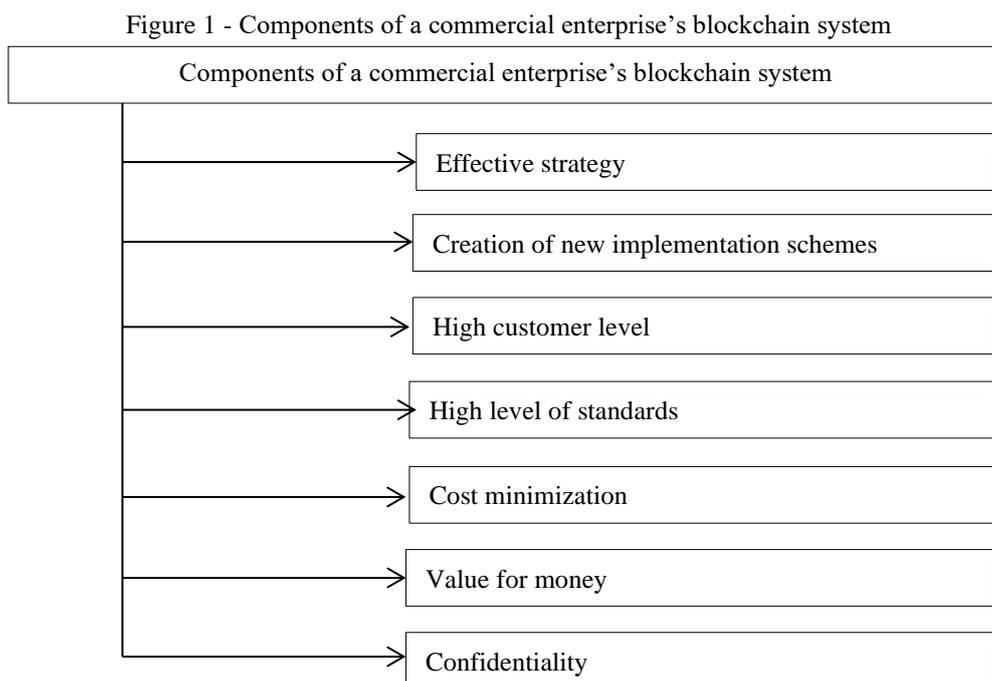
Blockchain helps to track attempts to change data entered into the network. This is especially important in a competitive marketplace where paper-based digital objects can be copied, modified, and distributed virtually at no cost. The immutability of the data entered into the ledger using

blockchain makes it easy to authenticate products and documents. However, while blockchain can help prevent fraud in the accounting industry, technology's resistance to hacking alone cannot prevent the introduction of false information into the accounting system.

The immutable and distributed nature of blockchain negates the need for database backups, thereby fundamentally changing disaster recovery. As soon as information is added to blockchain, it is transmitted to the entire network and stored on all nodes, and it is almost impossible to change it. If one node is damaged, the information can be easily recovered.

The use of blockchain implies the authentication of the parties, although not all transactions require such a high level of identification reliability. Therefore, the chosen authentication method should be as reliable as it is consistent with the purpose for which the data message was created or transmitted, considering all circumstances, including any relevant agreements.

The components of a commercial enterprise's blockchain system are an effective strategy, high customer level, and value for money (Figure 1).



The use of electronic instead of paper workflow, that is, the implementation in electronic form of tracking the movement of goods and payments in the form of a distributed record, allows providing for important functions of the delivery of goods. This includes the guarantee of certificates of origin and authenticity, declared value for insurance purposes, protection during transportation (for

example, integrity of the packaging, condition of the vehicle and container, etc.), integrity of the information used by the regulatory authorities to assess risks defining inspections and permits, as well as information about trading companies (traders) and service providers, involved in a trade transaction.

In modern market conditions, when the possibilities of supplying goods and parts of finished products from suppliers hiding their names are extremely high, the possibility of verifying the sources of supply acquires high importance, especially in mechanical engineering products. In them, many parts and assemblies obtained from subsuppliers are used. Every company must track every supplier and every component from its source.

Something similar is already happening with food products labeled “organic” in stores. Companies use blockchain to track the supply of purchased goods, which is very important in the food industry. Registry entries are objective and cannot be forged. Therefore, trading multinationals may not trust, for example, the accounts of companies supplying food products from some countries. Thus, they use blockchain to track the supply of food and non-food products.

Operations for the accounting of commodity deliveries should be done at regular intervals so that company specialists can see how many months, for example, a product was in the warehouse before processing. Accounting takes place in relation to where the product comes from and where it is processed and stored. This information is then used by companies to fix the date of sale.

Performing such operations on paper can be costly, but the costs can be reduced by using blockchain. Companies must use blockchain to track transactions from start to finish. Thus, each product sold can have its own history, which is stored digitally. If necessary, one can track each element within the product, for example, trace product manufacturing from the date of purchase of raw materials to the place where it was manufactured.

In addition, the system can be configured so that each supplier does not need to go to a central authority to complete transactions; each transaction will be protected by encrypted data. Blockchain allows entrepreneurs in various countries to create transactions in a computer system. These transactions cannot be modified as they are signed in many secure ways and have a due date.

One of the most widely used areas of blockchain is its application in the Internet of Things, in particular, control of the delivery of goods in international trade. Specific areas of its application include: fixing the location of cargo or sea containers and their movement using the obtained GPS coordinates; opening and closing of container doors; container temperature; external impacts on

containers (pallets) of products. For expensive items, such as pharmaceuticals or luxury goods, it is used for tracking or identifying individual packages or products.

Internet of Things sensors can be useful for collecting data that are analyzed by other systems and then provide analysis results. However, such devices are usually not used directly as sensors due to security concerns and the systems connected to tens of thousands of devices can be overloaded with data volumes.

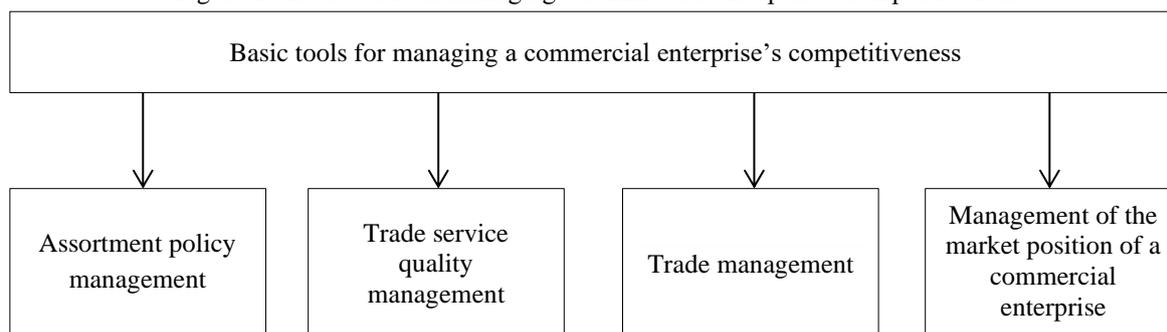
In addition, recording persistent readings on blockchain can be costly for the networks where the data is recorded, since there is a certain amount to be paid for it. As a result, data from devices is often filtered and only data outside certain ranges is transmitted, or data is transmitted without analysis, as a general set of readings. A classic example of the use of data in blockchain is monitoring the delivery of goods whose quality is sensitive to the temperature of transportation (for example, fruits that must be kept at temperatures between 4 and 15°C during transportation) for insurance purposes.

During transport, the device in the shipping container records, for example, that the fruit has been stored at 0°C for two full days. This information is transmitted to a smart contract. It notifies the insurance company that an insurance payment should be made to the supplier (provided that the terms of the contract include delivery and insurance of the goods at the expense of the supplier) to compensate for goods destroyed by an excessively low temperature. The payment is automatically performed by the smart contract mechanism (program) without any further intervention from the supplier or the transport company.

This significantly reduces the costs of insurance companies for processing claims. They do not need to reconcile the information provided by the sender with the insurance company that issued the policy, assess the reliability of the insurance claim, and then request payment. It also lowers costs for the shipper as they do not need to take any further steps to document the problem and receive insurance payments faster.

The implementation of blockchain requires the use of basic tools for managing a commercial enterprise's competitiveness (Figure 2).

Figure 2 - Basic tools for managing a commercial enterprise's competitiveness



Some time ago, online shopping covered only a certain range of goods and was carried out mainly by representatives of the younger generation. Today, a significant part of the population of every developed country uses electronic commerce tools.

Moreover, the tools that digitization provides to every citizen touch on many areas of entrepreneurial activity, from the provision of banking services to private tutoring and retail. The share of industries that rely on digital technologies is constantly growing. There are processes of penetration of digital technologies into other spheres of society, which radically change their technological order.

Some areas of activity have already been completely transformed under the influence of digital technologies. Soon e-commerce will dominate at the household level, and approaches to the very organization of trade will change greatly. Within the framework of e-commerce, the Internet is used (by the buyer, the seller, or both) to search for commercial information, make purchases, sell, and deliver (organize delivery of) goods or services across state borders.

These activities include Internet access and cross-border data flows. Therefore, almost all international trade relies on the use of the Internet. It is almost impossible to organize modern trade without the help of Internet technologies. Thus, trade relations can be divided into several conditional blocks: 1) trade relations, which have completely moved into the electronic sphere (supply of services); 2) supply of goods that, in principle, can be carried out without human participation (automation of logistics); 3) supply of goods using the capabilities of the electronic sphere for organizational needs.

Therefore, digital commerce is trade using Internet technologies and electronic payment systems. This mechanism (which includes all the possibilities of electronic money transfers and communication via the Internet) is used for ordering and organizing production and delivery of

products or services. It is possible to highlight such components of e-commerce as platforms, digital services, and services to increase the added value of products.

The emergence of electronic platforms determined the place e-commerce occupies now. A common feature of these platforms is that buyers can access them from home, which is fundamentally important. If earlier participation in international trade excluded retail and only large players could conduct transactions, now the cost of entering this market is determined only by the purchase price. In other words, now the trade organization scheme looks like this: universal trading platform – final buyer.

4. Discussion

The reliability of the presented approaches is confirmed by the fact that although information and communication technologies have strongly influenced the organization of production, they have not yet succeeded in completely digitizing trade operations (Frolova et al., 2018; Kosevich et al., 2020; Shishanova et al., 2020). Despite efforts to introduce electronic processes to handle some aspects of trade procedures, such as the one-stop shop, trade continues to rely heavily on paperwork.

Many transport companies are actively collaborating with information companies to develop trade finance blockchain to quantify the documentation associated with business as usual. Therefore, the blockchain-based approach consolidates all documents into a single, template-based workflow that starts when the manufacturer submits the packing slip.

At the end of each step, documents are collected and transferred so that participants can see what was sent, when, and by whom. Neither party can change, delete, or even add any records without the consent of others in the network. In addition, information blocks using blockchain can be public, that is, open to anyone or corporate. Anyone can read public registries. One of the flaws in the use of blockchain is the possibility of an attacker taking control of 51% of the registry nodes. In this case, they can solve the problem of consensus, contrary to the interests of other interested parties.

New digital technologies, such as social media, mobile communications, and analytics, are rapidly developing in the context of the general trend of digitization of economic and social life. These innovations are widely used by both consumers and employees. Telecommuters in manufacturing companies often come up with digital solutions better at home than in the office, and many clients are more educated in digital capabilities than sales managers trying to sell to them.

Executives in all industries, from media to electronics to paint manufacturing, are faced with a myriad of new digital opportunities, but find that they lack the specific knowledge to skillfully guide their use.

5. Conclusion

To perform all operations using blockchain, jobs must be created and appropriate programs developed, which is impossible without qualified, well-trained personnel. The possibilities of using blockchain are huge, but it is difficult for enterprises to integrate it into their systems. Blockchain will be necessary for those companies that intend to track the implementation of the supply chain and want to be more transparent in their business operations.

One should take an objective approach to new opportunities and consider the challenges they pose. Blockchain is not a one-size-fits-all solution, and the imperfection of the legal framework for the functioning of new technological approaches is a serious obstacle to the implementation of blockchain. It can effectively implement the digitization of trading operations, but a legal framework is needed that allows transactions using digital means, as well as confirming the legitimacy of electronic transactions and electronic signatures.

Acknowledgments

The study was carried out within the framework of the state assignment of the Ministry of Science and Higher Education of the Russian Federation FSSW-2020-0009 “Development of a methodology for managing the competitiveness of enterprises in the field of commodity circulation in the digital economy”.

References

- Bragin, L.A., Panasenko, S.V., Nikishin, A.F., Aleksina, S.B., Boykova, A.V. (2019). *Regional aspects of the development of the cheese market in terms of the trend of healthy nutrition*. *Entrepreneurship and Sustainability Issues*, 7(1), 626-636.
- Deputatova, E.Y. (2020). Retail in the age of the pandemic and changes in consumer behavior. *Journal of Economy and Entrepreneurship*, 10(123) 1056-1058. (In Russian)
- Frolova, V.B., Dmitrieva, O.V., Biryukov, V.A., Avramenko, G.M., Lebedev, K.A. (2018). Development of control system of financial and economic results of an enterprise. *International Journal of Engineering and Technology (UAE)*, 7(4.38), 167-170.

- Ivanova, M.A. (2017). *Assessment of Trade Enterprise Competitiveness in Modern Conditions*. Vestnik of Yaroslav the Wise Novgorod State University, 1(23), 16-21.
- Klenina, A.N. (2019). *Influence of the Internal Environment of the Enterprise and Capacity of the Target Market Segment on the Competitiveness of Retail Commercial Enterprises*. Fundamentalnye nauki i sovremennost, 9(30), 71-75.
- Kosareva, O.A., Eliseev, M.N., Cheglov, V.P., Stolyarova, A.N., Aleksina, S.B. (2019). Global trends of digitalization of agriculture as the basis of innovative development of the agro-industrial complex of Rus. *EurAsian Journal of BioSciences*, 13(2), 1675-1681.
- Kosevich, A.V., Novikova N.G., Gladkikh V.I., Sharonin P.N., Smirnov M.A. (2020). Improving Economic and Legal Regulation in the Tourism Sector. *Journal of Environmental Management and Tourism*, XI(4.44), 979 - 984.
- Neustrueva, A.S., Petrenko, Iu.V. (2020). *Building a Matrix of Joint Purchases as a Means of Effective Location of Assortment Groups in a Shopping Hall*. Meridian, 9(43), 544-546.
- Panasenko, S., Karashchuk, O., Krasil'nikova, E., Mayorova, E., Nikishin, A. (2020). Analysis of intangible assets of online stores in Russia. *International Journal of Management*, 11(5), 579-589.
- Ramazanov, I.A., Strungar, A.N. (2018). Information and communication globalization of the Russian economy. *Journal of Creative Economy*, 12(10), 1549-1568.
- Shakhmametev, A.A., Strelets, I.A., Lebedev, K.A. (2018). *Strategic mechanisms for the future development of the international e-commerce market*. Espacios, 39(27), 21.
- Shishanova, E.I., Bagdasarian, A.S., Semak, A.E., Frolov, A.L., Sharonin, P.N. (2020). Integrated Use of Multitrophic Aquaculture Resources in the Recreational Business. *Journal of Environmental Management and Tourism*, XI(3.43), 714-720.
- Snitko, L.T., Savenkova, I.V., Patulov, V.S. (2020). *Conceptual Approaches to the Chain Retailers Competitiveness Management*. Herald of the Belgorod University of Cooperation, Economics and Law, 3(82), 227-238.
- Veselovsky, M.Ya., Pogodina, T.V. (2020). *Forming company strategic competitiveness based on intellectual leadership and key competencies*. Vestnik of Astrakhan State Technical University. Series: Economics, 2, 19-27.
- Zavalko, N.A., Kozhina, V.O., Zhakevich, A.G., Matyunina, O.E., Lebedeva, O.Y. (2017). *Methodical approaches to rating the quality of financial control at the enterprise*. Quality - Access to Success, 18(161), 69-72.