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IBI (India) = 4.260  
OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

### International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2019 Issue: 11 Volume: 79

Published: 20.11.2019 <http://T-Science.org>

QR – Issue



QR – Article



**Saidakhror Saidakhmedovich Gulamov**

Statistics Scientific research institute  
Academician, Dr.Sci.(econ.), prof., chief of the chair «Digital economy»  
Tashkent, the Republic of Uzbekistan

**Michael Nikolaevich Svirin**

Tashkent financial institute  
The assistant of the chair «Electronic commerce and digital economy»  
Tashkent, the Republic of Uzbekistan

**Abbas Tairovich Shermukhamedov**

Tashkent branch of the Russian economic university after G.V. Plekhanov  
Dr. Sci.(math.-physz.),prof. of the «Digital economy and mathematic discipline»  
the Republic of Uzbekistan

## DIGITAL LOGISTICS AND BLOKCHEJN-SYSTEMS - THE BASIS ON DEVELOPMENT OF TRANSPORT SERVICES

**Abstract:** Introduction of digital technologies in all branches of economy leads to labor productivity and profit growth. This process does not avoid also sphere of rail transportation. In Russia and Republic Uzbekistan the adjusted successful projects online-aggregation of cargo transportation and the digital turns introduced at the large enterprises for transport already work. Electronic tickets, online registration for flights, "clever" systems of navigation, a taxi call through the appendix in phone are already enough habitual things. Soon, quite possibly, pilotless transports, intellectual control systems of transport streams, "clever" roads which are independently capable to trace the same illegal transportations, Electronic tickets become ordinary, online registration on flights, "clever" systems of navigation, a taxi call through the appendix in phone are already enough habitual things. Soon, quite possibly, pilotless transport, intellectual control systems of transport streams, "clever" roads become ordinary.

The Digital logistics and development of a logistical infrastructure, technology of blockchain are important in system of transport routes. In article questions of development of digital logistics and intellectual transport systems in Russia and Uzbekistan are considered. Application of Digital logistics lifts transport service on qualitatively new level and provides qualitatively new level of transport services and safety of transportations on the world railways, including in Russia and in the Republic of Uzbekistan.

**Key words:** blockchain, the transport services, transported cargoes, transport-logistical sectors, digitalization of transportation, IT system, digital logistics, drawing of deliveries.

**Language:** English

**Citation:** Gulamov, S. S., Svirin, M. N., & Shermukhamedov, A. T. (2019). Digital logistics and blokchejn-systems - the basis on development of transport services. *ISJ Theoretical & Applied Science*, 11 (79), 249-254.

**Soi:** <http://s-o-i.org/1.1/TAS-11-79-53> **Doi:**  <https://dx.doi.org/10.15863/TAS.2019.11.79.53>

**Scopus ASCC:** 3313.

### Introduction

Development of export logistics is impossible without system work on perfection of conditions of export logistics and development of export of transport services. Application of digital decisions on transport with use of the electronic devices providing

protection and monitoring of transported cargoes, standardization and digital relations of participants of the market of cargo transportation is basic for today. Digitalization of transport-logistical sector on the basis of technologies VoIP, reliability and communication quality increase, creation of the

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uniform operational centers and expansion of functionality of dispatching management for the account of integration with control systems and safety, cyber- physical and IT systems is conducted in many countries. As it is known, in the world every day about 3 billion person reach or go for work and back (transport and passenger streams) in a year 1 billion people become tourists (tourist streams); some tens millions people daily address to doctors (medical streams); a large quantity of various cargoes move between warehouses of various levels [1]. The system «Digital Logistics» is constructed on technology BlockChain which guarantees a transparency, reliability and reliability to store in System «Digital Logistics» of the information where any of participants cannot forge or remove the information from system, and loss of electronic documents becomes impossible.

The basic possibilities of a platform in technology BlockChain provide placing of demands for transportations with all essential parameter's; inquiry of variants of routes from transport companies; inquiry and the analysis of the prices and conditions of realization of transportations from different suppliers; registration and accreditation of consumers and suppliers of logistical services; carrying out one and malty stage selection of offers of service providers; carrying out of position the auctions by fragments of routes with suppliers; the coordination of multilateral agreements with participants of the transaction; the conclusion of electronic contracts between participants of the transaction; monitoring of carrying out of transportations (tracking); control of course of execution of contracts by their participants; formation of ratings of suppliers and customers of services.

Technology Blockchain gives possibilities registration of new participants, as through аккредитующие to the organization, and directly. Concrete schemes of registration will be defined on a wish of the customer. The basic logistical services are transportation services - one, two and a lot of humeral, and also multimodal services unifies so that to provide high flexibility in tendering and comparison of offers from various suppliers by the set criteria.

For freight traffic formation of a chain of transportations with instructions initial, final and the intermediate points, essential parameters of transported cargoes - a kind, character, packing, volumes, weight, a regularity of the schedule of deliveries and the other parameters essential to the customer, and also the requirement to routes, types of transport or ways of transportations (for all chain or its separate fragment) is provided. The chain of transportations can be exposed on the auctions - as entirely, and on separate segments. Suppliers can offer the variants in the limits resolved by the customer (for example - the transportation schedules/terms). The system «Digital Logistics» will allow to transfer a

choice of executors directly to the client (to the consignor or cargo addressee), having excluded from process long and expensive purchasing procedures and, having made process as much as possible transparent for the client. To the client sets of routes with executors of each shoulder, cost and conditions will be generated. The client has possibility of comparison of offers on its interesting parameters (for example - to the prices, delivery terms, delivery guarantees in time, the insurance, etc.).

Both on all chain as a whole and by the chosen fragment: the client can independently choose an optimum variant of transportation taking into account all factors, including ratings of carriers. Thus transportations of cargoes can be distributed at once between several suppliers that can be useful for a case when the part from them offers more favorable conditions, but cannot cover all necessary volume. After a choice of a route and executors the system «Digital Logistics» will allow to conclude at once electronic contracts with all participants of a cargo transportation (including with the insurance companies). Execution of electronic contracts to be fixed in system «Digital Logistics» in process of execution of each stage (shoulder). The system «Digital Logistics» automatically traces dates of performance and forms offers under penal sanctions or claims to executors in other kind. In the system «Digital Logistics» all events connected with their execution, including tracing of shipments of cargo, tracking of their transportation through control points and the points co-ordinated by the parties, cargo reception in intermediate and final points, with identification of all registration units or volumes (for such cargoes as oil/fertilizer) are fixed.

### Discussion.

The system «Digital Logistics» provides possibility of control of execution of contracts - approaches of the intermediate and final events connected with execution of the contract - the beginnings of transportations, transportations of the co-ordinated consignments, observance of the schedule of shipments and transportations, executions of conditions of the contract by the involved participants, contract closing/cancellation. Consumers of services can estimate quality of granting of services by suppliers on a set of criteria (terms, quality, parity the price/quality) that in aggregate with indicators of execution of contracts allows to generate system of an estimation of quality of granting of services by suppliers - ratings of service providers and to consider them at selection of offers. (Ratings for Customers of services (to similarly systems Uber, Ebay, AliExpress etc.) are organized. Ratings will allow to reveal the unfair companies and to lower losses because of their activity, without reducing efficiency of work of diligent participants of system «Digital Logistics». In its basis is balanced of micro service kernel realizing

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the basic functions of system. With a kernel through sluices are integrated: the Server part (Service) BlockChain, connecting a kernel systems (business logic) and ensuring functioning with knots of network BlockChain; the distributed file storehouse intended for storage of great volumes given (documents, contracts, etc.); External information systems (a cargo transportation, logistical, unloading -loading terminals, ports, etc. - with which help cargo transportation tracking is conducted). The choice microservice architecture provides division of system into set co-operating among themselves микро services. Everyone microservice represents the separate, rather simple appendix realized on the technological stack. It allows providing:

- System scaling on productivity in any necessary limits;
- Higher degree of reliability, stability and productivity of system;
- Higher degree of security of the data from not authorized access;
- Possibility of development separate microservices without influence on other;
- A choice of an optimum stack of technologies for the decision of each class of problems;
- Optimization of development, support and support of all system as a whole;
- Possibility of updating and development of system with the minimum idle times.

For interaction microservices the hybrid mechanism - direct synchronous inquiries and an asynchronous exchange through turn of messages is among themselves used. It allows to optimize system and to reach balance of productivity, scalability and speed of reaction. Users carry out work with system through browsers on laptops or mobile devices, or through mobile appendices.

Interaction with system is carried out through special appendix for browsers or for mobile devices. The similar approach provides additional level of protection and loading distribution. For work with electron - digital programs the certificated cryptographic modules established on computers of users (Crypto Pro or its analogues) are used. In the long term, after certification carrying out, work with cloudy electron - digital programs can be added that will allow to use electron - digital programs from mobile devices. For work BlockChain are used the server part directly integrated with a kernel (business logic) of system and a network from knots, realized on the basis of platform Emer. Network knots represent the services developed on computers of users-participants of system or separate servers (in a cloud). Server knots develop both the operator, and participants. Storage of large files (contracts and other documents) is carried out in the distributed file storehouse. Duplicates can be stored on computers of users. Application BlockChain allows by means of unique Hecht files to certify an invariance of these

files and their conditions. The distributed storage of Hecht on all knots of a network does any frauds and substitutions of files almost not realized that allows using them as legally significant documents. Work with network BlockChain is possible two ways.

Through the system interface where all logic and system possibilities is presented. Such work is possible through the browser or mobile appendices. The second way provides work with network BlockChain through the special supplement - agent BlockChain with which help it is possible to check up a condition of documents, them independently to verify about conformity of the given document of its (file) Hecht, and also to receive and compare the information given by system with the data of network BlockChain. Thus, the independent mechanism of control of reliability of the data and documents in system is realized.

The system «Digital Logistics» leans against technology of the distributed entrusted register of BlockChain. It allows making the highly reliable system, continuing to work at failure of any components. In the distributed register (BlockChain) are carried out records of three kinds:

- The description of the participant. A company name, the address, other public information, and also certified records from regulators.
- The offer of the participant. The participant offers other participants transport services on those or other conditions. The offer is signed by record that certifies responsibility of the company for the conclusion and performance of contracts with the corresponding offer [2].

- Contract record on cargo transportation.

The contract is created by the sender and the addressee, and conditions of stages of multihumeral transportation of cargo are brought in it. The contract contains Hecht the document-contents, and the signature of participants. As a result, usual users BlockChain see only Hecht, but cannot get access to contract details. In an audit case - the original document is shown and the means Hecht function prove conformity of the document of Hecht from BlockChain. Participants create records and publish them in BlockChain. Thereby they declare themselves, as about potential participants of transport activity. In record the regulator signature, number of the license and other legal information to which the participant proves the competency of participation in system contains. Each participant forms a number of offers which also publishes in BlockChain.

The offer contains conditions and the prices of transfer of cargoes. An offer format is text file with the fixed structure, allowing processing it in an automatic mode. Logistical service, having received the order, builds an optimum logistical route, proceeding from active offers. It can be the automated system on the basis of special algorithm, similar to systems of making of a route in the auto-navigator.

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The logistical service forms the delivery contract, but it does not publish, yet it contacts participants (owners of offers), shows them the contract, and receives from everyone the digital signature under the contract. Except the signature of the participant, the contract contains its unique payment address on which indemnification for execution of services in this contract will be added.

After that, the logistical service publishes in BlockChain the contract with all signatures of participants, than «opens the contract». The contract is transferred (probably) to the current owner of cargo, that is the sender. The sender delivers cargo to the first carrier, and transfers it cargo. By transfer of cargo to a carrier, that creates the signature for the contract (already the second), and transfers to the sender. That, having brought the signature in the contract, transfers to its carrier.

As a result:

- The contract the carrier owns.
- In the contract record contains that the carrier has accepted cargo.

All changes in the contract and all certificates of its transfer automatically materially to assure in BlockChain and anybody does not have possibility to "wind off" a situation. In the same way the carrier transfers cargo to other carrier, and there is a new signature «cargo has accepted» and the certificate of transfer of the contract further.

As the contract represents itself record in BlockChain, automatically there is an authentic history of transportation of cargo, with automatic and not-forged time labels. Therefore it is easy to prove, at whom cargo (and the corresponding contract) is in a responsibility zone at the moment and if it has been lost or stolen - that who last owner of cargo. After reception of cargo by the addressee, he signs the contract, and the contract is closed by that. This change is published in BlockChain by last supplier. For monitoring of a condition of logistical system and current position of cargoes it is offered to use the WEB-interface to BlockChain from which the necessary information is taken. Such WEB-sites can be much, them all participants of a network or regulating bodies can own. It is possible to create similar sites for public access. As the information in BlockChain for all is uniform, all sites will show the same condition. And even if any site swindles - that it can be checked up, having compared the information to contents of other similar sites.

The BlockChain -platform incurs key functions [2]:

- The mechanism of creation of records in BlockChain and authentic transfer of records between participants.
- High reliability from critical events, such as compelled stops or recoil BlockChain.
- Concept realization «sensible conservatism», that is - the maximum following to standards in

respect of innovations and safety, will allow working networks stably.

- The maximum compatibility with standards, simplicity of integration with existing systems.

- Function of unlimited scaling (increase in number of participants).

- Fruitful to developers the environment of the working out combining simplicity and reliability of work.

- A number of additional services on the same BlockChain, as well as payment service will allow to make fast and cheap payment between participants, including - trans boundary), or the distributed services of safety and construction of highly reliable computer networks.

Business takes root into management models logistical processes, and digitalization has concerned and in sectors of transport logistics, i.e. introduction of digital technologies in business processes inevitably. For example, one of the largest logistical companies PEK («First forwarding company») delivers orders of cargoes of any volume and weight across all Russia from Internet shop or from the supplier in hands of the client or to the nearest warehouse Easy Way. For a year service was issued as independent affiliated brand PEK.

Convenience that it is possible to order delivery small, not dimensional things, tracing the order online status. Where the segment of electronic commerce is the basic driver of the modern market of logistical services. In system the principle of simple and clear decisions for clients - Internet shops is put. PEK as the leader of the newest technologies in logistics, has developed and has introduced them for quality and speed of service, convenience of clients, in particular, the summer of 2017 had been introduced «System of fixing and accumulation of client messages» (SPHINX) for feedback processing ».

PEK, has connected in uniform information Centre new specifications that have allowed to reduce time of consideration of client references since several days till several o'clock. The SPHINX has united all information resources of the company: from administrative programs of each branch to messages in a convenient private office on Internet portal PEK. In August, 2017 the company declared reduction of terms of transportation of cargoes, in some directions time in a way was reduced till 5 days that on the average for 3-5 days advance competitors. Delivery terms on a filial network of the central Russia and Ural Mountains were reduced on the average on two-three days. Service of modular cargoes has helped clients to save considerably time for transportation of the goods of small volume and weight and the tariffs established PEK on bulky goods and pallet transportation in provides in deadlines with individually picked up route and a type of transport thanks to what the probability of not planned delays considerably decreases, «the Digital logistics» in the Russian

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Federation is created in March, 2018 year for working out and realization of digital services on a railway transportation. The Russian railways as the subject of natural monopoly »and on a platform it is registered almost 2.8 thousand consignors. Since 2017 year when the platform is placed in operation, consignors have ordered on it 140 thousand transportations for the sum almost 10 billion rbl. It is supposed to increase a service ruler for the account of the organization of transportations not only in the in-Russian message, but in international and transit.

Application of a digital platform at the organization of rail transportation will allow not only raising efficiency to its participants, but also considerably will simplify to clients access to an infrastructure. Competitiveness of railway transportation thus will grow only. For clients the company will create complex logistical decisions for the account of integration of own information systems of service providers that will accelerate a commodity-money turn, to construct optimum logistics of moving of the goods and to minimize the expenses connected with it. Electronic document circulation with customs, sanitary, tax and other enforcement authorities becomes plus also. Numbering and control of services of all chain of counterparts will simplify mechanisms of financial interaction that is it will be possible to apply all modern forms of calculations. The system «Digital Logistics» is intended for a corporate segment (B2B, B2G) and represents the closed electronic platform access to which is carried out on a network the Internet through Web the browser from usual personal computers and mobile devices.

Users of System «Digital Logistics» are the commercial organizations and the state structures interested in the order or granting of logistical services in cargo transportation - "railway", providers of logistics, the transport and logistical companies, carriers [3].

The system to realize following possibilities: clients will quickly place Electronic Demands for a cargo transportation and at once to transfer to its any quantity of participants in work; clients will quickly receive all possible variants of electronic routes of transportation; clients can quickly and conveniently compare electronic routes on any number of parameters (cost, to terms, risks, etc.) and to choose the optimum; clients, cargo carriers, insurers can be transparent to trace all stages on the personal computer, smart phones and tablets; clients, cargo carriers, insurers will be notified at once on arising situations (delays of cargo, damage etc.); at cargo carriers, customers, intermediaries there will be transparent ratings; insurers can estimate risks on the basis of ratings of participants; to increase number of clients and partners quickly connecting new participants.

The digital logistics roughly develops and in the Republic of Uzbekistan. The decision of the President

of the Republic of Uzbekistan № 3832, July, 3rd, 2018 year «About measures on development of digital economy in the Republic of Uzbekistan». The state takes large-scale measures on development of digital sector of economy, systems of electronic document circulation take root, electronic payments develop and the is standard-legal base in sphere of electronic commerce is improved [4].

The digital economy functioning on information-technological platforms develops with intensive speed that causes necessity of creation of new models of such platforms. Technologies «BlockChain» (technologies of the distributed register of the data), "artificial intelligence", use of possibilities of supercomputers, and also activity on crypto-actives are one of directions of development of digital economy in many countries of the world. Technologies «BlockChain» gradually take root not only into many sectors of economy, but also in system of the government and other public relations.

### Conclusions.

System «Digital Logistics» in Russia, intended for the organization on granting of logistical services (one, two and a lot of humeral, and also a multimodal cargo transportation) in electronic form where reception of electronic demands from clients on a cargo transportation, gathering of offers of transport companies on the organizations of routes, and also gathering of offers cargo carriers on performance of transportations and cargo transfers on different shoulders of routes it is necessary to improve on each of shoulders transportations for formation of variants of routes. To strengthen monitoring of performance of electronic contracts by executors of transportation at each stage, and also transparent and operative granting of the information on a cargo transportation course to all participants [5-11].

With a view of the further perfection of system of the government, creation of conditions realization of Strategy of actions is necessary for introduction and development of digital economy, improvement of the investment environment in five priority directions of development of the Republic of Uzbekistan in 2017-2021 years. For the Republic of Uzbekistan which is in a geographical position Centre to Centre new manufactures and on the Eurasian transit way, natural value has priority development of conditions for digital logistics and chains of deliveries of the goods from Republic of Uzbekistan to the EU countries and to the Asian countries. On the one hand, it will create possibilities for revealing of competitive domestic productions and their inclusion in the international division of labor, and on the other hand will allow to stir in our territory of manufacture of European, Chinese, Japanese, American and other companies for deliveries of the goods, both to Asia, and to Europe. Development of digital logistics in Republic of Uzbekistan is connected with innovative programs,

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with use of exclusively electronic documents that has allowed to reduce time of official registration of papers several times, thus effective digital interaction between the railway and supervising bodies, has created stimulus for level increase of containerization of internal and foreign trade goods traffics. Thanks to association of information systems "Uzbek railways", customs service's transportation of the goods in foreign countries have become simpler. In Uzbekistan

it is expedient to create modern information-logistical service which will accompany transportation of the container of any forwarding agent or the operator the electronic data on all transit, to provide with the necessary electronic information not only interested persons, but also the state supervising bodies. Besides, introduction of mobile workplaces for workers of railway station allows optimizing registration of technological operations

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