

Ministry of Education and Science of Ukraine
Black Sea Universities Network

ODESA NATIONAL UNIVERSITY OF TECHNOLOGY

International Competition of
Student Scientific Works

BLACK SEA SCIENCE 2022 PROCEEDINGS



ODESA, ONUT 2022

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BLACK SEA SCIENCE 2022

Proceedings

Odesa, ONUT 2022

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INTRODUCTION

International Competition of Student Scientific Works “Black Sea Science” has been held annually since 2018 at the initiative of Odesa National University of Technology (formerly Odesa National Academy of Food Technologies) with the support of the Ministry of Education and Science of Ukraine. It has been supported by Black Sea Universities Network (the Association of 110 higher education institutions from 12 countries of the Black Sea Region) since 2019, and by Iseki-FOOD Association (European Integrating Food Science and Engineering Knowledge into the Food Chain Association) since 2020.

The goal of the competition is to expand international relations and attract students to research activities. It is held in the following fields:

- Food science and technologies
- Economics and administration
- Information technologies, automation and robotics
- Power engineering and energy efficiency
- Ecology and environmental protection

The jury includes both Ukrainian and foreign scientists. In the 4 years that the competition has been held, the jury included scientists from universities of 24 countries: Angola, Azerbaijan, Benin, Bulgaria, China, Czech Republic, France, Georgia, Germany, Greece, Israel, Italy, Kazakhstan, Latvia, Lithuania, Moldova, Pakistan, Poland, Romania, Serbia, Slovakia, Switzerland, Turkey, USA.

At the same time, every year the geography has expanded and the number of foreign jury members has increased: from 46 jury members representing 25 universities from 12 countries in 2018, to 73 jury members of the 46 universities from 19 countries in 2022.

More than a thousand student research papers have been submitted to the competition from both Ukrainian and foreign institutions from 25 countries: China, Poland, Mexico, USA, France, Greece, Germany, Canada, Costa Rica, Brazil, India, Pakistan, Israel, Macedonia, Lithuania, Latvia, Slovakia, Romania, Kyrgyzstan, Kazakhstan, Bulgaria, Moldova, Georgia, Turkey, Serbia.

The interest of foreign students in the competition grew every year. In 2018, the students representing 15 institutions from 7 countries have submitted 33 works. In 2021 the number of submitted works increased to 73, authored by the students of 40 institutions from 18 countries.

The competition is held in two stages. In the first stage, student research papers are reviewed by members of the jury who are experts in the relevant fields. In the second stage of the competition, the winners of the first stage have the opportunity to present their work to a wide audience in person or online.

All participants of the competition and their scientific supervisors are awarded appropriate certificates, and the scientific works of the winners are included in the electronic proceedings of the competition. Every year the competition receives a large number of positive responses from Ukrainian and foreign colleagues with the desire to participate in the coming years.

2. ECONOMICS AND **ADMINISTRATION**

PROSPECTS OF TECHNOLOGY INTRODUCTION OF CORPORATE BLOCKCHAIN IN THE CONDITIONS OF DIGITALISATION OF ECONOMY

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Abstract. *The article is sanctified to the research of modern trends of digitalisation of economic activity. Examinations of the main components of Blockchain technology as one of the instruments of digital transformation of the state's economy is executed. The analysis of functioning of Blockchain network, principles of data transmitting in this network, processing and storage of data; the features of Blockchain using in business is described; analysis of basic trends of digital infrastructure development; determination of the basic directions of the use of Blockchain technology for the organization of business processes in different branches of economy; comparative analysis of Blockchain's corporate decisions's application from IBM and AWS; describing for the Ukrainian enterprises of Blockchain's corporate of expediency application is conducted. On the basis of methods of expert evaluation the estimation of perspective diversification activity of international IT-company in the direction of business consulting from the grant of services of Blockchain corporate is carried out.*

Keywords: *technology, business consulting, Blockchain, corporate Blockchain, data, information, network, analysis, experts.*

I. INTRODUCTION

Actuality. The acceleration of public progress stipulates permanent transformations and structural transformations of the economic systems under the act of the newest technologies. Digital technologies become a leading resource next to the traditional factors of production. These technologies assist the increase of enterprises' competitiveness, thus an assistance to provide the transparency of doing business becomes their important aspect. One of the most perspective technologies of this direction is Blockchain technology. Digital transformatisation for Ukraine in the conditions of eurointegration is very actual. Digitalisation of domestic enterprises due to the introduction of Blockchain must give the possibility to become us the valuable participants of outer informative space and to assist the forming of effective and transparent business processes. The marked arguments actualise the use of this technology in Ukraine.

The aim of the research. Systematization of theoretical and methodological bases of the use of Blockchain technology analysis and the development of research and practice recommendations in relation to the economic value for the Ukrainian enterprises of corporate Blockchain is described.

Theoretical, methodical and practical meaningfulness of the given results. The key aspects of Blockchain use in business, grouped directions of the use of this technology for organization the business processes in different brachnes of economy

are considered. On the basis of methods of expert evaluation the efficiency of diversification activity of international IT-company in the direction of business consulting with the grant of services of corporate Blockchain is carried out.

Informative sources of the research. Legislative and normative acts of Ukraine, official publications of international organizations, monographic literature, materials of scientific conferences, electronic resources from the Internet, results of questioning are used.

II. LITERATURE ANALYSIS

The researchers of many domestic scientists are sanctified to the problems of digitalization of economy scientific developments, such as: D. Hladkyh, O. Humeniuk, I. Davydova, H. Karcheva, D. Kasianenko, L. Kurhusenkova, O. Lapko, T. Vine, P. Putsenteilo, Z. Tymoshenko. Thus, part of questions remains debatable enough, in particular the use of digital technologies on a base of Blockchain. This situation can be explained by that traditionally Blockchain technology is used at the market of cryptocurrency and possibility of its use for other spheres is remaining unnoticed.

Scientists try to define the trends of development and influence of modern digital technologies on different spheres of business. Thus, in scientific works of V.M. Zhukovskiy the modern tendencies of digital technologies application in personnel management is investigated [1]. O. I. Kravchuk, I. O. Varis investigate the digital technologies of personnel management in the conditions of quarantine limitations [2]. The Boston Consulting Group undertook the research in relation to the necessity of digital culture forming for the achievement of digital transformation purposes [3].

Domestic and foreign scientists investigate the trends of cryptocurrency: N. Hryshuk, B. Ihnatova, O. Demydov, A. Zheleznov, M. Kravets, V. Kornieiev, V. Mischenko, I. Sytnyk, O. Cheberiako, V. Lukianov and A. Burkovska. These scientists studied the nature and features of cryptocurrency. T. Zheliut and O. Brechko set the features of transactions realization from cryptocurrency, differences from operations with traditional currency. A. Tsyhanova investigates cryptocurrency's emission. V. Kornieiev and O. Cheberiako [4] described advantages and disadvantages of cryptocurrency from the different countries' experience, offering, that corresponding financial services must be licensed by the state as the type of professional activity on the stages of mining and trading and financial consulting.

Also, the question of digital transformation of economy, certain possibilities of the use of Blockchain technology as innovative technology of business processes in different branches of state's economy is investigated by the scientists. Thus, the researches of Blockchain questions as the direction of accounting development the following scientific researches are devoted, such as M. V. Dubinina, S. V. Syrtseva, O. V. Byhanov, N. O. Tusova, O. V. Melnychenko, V. V. Kornieieva, H. M. Tarasiuk [5]. Also, perspective direction of the use of Blockchain technologies is insurance due to the conclusion of smart contracts [6].

In recent year the use of this concept became popular in society. Such popularity allows us to attribute it to neologisms that are constantly in mass consciousness. This category also often meets in the separate legal documents of our state. Thus, in the decision of № 13-rd Rada of the National Bank of Ukraine from 26.05.2020 «About

the activity of management of the National Bank of Ukraine in relation to perfection of the payment system and problem of digital currencies of central banks and payment systems on Blockchains» it is suggested to take into account information of Rada of the National Bank of Ukraine on perfection of the payment system and problem of digital currencies of central banks and payment systems on Blockchains and information about the problems and prospects of digital currencies development of central banks and analysis of results of pilot scheme «e-hryvnia (e-UAH)». In Resolution of Cabinet of Ministers of Ukraine from 25.03.2020 №274 (questions to the competence of vice-prime ministers of Ukraine), the necessity of development of virtual assets providing is marked, Blockchain, artificial intelligence, of digital innovations development [7]. Thus, this resolution is doubled from Resolution of Cabinet of ministers of Ukraine from 18.09.2019 №856, that sets the circle of competences of Ministry of digital transformation [8].

Domestic legislation in this sphere is remaining unsettled. It is confirmed by Conclusion in relation to the project of Law on virtual assets. In particular, it is marked in this document, that by its aim the project does not contain contradictions and, mainly, corresponds to the international and law obligations of Ukraine, that is formed on the base of eurointegration directions. However, it is marked that this document needs substantial perfection, especially, it concerns the providing with correspondence to Recommendations of Group of the financial events development of fight against money structuring (FATF) and corresponding Directive 2015/849 [9].

The legislatively connected questions are features of legal regulation of technologies application of the distributed information processing on the whole (technology of the distributed register as DL-technology, and «Blockchain» technology as its variety), taking into account decentralizing character of storage and processing of information. The separate legal aspects of application of the marked technology in scientific literature of the last time are investigated [10, 11].

Thus, deiscussed terminology in the sphere of Blockchain technology, an ambiguousness of perception in society was brought to the necessity of study of the state of the legislative regulation of this sphere. Research of the contest of legislative suggestions, that is accepted and registered in Verkhovna Rada of Ukraine, resolutions of Cabinet of Ministers of Ukraine and documents of the National Bank of Ukraine allowed to define the general features:

- the authors of projects and other normative acts give determination in the text of legislative act to the certain terms of technical character, id est the aim of the legislative regulation is not regulated by certain relations, but creation of legislative definitions;
- most actively “Blockchain” technology is developing in the field of state registers;
- in the field of the personal authentication, introduction of the personal electronic keys for the personal activity of the state is not set;
- strengthening of the state’s responsibility for functioning of the system;
- stimuli are supported that influence on providing the functioning of the system by users;
- events in relation to security of information (from loss and distortion) [12-17].

It is concerned that Blockchain shows the chain of blocks of transactions. Thus, it is the distributed database that has the opportunity to support the list of records (they are named blocks), that increases constantly. The marked base has safety devices from modifications. All blocks of this base contain the mark of time and necessary references to the previous blocks of hash-trees [18].

III. OBJECT, SUBJECT, AND METHODS OF RESEARCH

The object of the research is the use of Blockchain technology.

The subject of the research is theoretical and methodological principles, organizational mechanisms of analysis of the directions of Blockchain technology use.

Methods of the research. The achievement of the declared aim of the research is carried out by the means of scientific and special methods. The methods of induction and deduction, methods of the scientific abstracting, classification, theoretical generalization and comparison, are used for exposure, selection, theoretical analysis, actualization, classification, generalization of the printed sources from the range of problems of Blockchain technology use; methods of statistical analysis of dynamics rows - for the study of of digital infrastructure trends progress; methods of expert estimations - for description of efficiency of diversification activity of international IT company in direction of business consulting with the grant of services of corporate Blockchain; statistical methods for the evaluation of homogeneity of expert group are given.

IV. RESULTS

4.1. The main components of Blockchain technology

Blockchain shows a digital cluster, that is impossible to “break” and that can be programed not only for the record of financial transactions but also for other existent data and absolutely any information [19]. We interpret Blockchain as the technology that facilitates work in the process of transactions registration and watching of assets in business. An asset can be material or non-material. Practically everything, that has a value, can be found in the network of Blockchains, decreasing the risk and cutting down expenses for all attracted.

Information that is stored in the Blockchain network circulates by the principles of the general and regular updating of database. This principle became the new basis of the use of networks that has corresponding advantages and disadvantages. The database for Blockchain network is impossible to keep on on transmitter, and it results in the volume, that all records are subject to general availability and verification. Existence of the centralized copy that would be stolen, break or change, because information simultaneously spreads through the networks of thousands of computers and becomes accessible to all subjects of the internet becomes impossible. Blockchain technology contains the “built-in” mechanisms of defence. Due to storage of identical blocks of information for the Blockchain networks, it is impossible to control by one organization; there is not “vulnerable” center for hacker attacks.

The volumes of operations in the whole world is growing in geometrical progression and it will increase complication, vulnerability, unefficiency, and charges on the current transaction systems. The increase of electronic commerce, Internet

banking and purchases, together with growing mobility of people in the whole world, entailed the increase of transactions volumes. For solving such problems, rapid pay networks, that provide the mechanisms of establishment of trust, does not require the specialized equipment, does not have duplication of payments, provide transparency and trust to business are needed. Thus, the study of basic features of Blockchain technology allowed them to define in detail and put in order:

1. Features of the normatively-legal regulations at national and international level.
2. Interpretation of category of «Blockchain» on the basis of existent determinations and approaches as technology that facilitates work in the process of transactions registration and looking through the assets in business.
3. Most popular directions of Blockchain use, the sphere is taken to the state registers as confessed by leading experts in the sphere of the state strategic planning of the most progressive with considerable prospects.
4. Existed limitations in effective realization of many economic operations that can be decreased due to Blockchain use.

The dynamics of the amount of scientific researchers for the last few years and the problems of Blockchain technology is given in Fig. 1.

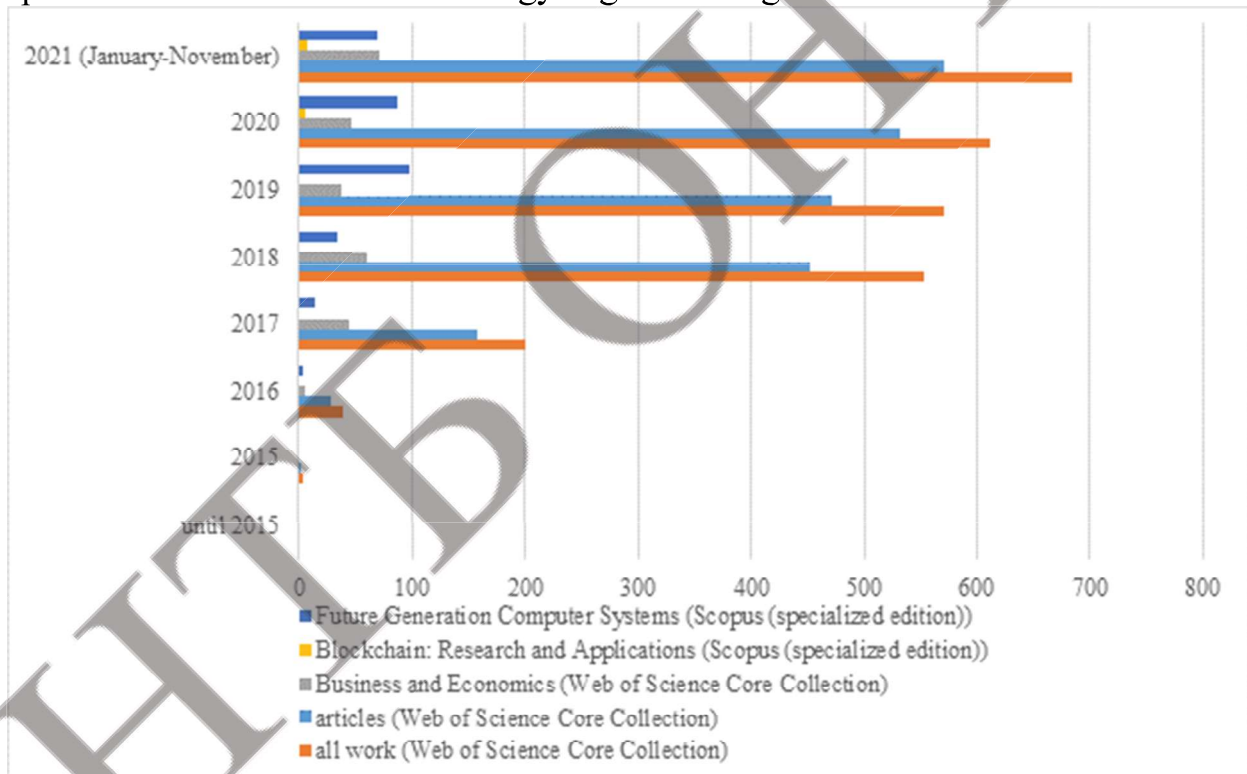


Fig. 1. Dynamics of the number of scientific papers on the blockchain in scientometric databases until November 2021 [calculated for 20-22]

The amount of all publications in relation to Blockchain technology in Web of Science Core Collection (WOS) and specialized editions of Scopus, the amount of articles by all directions and amount of the articles by direction of “business and economy” were analysed by us. The amount of articles continues to increase, that certifies growing actuality of the investigated technology in 2021.

4.2. Analysis of Blockchain network, principles of transmission, processing and storage of data. Key concepts of Blockchain for business

Basis of Blockchain technology is made by application of the following technological receptions and methodologies of work in industry of data enciphering: asymmetric cryptosystem (asymmetric algorithms of enciphering); receptions of data randomising (hash-functions: MD and SHA); for the recording of randomising results the table of hashcoding is used; Smart Contracts are the method of data communication (values in digital image) from one participant to other; realization of POC mechanism (Proof of concept) and talkens are the claim of agreement in the system (it is proof of conception as the method of event verification).

Blockchain functioning is related to implementation of enormous amount of calculations, for realization of which corresponding calculable powers that is given by the providers of cloudy services for considerable monetary resources are needed. But it is necessary to mark the warning for the proprietors of cloudy services accounts, that unconscientious miners, that get a commission for activity from defence of Blockchain constancy, can use their accounts. Thus, “newbie” that use cloudy services without the proper level of awareness in the sphere of cyber safety can get from AWS, Azure, Google Cloud, Gigacloud [23] or other providers of cloudy services the accounts on large sums, that can be ten and thousand USA dollars.

Information about this type of swindle is got as warning for the users of cloudy services as the result of conducted interview with an expert in the sphere of Cyber Security (DevSecOps at Jacobian Engineering) that has AWS Certified Security (Specialty Issued by Amazon Web Services Training and Certification) [24], and also AWS Certified Solutions Architect (Professional Issued by Amazon Web Services Training and Certification) [25]. Undertaken research of basic elements of Blockchain technology allowed to set and describe in detail basic advantages and disadvantages of this technology (Table 1).

Table 1. Grouping the advantages and disadvantages of blockchain technology

№	advantages	disadvantages
1.	Decentralization - all members of the blockchain network have equal rights.	Scalability - the size of the blockchain will increase with the number of transactions.
2.	Network transparency - data is publicly available, and deleting or modifying it is excluded.	The likelihood of a new type of fraud.
3.	Versatility - the possibility of application in completely different areas of business and public administration.	Probable breach of integrity if more than 50% of the computing power is on a single device.
4.	Reliability - transaction verification is available to all participants in the system and allows only legitimate transactions.	-

Blockchain for business is private, settled network with well-known personalities and without the necessity of the cryptocurrency use. To understand how Blockchain works for business, it can do revolution in business networks, it is necessary to set clearly four main key conceptions of Blockchain for business (Table 2).

Table 2. Contents of key blockchain concepts for business

№	Blockchain concept	Content concept
1.	Shared ledger	Only a distributed system of records shared in the business network is added
2.	Permissions	ensuring proper visibility. transactions are secure, authenticated and verified
3.	Smart contract	business conditions built into the transaction database and executed with transactions
4.	Consensus	All parties agree to verified online transactions

In business network transaction can be tested and passed in Shared ledger through the consensus. Blockchain for business requires consensus as the method of application of that mechanism that is considered the best in any branch segment. Smart-contract is a set of rules that regulate business, it is kept on Blockchain and executed automatically as the part of transaction. Realization of conceptions is impossible without establishment of basic participants of blockchain network (to take into account legislation of their actions) (Table 3).

Table 3. Blockchain network members and the content of their activities

№	Members	Content of activity
1	business blockchain user (Member)	business user with permissions to join the blockchain network and conduct transactions with other network members.
2	Regulator	blockchain users with special permissions to control transactions occurring in the network may be prohibited from conducting transactions
3	Blockchain developer	Programmers who create applications and smart contracts that allow blockchain users to make transactions in a blockchain network.
4	Blockchain network operator	Individuals with special authority and permissions to create, define, manage, and track a blockchain network.
5	Traditional processing platforms	Existing computer systems that blockchain can use to increase processing. This system may also need to initiate blockchain requests
6	Traditional data sources	Data systems that can provide data to influence the implementation of smart contracts and help determine how to communicate and transfer data between traditional applications and the blockchain through API calls using MQ-style cloud messaging (managed message broker service)
7	Certification Authority (Licensing)	Issues and manages the various types of certificates required to authorize the launch of a blockchain.

4.3. Trends of digital infrastructure development

Information technologies that provide the construction of digital infrastructure can be divided into 4 basic groups [26, p. 140]: internet of things, cloud computing, robotic technologies, artificial intelligence; Big Data and additive technologies 3D; technologies of connection, quantum and supercomputer technologies; Blockchain technologies, cyberphysics systems, digital planning and design. On the whole, the development of informatively-communication technologies in the world can be estimated by the amount of their users (Fig. 2).

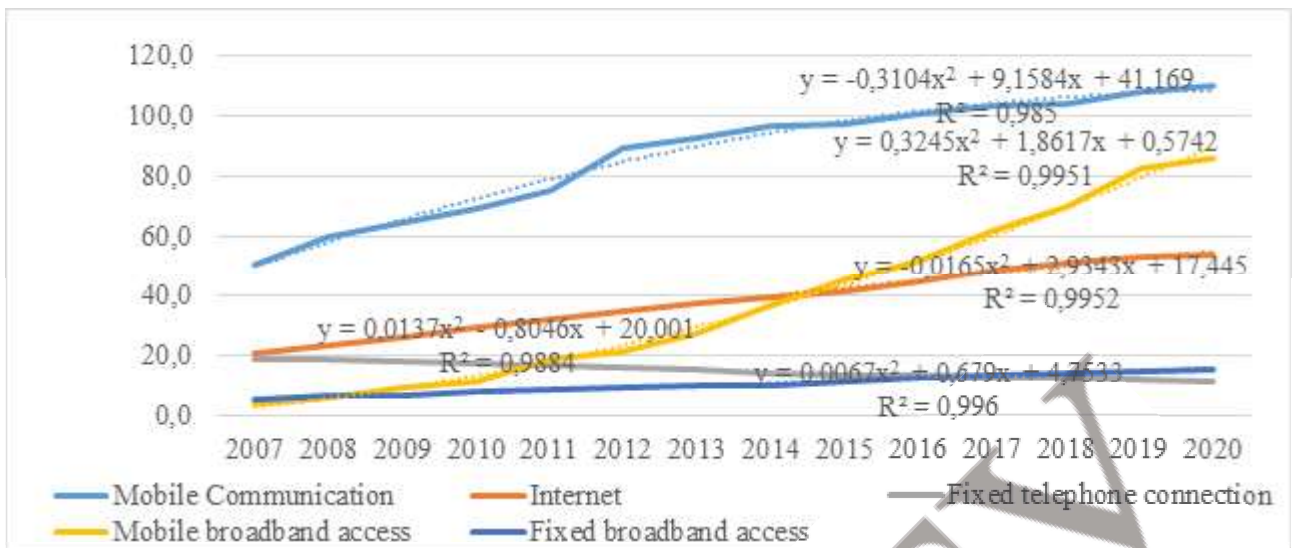


Fig 2. Number of subscribers in the world by types of information and communication technologies in 2007-2020, (% of the total population)

Dynamics during the investigated period is qualitatively designed after polynomial dependences and that is why they can be used for prognostication. Thus, at the end of 2020 there is 53,8% population of the world, used the Internet, comparatively with 20,6% in 2007. During 2007–2020 the amount of subscribers of mobile broadband access grew quicker from 4% in 2007 to 85.9% in 2020 [27].

The important factor to increase the access to the Internet are the appearance of new technologies of mobile communication and passing to the next generations, dissolution in years between such technological gaps each time diminishes: between 2G and 3G is 10 years, between 3G and 4G is 5 years. In 2018 the newest was the fourth generation, and already now there is preparation to the introduction of 5G. It needs considerable investments, but will allow to operating the considerable volumes of data much better, to process their greater volumes and link with the greater amount of devices [28, p. 7]. It is forecasted, that 2025 more than half of population will have the access to 5G (Table 4) [29, p. 8].

Table 4. Use of mobile technologies by regions and generations in 2018 and 2025 (forecast), %

Regions	2018			Forecast until 2025			
	2G	3G	4G	2G	3G	4G	5G
Asia and Oceania	34,12	2,34	45,28	5,00	13,00	67	15,00
Latin America	26,26	39,89	35,12	5,00	21,00	65,00	8,00
Middle East and North Africa	37,06	40,08	23,32	10,00	32,00	52,00	6,00
Central and South Africa	59,29	3,65	6,21	14,00	59,00	24,00	3,00
Countries of the former CIS	36,15	4,36	19,33	2,00	18,00	68,00	12,00
Europe	18,15	36,23	46,67	1,00	7,00	63,00	29,00
North America	9,12	21,01	69,38	2,00	7,00	44,00	4,00
The world together	29,55	28,34	43,32	5,00	20,00	59,00	15,00

There is a tendency to the increase of part of IT sector in GDP of countries during the last years, besides it yields to the design of polynomials with the proper level of reliability (Fig. 3) [29].

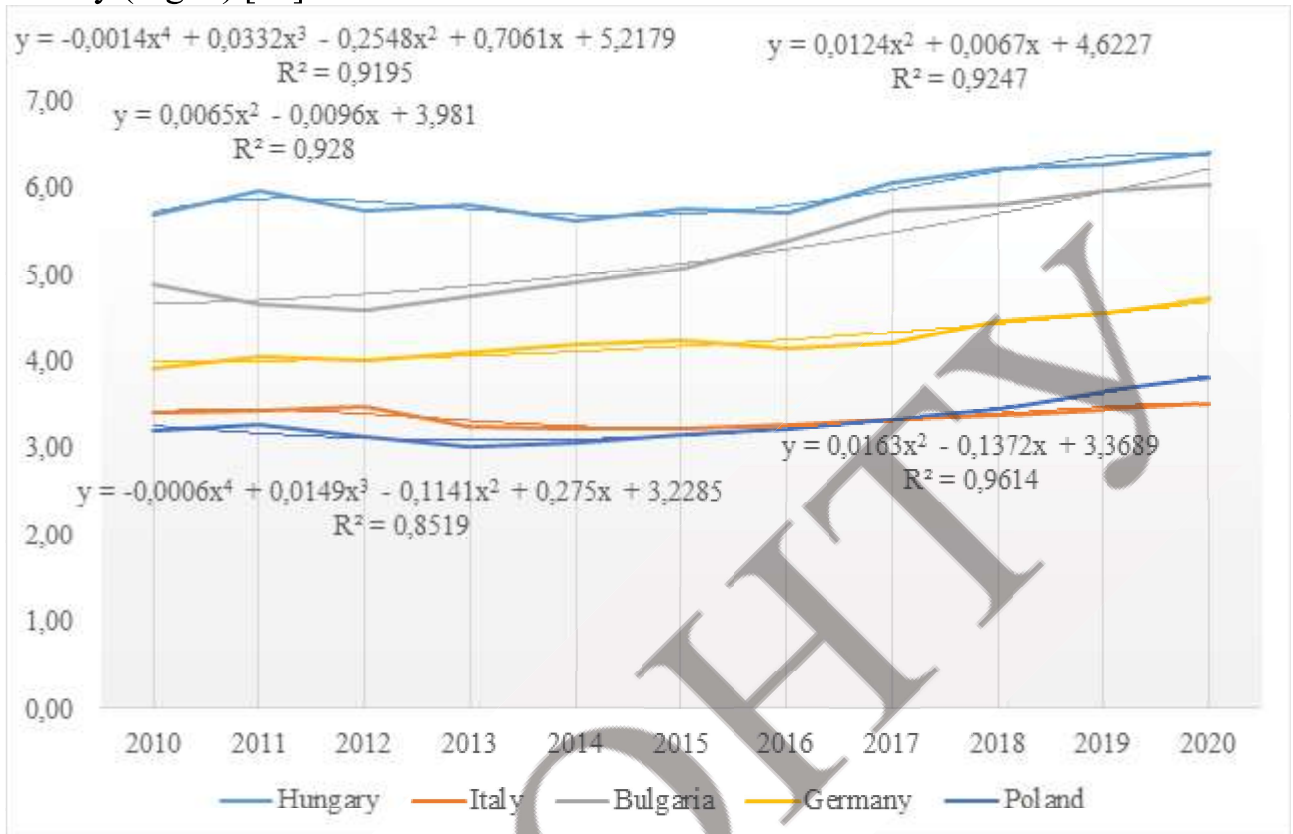


Fig. 3. Share in the GDP of the IT sector in some European countries, %

In most European countries this is 3-5%, but in some it is about 6-8%. In Ukraine this index in 2020 on different estimations was from 4% to 5,5%, however, one of goals of Ministry of Digital Transformation of Ukraine is its increase to 10% in 2024. Digital transformation must certainly take place in parallel with introduction of technologies that guarantee data protection and prevent cybercrime. In Ukraine it can be realized on the base of Blockchain.

4.4. Use of Blockchain technology as innovative technology of organization of business processes in different branches of state's economy

Blockchain technologies are perspective for development of electronic registers of right of ownership on earth and other objects of the real estate, digital platforms for storage, transferrableness and administration of these citizens, organization of purchases, electronic budgets, providing of electronic referendums, e-petitions, e-voting, electronic management, creation of single electronic state demographic register as the digital identifier of citizens of Ukraine, development of modern systems of integrated deliveries chains [30, p. 81].

Blockchain technologies can give the opportunity to pass and keep information safely, barriering its from interferences, consequently, they will be especially actual in domestic conditions. Introduction of Blockchain technologies and other digital technologies will allow to promote comfort and functionality of many systems and

processes, provide financial cost and charges reduction on personnel, and also substantial increase of safety of information and its transparency.

Forecast, that the amount of projects with the successful use of Blockchain considerably will grow during 2022-2026, and 2030 to the general effect from its use due to the reduction of charges and creation of new income will attain 3 trl. USA \$ [31, p. 35].

The example of the use of Blockchain technology of divided data storage with the aim of information defence in Ukraine by Ministry of Digital Transformation the digital platform of e-state «Action» is realized. Portal «Action» allows to get access to the state on-line services, and also to information from national electronic informative resources. It is also possible to use mobile application «Action» with the similar functional.

One of the best methods to understand Blockchain is to estimate its permanent potential and define, can it improve the method of doing business by the organization, and also to consider the cases of its use. Thus, it follows to define those industries that can use this technology potentially. Perspective to learn experience of IBM Blockchain (business consulting or management by its network). Blockchain technology of IBM or actual Blockchain networks of IBM helped many businesses. IBM Blockchain has its own experience solving business problems by means of Blockchain technology and due to large branch experience and Blockchain technological examination. IBM unites all unique systems which are necessary for success achievement.

4.5. Prospects of Blockchain application in accounting, audit and insurance

Technology of Blockchain shows the set of tools that can become the catalyst of development not only for the developed countries. Due to this technology financial mediators must lose their meaningfulness, and the population of country will be in more equal terms with comparison to more provided layers of population.

For today the American institute of the certificated public accountants (American Institute of Certified Public Accountants, AICPA) works on the development of regulations, corresponding algorithms, instructions, educational materials, to help the certificated accountants and public accountants better understand and apply Blockchain technology in practice in bookkeeping and audit. Basic idea: relative simplicity of accounting (cryptocurrency show non-material assets with the undefined term of the useful use, their sale is subject to taxation, capital augmentation is taken into account [32]).

Another perspective direction of the use of Blockchain technology is insurance, at the construction of different decisions this technology provides reliability and transparency for clients, to modernize this industry:

- smart-contracts help to provide automatic insurance payments, bring down risks and on the whole to improve quality of customers' service;
- efficiency of Blockchain system makes markets decentralize, fully digital and more safe, reduces time of the inquiry processing and cost of transactions; abandonment from mediators and transparency of public Blockchain platforms, promotes trust to the system, substantially increases speed of work and reduces its cost;

- the high-rate of transaction processing allows easier to pick up the individual cost of services and makes market more flexible;
- new types of insurance and general economy are appeared and developed: P2P of insurance, microinsurance, point (self-reactance) insurance;
- availability of insurance services and more and more users get the access to the market.

4.6. Analysis of Blockchain's corporate decisions application (IBM, AWS)

The modern world requires innovative decisions that is why many world companies are developing exactly by means of this technology. Leaders that make decision often look closely to Blockchain technology with the aim of increasing the work efficiency, cost reduction and risks. Blockchain gives a synergistical effect at creation of new business models to organizations.

AWS gives the specialized instruments for satisfaction of certain necessities, if it is necessity for the centralized database of register that supports unchanging and transactions records by cryptographic methods, or multilateral, is fully managed by Blockchain networks that helps to work without mediators are checked up. Clients with the workloads constrained with the use of Blockchain technology and registers choose AWS more often than any other supplier of cloudy decisions. 25% of all workloads of Ethereum in the world work on AWS.

Amazon Managed Blockchain simplifies the difficult work related to application of Blockchain networks, increasing time of placing of Hyperledger Fabric platforms on 60%. Managed Blockchain Service simplifies management networks, as it supports the interface of command line of AWS, services of AWS CloudFormation and Amazon Cloudwatch Logs. Amazon QLDB works in 2-3 times quicker of traditional platforms, giving the transaction processing to the operators, analogical SQL, and debenture model of data.

AWS has more than 70 tested partners of Blockchain decision that provide support of all basic protocols of Blockchain technology, including Hyperledger Sawtooth, Corda, DAML, Ethereum, Quorum, Blockstack, Blockapps Strato, RSK, Kadena ScalableBFT and many others. AWS offers resources for on-line training and certifications that will help to work on the achievement of set goals in any place and in comfortable time. The company offers flexible possibilities from AWS Training and Certification – from the format of Digital training and online-lectures with a teacher in comfortable rate to the remote examinations [33].

The last version of IBM Blockchain platform is based on feedback from more than 500 clients. These systems work in different environments - both local and in cloudy. Protocol with an open code, for work in any calculable infrastructure is created. Nestlé Company inculcated the closed blockchain system for supplying control of foodstuffs. OpenSC Company, created by Boston Consulting Group and World fund of wild nature, became the partner of Swiss giant in this project. OpenSC develops Blockchain platform that helps the enterprises of food industry to remove illegal, harmful for environment products from the deliveries chain. Nestlé is inalienable part of IBM FoodTrust, and asserts that due to creation of this ecosystem of closed Blockchain in the company, they are able maximally to realize an intrinsic value and

increase this technology. The example of such world giant, as Nestlé, proves that introduction of Blockchain system destroys the enterprise on a new level [34].

Software and interface of IBM Blockchain Platform provide flexibility, productivity and powerful possibilities necessary for opening of Blockchain technologies potential. Advantages of IBM Blockchain Platform are following:

- the tested Blockchain system that is already successfully used in different industries, with the numerous examples of introduction. IDC, Everest Group, Juniper Research, HFS Research, BRG and other companies name this platform as the branch leader. Also round-the-clock support service passed the verification in practice;
- to begin quickly work, it is possible to join to already operating client networks. But at presence the special necessities of IBM Blockchain Platform will help the enterprise to create new network that answers such necessities;
- the advanced instruments of management will allow to invite in the range of network development and plug into the network other organizations from other local IT infrastructure. Support of multicloudy environments functions means the possibility to invite addition users that work for other strangers cloudy environments;
- the IBM Blockchain Platform is created on the basis of Hyperledger Fabric platform from Linux Foundation. The open source code, support of local infrastructure and possibility to work with the cloudy environments of extraneous suppliers allow to avoid attachment to the certain suppliers.

Thus, the choice for collaboration with Blockchain services providers are difficult enough, that is why it follows to be oriented on the specific of company activity and its clients.

4.7. The explanation of economic value for Ukrainian enterprises of the technology of corporate Blockchain

Practical part of the research is realized on the base of LTD «First Bit» that works in Ukraine from 2005 and it has offices in Kyiv and Odesa. LTD works on IT market during 20 years in 5 countries of the world. More than 14 years in Ukraine company offers complex solutions of of different tasks complication, IT services for effective business management are also offered. Also «First BIT» is «Center of the real automatization», «Center of Certificated Training», «Center of production and trade competence», «Center of accompaniment» and it is the member of «Union of business automatization». The clients of the company get necessary services for successful management: mobile additions, web decisions, cloudy services, own developments are offered.

Thus, this company is powerful enough with stable position at the market of IT services, but it can become the prospect of Blockchain technology introduction. Organization can quickly join to already existed network created on the basis of IBM Blockchain Platform. In addition, consulting corporation can work out its own network with exact accordance with its necessities. Thus, activity diversification due to partnership of consulting from the introduction of tBlockchain systems will result to company's withdrawal to a new level among competitors, expanding new markets, will provide the proper level of stakeholders' loyalty, will assist to personnel development.

It is also necessary to mark, as LTD “First BIT” develops not only at the internal market but also on external, this enterprise topically will be necessary to inculcate Blockchain systems for the clients.

For introduction of events from organization of consulting partnership in relation to Blockchain systems, it is necessary to conduct the estimation analysis of workers’ relation to the quality of personnel training on the enterprise. And also to conduct the expert questioning of results estimation at the terms of traditional directions storage and with the use of Blockchain technology [35]. For this purpose the enterprise can conduct questioning with the use of *Google Forms*. Corresponding questionnaires, questioning and given results (annex A) is conducted were designed by us.

Questioning was done among the staff. 12 persons took part in questioning. The answer of every respondent for a question is analysed as diagrams (Fig. 4-10).

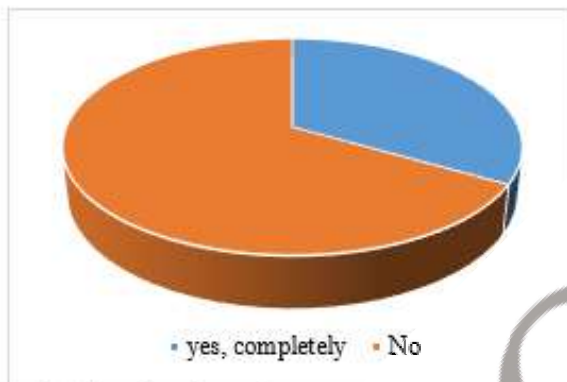


Fig. 4. Distribution of answers to the question: "Are you satisfied with your own level of qualification?"

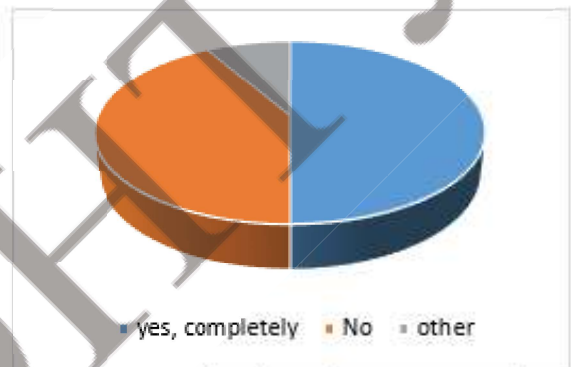


Fig. 5. Distribution of answers to the question: "Do you like the methods of training employees in the company?"



Fig. 6. Distribution of answers to the question: "Is it necessary to conduct training only on professional qualities, or also on personal?"

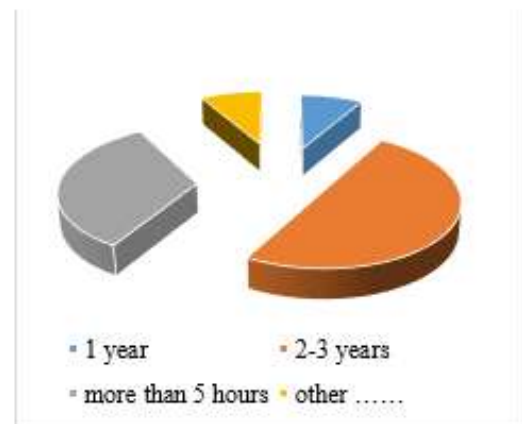


Fig. 7. Distribution of answers to the question: "How many hours a week are you ready to devote to training?"

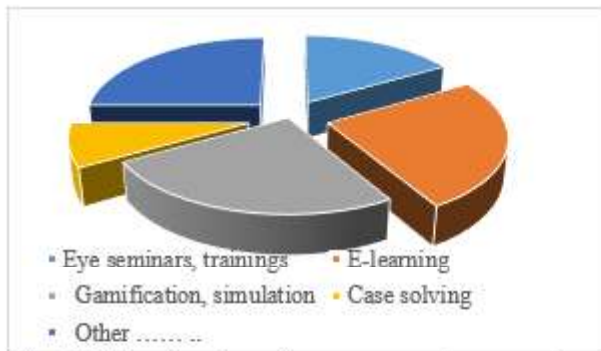


Fig. 8. Distribution of answers to the question: "Which option to get information do you like best?"

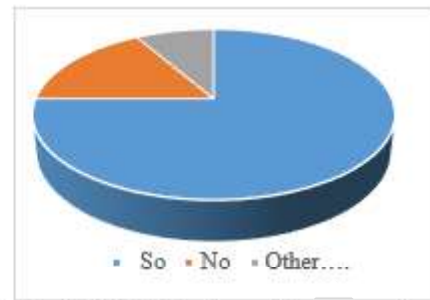


Fig. 9. Distribution of answers to the question: "Do we need to evaluate the effectiveness of training?"

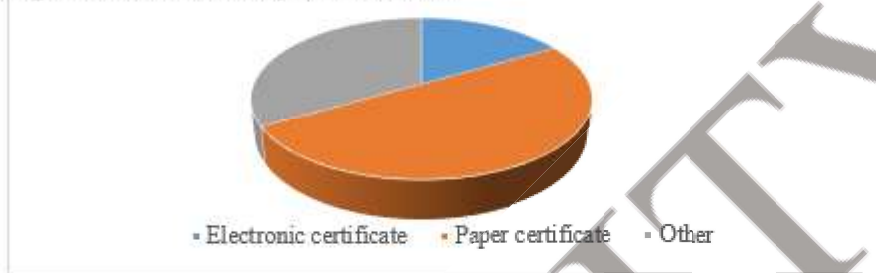


Fig. 10. Distribution of answers to the question: "In what form do you want to receive certificates based on learning outcomes?"

All data from the above-mentioned diagrams are taken from answers, grouped of Google Forms. Thus, analysing results, it is possible to say, most workers are not satisfied with their qualification (66,67%) that certificates about their aspiration to the development. Respondents' opinions in relation to the degree of satisfaction of existent teaching system is practically distributed almost in half. In relation to the problem of training on professional and personality qualities, then anymore 90% respondents consider that it is necessary to conduct training on both. 50% polled workers are ready to spend time for training of 2-3 hours a week, but anymore 33% of workers can have training more than 5 hours for a week. 25% of workers were chosen method of e-learning training, other 25% of workers like gamification, and only 16,67% liked face-to-face seminars, that is fully expectant for IT company. Such distribution of answers means that workers are ready for the introduction of innovative information technologies. Fully was unexpected that 50% respondents wish to get paper certificate on the results of training. 75% of polled workers consider that efficiency of training needs to be estimated.

Next step in the estimation of personnel readiness to the introduction of innovative technologies in company's activity of realization of evaluation expert's results of LTD «FIRST BIT» diversification activity due to the introduction of consulting partnership direction in relation to Blockchain technology is offered. 13 employees of financial subdivisions (annex B) took part in questioning (Fig. 11).

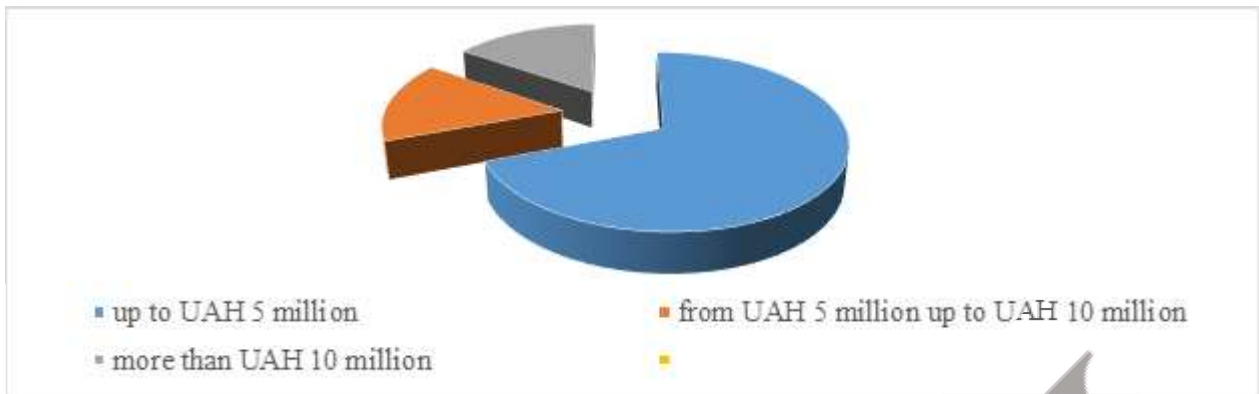


Fig. 11. Distribution of responses according to the most probable indicator of the company's revenue growth from the proposed range, provided that the existing traditional areas of activity are maintained

Thus, almost 70% experts think that at the terms of staraha of existent traditional activity directions, annual increase of income will be less than 5 mmln.hrn. (Fig. 12).

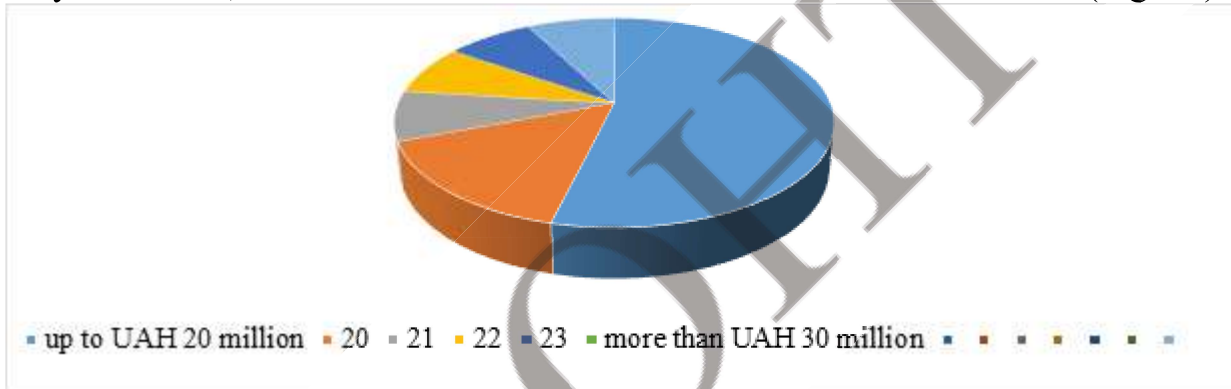


Fig. 12. Distribution of answers according to the most probable indicator of the company's revenue growth from the proposed range, provided that the company's activities are diversified in the direction of implementing a consulting partnership for the development of blockchain technology

Almost 54% (7 persons) of experts think that annual company's income will grow less than on 20 mln.hrn. annually on condition of activity diversification in direction of consulting partnership from introduction of Blockchain technology, only one person (7,7% polled) considers that it will exceed 30 mln.hrn. Other four experts (38,46%) consider income will grow in the range from 20 million hrn. to 23 mln.hrn. Let us conduct the estimation of expert group's opinions homogeneity (Table 5).

Table 5. Grouping of experts according to the growth of the company's revenues from the proposed range, provided that the company's activities are diversified in the direction of implementing a consulting partnership for the development of blockchain

Income increase, UAH million	Up to 20	20-23	More than 30	Total
Number of experts, persons	7	5	1	13
Specific weight, %	53,85	38,46	7,69	100
X_{av}	20,65			
Deviation $\Delta X = (X_i - X_{av})$	-2,15	0,85	10,85	...
ΔX^2	4,64	0,72	117,64	122.99

The size of this forecast must be checked for reliability and typicalness. Determine the standard deviation that characterizes dispersion of separate experts' opinions in relation to mean value.

$$\sigma = \sqrt{\frac{\sum(X_i - X_{av})^2}{n}} \quad (1)$$

X_i – i expert's opinion, the forecast of the enterprise's income is increasing
 X_{av} – average arithmetic selections of experts' forecast values

$$\sigma = \sqrt{\frac{122.99}{13}} = 3.076 \text{ UAH million}$$

Determine the variation coefficient that characterizes homogeneity of expert group's totality:

$$CV_{\sigma} = \frac{\sigma}{X_{cep}} \times 100\% \quad (2)$$

$$\frac{3,076}{20,65} \times 100\% = 14,89\%$$

As the calculation value of variation coefficient $CV_{\sigma} < 33\%$, then the expert group can be considered homogeneous, that specifies the possibility to use expert estimations for further calculations.

The next stage of Blockchain system introduction on the enterprise will be to choose the consulting corporation that is the provider of global informative networks. LTD «First Bit» can quickly join to already existent network bwhoch was created on the basis of IBM Blockchain Platform. In addition, consulting corporation can work out its own network with exact accordance with the company's necessities. As clients of LTD «First Bit» are companies in the field of distribution, import, export, logistic, rent of apartments and row of concomitant services, then it will be expediently to inculcate exactly IBM Blockchain Transparent Supply. It will help to provide transparency at the level of all partners on the deliveries chain. The common use of data is the key to success in business. Blockchain platform allows promoting efficiency of data exchange as the enterprise only determines who can look over data. Decision for providing of deliveries chain transparency allows creating unchanging, divided register for the general use with partners on the deliveries chain, to promote the degree of trust and transactions efficiency. Blockchain plays an important role in the world, where speed, exactness and cooperation determine the optimal deliveries chain [36].

IBM Blockchain Transparent Supply gives Blockchain platform by means of what company can create the own ecosystem of data exchange with partners within the framework of reliable deliveries chain [37].

For the clients of LTD «First Bit» the introduction of this system will bring advantages:

- possibility to confirm the commodities origin and show to the consumers advantage of brand among the competitors, namely: complete information about the products origin on the basis of Blockchain data with limitation of rights for access;
- to look through the information about supplies in all deliveries chain practically in real-time, to optimize supplies by means of function of automatic addition, in order to

avoid goods scarcity or surplus supplies, to improve the indexes of realization and inculcate the dynamic pricing;

- to provide complete transparency and decreasing of administrative charges, related to the settlement of discussed situations, products recalling, demonstration of normative requirements observance and documentation exchange with business partners.

In difficult times, so as the world pandemic, this question has a greater value. Companies and consumers expect the guarantee of commodity authenticity from the brands, in that time as participants of deliveries chain require the responsible choice of suppliers and transparency increase with the aim of minimization of discussed situations. Also, it is needed to mark that the main advantage of introduction of this system will be fully training of company's guidance and employees of using the platform, technical support 24/7 and absolute accompaniment.

Thus, introduction of consulting partnership from Blockchain system development from IBM Blockchain. It will result to the increase of clients' loyalty and partners due to providing of their activity transparency was offered by us. It is no less important that after introduction of IBM Blockchain Transparent Supply the envisaged of workers' training and certification is needed. Thus, the input of consulting partnership with possibility of Blockchain systems development under the needs of our customers will result to the company's withdrawal on the new level among competitors, expanding new markets.

V. CONCLUSIONS

The actuality of undertaken research in relation to the analysis of Blockchain technology use is confirmed by the certain tendencies of digital transformation in the conditions of eurointegration processes. The special accent is done to the prospects of introduction of Blockchain technologies that will give possibility for our state to become the valuable participant of outer space informative and will assist the forming of effective and transparent business processes.

Systematization of theoretical and methodological bases of Blockchain technology allowed to set the features of the normatively-legal regulations of this phenomenon at the national and international level. Discussion of terminologies in the sphere of Blockchain technology, ambiguousness of perception in society, lacks of the state of the legislative regulation of this sphere are marked. The offered interpretation of "Blockchain" category on the basis of existent determinations and approaches as technology that facilitates the work in the process of transactions registration and looking through the assets in business-network are given. The most popular directions of Blockchain use, existent limitations are considered in effective realization of many economic operations that can be decreased due to Blockchain use and were determined by us.

The swiftly growing dynamics of the amount of publications in relation to Blockchain technology in the scientometrical bases of Web of Science Core Collection and Scopus, that is sharp evidence of growing actuality of Blockchain technologies is marked. The important element of the research is the study of Blockchain network work, principles of transmission, processing and storage of data, that allowed to set

bases of this technology, that are based on technologies and methods of work from data enciphering, their essence, content, advantages and disadvantages. An interview is conducted with an expert in the sphere of cybersecurity, as the result of given information on the new type of swindle with the use of cloudy services for Blockchain system unconscious miners.

We consider the key conceptions of Blockchain for business, that is taken Shared of ledger, Permissions, Smart of contract, Consensus, their specifications, and also clearly participants of Blockchain network and the content of their activity, is described in details. Investigating the basic progress of digital infrastructure trends, we make the approach to the determination of digital economy as economic system, that characterizes the new technological mode of economy and has the characteristic deployment of digital technologies on the basis of innovations and their implementation in all types of economic activity and sphere of vital functions of the society.

Also we grouped and detailed information technologies that provide in-process the construction of digital infrastructure and place in this infrastructure of Blockchain technology. We formed the hypothesis, that the use of Blockchain technology allow to bring down the level of bureaucratization, will promote business transparency, will assist the general increase of IT industry income, and it will allow to attract domestic and foreign investors due to the simplification of business registration procedures.

On the results of analysis, grouping of directions of Blockchain technologies application is executed in business. The training of corporate decisions directions of Blockchain application is undertaken from IBM and AWS, experience of international companies that apply these decisions in practice is studied, and also the description of corporate decisions from IBM for international IT company, worked out events from organization of partnership of consulting with IBM company in relation to the development of blockchain systems as direction of activity diversification of the company is carried out.

For the considering of introduction of the given events, the conducted estimation of workers' relation to the quality of personnel training on the enterprise and expert evaluation of the results of activity diversification due to the introduction of partnership consulting direction in relation to Blockchain technology is described. Distribution of answers marked that the workers of company are ready for the introduction of innovative information technologies.

In relation to the prospect of diversification of enterprise's activity experts marked that this direction is perspective. Thus, the introduction of consulting partnership from the development of IBM Blockchain system will result the increase of clients' loyalty and partners due to providing of their activity transparency is offered.

VI. REFERENCES

1. Жуковська В. М. Цифрові технології в управлінні персоналом: сутність, тенденції, розвиток. (2017). *Науковий вісник Міжнародного гуманітарного університету*, 27(2), Стаття. <http://www.vestnik-econom.mgu.od.ua/journal/2017/27-2-2017/5.pdf>
2. О. Кравчук, І. Варіс, К. Заривних. (2021). Цифрові технології менеджменту персоналу: тенденції та виклики в умовах пандемії COVID-19. *Економіка та суспільство*, 26, Стаття. <https://economyandsociety.in.ua/index.php/journal/article/view/400>

3. BCG. (2018). *It's not the Digital Transformation without a Digital Culture* (Publication No. 13). <https://www.bcg.com/publications/2018/not-digital-transformation-without-digital-culture>
4. Korneev V. (2019). Cryptocurrency: era and field of financial innovations. *Bulletin of Taras Shevchenko National University of Kyiv Economics*, 196, Article. <https://doi.org/10.17721/1728-2667.2018/196-1/6>
5. M. Dubinina, S. Syrtseva, O. Buganov & N. Tusova. (2018). Blockchain Technology as a Means of Accounting Transformation. *Modern Economics*, 12, Article. [https://doi.org/10.31521/modecon.V12\(2018\)-11](https://doi.org/10.31521/modecon.V12(2018)-11)
6. Mohan D. Top 5 Insurtech Trends for 2017. *Insurtech Innovation Platform*. <https://thefinancialbrand.com/62732/insurance-technology-insurtech-trends/>
7. https://zakon.rada.gov.ua/laws/show/274-2020-%D0%BF?find=1&text=%D0%B1%D0%BB%D0%BE%D0%BA%D1%87%D0%B5%D0%B9%D0%BD#w1_1
8. https://zakon.rada.gov.ua/laws/show/856-2019-%D0%BF?find=1&text=%D0%B1%D0%BB%D0%BE%D0%BA%D1%87%D0%B5%D0%B9%D0%BD#w1_1
9. https://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=69110
10. Konashevych O. (2015). The Use Of Blockchain Technology for the Development Of Electronic Democracy And Electronic Governance. *Часопис Національного університету «Острозька академія», серія «Право», 1.* Article. <http://lj.oa.edu.ua/articles/2015/n1/15koiaeg.pdf>
11. Доронін І.М. (2017). Використання сучасних технологій розподіленої обробки даних: право та функції держави. *Інформація і право*, 2(21)
12. Доронін, І. (2017). Реалізація економічної функції держави у ході правової регламентації обігу криптовалют. *Закарпатські правові читання. Матеріали ІХ науково-практичної конференції (20-22 квітня 2017 року, м. Ужгород).*
13. Доронін І.М. (2017). Криптовалюти: соціально-економічні фактори, право та функції держави. *Інформація і право*, 3(22).
14. Винья, П., Кейси, М. (2016). *Епоха криптовалют: как биткойн и блокчейн меняют мировой экономический порядок.* Манн, Иванов и Фербер.
15. Dodd, Nigel (2017) The social life of Bitcoin. Theory. *Culture & Society*, LSE Research Online. <http://eprints.lse.ac.uk/69229/>
16. Некрасов В. (2017). Обділений блокчейном: чому земельний кадастр отримав «неповний» Blockchain. *Економічна правда*. <https://www.epravda.com.ua/publications/2017/10/11/629979/>
17. Рекун А. (2017). Две украинские стороны одного блокчейна. *AgroPortal*. <http://agroportal.ua/views/blogs/dve-ukrainskie-storony-odnogo-blokcheina/>
18. Блокчейн (2021, October 29). In Wikipedia. <https://uk.wikipedia.org/wiki/Блокчейн>
19. Don & Alex Tapscott. (2018). *Blockchain Revolution : How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World.* Penguin Books Ltd.
20. <https://www.sciencedirect.com/journal/blockchain-research-and-applications/issues>
21. <https://www.sciencedirect.com/search?qs=blockchain&pub=Future%20Generation%20Computer%20Systems&cid=271521&show=100&offset=200>
22. https://publons.com/researcher/?is_core_collection=1&hcr=1&order_by=num_reviews
23. <https://ua.interfax.com.ua/news/blog/708733.html>
24. <https://www.credly.com/badges/7f45d06e-1878-4577-9022-c7579510c6cc>.
25. <https://www.credly.com/badges/a43b5434-dc40-4920-843c-73d1bbb45bb8>
26. Пуцентейло П. Р., Гуменюк О. О. (2018). Цифрова економіка як новітній вектор реконструкції традиційної економіки. *Інноваційна економіка* 5(6)..
27. ITU. *ICT Statistics*. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>
28. UNCTAD. *Digital economy report 2019*. https://unctad.org/en/PublicationsLibrary/der2019_en.pdf

29. Eurostat. *Digital economy and society*. Database. <https://ec.europa.eu/eurostat/web/digitaleconomy->
30. Лапко О. О., Солосіч О. С. (2019). Технологія блокчейн: поняття, сфери застосування та вплив на підприємницький сектор. *Бізнес Інформ*, 6.
31. World Trade Organization. *World Trade Report 2018*. https://www.wto.org/english/res_e/publications_e/world_trade_report18_e_under_embargo.pdf
32. Cryptocurrencies: Time to consider plan B: PwC. <https://www.pwc.com/us/en/cfodirect/publications/point-of-view/cryptocurrency-bitcoin-accounting.html>
33. <https://aws.amazon.com/ru/blockchain/>
34. Мокляк М.В., Хаустова Е.О. (2018). Технологія blockchain в логістичній системі підприємства. *Класичний приватний університет*, 1(06).
35. Лей Ханг, До-Хьон Кім. (2021). Оптимальна методологія побудови мереж блокчейн на основі аналізу налаштованих компонентів для підвищення продуктивності Hyperledger. *Блокчейн: Дослідження та програми 2021 року*
36. Інессіттон-Канданедо, Рікардо С.Алонсо. (2019). Огляд референтних архітектур обчислювальних технологій та нова глобальна пропозиція. *Комп'ютерні системи майбутнього покоління*, 99.
37. IBM Blockchain Platform. <https://www.ibm.com/us-en?lnk=m>

ANNEX A

Monitoring of the state of personnel training activities in LLC "FIRST BIT"

Objective: to assess the attitude of employees to the quality of staff training activities at the enterprise.

Provide one answer to each of the following questions, please.

- 1) Are you satisfied with your level of qualification?
 - yes, completely
 - no
 - other ...
- 2) Do you like the methods of training employees at the company?
 - So
 - No.
 - Other
- 3) Is it necessary to conduct training only on professional qualities, or also on personal?
 - Yes, need both
 - No, only for professionals
 - No, personal only
 - Other...
- 4) How many hours a week are you ready to spend studying?
 - 1 hour
 - 2-3 hours
 - More than 5 hours
 - Other.....
- 5) Which information option do you prefer?
 - Face-to-face seminars, trainings
 - E-learning
 - Gamification, simulation
 - Solving cases
 - Other
- 6) Do we need to evaluate the effectiveness of training?
 - So

- No.
- Other

7) In what form do you want to receive certificates based on learning outcomes?

- Electronic certificate
- Paper certificate
- Other

ANNEX B

Expert evaluation of the results of diversification of the activities of the company "FIRST BIT" through the introduction of consulting-partnership on blockchain technology

Objective: comparative evaluation of the company's performance while maintaining traditional trends and using blockchain technology

1. Choose the most probable indicator of the company's revenue growth from the proposed range, provided that the existing traditional areas of activity are maintained

- Up to UAH 5 million.
- From UAH 5 million to UAH 10 million
- More than UAH 10 million

2. From your point of view, what increase in income is possible due to the diversification of your company's activities in the direction of implementing a consulting partnership for the development of blockchain technology.

- Up to 20 UAH million
- 21 UAH million
- 22 UAH million
- 23 UAH million
- 24 UAH million
- 25 UAH million
- 26 UAH million
- 27 UAH million
- 28 UAH million
- 29 UAH million
- 30 UAH million
- More than 30 UAH million

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