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DETERMINATION OF THE EFFICIENCY OF IMPLEMENTING BLOCKCHAIN TECHNOLOGY INTO THE LOGISTIC SYSTEM

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Abstract
The activity of enterprise is closely related to the need to transport goods. To date, the process of cargo delivery is complicated by: low speed of the logistics cycle; long document flow and the presence of errors in it; cargo safety. The need to improve the system of transport logistics of an industrial enterprise determines the relevance and objectivity of the research. The implementation of Blockchain technology will solve the existing problem in the field of supply management. In this study, the stages of implementation of blockchain technology are considered and the economic efficiency defined.

Keywords: Industrial Enterprise, blockchain technology, supply chain management, logistics

Introduction

An effective and strategic partnership between a buyer and its suppliers is one of the most important success factors in logistics. Supply chain collaboration involves the exchange of key information obtained from the market and global network operations, followed by rapid collaborative decision-making based on such information. By working together to match supply and demand, two trading partners can increase mutual benefits and reduce risks. Since the beginning of the supply chain, the importance of logistics collaboration has been emphasized in both industry and academia. In particular, information technology (IT) such as web services, barcode and RFID have played a critical role in the success of the logistics collaboration. IT integration made it possible to receive operational information from the logistics, and then share it with interconnected partners in real time. In addition, recent advances in big data analytics, including IT, have increased the transparency and predictability of the business environment. As new ITs are developed, their potential applications in collaboration with the supply chain should be explored.

Recently, electronic money such as bitcoin has gained attention due to increased use in online and offline marketplaces, as well as wild fluctuations in the value of money in the electronic money transaction market. This electronic money is based on blockchain technology [1,2]. Blockchain technology has the advantages of information transparency, information immutability, and smart contract to support communication and reliability required for logistics collaboration [3]. We refine these benefits as follows: first, transparency means that relevant information, including transaction history, is visible and traceable to all participants; such data is automatically updated with the latest authorized changes to the associated blockchain networks. Second, the immutability of information prevents information or data in the blockchain network from being changed, or deleted without the consent of network participants. Finally, the smart contract reflects the efficient and convenient management of contracts between logistics partners. In general, blockchain is considered technology that can improve the efficiency and effectiveness of supply chain partner processes. This study suggests that all three benefits positively influence logistics collaboration processes such as supply chain partnerships, which ultimately influences performance.

In a supply chain, buyers and suppliers usually try to supply goods or services based on medium or long-term contracts. When executing a supply contract, two partners are required mutually agree on cooperation in order to successfully respond to uncertain market situations or a supply chain failure. The outcome of the partnership is assess and consider for renewal upon termination of the contract. A partnership after several contract renewals often viewed as a strategic partnership. The strategic partnership could become more effective and show further growth. Blockchain, which has recently gained attention in the digital commerce market, has technical characteristics that can be used in cooperation between partners.

Literature review

Since transport logistics is a companion of modern enterprises, without optimal solutions to transport problems, the presence of a logistics department and well-trained specialists in the field of customs clearance, you can lose large amounts of money to deliver goods to customers, which in the short term will not allow the organization to achieve tactical goals, and in the future - to fulfill the planned development indicators.

A possible solution to this problem in logistics systems may be the introduction of blockchain technology. A blockchain (English: Block chain or chain of blocks) is a continuous sequential chain of blocks (linked list) that contains information in accordance with certain rules [11].

When the material arrives from the primary source through the chain of production organizations - transport organizations - intermediary organizations to the final consumer, the cost increases [12]. More than 70% of the final cost of the product includes the cost of storage, transportation and packaging [4].

In all functional areas of logistics, the main task is control the implemented processes. Monitoring of the logistics process is the orderly and, as far as possible, continuous processing of logistics data to identify deviations or discrepancies between the planned and actual values of logistics indicators, as well as analysis of these deviations to identify the causes of discrepancies. There are such stages of logistics system management as:

- Determination of planned values of logistic indicators;
- Calculation of actual values of logistic indicators;
- Comparison of actual and planned indicators (identification of deviations);
- Analysis of identified deviations.

Internal control is an audit procedure that is carried out to evaluate the effectiveness of the procurement service; in general, its relations with internal consumers (other services), the working methods used by the staff of the supply service, relations with suppliers are evaluated. To maintain a high competitiveness, the logistics system must constantly evolve and become more and more complex. To do this, it is necessary to analyze the performance indicators of the logistics system, which reflect the effectiveness of its work from an operational, economic and technical point of view. Logistics performance indicators can be direct or indirect, absolute or relative. Direct indicators of logistics activities are more suitable for analyzing the causes of the current situation and finding management decisions. Indirect indicators of logistics performance, such as profitability or payback period, are often related to finances.

The use of indicators usually makes sense only if they are compared with similar indicators of other enterprises or with the same indicators obtained for a different period of time [5].

In modern transport logistics, when choosing the best routes and transport, computer processing of the initial data (orders, cargo parameters, vehicle fleet, etc.) is necessary, this is due to the constantly growing volumes of data on the state of control objects. Shelter data is sent to the control center in a “closed” form from satellites, and manual processing of such a flow of information becomes laborious, which leads to a loss in the effectiveness of decisions made and an increase in the number of errors.

A possible solution to this problem in logistics systems could be the introduction of blockchain technology. Blockchain (eng. Blockchain or block chain) is a continuous sequential chain of blocks (linked list) that contains information in accordance with certain rules. Most often, copies of block chains are stored and independently processed on different computers [6, p. 240].

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Due to the fact that all blocks in this technology are interconnected and in most cases cannot be changed, this technology can solve the problem of security in logistics, namely, to prevent the possibility of data modification and falsification by hackers. Computer algorithms written in the chain of blocks, called smart contracts, allow you to automate many logistics processes and, therefore, reduce their prices, as well as reduce the influence of the "human factor". The focus on the introduction of blockchain technology in the technological side of logistics reduces risks and significantly increases stability, as it forms its practical focus. The implementation of blockchain technologies in industry is beneficial for increasing efficiency in document management, data storage, supply chain management, payment systems, e-commerce, and voting systems and public opinion research [7, pp. 163-164].

Blockchain Technology

Blockchain technology, introduced by Haber and Stornetta in 1991, gained popularity in January 2009 with the launch of Bitcoin (a blockchain cryptocurrency application). A blockchain consists of a series of interconnected blocks, each block containing a set of transactions (encoded with a hash function), a time stamp, a hash of the previous block, a block identifier, and an existing consensus mechanism) shown in Figure 1. These blocks are recorded in a general ledger in accordance with the agreement rules agreed by the network partners. Because of the fixed features, the blocks are difficult to modify or counterfeit by an individual partner. Blockchain technology provides an effective mechanism for achieving consensus on secure and seamless data sharing without compromising data. This creates technology-based confidence among a group of members who have trust issues that are not centralized in an unreliable and decentralized network.

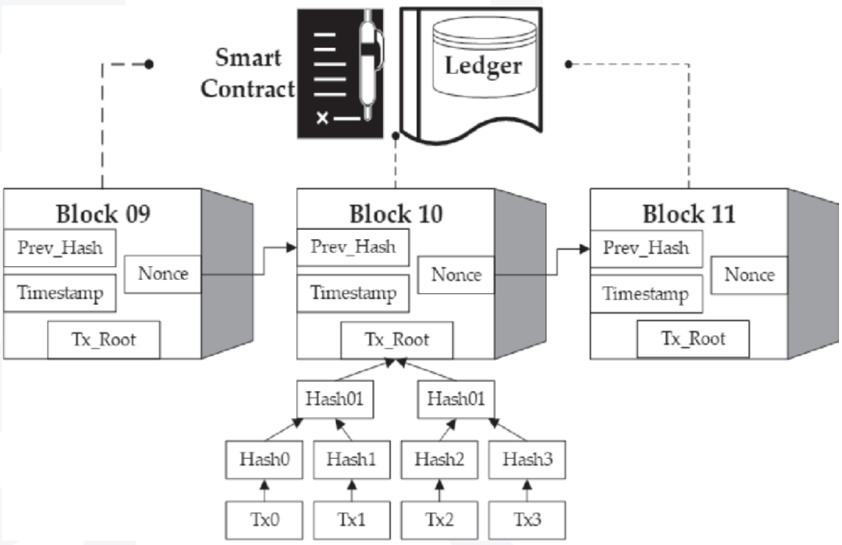

Figure 1. The structure of the blockchain

The most important element of blockchain technology, which ensures network security and keeps the general ledger unchanged, is to use the hash function to encrypt each block and connect it to the previous block. This hash function generates a fixed length value (such as 256 bits for SHA-256) for any arbitrary access to a cryptographic function (e.g. Bitcoin, such as SHA-256). There is a fake random output (hash value) for each input value, which is difficult to predict but easy to predict. Two identical entries always create the same unique hash, but a small change significantly changes the value of the outgoing hash. Therefore, any change in the transaction data of a registered block changes the hash of all subsequent blocks.

Although blockchain has emerged in the last decade, many still do not fully understand its meaning and therefore cannot even imagine its areas of application. For the same reason, this tutorial discusses the basic principles of blockchain and its application in various fields.

Blockchain is also often understood to belong to a multi-purpose project type. Because no matter who or what field you work in, you can do something using blockchain. For example, blockchain can serve as an interesting and promising environment for software developers. For the entrepreneur, the blockchain mechanism can serve as a very convenient tool for reviewing and designing business operations and external relations.

Entrepreneurs can start startups (new projects) without fear of spending a lot of money on a blockchain, even with a small number of customers. Blockchain is neither a simple object, nor a product, nor a trend, nor a definite opportunity. Perhaps it consists of several parts, some of which work together, while others operate independently and independently of each other. For the same reason, that is, due to its modularity, blockchain technology can be applied in many directions and areas.

In general, the development of blockchain technology has a huge innovative potential. Just like the internet economy, blockchain technology is creating a new kind of economy, and that's why we shouldn't overlook the opportunities to take advantage of this opportunity. A cryptotechnological digital economy will be an economy based on decentralized trust, both politically and digitally.

Blockchain gives everyone the same opportunity, in a sense equalizing the opportunities of the participants. While the main function of the Internet is primarily to distribute data and ensure its exchange, the function of the blockchain is to transmit data of a certain value. Thus, blockchain is a promising and future innovative technology. For example, in October 2015, when The Economist published an article entitled "Blockchain, Trust Mechanism," this information quickly spread on the Internet and social media as an innovative innovation around the world.

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Because until then, no one had any information about the blockchain. Advertising on the front page of a magazine with a great reputation on economics, praising the blockchain, caused a great deal of controversy, of course. According to The Economist, blockchain is a technology that allows confidence, and this trust mechanism, which is based on bitcoin, will radically change the mechanism of operation of the modern economy.

Since October 2015, the information provided by the media on the blockchain chapter has not decreased, but has increased, and a large number of projects based on blockchain technologies, digital currencies and other distributed registers have emerged. Thus, thanks to an article published in a single prestigious journal, many heated discussions on blockchain, bitcoin, cryptocurrency, and distributed consensus began, and a revolutionary march of new technology began around the world.

It should also be understood that blockchain is a digital innovative technology that completely transforms society and the economy, radically changes a number of business models and, as a result, brings confidence as a scientific and technical innovation. Because of the trust, the pressure on the media will be significantly reduced, most businesses and organizations will be provided with blockchain technology, and the number of projects using blockchain will increase, and investors will realize this and focus their efforts on developing such technologies.

As a result, we are also beginning to look at the world in terms of trust because of blockchain technology, and blockchain technology gives us freedom and confidence.

To understand the meaning of this term, we give below its definitions derived from different perspectives and approaches, which allows us to understand it more fully:

A blockchain is a large accounting book or journal (grossbux) on computers running around the world that anyone can add notes to and read at any time.

Blockchain is a software product that allows data to be stored and modified on the Internet in a secure and transparent manner without a central authority.

A blockchain is a blockchain (digital conveyor) that stores various forms of information about transactions, contracts, property documents, works of art, and more.

Blockchain is a technology that provides trust, responsibility, and transparency among all participants through collective agreement and a distributed accounting book or journal algorithm, using a new generation of transactional software.

Blockchain is a database organization technology that relies on the Internet and takes full advantage of all its advantages, including open protocol, encryption, and computing capabilities. This distributed database can be equated with an electronic accounting book in which each transaction is recorded without changing or losing the previous one. This e-book is active, written in chronological order, distributed, verifiable, and protected from falsification of data based on mutual trust (consensus) between system participants (nodes).

A blockchain is a distributed database of transactions that can be compared to a very large and decentralized 'grossbux'. In it, due to the capabilities of the Internet, data and sizes are transparently protected and stored autonomously. But there is no central body to oversee these processes. The book in which the data is stored is active, chronologically structured, distributed, verifiable, and protected from falsification based on distributed consensus.

Each participant of the network has an up-to-date copy of the "grossbook" in a quasi-real environment, and the data contained in it is constantly synchronized between all participants in the network over time. Based on the above, we can conclude that blockchain technology allows us to:

• Allows you to automate transactions without involving third parties.
• Blockchain is a system based on trust and consensus.
• Blockchain is an infrastructure that provides authentication and notarization.

Examples of the basic principles on which the blockchain system is based are:

❖ There will be a distributed grossbux or 2.0 register organized on the principle of a distributed accounting journal among all participants.

❖ Decentralization and abandonment of intermediaries - the blockchain is not controlled by any centralized body and there is no place for other third parties in the trust system between the two participants.

❖ Consensus: The fact of accepting or rejecting a transaction is the result of a distributed consensus, not a decision of a particular centralized organization.

❖ Invariability and permanence: Records cannot be changed or lost.

❖ Distributed trust and transparency: data, actions and consensus are separated.

In other words, blockchain has the characteristics of working by collective consensus, working with a very large and open accounting journal, decentralization and distribution, ensuring reliability, transparency and generality in the system. It should also be noted that the blockchain is not only a blockchain of bitcoin and etherium systems, and there is no known single blockchain system.

There are so many non-interconnected blockchains in the world that they can even interact. Thus, technical specifications related to working with some applications in the blockchain may also occur. Blockchain technology creates a distributed algorithmic trust infrastructure, unlike current centralized management. Thus, the blockchain itself includes a distributed algorithmic trust infrastructure or a consensus on demand.

Because of these similar features, most experts compare blockchain to the Internet, and as a result emphasize the advantage of blockchain over the Internet. The following is a comparison of the two systems:

• The Internet allows you to automate communications (both communication and relationships), while blockchain automates transactions and eliminates third parties.

• The Internet is a decentralized publishing system, and blockchain is a distributed trust system.

• Internet publishing infrastructure, and blockchain is the infrastructure for logging in.

Since the development periods of the Internet and blockchain cover the years 1994-2015, the results of this period can be illustrated by the following examples:

1994, Internet:

- Interpersonal communication.
- Automatic printing.
- Electronic commerce.
- Social networks.

2015, blockchain:

- Decentralization.
- Confidence.
- Dealing with valuables without intermediaries.

So there is no contradiction between the Internet and the blockchain, there is only a difference in the development of technology. A registry for creating and using a blockchain (a string of blocks, such as bitcoin), and key encryption for protection, a consensus-based algorithm, and a one-color P2P (peer-to-peer) network (i.e., a decentralized computer network in which participants have the same rights) need Now adding participants to this system is a necessary element for the operation of the blockchain system. As an example, we take the blockchain of bitcoin and in its example we consider the formation of the blockchain, its basic principles and operation. In this case, we will study the blockchain activity in four stages:

Step 1: The two participants agree on the terms of the transaction (e.g., money transfer process, assets, financial documents, etc.).

Step 2: The log is “scanned” by network members. Based on an analysis of the chronology of this journal, network members are assured that the seller actually owns the declared assets or funds.

Step 3: If all work is in place, then the transactions are confirmed and added to the end of the block chain.

Step 4: The log will be distributed to all network participants. Its scattered state provides protection. It is also necessary to change the logs of network (node) members to falsify any transaction. This, of course, is not possible. To clarify the discussion, we make the following note: “Bitcoin blockchain was first defined as a blockchain. In it, each transaction is encrypted to be one of the blocks. The next transaction, in turn, is encrypted on the basis of the previous block, and so on - the same sequence of actions led to the concept of a blockchain, or in other words, the concept of a blockchain.

Thus, in order to obtain trust status, each agreement (or transaction) must be signed using asymmetric cryptography (public or private key). Thus, three types of information are required to make a transaction in a bitcoin-type blockchain:

• Debit address private key
• The public key to the credit address
• The amount of the transaction

As a decentralized fixed database, the blockchain provides a secure environment for transactions between two or more participants. Transactions are chained in chronological, unchanging order as blocks of data, allowing stakeholders to share information securely and transparently. The new blocks are connected to the previously written block, validated, and stored in the disk memory of several users in different locations, called “nodes”. Once you have approved all transactions, there is a consensus among all nodes, which allows you to increase the blockchain’s reputation as a secure, scalable, and transparent decentralized technology.

According to various researchers, blockchain technology has been identified as the next major disruptive technology.

After the Internet changed its path, we exchanged information and changed our way of communicating mobile and social network, blockchain had a revolutionary potential as a safe economic layer, and the Internet was lacking. Swan divides the blockchain into separate objects: blockchain 1.0 for currency transfer and digital payment systems, blockchain 2.0 for contracts other than simple currency transactions, and blockchain 3.0 for applications other than currency and finance. and markets. These other applications include intellectual property (IP) in a variety of fields, from art to science.

SMART CONTRACTS

Smart properties (tangible and intangible assets) are replaced in Blockchain 2.0 as smart contracts on a decentralized open source platform such as Eferium. Smart contracts stored in blockchains are highly automated scripts that allow you to check transactions between different actors. As one of the key features of blockchain, smart contracts automate business processes while reducing costs and human error. Smart contracts provide accountability, trust, and oversight because all transactions can be tracked and checked in a secure, decentralized database. These automated contracts can lead organizations to significant cost savings as manual management becomes obsolete. By reducing costs and increasing supply chain transparency; smart contracts have a major impact on the future of logistics. In addition, smart contracts can be used to ensure that stability requirements are met throughout the supply chain. Smart contracts are discussed in the literature, but their effectiveness has not been clearly evaluated. Saved transactions are not limited to being financial, which improves the blockchain's application in areas other than the financial sector [54]. According to Schmid and Wagner, the blockchain can be used not only for transactions, but also as a system for recording, tracking and tracking all tangible and intangible assets on a global scale. Consensus-based record verification eliminates the need for trusted intermediaries and not only reduces transaction costs, but also helps organizations make management decisions in supply chain relationships.

Blockchain industrial applications. In increasingly complex global supply chains, third parties collect large amounts of data throughout the supply chain, which increases the risk of data security. Instead of storing sensitive data in centralized databases, a blockchain can provide a secure solution for increasing complexity. As more personalized data is collected by data-driven companies whose goal is to offer clearly customized services, according to Zisking et al., Public concern about user privacy is growing. The growing popularity and use of bitcoin in the financial sector has proven that decentralized personal data management systems can increase scrutiny and secure data exchange. According to Schmidt and Wagner, just as the Internet has changed the way we share information globally, so has blockchain changed the way we trust it. By eliminating the need for human intervention, the blockchain has the ability to eliminate the need for personal trust at both the individual and organizational levels. Thus, a system trust based on consensus rules and in this case automated agreements in the form of smart contracts can replace personal trust in a simplified blockchain business environment. According to Saberi et al, this change in trust will radically change the traditional customer-supplier relationship. Thus, an unreliable environment shakes the status quo and forces current supply chain theories to reconsider. Supply chain participants rely heavily on their suppliers when it comes to the quality and safety of their products, especially in food supply chains. For food supply chains, “farm-to-fork” monitoring data on farming practices, storage and transportation conditions are required. If there are any complications during the cold chain, it can lead to disastrous consequences. The implementation of the blockchain by Chipotle Mexican Grill after a food poisoning incident was presented as an example for food supply chains. The Chipotle incident was caused by a complex supplier network and inefficient monitoring, as well as a lack of transparency and oversight in the supply chain. In addition to data security and reliability, blockchain can also be used to prove the origin and authenticity of products. According to Venkatesh et al., Blockchain technology has been implemented with track and tracking applications in manufacturing and logistics. In manufacturing processes, this has helped to identify machine malfunctions and defective raw materials. Among the most popular cases mentioned in the literature, Walmart, Maersk and other transnational corporations optimize their activities using blockchain. Thus, blockchain technology can be a solution to the puzzles of complex supplier networks and lay the foundation for a logistics system. Research by Ko, Li, and Ryu has shown that two aspects of blockchain have the most key impact on production: real-time transparency and cost savings. These aspects affect the profitability and competitiveness of manufacturing enterprises, which in turn has a positive impact on their sustainability. The study by Ko et al. Also compared large manufacturing firms with their enterprises and presented interesting findings for smaller firms. Typically, production audit and control costs are relatively high for smaller companies. They can narrow the gap with their larger competitors by saving the costs incurred due to transparency in real time.

Blockchain’s relationship with other technologies Blockchain implementation is interrelated with the ongoing development of other disruptive technologies such as the Internet of Things (IoT), artificial intelligence (AI), cloud computing, and big data analysis. IoT can be defined as a network of devices connected to the Internet that provides communication between devices, as well as between devices and people. It has the ability to automatically collect data throughout the supply chain and minimize manual interactions with data. Big data analysis refers to the large amount of data that is collected and managed to identify relevant data and optimize processes. In the consumer goods industry, big data enhances demand forecasting and optimization of supply chain processes. Together, these disruptive technologies are part of a fourth industrial revolution called Industry 4.0, which, according to Hofmann and Rusch, has the potential to change the way products are designed, manufactured, delivered, and paid for. Innovation and economic growth are driven by technological change, and the value of relevant data is expected to increase in the near future. In the so-called “big data era,” data is constantly collected and analyzed, which in turn increases the need for a secure, decentralized database. According to Kamble et al., These evolving technologies help manage demand and supply changes and support decision-making in supply chains that improve their overall performance.

Methodology

Since the analysis revealed the interdependence and mutual influence of transport and information support in the processes of transportation, the author recommends using the performance indicators of the processes of transport and information logistics.

Efficiency of transport logistics processes:

- coefficient of absence of damages (Ka.damage) is characterized by the ratio of the number of undamaged vehicles to the total number of vehicles;
- coefficient of timely delivery (Kt.delivery) is characterized by the ratio of the number of vehicles delivered on time to the total number of sent vehicles.

Thus, the integral coefficient of efficiency of transport logistics processes is presented in formula (1):

Kt = Ka.damage * Kt.delivery (1)

Efficiency of information logistics processes:

- the ratio of the absence of errors in the transmission of information (Kerror.inf) is characterized by the amount of delivered information to the total amount of transmitted information;
- coefficient of efficiency of information transfer (Kop. inf) is characterized by the ratio of the desired speed of bringing information to the average speed of bringing information.

Thus, the integral coefficient of efficiency of information logistics processes is presented in the formula (2):

Ki = Kerror.inf * Kop. inf (2)

The above coefficients allow us to determine the overall integral indicator of the efficiency of information and transport logistics processes, which is presented in formula (3):

Eoverall = Ki * Kt (3)

To calculate the economic efficiency of the introduction of blockchain technology, it is recommended to determine the factors that form the economic damage at an industrial enterprise.

Analysis and results

Transaction costs can be interpreted as costs arising in the process of economic interaction between business entities: “Transaction costs include the costs of making decisions, developing plans and organizing upcoming actions, agreeing on their content and conditions when two or more participants enter into business relations; the costs of changing plans, renegotiating the terms of the transaction and resolving disputes, when dictated by a change in circumstances; the costs of ensuring compliance by the parties with the agreements reached. The cost of information retrieval arises from the fact that information about potential buyers or sellers of consumer goods or factors of production and current prices is needed before a transaction is made. Costs of this kind consist of the time and resources required to conduct the search, as well as the losses associated with incomplete and imperfect information.

Transaction costs also include any losses arising from the ineffectiveness of joint decisions, plans, contracts and established structures; inefficient responses to changing conditions; ineffective protection agreements. In a word, they include everything that in one way or another affects the comparative efficiency of various methods of resource allocation and organization of production activities [8].

Scientists paid special attention to the accounting and control of transaction costs in railway transport. In their opinion, from the point of view of institutional theory, "the profitability of railway transport assets, which are specific, depends not only on the size of the movement, but also on the level of transaction costs, which depend on the inclusion of ownership relations and the configuration of the organizational structure of the corporation".

Often, managers do not take into account the fact of spending a significant amount of labor resources when making management decisions on the withdrawal of various technological functions or business processes. Information security is provided by legal and information services, which also leads to certain costs.

In solving the problems of using intellectual property, not only employees of the legal service, but also employees of intellectual property departments are involved, which undoubtedly leads to the diversion of labor resources and, as a result, to additional costs. The formation of tariffs for the provision of services requires a significant diversion of resources, since this procedure is time-consuming.

This area of responsibility also has tenders, tenders and market analysis, which requires the labor of employees of the relevant services. One of the main problems of modern economic analysis is the difficulty of measuring transaction costs. Not all types of transaction costs can be valued in monetary terms. In addition, the usual procedure for expressing the time spent on a transaction in terms of money is imperfect due to the absence in many cases of specialized provision of one or another aspect of the transaction (for example, negotiation) by intermediaries.

D. North estimates the level of transaction costs in the US economy up to 40-45%, i.e. up to 4 trillion dollars in year. In practice, when corporations with a complex organizational structure appear, transaction costs become tangible and can reach significant amounts. Thus, to determine the static efficiency of the implementation of blockchain technology, we apply formula (4), [10].

$$Eimpl=\Delta DC+K \qquad (4)$$

Where : Eimpl - indicator of economic efficiency of capital investments;
ΔD - increase in annual income;
C - current annual costs;
K - capital investments.

Based on formula (4), ΔD should be taken in the form of cost savings, prevention and occurrence of logistical risks, as well as an increase in freight turnover.

To determine the dynamic efficiency of investments, the net present value method can be used, which shows the net income or net loss of the investor when putting money into the project and the cash return on implementation. As a cost estimate of the result, cost savings from the prevention or occurrence of logistical risks can be used.

Conclusion

As a result of the study, the following conclusions were drawn:

- the logistics system at the enterprise is one of the most complex and with this well-functioning mechanism. Enterprises that have switched to organizing the production cycle system in accordance with the principles of logistics can rationally organize production processes;
- studied the basic concepts related to the system and organization of transport logistics of an industrial enterprise. Despite the wide variety of interpretations of the basic concepts, it was concluded that the study will use the interpretation of such definitions as: logistics, transport logistics, system, transport and transport logistics system;
- a comparative description of transportation models is presented, the most progressive model of cargo transportation to date is demonstrated. The main stages of the transport and technological scheme were also demonstrated;
- the orientation of the implementation of blockchain technology on the technological side of logistics reduces risks and significantly increases stability, since it forms its practical orientation. The introduction of blockchain technology in the industry is beneficial for improving the efficiency of the workflow, data storage, managing the supply of goods, reducing errors in the document flow and its duration, reducing the duration of the logistics cycle;

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