УДК 336.74
JEL: G10; E51; F30

Sergiy Obushnyi
Ph.D. (Economics), deputy dean,
Faculty of Information Technology and Management,
Borys Grinchenko Kyiv University,
Kyiv, Ukraine
ID ORCID: 0000-0001-6936-955X
e-mail: s.obushnyi@kubg.edu.ua

Roman Kravchenko
CEO 482.solutions LTD,
Odessa, Ukraine
ID ORCID: 0000-0003-3758-1649
e-mail: roman@482.solutions

Leonid Khatskevych
Strategic Partnership Manager at 482.solutions LTD,
Odessa, Ukraine
ID ORCID: 0000-0002-5032-9483
e-mail: leonid@482.solutions

Sergii Nekrasov
PM Lead at 482.solutions LTD,
Odessa, Ukraine
ID ORCID: 0000-0001-6931-1892
e-mail: sergii@482.solutions

Artem Frantsiian
CTO at 482.solutions LTD,
Odessa, Ukraine
ID ORCID: 0000-0002-4625-3105
e-mail: af@482.solutions

ANALYSIS AND SOLUTION OF THE CONCEPTUAL AND TERMINOLOGICAL PROBLEM OF THE BLOCKCHAIN CONCEPT DEFINITION

Abstract. In this study, the authors formulated, analyzed and solved the conceptual and terminological problem of using the term and the definition of the Blockchain concept, taking into account their influence on the development of consistent theoretical knowledge and right practical experience in the subject areas of its application. In order to achieve the goal of this study, the authors proposed a solution in the form of an author's definition of the Blockchain concept, based on the analysis of meanings, the derivation of their classification and identification of characteristics of this concept.

The core of research analysis based on the criterion of the definition's proximity to the original meaning, which was put into the concept by the original authors who laid the theoretical and practical foundations for the domain area of decentralized computing, machines, and networks.

To obtain a definition of the Blockchain concept the authors used a method based on identifying and analyzing two types of conditions in the Blockchain concept: properties and characteristics. Thus, for the formation of the definition, were selected characteristics (sufficient conditions) that characterize and reveal the meaning of the phenomenon.

The research starts by reconstructing the etymology and thus the primary meaning of the Blockchain concept. Further, the authors inventory and systematize a set of existing definitions. Based on the analysis of this set 3-types classification of Blockchain concept interpretations is proposed.

The key result of the research is the analysis and decomposition of definitions into properties and characteristics. Subsequently, it is synthesized in the form of the author's definition that has the property of uniqueness, accuracy, completeness, reliability, relevance, objectivity.

To find a solution of the problem, the authors use analytical linguistics approaches: definition inventory, analysis of definitions, normalization of terms and variety of existing definitions and codification.

The applied contribution of the study, which goes beyond its main boundaries, is to prepare material match to the class of problems of the ISO 22739 standard, Blockchain and distributed ledger technologies – Vocabulary [1].

Keywords: Blockchain, Blockchain Management System, BMS, Distributed Ledger Technology, DLT, Distributed System, Distributed Computing, Distributed Network, Terminology, Definition, Glossary.

DOI: http://doi.org/10.32750/2020-0202

INTRODUCTION

Formulation of the problem. Blockchain technology is not something completely new, it only adsorbs a number of technologies and principles that have existed since the 70's [The concept of cryptocurrencies is built from forgotten ideas in study literature. Arvind Narayanan, Jeremy Clark, Bitcoin's Academic Pedigree, ACM Queue, Vol. 15, No. 4]. Despite the historical maturity of the constituent technologies (for a more detailed analysis, see Section II, V), Blockchain, as a comprehensive cross-industrial concept and the subject area of its practical application, is at an early stage of its development (the stage of deep development from 20.00 to 60.60 regulating ISO standards [2], beginning of the second phase of technology maturity according to the Gartner methodology [70]. This is the reason that there are many interpretations of the Blockchain concept in the industry often contradicting each other.

Within the framework of this study, only criteria, boundaries, and the structure of conceptual and terminological issues are defined. This study was performed by the authors taking also into account the growing relevance of practical application of Blockchain [63].

For better understanding of the study logic, its main categories should be defined:

– concept – meaning (noumenon) of the Blockchain phenomenon;

– term – word or phrase that correlates with the Blockchain concept;

– definition – reveals the meaning of the Blockchain concept;

– characteristics (sign) – means characteristics that define boundaries, are contained in the definition and reveal the meaning of the Blockchain concept. All the characteristics of the concept need not be included in its definition; however, the definition should reflect the main characteristics and the relationships between them.

The object of the study is multiple definitions of the Blockchain concept.

The subject of the study is the author's definition, which reveals the original meaning of the Blockchain concept, which has the properties of uniqueness, accuracy, completeness, reliability, relevance, objectivity.

To achieve the goal, it is required to solve the following tasks:

− to analyze the etymology of the Blockchain concept;

− to inventory and systematize the existing definitions;

− to analyze the variety of definitions for their uniqueness, accuracy, completeness, reliability, relevance, objectivity;

− to identify conditions from the definitions;

− to perform the process of definitions normalization;

− to classify multiple definitions based on the type of interpretation;

− to identify among the conditions those that are significant;

− to perform codification in the form of an author's definition of the Blockchain concept, based on the selected essential conditions (characteristics).

Blockchain Concept Etymology

The first references to the concepts close in their meaning to the Blockchain concept are found in publications: 1991, Stuart Haber, W. Scott Stornetta ("chain of time-stamps) [7] and 2008, Satoshi Nakamoto ("chain of blocks") [3]. It is the work of Satoshi Nakamoto that is considered the fundamental incentive in the popularization of blockchain technology. But the history of formation of the foundations of this technology began much earlier – in the 70's of the twentieth century.

Here are the works that underlie blockchain:

- 1977 – RSA, Ron Rivest, Adi Shamir, Leonard Adleman [4];
- 1980 – Protocols for public key cryptosystems, Ralph Merkle [5];
- 1983 – Ecash, anonymous cryptographic electronic money, David Chaum [6];
- 1991 – How to time-stamp a digital document, Stuart Haber, W. Scott Stornetta [7]; – number of studiers and experts consider this work to be one, where the prototype of the Blockchain concept (called "chain of time-stamps") has been described for the first time;
- 1992 – Improving the Efficiency and Reliability of Digital Time-Stamping, Dave Bayer, Stuart Haber, W. Scott Stornetta [8];
- 1997 – Hashcash based on PoW, Adam Back [9];
- 1998 – B-money, Wei Dai [10];
- 1998 – Bit gold, Nick Szabo [11];
- 1999 – Proofs of Work and Bread Pudding Protocols, Markus Jakobsson Ari Juels [12];
- 2004 – Reusable Proofs of Work, Hal Finney [13];
- 2008 – Bitcoin: A Peer-to-Peer Electronic Cash System, Satoshi Nakamoto; ("chain of blocks" is mentioned)

The term Blockchain ("block chain") was first used in November 7, 2008 by Hal Finney in the metzdowd.com mailing list (Bitcoin P2P e-cash paper, Hal Finney in his analysis of the Satoshi Nakamoto original work [14]

According to Merriam-Webster, the emergence of the term Blockchain dates back to 2011 [71], and in March 2011 Blockchain.com, blockchain.net, blockchain.info and blockchain.org were registered [72]

Thus, the analysis of the Blockchain concept etymology showed that it covers a wide range of hypotheses of its emergence. In the following sections, we will go to detailed analysis of modern definitions of this concept, taking into account the history of its origin and primary meaning.

Definition Variety Arrangement

A deeper analysis of this aspect is beyond the scope of this study, the purpose of which is the formation of an author's definition, which has such qualitative properties as uniqueness, accuracy, completeness, reliability, relevance, objectivity ("reference term", "reference definition"), therefore, it allows to avoid the range of problems mentioned above.

In our opinion, the accuracy of the term is achieved primarily by the accuracy of term use. Obviously, the inaccuracy, vagueness of the transmitted meaning is characteristic of terms in the period of formation or rethinking. Based on the conclusions of Section II, we can conclude that the Blockchain concept can be attributed to the class of terminoids [16] – a special lexeme used to refer to the emerging, insufficiently established and, therefore, ambiguously understood phenomenon.

The presence of terminological uncertainty in this subject area is in itself not a problem, but it serves as a source of three classes of problems:

● gnoseological problem – distortions at knowledge transfer in the process of professional communication and training;

● problem of technical creativity and engineering – impossibility of correct description of the requirements for IT systems, and the errors in their design;

● ethical problem – erroneous judgments regarding events that use the Blockchain concept in the process of legal and judicial practice, leading to adoption of erroneous judicial decisions; this class of problems is a potential source of violations of human rights and freedoms.

Despite the fact that the terminoid does not have clear boundaries, and therefore no definitions, the authors of this study set the goal of forming a definition that has the property of uniqueness, accuracy, completeness, reliability, relevance, objectivity, and therefore, in this form refers to the class of terms.

The formation of the Blockchain copyright term and its definition is a logical operation that reveals the content (meaning) of the Blockchain concept by describing its essential and distinctive features.

To obtain the author's definition of the Blockchain term, methods of analytical linguistics were used. The process was constructed as follows.

1. Definition inventory – structuring of many terms and their definitions in the form of ordered subsets (Table 1).

2. Analysis of definitions – analysis of definitions with the identification of the essential conditions (Table 1), revealing the meaning of the concept out of them.

3. Normalization of terms – existing variety of definitions is classified according to disjoint types, according to the semantic interpretation (Section V).

4. Identification of the concept conditions – from a subset of definitions (clause 2), on the basis of the criterion of correspondence to a localized type (clause 3), and the corresponding meaning of the concept, the necessary conditions (properties) and sufficient conditions (characteristics) are extracted (Table 2).

5. Codification – the resulting set of sufficient conditions (properties) is supplemented and refined, and on this basis the Blockchain concept is formalized in the form of its author's definition.

Thus, we have formed the process of the author's definition obtaining, which represents systematization and construction of a classification scheme of the concepts of the studied subject area. The result of this process are obvious essential characteristics of the concept. Thanks to this, a refinement of the existing definition of the concept is achieved in the form of creation of the author's definition, which corresponds to the reference one.

Definition Variety Inventory and Analysis

There are examples of Blockchain definitions from key organizations which are dedicated to advancing technology for the benefit of humanity. Each of these organizations is a key player in their sphere and has an impact over people by leading, coaching, standardizing the technologies and processes.

Analyzing *Table 1*, one can note many different definitions of the Blockchain concept, often contradicting each other. Such a variety makes it difficult to understand the Blockchain phenomenon, as well as its advantages, disadvantages, areas and methods of application. One can distinguish such, the most frequently used, variations of interpretations:

− interpretation of Blockchain as distributed ledger technology (DLT);

− interpretation of Blockchain as a distributed system for transactions management;

− interpretation of Blockchain as a technology or method of records storage.

Table 1

Analysis of the definitions of the Blockchain concept

Definition	Organization	Conditions
Vendors of platforms and software based on DLT		
Blockchain is a shared, immutable ledger for recording transactions, tracking assets and building trust [17]	IBM	shared, immutable, ledger, record of transactions, assets tracking, building trust
Blockchain is a distributed ledger technology that has the potential to transform the way enterprises, governments, and consumers exchange data [18]	Intel	distributed, ledger, technology, exchange data transforming
Blockchain is based on distributed ledger technology, which securely records information across a peer-to-peer network [19]	SAP	based on DLT, secure, recording information, records of P2P network's data
Blockchain is a ledger of decentralized data that is securely shared [20]	Oracle	ledger, contain decentralized data, secure, shared
Blockchain is a record-keeping and contract-enforcement technology that's based on complex cryptography [21]	Microsoft	record-keeping, contract-enforcement, technology, based on cryptography
Blockchain is a technology that makes it possible to build applications where multiple parties can record transactions without the need for a trusted, central authority to ensure that transactions are verified and secure [22]	AWS	technology, related to multiple parties, recording transactions, trustless, without central authority, verifying and securing transactions
Blockchains have been developed to provide a decentralized, distributed database to record electronic transactions [23]	Mastercard	decentralized, distributed, database, records of electronic transactions

Blockchain is a digital, decentralized transaction ledger [24]	Exelon	digital, decentralized, transaction ledger
DLT vendors		
A blockchain is a distributed database with no central authority and no point of trust [25]	Hyperledger	distributed, database, decentralized, no point of trust
Blockchain is a type of DLT where transactions are recorded with an immutable cryptographic signature called a hash [26]	R3	DLT, recording transactions, hash
A blockchain is a distributed computing architecture where every network node executes and records the same transactions, which are grouped into blocks [27]	Ethereum	distributed computing architecture, recording transactions, grouped into blocks
Blockchain is a distributed, cryptographically-secure database structure that allows network participants to establish a trusted and immutable record of transactional data without the need for intermediaries [28]	ConsenSys	distributed, cryptographically secured, database, trusted, immutable, recording transactional data
The block chain is a public record of Bitcoin transactions in chronological order. The block chain is shared between all Bitcoin users [29]	Bitcoin.org	public record, transactions, in chronological order
Blockchain is a method for keeping data synchronized across multiple, independent stakeholders [30]	Stellar	method, data keeping, synchronized, independent stakeholders
Blockchain is a database technology but built in a radically different way. It offers the potential to drastically simplify accounting, supply chain	NEM	database technology

management, records keeping, asset tracking, and more [31]		
A Blockchain is a sequential chain of blocks where each block references its chronological predecessor, similar to a linked list [41]	IOTA	sequential chain of blocks, referencing of chronological predecessor, linked list
Associations, consortiums, nonprofit organizations		
Blockchain is an open-source distributed database using state-of-the-art cryptography through a distributed ledger that enables trust among disparate individuals or third parties [32]	IEEE (Institute of Electrical and Electronics Engineers)	open-source distributed database, state-of-the-art cryptography, distributed ledger, trust
Blockchain is an immutable distributed permissioned transparent ledger with scalable storage, computing and workflow capabilities that enables permission real-time interactions, configurable consensus and replaces implicit trust with cryptographic proofs [33]	W3C (World Wide Web Consortium)	immutable, distributed, permissioned, transparent, ledger, scalable storage, configurable consensus, cryptographic proofs
Blockchain is a shared, immutable ledger that can record transactions across different industries, thus enhancing transparency and reducing transaction costs. It is a digital platform that records and verifies transactions in a transparent and secure way, removing the need for middlemen and increasing trust through its highly transparent nature [37]	ISO (International Organization for Standardization)	shared, immutable, ledger, recording transactions, transparency, reducing transaction costs, digital platform, recording and verifying transactions, security, trust
Blockchain is a distributed ledger with confirmed blocks organized in an append-only,	ISO 22739:2020	distributed ledger, confirmed blocks organized,

sequential chain using cryptographic links [58]		sequential chain, cryptographic links
A blockchain is a collaborative, tamper-resistant ledger that maintains transactional records. The transactional records (data) are grouped into blocks. A block is connected to the previous one by including a unique identifier that is based on the previous block's data [34]	NIST (The National Institute of Standards and Technology)	collaborative, tamper-resistant ledger, maintaining transactional records, blocks, unique identifier based on the previous block's data
A digital database containing information (such as records of financial transactions) that can be simultaneously used and shared within a large decentralized, publicly accessible network [73]	Merriam-Webster	digital, database, containing information, can be shared, decentralized, publicly accessible, network
Professional services companies		
A blockchain is a decentralized ledger of all transactions across a peer-to-peer network. Using this technology, participants can confirm transactions without a need for a central clearing authority. Potential applications can include fund transfers, settling trades, voting, and many other issues [66].	PricewaterhouseCoopers	decentralized, ledger, transactions, peer-to-peer, technology, no central authority, fund transfers
a distributed database that holds a growing number of records [35]	KPMG	distributed, database, holding records
A decentralized ledger of each transaction that occurs across a network, which enables the decentralized exchange of trusted data – a "shared record book" [36]	Ernst & Young	decentralized, ledger, transaction, exchanging trusted data

A blockchain is a digital and distributed ledger of transactions, recorded and replicated in real time across a network of computers or nodes. Every transaction must be cryptographically validated via a consensus mechanism executed by the nodes before being permanently added as a new "block" at the end of the "chain" [39] The original Blockchain is open-source technology which offers an alternative to the traditional intermediary for transfers of the crypto-currency Bitcoin [38]	Deloitte	digital, distributed, ledger of transactions, recording and replicating in real time, network of nodes, cryptographically validated, consensus mechanism
Blockchain is a new way of storing data in a distributed ledger that allows multiple stakeholders to confidently and securely share access to the same information [40].	Accenture	storing data, distributed ledger, confidentiality, security, sharing access
Blockchain can be defined as a distributed ledger technology that can record transactions between parties in a secure and permanent way [42]	DHL	distributed ledger technology, recording transactions, security, permanency
Study companies		
A blockchain is an expanding list of cryptographically signed, irrevocable transactional records shared by all participants in a network. Each record contains a timestamp and reference links to previous transactions. With this information, anyone with access rights can trace back a transactional event, at any point in its history, belonging	Gartner	list of transactional records, cryptographically signed, irrevocable, shared, time stamp, reference links to previous transactions, distributed ledger, chronologically ordered list

to any participant. A blockchain is one architectural design of the broader concept of distributed ledgers [43]. Blockchain is a type of distributed ledger, an expanding chronologically ordered list of cryptographically signed, irrevocable transactional records shared by all participants in a network [44]		
A digital, distributed ledger of transactions or records. The ledger, which stores the information or data, exists across multiple participants in a peer-to-peer network. There is no single, central repository that stores the ledger [45]	International Data Corporation	digital, distributed, ledger of transactions, storing data, peer-to-peer network, no central repository
A database of every single transaction that is shared on a peer-to-peer network. It's basically a permanent chain of transactions that are grouped together in blocks and synchronized worldwide, so that the blocks cannot be altered once they are added to the chain [46]	Capterra	database, peer-to-peer network, permanent, chain of transactions, grouped in blocks, synchronized, cannot be altered
Leading universities [48]		
Allows a network of computers to agree at regular intervals on the true state of a distributed ledger [48]	Massachusetts Institute of Technology	network of computers, agreeing on the true state, distributed ledger
A blockchain is a digital, secure, public record book of transactions (a ledger) [49]	Stanford University	digital, secure, public, record book of transactions, ledger
A blockchain is a distributed database, meaning that the storage devices for the database are not all connected	Harvard University (Harvard Blockchain Lab)	distributed database, growing list of records, blocks, timestamp, link to a previous block

to a common processor. It maintains a growing list of ordered records, called blocks. Each block has a timestamp and a link to a previous block [74]		
Blockchain is an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way [50].	Harvard Business Review (subsidiary of Harvard University)	open, distributed ledger, recording transactions, verifiable, permanent
Blockchain is a shared, replicated ledger that underpins technology such as Bitcoin [51].	University of Oxford	shared, replicated ledger
A blockchain is a ledger in which agents known as writers (or nodes) take turns recording information. This information could consist of payment histories, contracts outlining wagers between anonymous parties, or data on ownership of domain names, among other applications [52].	Princeton University	ledger, nodes, recording information
Legislative acts		
"Blockchain technology" means distributed ledger technology that uses a distributed, decentralized, shared and replicated ledger, which may be public or private, permissioned or permissionless, or driven by tokenized crypto economics or tokenless. The data on the ledger is protected with cryptography, is immutable and auditable and provides an uncensored truth [53]	HB 2417 amends the Arizona Electronic Transactions Act ("AETA")	technology, distributed ledger technology, distributed, decentralized, shared, replicated ledger, public or private, permissioned or permissionless, tokenized or tokenless, protected with cryptography, immutable, auditable, uncensored truth

"Blockchain" means a mathematically secured, chronological, and decentralized ledger or database [54]	California State Assembly	mathematically secured, chronological, decentralized, ledger, database
The term "blockchain" can refer to a well-known, specific blockchain (the Bitcoin blockchain), a custom-built private or public blockchain, or the general idea of creating an immutable, chronological ledger of transactions protected against revision by encryption and consensus algorithms [55]	Cook County (Illinois state) Recorder of Deeds	private or public, immutable, chronological ledger of transactions, protected against revision, encryption, consensus algorithm.

Based on the foregoing, an end user, a consumer who wants to study the theoretical part, may experience either a complete misunderstanding of this concept, or an incorrect idea of the essence of Blockchain. As you can see, one of the common forms of distortion is the appropriation to the Blockchain of such properties and characteristics that do not belong to this concept: publicity and privacy, decentralization, security, trust, etc.

We consider it important to analyze, isolate and fix only those properties and characteristics that relate to the Blockchain concept in its original sense. Based on these attributes, it is possible to construct an author's definition of a concept that will have characteristics that ensure the fullness of its meaning

Concept Types Classification and Interpretation

As one can see, the interpretations of the Blockchain concept are extensive (Table 1). This is due to the many scenarios of using Blockchain in various fields of knowledge, and subject areas of human activity, each of which imposes a semantic coloring on this concept.

Further, in order to systematize the variety of interpretations, and to localize the subset containing the initial meaning of the Blockchain concept, the variations of interpretations specified in Section IV were supplemented and their classification was derived on this basis. Thus, the existing variety of interpretations of the Blockchain concept (Table 1) can be attributed to 3 types:

– Blockchain as abstract machine – a concept related to the sections of computer science, in terms of abstract models of distributed methods and computing processes. In this case, Blockchain is understood as a method of construction of abstract (models) of distributed computers and networks;

– Blockchain as technology (as system, as software) – as a concept related to the sections of computer science, in terms of specific methods and processes of distributed computing. In this case, Blockchain is understood as the technology for construction of specific (applied) distributed computing machines and networks, as well as the distributed computing machines and networks themselves.

– Blockchain as data structure – a concept related to the sections of computer science, in terms of data management methods and processes. In this case, Blockchain is understood as a collection of data in a unique format (full definition – see Section VII).

Blockchain as abstract machine. In the framework of the abstract approach, the Blockchain concept is analyzed in terms of the theory of finite-state machine (FSM).

A blockchain system, consisting of record storage and service and user program instructions runtime environment, is an implementation of a decentralized probabilistic finite-state machine, hereinafter DPFSM. Relevant theoretical questions are highlighted in the study [56].

The principle of operation of this finite-state machine is based on transactions and blocks, which, being strictly (chronologically) ordered, represent input signals and DPFSM states, respectively. In FSM terminology, Blockchain, by analogy with the transition table, is a digital notary [15], which guarantees DPFSM transition between many random Sk states.

In the categories of institutional economics, and the Coase theory of transaction costs, the Blockchain is considered as an "ideal mathematical object like a Turing machine", the machine of the third (relative to Hard and Soft) value level (Intangible) [S.B. Chernyshev, "Techno economics. Who needs the blockchain and why", p. 190] and the platform layer "for phased transactions sublation" [S.B. Chernyshev, "Techno economics. Who needs the blockchain and why", p. 225].

In addition, within the framework of this system of theories, Blockchain, as a "transaction protocol" [15], can be used in digital platforms to solve the following problems:

− establishing the fact of trust between the participants of the system;

− third party censorship-resistance;

− increasing the transparency of the system agents interaction processes;

− "transactions sublation" – reducing the overall level of transaction costs of the system, up to zero one.

Blockchain as technology (as system, as software). From the Table 1 it follows that the most authoritative sources attribute Blockchain to this type, describing it as a distributed network, database, ledger. There is an explanation for this, since almost simultaneously two different concepts emerged that were not formalized as terms: a data structure of a certain type, which was described as "chain of blocks", "block chain", and a system built using this data structure and other complementary technologies to achieve the required properties. Both concepts are equivalently and erroneously called Blockchain. To resolve this paradox, we propose to distinguish between these concepts by introducing the term Blockchain Management System (BMS), which describes systems built using a data structure of a certain type, which we call Blockchain.

Blockchain as collection of data (noumenon Blockchain). Taking into account the etymology of the concept, we can conclude that Blockchain is directly related to the data collection with a unique format for organizing the collection. Elements in the Blockchain are called blocks, and the relationship between the elements is expressed in the unique formation of a link (pointer) of the next element to the previous one. This link defines one of the key properties of the data collection: the impossibility of replacing any element of the collection without replacing the elements to the end of the collection. Since the collection is organized in chronological order, it is a linked chain in which elements can only be added to its end. In this study, we adhere to this particular type of interpretation, considering it the most correct and close to the original meaning of the Blockchain concept.

Blockchain Concept Properties and Characteristics

To determine the characteristics that subsequently become the basis for the author's definition of the Blockchain concept, the following algorithm was defined.

1. Separation from each Blockchain concept definition (Table 1) of the conditions related to its interpretation as a data structure (type 3 "Blockchain as data structure"), followed by their fixing in Table 2 in the form of essential conditions, i.e. those that correspond to the meaning of this concept.
2. Adding to the Table 2 conditions that are not used in the definitions of the Table 1, but according to the authors are important for a common understanding. Such conditions contain the "authors" note.
3. Specification of definitions of conditions, and their analysis in terms of attribute to the Blockchain concept.
4. Determining condition attribute to the necessity condition (property) or sufficiency condition (characteristic, sign) in relation to the Blockchain concept. The operation is based on the implication: "a data collection may be called a Blockchain, if ..."

As a result of such an analysis, for the formation of the author's definition, we obtain a list of characteristics (Table 2), from which we will identify the key ones. Adaptation of the DAO platform to such rules will make it possible to administer the created DAO in an automatic mode with automatic provision of complete information to the relevant authorities.

Table 2

Conditions (properties and characteristics) of the Blockchain concept.

Condition	Description	Condition analysis	Essential condition: necessity – property, sufficiency – characteristic
Data structure (authors)	is a collection of data values, the relationships among them, and the functions or operations that can be applied to the data [57]	Blockchain is a data structure, since it is a collection of data, defining the relationship between data and the operations allowed for them	property
Database	is an organized collection of data, generally stored and accessed electronically from a computer system	Blockchain can be used by databases to organize data collections.	is not the property or characteristic (None)

Ledger	a book in which things are regularly recorded, especially business activities and money received or paid [59]	Blockchain can be used to store records of financial business activities. What to store in Blockchain is determined by users, not data structure	is not the property or characteristic (None)
Immutable	not changing, or unable to be changed [60]	Based on the definition of immutability, Blockchain is not immutable, because part or all records can be changed starting from any block with the obligatory change of all subsequent ones. Herein, it is impossible to change any, not the last block without changing subsequent ones	is not the property or characteristic (None)
A link to a previous block	pointer to the previous element of the collection (authors)	Each subsequent block contains a hash of the previous block. This is the link (pointer), which ensures high complexity of substituting a block already recorded in the list for another, since the hash of the previous block is included in the formation of the hash of each block	characteristic
Message digest (cryptographic hash)	a cryptographic hash function containing a string of digits created by a one-way hashing formula [61]	It is currently used to create a link to the previous block, but in our opinion, this is only one of the known ways to create a link with a similar property. To ensure universality, it is not the method that is used to create the link that matters, but the property that such link has	is not the property or characteristic (None)
Linked list	a list implemented by each item having a link to the next item [62]	Blockchain, in essence, is similar to a linked list, but with a link that is opposite in direction. In Blockchain, each	is not the property or characteristic (None)

		subsequent record has a link to the previous one, and the link itself also has a property that the link does not have in the linked list	
Merkle tree (hash tree)	is a tree in which every leaf node is labelled with the cryptographic hash of a data block, and every non-leaf node is labelled with the cryptographic hash of the labels of its child nodes	It is used in the Blockchain Management System to reduce storage space, as well as to be able to synchronize a site without downloading all historical information. Blockchain itself does not prescribe the use of this data structure.	is not the property or characteristic (None)
Chronological order	the arrangement of things following one after another in time [64]	Blocks in Blockchain are arranged sequentially, in chronological order, which means that new information can only be written to the end of the collection	characteristic
Timestamp	a record in printed or digital form that shows the time at which something happened or was done [65]	Each block may contain a timestamp, but its content depends only on the desire of the user to enter such information into the block	is not the property or characteristic (None)
List	is an abstract data type that represents a countable number of ordered values, where the same value may occur more than once	Blockchain does not belong to this abstract data type, since values in Blockchain cannot be repeated	is not the property or characteristic (None)
Set (authors)	is an abstract data type that can store unique values, without any particular order	Blockchain does not belong to this abstract data type, since values in the Blockchain are stored in strict chronological order	is not the property or characteristic (None)
Block	a group of things bought, dealt with, or	Elements of data stored in the Blockchain are commonly called blocks.	characteristic

	considered together [67]		
Unique elements (authors)	being the only existing one of its type [68]	Each item in Blockchain is unique.	characteristic
Transaction	a single action such as adding a sale or a new customer, which changes data in a computer database [69]	Blockchain data elements can contain transaction information. As with ledger, the end user determines what to store in this data structure	is not the property or characteristic (None)

Having analyzed the definitions from *Table 1*, and the conditions recorded in *Table 2*, it can be concluded that most of the conditions used by key organizations to describe the Blockchain concept are not, in fact, its properties or characteristics. On the contrary, most of the definitions contain false properties and characteristics that relate not to the Blockchain concept, but to systems built on the basis of Blockchain and related technologies. These, and other errors that occur when defining Blockchain, can be attributed to these types:

− substitution of Blockchain concepts and technology of the distributed ledger (DLT);

− substitution of the Blockchain concepts and Blockchain management system (analysis and definition – see Section VII).

− use of properties and characteristics that are not related to the technology itself, such as publicity and privacy, decentralization, security, trust, etc.

It should be noted that Blockchain combines such abstract data types as “list” and “set”, because it is an ordered sequence of unique elements.

The condition of immutability is rather ambiguous. We cannot say that Blockchain is completely immutable, since it is possible to change part of the chain starting from any block with changing all subsequent blocks. Nevertheless, replacing any block at the beginning or in the middle of the chain without changing subsequent blocks to the end of the chain is impossible, and this is one of the main properties of the Blockchain.

Author’s Term Definition

The main criteria for the author’s definition are accuracy and lack of redundancy. In addition, the author's definition should correspond to the fixed properties and characteristics, or at least should not conflict with them.

After analyzing the definitions (Table 1), the properties and characteristics of the Blockchain (Table 2), taking into account the practical experience of the authors in the subject area, the historical context of the corresponding field of knowledge, guided by the practical value of this phenomenon, we define Blockchain as follows:

“Blockchain is a chronological collection of data elements, called blocks, where each element is unique and has a specific link to the previous one. The link provides a high complexity to change and/or delete data elements”.

Since our definition conflicts with many other definitions that describe the Blockchain as a distributed system or distributed ledger technology (DLT), we propose to distinguish between these concepts, thereby returning their original meaning, accuracy, and practical value. Guided

by these principles, we give the Blockchain Management System concept and the author's conceptual definition:

"Blockchain Management System (BMS) is a software that is usually created using DLT and that interacts with end users, applications and blockchain itself to manage the data in a verifiable and decentralized way, with high complexity to change and/or delete data".

Since the concept of the Blockchain Management System needs to be subjected to a deeper analysis, which is beyond the scope of this study, the proposed definition should be used "as is", with the simultaneous adoption of a critical analysis by representatives of the scientific and professional communities.

CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

In the process of the study, the authors analyzed the history of the emergence of the Blockchain concept, its etymology, variety of definitions, as well as properties and characteristics that reveal the meaning of this concept.

The study logically proved the inconsistency of the definitions used. From an analysis of the properties and characteristics that are used in the definitions, it follows that most of them are not the properties and characteristics of the Blockchain. Moreover, false properties and characteristics are assigned to the Blockchain concept, while true ones, on the contrary, are ignored. This prevents a unified and true understanding of the Blockchain phenomenon, leads to confusion and complicates the process of developing common standards for Blockchain technology, in the areas of its application.

The applied approach of analytical linguistics, as well as the sequential process of analysis and synthesis underlying it, provided the study result, formalized in the form of an author's definition. This allows us to guarantee the purity of the concept, and a return to its primary historical meaning. In further study, we also plan to dig in the Blockchain Management System concept.

The current results can be used as study materials for the development of a terminological standard [ISO 22739, Blockchain and distributed ledger technologies — Vocabulary].

REFERENCES

1. "ISO 22739", ISO, 2020. [Online]. Available: https://www.iso.org/standard/73771.html?browse=tc. [in English]
2. Standards by ISO/TC 307 – Blockchain and distributed ledger technologies, https://www.iso.org/committee/6266604/x/catalogue/p/0/u/1/w/0/d/0 [in English]
3. Bitcoin.org, 2008. [Online]. Available: https://bitcoin.org/bitcoin.pdf [in English]
4. Rivest; Ronald L. (Belmont, MA), Shamir; Adi (Cambridge, MA), Adleman; Leonard M. (Arlington, MA, "Cryptographic communications system and method", U.S. Patent 05/860,586, 1977. [in English]
5. R. Merkle, "Protocols for Public Key Cryptosystems", 1980 IEEE Symposium on Security and Privacy, 1980. Available: 10.1109/sp.1980.10006 [in English]
6. Chaum, David (1983). Blind signatures for untraceable payments (PDF). Advances in Cryptology Proceedings of Crypto. 82. pp. 199–203. doi:10.1007/978-1-4757-0602-4_18. ISBN 978-1-4757-0604-8. [in English]
7. S. Haber and W. Stornetta, " How to Time-Stamp a Digital Document", Journal of Cryptology, Vol. 3, No. 2, pp. 99{111, 1991. Available: 10.1007/bf00196791 [in English]
8. D. Bayer, S. Haber and W. Stornetta, "Improving the Efficiency and Reliability of Digital Time-Stamping", Sequences II, pp. 329-334, 1993. Available: 10.1007/978-1-4613-9323-8_24 [in English]
9. Hashcash.org, 1997. [Online]. Available: http://www.hashcash.org/papers/hashcash.pdf. [in English]
10. Weidai.com, 1998. [Online]. Available: http://www.weidai.com/bmoney.txt. [in English]
11. "Nick Szabo BitGold – Satoshi Nakamoto – BitcoinWiki", En.bitcoinwiki.org, 1998. [Online]. Available: https://en.bitcoinwiki.org/wiki/Nick_Szabo#cite_note-PeckBitcoin2012-4 [in English]
12. M.Jakobsson and A.Juels, "Proofs of Work and Bread Pudding Protocols(Extended Abstract)", Secure Information Networks, pp. 258-272, 1999. Available: 10.1007/978-0-387-35568-9_18 [in English]

13. Web.archive.org. 2004. RPOW – Reusable Proofs Of Work. [online] Available at: <https://web.archive.org/web/20071222072154/http://rpow.net/> [in English]
14. Metzdown.com, Bitcoin P2P E-Cash Paper. [online] Available at: <https://www.metzdowd.com/pipermail/cryptography/2008-November/014827.html>. [in English]
15. S. Obushnyi, R. Kravchenko and Y. Babichenko, "Blockchain as a Transaction Protocol for Guaranteed Transfer of Values in Cluster Economic Systems with Digital Twins," 2019 IEEE International Scientific-Practical Conference Problems of Infocommunications, Science and Technology (PIC S&T), Kyiv, Ukraine, 2019, pp. 241-245, doi: 10.1109/PICST47496.2019.9061233. [in English]
16. G. Polenova and T. Klikushina, Language and speech in synchrony and diachrony. 2017. p 228. ISBN-13: 978-1443886420 [in English]
17. "What is Blockchain Technology? | IBM Blockchain", Ibm.com. [Online]. Available: https://www.ibm.com/blockchain/what-is-blockchain. [in English]
18. "Intel and Blockchain – Better Together", Intel. [Online]. Available: https://www.intel.com/content/www/us/en/security/blockchain-overview.html. [in English]
19. "What is Blockchain?", SAP. [Online]. Available: https://www.sap.com/insights/what-is-blockchain.html. [in English]
20. "What is Blockchain? | Oracle", Oracle.com. [Online]. Available: https://www.oracle.com/blockchain/what-is-blockchain.html. [in English]
21. "Blockchain Technology and Applications | Microsoft Azure", Azure.microsoft.com. [Online]. Available: https://azure.microsoft.com/en-us/solutions/blockchain/#latest-information. [in English]
22. "Overview of Amazon Web Services", D1.awsstatic.com. [Online]. Available: https://d1.awsstatic.com/whitepapers/aws-overview.pdf. P.18 [in English]
23. MasterCard International Incorporated, "Method and system for partitioned blockchains and enhanced privacy for permissioned blockchains", U.S. Patent 10,097,344, 2018. [in English]
24. "Exploring Technology's Next Frontier", Exeloncorp.com. [Online]. Available: https://www.exeloncorp.com/grid/exploring-technologys-next-frontier. [in English]
25. "An Introduction to Hyperledger", Hyperledger.org. [Online]. Available: https://www.hyperledger.org/wp-content/uploads/2018/08/HL_Whitepaper_IntroductiontoHyperledger. P.3 [in English]
26. "Blockchain 101 – Blockchain Technology & DLT Explained | R3", R3. [Online]. Available: https://www.r3.com/blockchain-101/. [in English]
27. Ethereum, "ethereum/homestead-guide," GitHub. [Online]. Available: https://github.com/ethereum/homestead-guide/blob/master/source/introduction/what-is-ethereum.rst. [in English]
28. "Blockchain Super FAQ: Frequently Asked Questions About Blockchain and Ethereum," ConsenSys. [Online]. Available: https://consensys.net/knowledge-base/blockchain-super-faq/. [in English]
29. "Block Chain," Bitcoin. [Online]. Available: https://developer.bitcoin.org/devguide/block_chain. [in English]
30. "Blockchain Basics," Learn about Stellar. [Online]. Available: https://www.stellar.org/learn/blockchain-basics. [in English]
31. Julian, "Page 14 of 20 – Your source for NEM related News," NEM News Website, 21-Mar-2018. [Online]. Available: https://nemflash.io/page/14/?page=5&page_number_0=113. [in English]
32. "Blockchain Overview," IEEE Blockchain Initiative. [Online]. Available: https://blockchain.ieee.org/about. [in English]
33. "What is Blockchain," w3c/blockchain. [Online]. Available: https://github.com/w3c/blockchain/wiki/What-is-Blockchain. [in English]
34. Robin.materese@nist.gov, "Blockchain," NIST, 17-Jan-2020. [Online]. Available: https://www.nist.gov/topics/blockchain. [in English]
35. "Blockchain in Finance," KPMG, 20-May-2019. [Online]. Available: https://home.kpmg/uk/en/home/insights/2019/03/bffb-blockchain-in-finance.html. [in English]
36. "Blockchain consulting services," EY. [Online]. Available: https://www.ey.com/en_gl/advisory/blockchain-consulting-services. [in English]
37. C. Naden, "Blockchain technology set to grow further with international standards in pipeline," ISO, 24-May-2017. [Online]. Available: https://www.iso.org/news/Ref2188.htm. [in English]
38. "Blockchain explained... in under 100 words," Deloitte Switzerland, 16-Apr-2019. [Online]. Available: https://www2.deloitte.com/ch/en/pages/strategy-operations/articles/blockchain-explained.html. [in English]
39. "Blockchain: A technical primer," Deloitte Insights. [Online]. Available: https://www2.deloitte.com/us/en/insights/topics/emerging-technologies/blockchain-technical-primer.html. [in English]

40. “Blockchain: What it is & Why it Matters,” Accenture. [Online]. Available: https://www.accenture.com/us-en/insights/blockchain-index. [in English]
41. FAQs | IOTA. [Online]. Available: https://web.archive.org/web/20190329075739/https://www.iota.org/getting-started/faqs. [in English]
42. “BLOCKCHAIN IN LOGISTICS,” https://www.dhl.com/. [Online]. Available: https://www.dhl.com/content/dam/dhl/global/core/documents/pdf/glo-core-blockchain-trend-report.pdf. [in English]
43. Gartner_Inc, “Blockchain,” Gartner. [Online]. Available: https://www.gartner.com/en/information-technology/glossary/blockchain. [in English]
44. “Gartner Top 10 Strategic Technology Trends for 2020,” Smarter With Gartner. [Online]. Available: https://www.gartner.com/smarterwithgartner/gartner-top-10-strategic-technology-trends-for-2020. [in English]
45. “New IDC Spending Guide Sees Strong Growth in Blockchain Solutions Leading to $15.9 Billion Market in 2023,” IDC. [Online]. Available: https://www.idc.com/getdoc.jsp?containerId=prUS45429719. [in English]
46. “Construction and Blockchain: How Can It Help the Industry?, ” Software Buying Tips and Advice for Businesses. [Online]. Available: https://blog.capterra.com/construction-and-blockchain-how-can-it-help-the-industry/. [in English]
47. “QS World University Rankings 2020,” Top Universities, 09-Jun-2020. [Online]. Available: https://www.topuniversities.com/university-rankings/world-university-rankings/2020. [in English]
48. Z. Church, “Blockchain, explained,” MIT Sloan, 25-May-2017. [Online]. Available: https://mitsloan.mit.edu/ideas-made-to-matter/blockchain-explained. [in English]
49. “BLOCKCHAIN FOR SOCIAL IMPACT MOVING BEYOND THE HYPE,” https://www.gsb.stanford.edu/. [Online]. Available: https://www.gsb.stanford.edu/sites/gsb/files/publication-pdf/study-blockchain-impact-moving-beyond-hype_0.pdf. [in English]
50. Marco Iansiti and Karim R. Lakhani, “The Truth About Blockchain,” Harvard Business Review, 21-Aug-2019. [Online]. Available: https://hbr.org/2017/01/the-truth-about-blockchain#:~:text=The technology behind bitcoin, blockchain, permanently, and very efficiently.&text=Blockchain could slash the cost,that could transform the economy [in English]
51. U. of Oxford, “Blockchain Software Engineering,” Oxford University Department for Continuing Education. [Online]. Available: https://www.conted.ox.ac.uk/courses/blockchain-software-engineering. [in English]
52. Abadi, Joseph, and Markus K. Brunnermeier, ”Blockchain Economics”,August 31, 2019 [in English]
53. Arizona HB2417: 2017: Fifty-third Legislature 1st Regular,” LegiScan. [Online]. Available: https://legiscan.com/AZ/text/HB2417/id/1588180. [in English]
54. “California AB2658: 2017-2018: Regular Session,” LegiScan. [Online]. Available: https://legiscan.com/CA/text/AB2658/2017?utm_content=bufferdae97&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer. [in English]
55. Karen A. Yarbrough and John Mirkovic, “BLOCKCHAIN PILOT PROGRAM FINAL REPORT,” COOKRECORDER.COM/BLOCKCHAIN, 30-May-2017. [Online]. Available: https://cookrecorder.com/wp-content/uploads/2016/11/Final-Report-CCRD-Blockchain-Pilot-Program-for-web.pdf. [in English]
56. J. Shorish, “Blockchain State Machine Representation”, 23-Jan-2018. [Online]. Available: osf.io/preprints/socarxiv/eusxg. [in English]
57. P. Wegner, V. Profile, E. D. Reilly, Contributor MetricsExpand All Peter Wegner Brown University Publication Years1968 – 2010Publication counts75Available for Download46Citation count3, Peter Wegner Brown University Publication Years1968 – 2010Publication counts75Available for Download46Citation count3, and Authors: Peter Wegner View Profile, “Data structures,” Data structures | Encyclopedia of Computer Science, 01-Jan-2003. [Online]. Available: https://dl.acm.org/doi/10.5555/1074100.1074312. [in English]
58. iTeh Standards. 2020. Iteh Standards. [online] Available at: <https://standards.iteh.ai/catalog/standards/iso/eefbc8a8-0fcf-4933-8055-5a8e882cc2ad/iso-22739-2020> [in English]
59. “LEDGER: meaning in the Cambridge English Dictionary,” Cambridge Dictionary. [Online]. Available: https://dictionary.cambridge.org/dictionary/english/ledger. [in English]
60. “IMMUTABLE: meaning in the Cambridge English Dictionary,” Cambridge Dictionary. [Online]. Available: https://dictionary.cambridge.org/dictionary/english/immutable. [in English]
61. “What is Message Digest? – Definition from Techopedia,” Techopedia.com. [Online]. Available: https://www.techopedia.com/definition/4024/message-digest. [in English]
62. linked list. [Online]. Available: https://xlinux.nist.gov/dads/HTML/linkedList.html. [in English]
63. Gartner Top 10 Strategic Technology Trends for 2020, https://www.gartner.com/smarterwithgartner/gartner-top-10-strategic-technology-trends-for-2020 [in English]

64. “Chronological order,” Dictionary.com. [Online]. Available: https://www.dictionary.com/browse/chronological-order. [in English]

65. “TIMESTAMP: meaning in the Cambridge English Dictionary,” Cambridge Dictionary. [Online]. Available: https://dictionary.cambridge.org/dictionary/english/timestamp. [in English]

66. "Making sense of bitcoin, cryptocurrency and blockchain", PricewaterhouseCoopers. [Online]. Available: https://www.pwc.com/us/en/industries/financial-services/fintech/bitcoin-blockchain-cryptocurrency.html [in English]

67. “BLOCK: meaning in the Cambridge English Dictionary,” Cambridge Dictionary. [Online]. Available: https://dictionary.cambridge.org/dictionary/english/block. [in English]

68. “UNIQUE: meaning in the Cambridge English Dictionary,” Cambridge Dictionary. [Online]. Available: https://dictionary.cambridge.org/dictionary/english/unique. [in English]

69. “TRANSACTION: definition in the Cambridge English Dictionary,” TRANSACTION | definition in the Cambridge English Dictionary. [Online]. Available: https://dictionary.cambridge.org/us/dictionary/english/transaction. [in English]

70. The 4 Phases of the Gartner Blockchain Spectrum, https://www.gartner.com/smarterwithgartner/the-4-phases-of-the-gartner-blockchain-spectrum/Jentzsch, C. Decentralized Autonomous Organization to Automate Governance. Available online: https://lawofthelevel.lexblogplatformthree.com/wp-content/uploads/sites/187/2017/07/WhitePaper-1.pdf (accessed on 18 September 2020). [in English]

71. Merriam-webster.com. 2020. Time Traveler By Merriam-Webster: Words From 2011. [online] Available at: https://www.merriam-webster.com/time-traveler/2011 [in English]

72. 2011. [online] Available at: <https://whois.domaintools.com/blockchain.com> [in English]

73. Merriam-webster.com. Definition Of BLOCKCHAIN. [online] Available at: <https://www.merriam-webster.com/dictionary/blockchain> [in English]

74. Harvard Blockchain Lab. What Is Blockchain: Explained For Beginners. [online] (2018) Available at: http://web.archive.org/web/20190907054734/https://blogs.harvard.edu/blockchain/2018/07/12/what-is-blockchain-explained-for-beginners/ [in English]

Обушний Сергій Миколайович
кандидат економічних наук,
заступник декана
Факультету інформаційних технологій та управління
Київського університету імені Бориса Грінченка,
м. Київ, Україна
ORCID ID 0000-0001-6936-955X
e-mail: s.obushnyi@kubg.edu.ua

Кравченко Роман Сергійович
генеральний директор
ТОВ "482Солюшнс",
м. Одесса, Україна
ID ORCID: 0000-0003-3758-1649
e-mail: roman@482.solutions

Хацкевич Леонід Вікторович
керівник відділу стратегічних партнерств та комунікацій
ТОВ "482Солюшнс",
м. Одеса, Україна
ID ORCID: 0000-0002-5032-9483
e-mail: leonid@482.solutions

Некрасов Сергій Ігоревич
керівник відділу проектування
ТОВ "482Солюшнс",
м. Одеса, Україна
ID ORCID: 0000-0001-6931-1892
e-mail: sergii@482.solutions

Франціян Артем Ігоревич
технічний директор
ТОВ "482Солюшнс",
м. Одеса, Україна
ID ORCID: 0000-0002-4625-3105
e-mail: af@482.solutions

АНАЛІЗ ТА ВИРІШЕННЯ КОНЦЕПТУАЛЬНОЇ ТА ТЕРМІНОЛОГІЧНОЇ ПРОБЛЕМИ ВИЗНАЧЕННЯ BLOCKCHAIN

Аннотація. У цьому дослідженні автори сформулювали, проаналізували та розв'язали концептуальну та термінологічну проблему використання терміна та визначення концепції Blockchain, беручи до уваги їх вплив на розвиток послідовних теоретичних знань та правильного практичного досвіду в предметних областях його застосування. Для досягнення мети цього дослідження автори запропонували рішення у вигляді авторського визначення концепції Blockchain, заснованого на аналізі значень, виведенні їх класифікації та ідентифікації характеристик цього поняття.

Ядро дослідницького аналізу, засноване на критерії близькості визначення до вихідного значення, яке було вкладено в концепцію авторами, які заклали теоретичні та практичні основи для області децентралізованих обчислень, машин та мереж.

Для отримання визначення поняття Blockchain автори застосували метод, заснований на виявленні та аналізі двох типів умов у концепції Blockchain: властивостей та характеристик. Таким чином, для формування визначення були обрані характеристики (достатні умови), що характеризують і розкривають зміст явища.

Дослідження починається з реконструкції етимології і, отже, основного значення концепції блокчейн. Далі автори проводять інвентаризацію та систематизують набір існуючих визначень. На основі аналізу цього набору пропонується 3-х типова класифікація інтерпретацій концепцій Blockchain.

Ключовим результатом дослідження є аналіз та декомпозиція визначень на властивості та характеристики. Згодом він синтезується у вигляді авторського визначення, що має властивість унікальності, точності, повноти, надійності, релевантності та об'єктивності.

Щоб знайти рішення проблеми, автори використовують аналітичні лінгвістичні підходи: інвентаризація визначень, аналіз визначень, нормалізація термінів та різноманітність існуючих визначень та кодифікація.

Застосований внесок дослідження, який виходить за основні межі, полягає у підготовці матеріалу, що відповідає класу проблем стандарту ISO 22739 технології Blockchain та DLT.

Ключові слова: блокчейн; система управління блокчейн; BMS; технологія розподіленої книги; DLT; розподілена система; розподілені обчислення; розподілена мережа; термінологія; визначення; глосарій.