

SOCIAL SCIENCES. Economics**REVIEW ARTICLE: Translation from Ukrainian****The Phenomenon of Virtual Assets: Economic and Legal Aspects****Author's Contribution:**

A – Study design;
B – Data collection;
C – Statistical analysis;
D – Data interpretation;
E – Manuscript preparation;
F – Literature search;
G – Funds collection

Kud A. A.^{1,2,3 ABDEFG}¹ *Simcord Information Services SIA, Latvia*² *Simcord LLC. Technologies, Ukraine*³ *Simon Kuznets Kharkiv National University of Economics, Ukraine***Received:** 07.09.2020; **Accepted:** 08.10.2020; **Published:** 20.12.2020**Background and Aim of Study:****Abstract**

The current conditions of breakthrough digital technologies keep generating new phenomena. One of them are virtual assets having various types, existence environments, etc. It is known that today there is no clear understanding of virtual assets, nor there is any common classification of them, while the related terms require clarification in relation to economy and law.

The aim of the study: to characterize the phenomenon of virtual assets in relation to economy and law relying on the main trends of economy digitalization and establishment of the modern terms.

Materials and Methods:

In order to study the phenomenon of virtual assets in relation to economy and law, we have used the theoretical methods of analysis and synthesis, comparison, generalization, systematization and interpretation of results.

Results:

Studying the main trends of economy digitalization allowed us to determine the key properties of a virtual asset, to classify the subjects of the digital data accounting system based on the distributed ledger technology in the field of virtual asset use as well as to substantiate the way these subjects (“service providers” – “service users”) interrelate and interact. Having established the “original asset derivativeness” criterion and taking into account the objective properties of each virtual asset type and ways of their use, we suggested the following classification of virtual assets of the distributed ledger: tokenized asset and crypto-asset. We have proposed the following modern terms of the field of virtual asset use as well as their definitions: digital data accounting system based on the distributed ledger technology, distributed ledger, distributed ledger token, identifier, tokenized asset, digital asset, original asset, crypto-asset, user of the digital data accounting system based on the distributed ledger technology, service provider, and service user.

Conclusions:

Using various research methods allowed determining the key properties of a virtual asset, classifying the subjects of the digital data accounting system based on the distributed ledger technology as well as substantiating the way these subjects interrelate and interact in the field of virtual asset use. The classification of virtual assets of the distributed ledger and the modern terms with characteristics of the essence of main concepts of the research subject have been suggested.

Keywords:

virtual asset, tokenized asset, digital asset, crypto-asset, identifier, distributed ledger technology, distributed ledger

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Introduction

The world crisis 2020, among other things, makes governments and businesses re-evaluate their resources and look for new ways to manage the economic fallout from the crisis. It is already obvious that old management and decision-making models do not protect from massive economic shock and turn out to be useless for fighting new crises. The 21st century has already become an era of breakthrough digital technologies, and it keeps generating new phenomena with them. One of those phenomena are virtual assets of various types. Most of them are based on the distributed ledger technology, in particular, on the blockchain technology. It is known that many developed countries use them to shape a new “virtual economy v2.0”, the size of which amounts to hundreds of billions of US dollars. Thus, in the mid-2019, capitalization of the global and non-regulated market of cryptocurrencies as one of the types of virtual assets was appraised at approximately 327 billion US dollars (Eurasian Economic Commission, 2019). It definitely points out that the field of virtual asset circulation requires clear definition of objects and participants in relations that are related to such objects as well as appropriate and timely legal assessment by the government. Moreover, expanding the scope of application of the distributed ledger technology (blockchain) and its tools makes the issue of legal regulation of relations arising as well as the issue of studying the practical properties of virtual assets for their use in economy and law very important.

The aim of study. To characterize the phenomenon of virtual assets in relation to economy and law relying on the main trends of economy digitalization and establishment of the modern terms.

Materials and Methods

In order to study the phenomenon of virtual assets in relation to economy and law, we have used the theoretical methods of deduction and induction, analysis and synthesis, comparison, generalization, systematization and interpretation of results.

Results and Discussion

Over the last few years, the issue of essence of and legal framework for virtual assets of the distributed ledger has been provoking interest and disputes among both regulators and experts. Exploring the above issue will allow developing a theoretical basis for studying the practical properties of such types of virtual assets as tokenized assets and crypto-assets for their use in economy and law.

As at August 2020, the relations in the field of use of cryptocurrencies and the blockchain technology are governed by laws only in Malta and the Cayman Islands (Cayman Islands Monetary Authority, 2020). However, they are only applicable selectively, namely to the blockchain technology, distributed ledgers, and cryptocurrencies, but not to all types of virtual assets.

In July 2020, Russia also passed a draft law (Gosudarstvennaja Duma of the Russian Federation, 2020), which should make only a small part of known virtual assets used only in finance governed by law. All other countries only use by-laws (Eurasian Economic Commission, 2019) so far. This refers to state development concepts (Singapore, Australia, Kenya), presidential decrees (Uzbekistan), government decrees (Germany, Hong Kong), decisions of commissions or government agencies (Brazil, the USA, the Netherlands, Canada, the Republic of Korea, Uzbekistan), reports (Luxembourg (Houben & Snyers, 2020), Switzerland), etc. As a result of the governments being so cautious and indecisive, the experts and lawmakers follow the recommendations of such supranational bodies as the Financial Action Task Force (FATF) (Financial Action Task Force, 2020) and Organisation for Economic Co-operation and Development (OECD) (Organisation for Economic Co-operation and Development, 2020). Nevertheless, for the whole world the issue of enshrining the features of certain types of virtual assets at the statutory level is still relevant. Researchers around the globe cannot fully clear the phenomenon as well as various types and application of virtual assets (Hardjono, Lipton, & Pentland, 2020).

For better understanding of the basis of virtual assets and terminological “frames” of their legal essence, the nature of blockchain technology and several related terms (token, crypto-asset, identifier, virtual asset, tokenized asset, etc.) should be explained.

Blockchain is a technological solution in the digital space that provides an advanced method of digital data accounting. Blockchain is essentially an accounting system, which is based on accounting objects in the form of tokens, i.e. records in the digital data accounting systems based on the distributed ledger technology, which are identifiers of information that can be derived from, in particular, but not as a limitation thereof, an original asset. Blockchain differs from the so-called “classic accounting systems” by its accounting object and technological solution for its implementation. This refers to high-level encrypting, open protocol, distributed information storage, transferring digital data among accounting addresses without intermediaries, which ensures reliable and transparent token transactions. It is indeed difficult to imagine that a record in a standard register (e.g. in a transaction book or an Excel file of home accounting), i.e. not a blockchain record, may be a transaction object. On the contrary, such a record may be rather considered a result of some legal fact that caused emergence, change or termination of legal relations. Token as an accounting object of blockchain-based systems may in turn be an independent object of property relations having its own accounting units in the blockchain-based digital data accounting system (Figure 1).

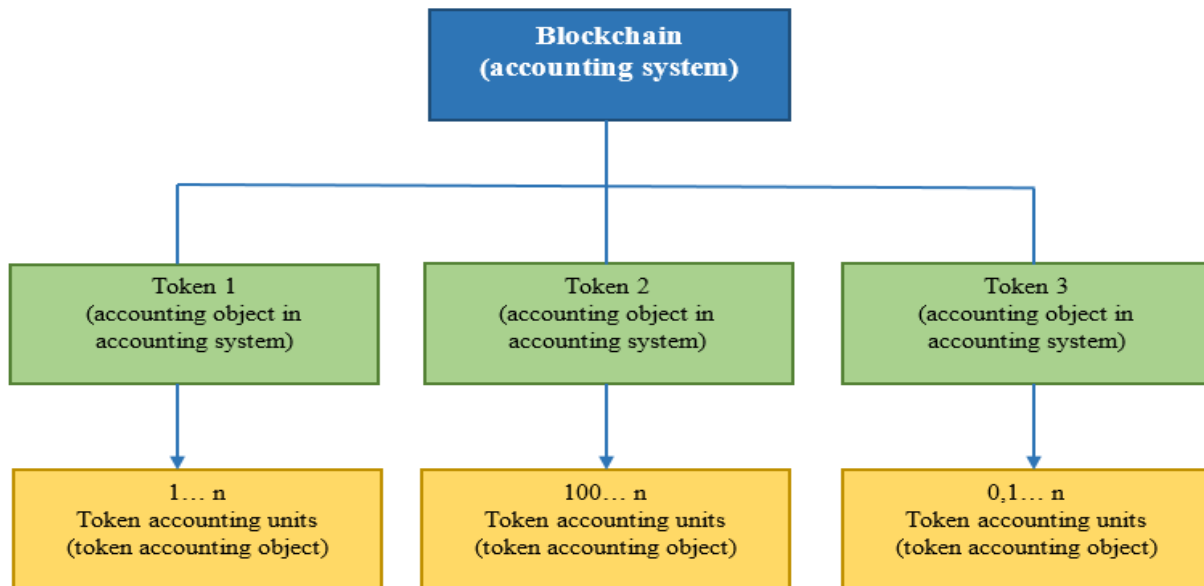


Figure 1. Blockchain-based digital data objects accounting system.

We can distinguish several features, which allow saying that token can be an object of relations:

- users of the accounting system (blockchain) can create tokens by themselves;
- token is in the form of identifier and has its own accounting units in the accounting system;
- depending on his/her goal, when creating a token, a user of the accounting system may specify the number of accounting units of this token to be issued at his/her own discretion;
- users of the accounting system transfer among one another not a token itself, but its accounting units;
- dual essence of token – token accounting units may be units of measurement of the scope of rights to this token, while token may be an object of accounting of any property existing outside the accounting system (outside blockchain);
- users of blockchain as a token circulation environment keep records together, so none of them can alter or delete entirely any data at his/her own discretion.

Since distributed ledger (blockchain) token is not only an accounting object, but may also be an object of relations, it is clear that a certain legal framework as well as regulations for its use should be established.

It should be noted that token is the main tool of the distributed ledger technology. Technically, all objects being actively discussed and argued about (virtual currencies, virtual assets, digital financial assets, etc.) are tokens in their nature.

For over ten years of its existence, the blockchain technology has evolved significantly and been through several stages, the so-called generations (Kud, Kucheriavenko, & Smychok, 2019; Pypenko & Kud, 2019). However, establishing a legal framework for blockchain tools as well as enshrining regulations for their use in legal provisions is still an important unresolved issue. The lawmaker generally faces several topical problems related to blockchain, solving of which would guarantee protection of rights of

participants in legal relations based on the blockchain technology.

Establishment of the Modern Terms.

Mixed attitude to blockchain as a poorly studied technology can be explained by lack of appropriate legal assessment of it. This complicates developing an appropriate legal framework greatly. To solve these issues, one should start from theory, namely from unifying the terms.

Blockchain is essentially one of the types of implementation of the distributed ledger technology based on a token being an accounting object.

As for blockchain tools, the existing laws and regulations use such terms as “cryptocurrency” or “crypto-asset” quite often. Some jurisdictions already define and regulate the above-mentioned object (Kud et al., 2019).

According to the reports and recommendations of international field-specific organizations and relevant state bodies, the following terms have been used to define the tools of the distributed ledger technology since 2013: tokens, coins, virtual currencies, cryptocurrencies, virtual assets, digital assets, digital financial assets, etc.

The European Central Bank was one of the first to give its opinion on the above phenomenon in its report “Virtual currency schemes” as of 2012 (European Central Bank, 2015). The document title itself says that it is virtual assets the authors are focused on.

In 2014, the FATF published its report “Virtual Currencies – Key Definitions and Potential AML/CFT Risks” (Financial Action Task Force, 2014). It not only served as backing for using the term “virtual currencies” in the years that followed, but also summarized the experience of the first tries to define the subjects of the system of virtual currencies. This being said, defining the subjects is an unresolved problem for the lawmaker as well.

In October 2018, the FATF amended its Recommendations as of 2012 (The FATF Recommendations, 2012) and added two new definitions to them, namely “virtual assets” and “virtual asset service provider” (FATF, 2018). After that, in 2019, the FATF published an Interpretive Note to its Recommendation 15 on New Technologies (INR. 15) and adopted Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers (Financial Action Task Force, 2019). Since the FATF Recommendations are a kind of international AML/CTF standard, financial experts and regulators around the globe focused on the term “virtual asset”. Thus, it is rather defining the related terms than establishing a relevant legal framework for virtual assets that has been an unresolved issue for the last decade. We still cannot claim this issue is resolved, even though there is a trend for further unification.

The FATF’s (2019) definition of virtual asset is as follows: “digital representations of value that can be digitally traded or transferred and that can be used for payment or investment purposes”. According to this definition, we can distinguish the following key features of a virtual asset:

- it is digital representations of value;
- it can be digitally traded or transferred;
- it can be used for payment or investment purposes.

As you can see, the above definition is quite broad and can cover virtual assets that are based not only on the distributed ledger technology, but on other (classic) accounting systems as well (e.g. uncertificated securities or electronic money). This complicates developing an appropriate legal framework for this object greatly.

Characteristics of the phenomenon of virtual assets in relation to economy and law.

Analysis of studying the issue allows determining the establishment of a legal framework for an object not controlled by the legal system yet, which is very important for the further practical use of its properties in economy and law.

In our opinion, one of the problems of the modern lawmakers in different countries is that they try to regulate an object before they study the nature of its origin, which, logically, entails many errors regarding its definition in the legal framework. If we talk about blockchain, we should take into account the technical aspects and its peculiarities as a whole.

We believe that determining the specific properties of virtual assets allowing us to classify them and to determine the areas and subjects of regulation of relations arising out of use of certain types of virtual assets would facilitate establishing the legal framework for the types of virtual assets.

Therefore, lack of unified definitions and clear classification makes it almost impossible to define the legal aspect of virtual assets and, consequently, to enshrine them in legal regulations and to establish an appropriate legal framework.

It is also important to understand that it is not correct to talk about regulation of the distributed ledger technology as well as about tools (virtual assets) and

relations based on this technology without taking into account and differentiating the legal status of subjects of such relations. This issue requires a comprehensive approach that includes determining the subjects and objects of relations based on the distributed ledger technology.

Determining the subjects of relations arising out of use of virtual assets of the distributed ledger.

As virtual assets are used more and more often worldwide, there is now a need to determine and formalize the status of participants in relations arising in the field of use of virtual assets of the distributed ledger.

The intergovernmental organization FATF (2014) and the European Central Bank (2015) have determined in their reports such subjects as inventors, issuers, miners, users, administrators and others. This information can be taken into account, however, determining the legal status of such subjects requires their characteristics, which would allow establishing powers, rights, and duties of all the subjects stated.

Users of digital data accounting system based on the distributed ledger technology.

Participants in relations arising out of use of virtual assets of the distributed ledger can be defined as users of a digital data accounting system based on the distributed ledger technology. Since such accounting systems are man-made, it is obvious that there are users who keep them running and there are users who use the benefits of such systems. Given the above, users of a digital data accounting system based on the distributed ledger technology can be classified as “service providers” and “service users” (Figure 2).

Service providers may provide their services to other users, which essentially entails implementing social relations in digital data accounting systems based on the distributed ledger technology with virtual assets. Virtual assets and digital data accounting systems based on the distributed ledger technology may be used as a way of implementing relations, while virtual assets may also serve as an object of relations. It should be noted that activities of service providers are entrepreneurial and are defined as activities in the field of information technology and computer systems or as intermediary services. It should also be noted that providing intermediary services for conducting transactions with crypto-assets requires special legal regulation.

In turn, other users of the digital data accounting system based on the distributed ledger technology (service users) use services both for personal and entrepreneurship purposes. Therefore, the accounting system based on the distributed ledger technology may be used as a transaction environment, where counterparties verified by the information platform have their accounts and all operations are registered in the system automatically. Such relations should be considered contractual and governed by civil and/or commercial law.

It is worth noting that if the parties to a virtual asset transaction in the digital data accounting system cannot

be identified, such a transaction shall be deemed void. It is due to the fact that, for technical reasons, such transactions are not covered by state guarantees, in particular, the legal rights and interests of non-identified participants cannot be protected.

Thus, having determined the subjects and objects of relations in the field of virtual asset use, we can say about establishing the legal framework for virtual assets and the legal status of the subjects. It is very important for regulating relations arising in the field of virtual asset use.

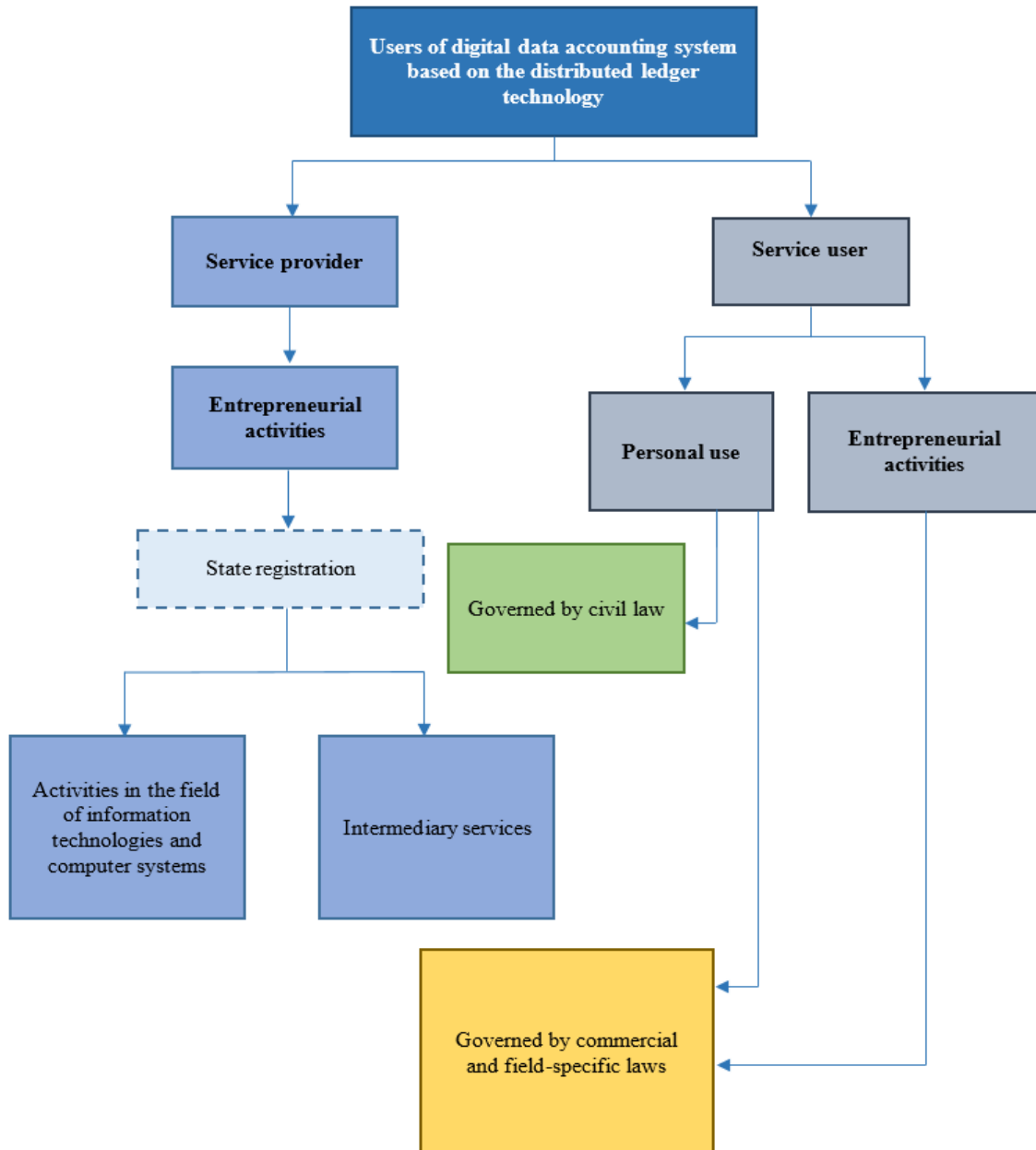


Figure 2. Users of the digital data accounting system based on the distributed ledger technology in the field of virtual asset use.

Substantiation of classification of virtual assets.

In our opinion, referring various virtual assets, even though they are similar in their origin, to a single legal framework, as regulators in many countries often see it to be, will not be an effective regulation method, but, on the contrary, will hinder development of relations arising out of their use. The reason is that different types of virtual assets have different origins and purposes when created (payment means, capitalization and saving means, asset rights confirmation means, etc.).

When we talk about a variety of objects, the use of which is not governed and whose legal status is not established, classification becomes a starting point for systematization of such objects. A substantiated classification will help to understand what a system of virtual assets is, what kind of relations may arise out of their use, and what a lawmaker should take into account to create actually effective mechanisms for regulating virtual assets.

Numerous foreign national and transnational regulators classified the tools of the distributed ledger technology

in their reports and guidelines, where they fell under appropriate categories so that appropriate regulatory frameworks, which should be different for each type of tokens, could be created and used. For instance, on February 16, 2018, the Swiss Financial Market Supervisory Authority (FINMA) published the Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs) (Swiss Financial Market Supervisory Authority, 2018), where they classified tokens by their “functional use”:

- payment tokens;
- utility tokens;
- asset tokens;
- hybrid tokens.

However, one classification is not enough to cover all the types of virtual assets of the distributed ledger since virtual assets are difficult for studying, and many of their properties are not known yet (or haven't shown yet). This fact did not allow experts and lawmakers around the globe to fully describe the characteristic of classification as well as to show the diversity of virtual assets through their properties.

While studying the peculiarities of distributed ledger technology and its tools, we have determined several properties, which make one types of virtual assets different from others, and proved them to be practically relevant:

- a) environment for implementation of virtual assets can be considered a starting criterion. Both the distributed ledger and a classic digital accounting system can serve as such an environment;
- b) virtual assets of classic digital accounting systems and virtual assets of the distributed ledger have different environments and implementation principles. Consequently, the approaches to regulation of such objects should take these peculiarities into account, which means their regulation will be different.

Classification allows accounting for the diversity of virtual assets and gives a true picture to understand the subject of regulation of social relations arising out of circulation of virtual assets.

In our opinion, the lawmaker should be focused on virtual assets the circulation environment of which is the distributed ledger.

Any property used by a user of the digital data accounting system based on the distributed ledger technology for creating a virtual asset of the distributed ledger to conduct transactions with this property may be an original asset.

Given the objective characteristics of many known virtual assets of the distributed ledger, one can only account for such criterion as “original asset derivativeness”. This criterion is enough to cover the maximum number of known virtual assets with taking into account the objective properties of each type of virtual assets as well as the ways of their use in real life.

The lawmaker is suggested to take into account the following classification of virtual assets of the distributed ledger:

1. Tokenized asset is a type of virtual asset, which exists exclusively in the digital data accounting system based on the distributed ledger technology in the form

of a record with an identifier of information derived from the original asset.

- The definition under consideration is based on the concept of “asset”. According to Clause 2 of Section 1 of Article 1 of the Law of Ukraine “On Prevention and Counteraction to Legalization (Laundering) of the Proceeds of Crime, Terrorist Financing, and Financing Proliferation of Weapons of Mass Destruction” dated December 06, 2019, “assets are means, including electronic money, other property, property and non-property rights” (Verkhovna Rada of Ukraine, 2019). Thus, the etymology of the term “tokenized asset” indicates that it is property. Tokenized asset, being an object of property relations, exists exclusively in the digital data accounting system based on the distributed ledger technology in the form of a record with an identifier of information derived from the original asset.

- The “tokenized” component indicates a key feature of the term under consideration, namely that a tokenized asset is not only property in itself, but is also an identifier (token) of digital information derived from the original asset (right to own and/or use and/or dispose of). Tokenized asset is a type of virtual asset, a means of certifying the rights of obligation and other rights, including rights of access to products and services, rights to a specific product or service, rights to receive a fixed income or a profit share, management rights, rights to purchase a specific asset at a certain price in the future (Eurasian Economic Commission, 2019). Introduction of the concept of “tokenized asset” at the statutory level ensures further implementation of the state policy for digital transformation.

A place of virtual asset of the distributed ledger in the accounting system is also very important for establishing the legal framework for it. The terms commonly used in accounting and enshrined in the International Financial Reporting Standards are suggested for this purpose. Thus, both a current asset (International Financial Reporting Standards Foundation, IAS 1) and a noncurrent asset (International Financial Reporting Standards Foundation, IFRS 5) can be an original asset.

Therefore, having identified the type of original asset, you can determine the corresponding type of tokenized asset:

- a) tokenized asset derived from the current asset, or
- b) tokenized asset derived from the noncurrent asset.

The advantage of this approach is that it provides a clear-cut solution for appropriate accounting and assessment of tokenized assets in accounting. As a result, it will facilitate developing the best approach to taxing transactions with tokenized assets.

Transactions with tokenized assets are contractual relations in their nature. Therefore, they should be governed by civil or commercial law (depending on the subjects of relations).

2. Crypto-asset (*cryptographic asset*) is a type of virtual asset, which exists exclusively in the digital data accounting system based on the distributed ledger technology in the form of a record with an identifier of information not derived from the original asset.

- The etymology of the term “crypto-asset” indicates that it is property in the cryptographic form with an identifier in the digital data accounting system based on the distributed ledger technology (Kud, 2019). The concept of “crypto-asset” is common in the related field. It reflects the technological side of this phenomenon, which is the result of combination of cryptographic technologies and the distributed ledger technology (Eurasian Economic Commission, 2019), and is the only correct one for use at the statutory level. Since crypto-assets are not derived from and backed by any property or property rights, it is suggested to classify transactions with them as “high-risk financial transactions” and, therefore, to classify them as such to be regulated and governed by state financial monitoring entities and field-specific laws accordingly.

Such differentiation between virtual assets only confirms the feasibility of their classification, since classifying both transactions with crypto-assets and transactions with other virtual assets of the distributed ledger (tokenized assets) equally as high-risk transactions or equally as usual civil legal relations (with no high risks) is not legally correct and wrong in terms of asset evaluation and tax accountability of participants in such relations. In conclusion, it could be said that effective regulation of relations in the field of virtual asset use at their current stage of evolution requires from the lawmaker to use a comprehensive approach to regulating relations arising out of use of virtual assets of the distributed ledger (blockchain) (Figure 3).

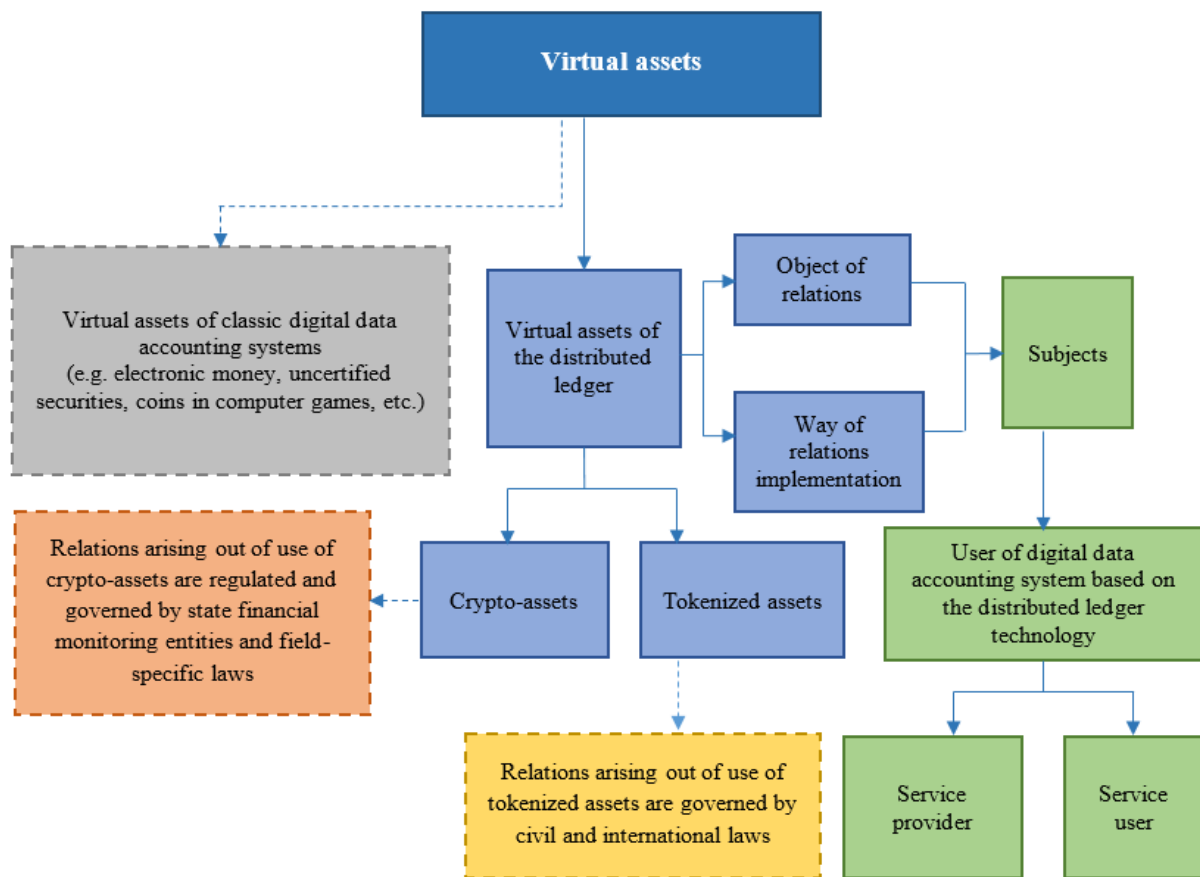


Figure 3. Comprehensive approach to regulating relations arising out of use of virtual assets of the distributed ledger (blockchain).

Therefore, draft laws prepared using the above approach to regulating relations should take into account the following:

1. All modern virtual assets known to date may be implemented in either classic digital accounting systems or the distributed ledger. The first ones can be easily covered by the current system of civil law with some minor amendments to legislation, while the second ones require much more of the lawmaker’s attention, in particular, adopting special regulations and establishing a legal framework for them.

2. When establishing the legal framework for tokenized assets and crypto-assets, one should take into account that they may be both an object of relations and a means used to implement relations, which, due to peculiarities of the distributed ledger technology, are implemented directly among users, without intermediaries. It is a distinctive feature of virtual assets of the distributed ledger not peculiar to other known types of virtual assets. It offers great prospects for future research in law, micro- and industry-specific economies, public management, and philosophy.

3. Two main types of virtual assets of the distributed ledger can be distinguished. They are tokenized assets and crypto-assets. Depending on the original asset, based on the International Financial Reporting Standards, tokenized assets can be divided into those derived from a current or a non-current asset. Due to different nature of their origination from original property (backing), tokenized assets and crypto-assets should be covered by different legal frameworks. This also offers new prospects for future research in economy and law.

4. The subjects of relations in the field of virtual asset use are, first of all, users of the digital data accounting system based on the distributed ledger technology who provide or use services implemented in such systems. They create demand for and supply of virtual assets, initiate transactions, and bear responsibility for using virtual assets of the distributed ledger. Enshrining the legal status of subjects is a mandatory condition of the comprehensive approach to regulating this field.

When studying the economic and legal aspects of tokenized assets and crypto-assets, special attention should be paid to the issue of practical use of tokenized assets.

Based on the foregoing, it can be concluded that tokenized asset can be used as a tool for implementing the method for recording, accounting, and management of property rights to assets. Tokenized asset can also be used as a means of certifying any rights; recording events; preparing, processing, and providing statistical and analytical information; performing logistics operations, etc. Depending on the purpose of creation of a certain tokenized asset, and, consequently, the properties laid down in it by its creator, such a tokenized asset may be referred to a separate type.

Digital asset is one of the types of the tokenized asset. It is a multifunctional tool for recording, accounting and management of property rights to assets, which at the same time provides its user with many more opportunities as it is transferred in parts, can be a derivative tool and a new means for right management, as well as due to other of its properties.

It should be noted that another method for managing property rights can be implemented through a digital asset.

Digital asset is an information resource derivative of the right to a value and circulating in the distributed ledger in the form of a unique identifier (Kud, 2019). The definition of this term provides the basic mechanisms of the method for recording, accounting, and management of property rights, proper implementation of which is only possible through using digital data accounting systems based on the distributed ledger technology.

The use of tokenized asset having a number of properties, which characterize it as a digital asset, allows implementing the method for recording, accounting, and management of property rights to assets as well as for their direct exchange among users of digital data accounting systems based on the distributed ledger technology without intermediaries.

It should be emphasized that relations in the field of use of virtual assets of the distributed ledger are only at

early stages of their evolution. As they continue to evolve, the list of objects and subjects of such relations will be expanding and require clarification, which will eventually cause mandatory legal enshrining of the relevant transformations and relations.

Based on the research findings, it is suggested to enshrine the use of the following terms and their definitions:

1. *Digital data accounting system based on the distributed ledger technology* is an information system for registration, storage, exchange of digital data and ensuring their accounting, which is based on the distributed ledger technology.

2. *Distributed ledger* is a set of technical and software units that work together, but in a decentralized and independent of each other manner, with the aim of recording the decision regarding registration of a record, as well as for storing, exchanging digital data and ensuring their accounting synchronized using a certain consensus algorithm, which allows creating separate digital data accounting systems that are based on a distributed ledger token.

3. *Distributed ledger token* is a record in the digital data accounting system based on the distributed ledger technology, which is an identifier of information that can be, but not exclusively, derived from the original asset.

4. *Identifier* is digital data in the form of a unique set of alphanumeric characters assigned to the distributed ledger token in its accounting system.

5. *Tokenized asset* is a type of virtual asset existing exclusively in the digital data accounting system based on the distributed ledger technology in the form of a record with an identifier of information derived from the original asset.

6. *Digital asset* is an information resource derivative of the right to a value and circulating in the distributed ledger in the form of a unique identifier.

7. *Original asset* is property in any form that is at disposal of a user of the digital data accounting system based on the distributed ledger technology and used to create a tokenized asset in order to conclude a transaction related to this property, in particular, but not as a limitation thereof, for business purposes or personal use.

8. *Crypto-asset* is a type of virtual asset existing exclusively in the digital data accounting system based on the distributed ledger technology in the form of a record with an identifier of information not derived from the original asset.

9. *User of the digital data accounting system based on the distributed ledger technology* is a natural person or a legal entity using the digital data accounting system based on the distributed ledger technology, in particular, but not as a limitation thereof, to implement the transaction with the tokenized asset and/or crypto-asset.

10. *Service provider* is a user of the digital data accounting system based on the distributed ledger technology that provides services related to tokenized assets and crypto-assets, in particular, but not as a limitation thereof, for ensuring implementation of transactions with tokenized assets and/or crypto-assets.

11. *Service user* is a user of the digital data accounting system based on the distributed ledger technology that uses services available in the digital data accounting system based on the distributed ledger technology, and/or uses tokenized assets and/or crypto-assets, in particular, but not as a limitation thereof, to conduct business or for personal use.

Conclusions

Using various research methods allowed studying the main trends of economy digitalization and determining the key properties of a virtual asset; classifying the subjects of the digital data accounting system based on the distributed ledger technology in the field of virtual asset use as well as substantiating the way these subjects interrelate and interact (“service providers” – “service users”). Having established the “original asset derivativeness” criterion and taking into account the objective properties of each virtual asset type and ways of their use, we suggested the following classification of virtual assets of the distributed ledger: tokenized asset and crypto-asset. It should be noted that there is a prospect for further system study of tokenized assets and substantiation of their classification depending on their properties. Digital asset holds a special place in this classification. We have proposed the following modern terms of the field of virtual asset use as well as their definitions: digital data accounting system based on the distributed ledger technology, distributed ledger, distributed ledger token, identifier, tokenized asset, digital asset, original asset, crypto-asset, user of the digital data accounting system based on the distributed ledger technology, service provider, and service user.

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References

Chohan U. W. Assessing the differences in bitcoin & other cryptocurrency legality across national jurisdictions. *SSRN eJournal*. 2017. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3042248 doi:10.2139/ssrn.3042248 (Last accessed: 11.06.2020).

- Dunayev I., Kud A. Developing digital skills and competencies of Ukrainian specialists as a vital need in the global digital transformation era. *Pressing Problems of Public Administration*. 2020. Vol. 1. № 57. P. 8–17. doi:10.34213/ap.20.01.01
- European Central Bank. Virtual currency schemes – a further analysis. Frankfurt am Main, Germany: ECB, 2015. 37 p. URL: <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes.en.pdf> (Last accessed: 29.05.2020).
- Financial Action Task Force. 12-Month review of revised FATF standards – Virtual assets and VASPs. Paris: FATF, 2020. 24 p. URL: http://www.fatf-gafi.org/media/fatf/documents/recommendation_s/12-Month-Review-Revised-FATF-Standards-Virtual-Assets-VASPs.pdf (Last accessed: 15.07.2020).
- Financial Action Task Force. Guidance for a risk-based approach to virtual assets and virtual asset service providers. Paris: FATF, 2019. 57 p. URL: https://www.fatf-gafi.org/media/fatf/documents/recommendation_s/RBA-VA-VASPs.pdf (Last accessed: 19.07.2020).
- Financial Action Task Force. Public statement on virtual assets and related providers. Orlando: FATF, 2019. URL: <https://www.fatf-gafi.org/publications/fatfrecommendations/documents/public-statement-virtual-assets.html> (Last accessed: 07.06.2020).
- Financial Action Task Force. Virtual Currencies – Key definitions and potential AML/CFT risks. Paris: FATF, 2014. 15 p. URL: <https://www.fatf-gafi.org/media/fatf/documents/reports/Virtual-currency-key-definitions-and-potential-aml-cft-risks.pdf> (Last accessed: 14.07.2020).
- Hardjono Th., Lipton A., Pentland A. Privacy-preserving claims exchange networks for virtual asset service providers. Cambridge: Massachusetts Institute of Technology, 2020. 18 p. (Preprint. Massachusetts Institute of Technology; arXiv:1912.06871v2[cs.CR]). URL: <https://arxiv.org/pdf/1912.06871.pdf> (Last accessed: 30.06.2020).
- Houben R., Snyers A. Crypto-assets – Key developments, regulatory concerns and responses. Luxembourg: European Parliament’s Committee on Economic and Monetary Affairs, 2020. URL: [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/648779/IPOL_STU\(2020\)648779_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/648779/IPOL_STU(2020)648779_EN.pdf) (Last accessed: 04.07.2020).
- International Financial Reporting Standards Foundation. IAS 1 Presentation of Financial Statements. London: IFRS Foundation, 2020. URL: <https://www.ifrs.org/issued-standards/list-of-standards/ias-1-presentation-of-financial-statements/#about> (Last accessed: 28.07.2020).
- International Financial Reporting Standards Foundation. IFRS 5 Non-current assets held for

- sale and discontinued operations. London, UK: IFRS Foundation. URL: <https://www.ifrs.org/issued-standards/list-of-standards/ifrs-5-non-current-assets-held-for-sale-and-discontinued-operations/#about> (Last accessed: 28.07.2020).
- Kud A. Substantiation of the term “digital asset”: Economic and legal aspects. *International Journal of Education and Science*. 2019. Vol. 2. No. 1. P. 41–52. doi:10.26697/ijes.2019.1.06
- Organisation for Economic Co-operation and Development. The tokenisation of assets and potential implications for financial markets. Paris, France: OECD Blockchain Policy Series, 2020. 62 p. URL: www.oecd.org/finance/The-Tokenisation-of-Assets-and-Potential-Implications-for-Financial-Markets.pdf (Last accessed: 29.07.2020).
- Pypenko I. S., Kud A. A. Genesis of IT economy: from cryptocurrency to digital asset. *International Journal of Education and Science*. 2019. Vol. 2. № 2. P. 56. doi:10.26697/ijes.2019.2.41
- Swiss Financial Market Supervisory Authority. Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs). Bern: FINMA, 2018. 11 p. URL: <https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung> (Last accessed: 27.06.2020).
- Virtual asset (service providers): Law of the Cayman Islands dated 25.05.2020 № 14 // Database “Cayman Islands Monetary Authority”. URL: https://www.cima.ky/upimages/commonfiles/VirtualAssetServiceProvidersLaw,2020_1594210684.PDF (Last accessed: 03.07.2020).
- Евразийская экономическая комиссия. Криптовалюты и блокчейн как атрибуты новой экономики. *ЕЭК*: веб-сайт. URL: <http://www.eurasiancommission.org/ru> (дата обращения: 01.06.2020).
- Кудь А., Кучерявенко Н., Смычок Е. Цифровые активы и их экономико-правовое регулирование в свете развития технологии блокчейн. Харьков: Право, 2019. 232 с.
- О цифровых финансовых активах, цифровой валюте и о внесении изменений в отдельные законодательные акты Российской Федерации: Федеральный закон Российской Федерации от 31.07.2020 № 259-ФЗ // Официальный интернет-портал правовой информации. URL: <http://publication.pravo.gov.ru/Document/View/0001202007310056> (дата обращения: 31.07.2020).
- Про запобігання та протидію легалізації (відмиванню) доходів, одержаних злочинним шляхом, фінансуванню тероризму та фінансуванню розповсюдження зброї масового знищення: Закон від 06.12.2019 № 361-IX // База даних “Законодавство України”/ВР України. URL: <https://zakon.rada.gov.ua/laws/show/361-20#Text> (дата звернення: 17.07.2020).
- Література**
- Chohan, U. W. (2017). Assessing the differences in bitcoin & other cryptocurrency legality across national jurisdictions. *SSRN eJournal*. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3042248 doi:10.2139/ssrn.3042248
- Dunayev, I., & Kud, A. (2020). Developing digital skills and competencies of ukrainian specialists as a vital need in the global digital transformation era. *Pressing Problems of Public Administration*, 1(57), 8–17. doi:10.34213/ap.20.01.01
- European Central Bank. (2015). *Virtual currency schemes – a further analysis*. Frankfurt am Main, Germany: ECB. Retrieved from: <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes.pdf>
- Financial Action Task Force. (2020). *12-Month review of revised FATF standards – Virtual assets and VASPs*. Paris, France: FATF. Retrieved from: <http://www.fatf-gafi.org/media/fatf/documents/recommendations/12-Month-Review-Revised-FATF-Standards-Virtual-Assets-VASPs.pdf>
- Financial Action Task Force. (2019). *Guidance for a risk-based approach to virtual assets and virtual asset service providers*. Paris, France: FATF. Retrieved from: <https://www.fatf-gafi.org/media/fatf/documents/recommendations/RBA-VA-VASPs.pdf>
- Financial Action Task Force. (2019). *Public statement on virtual assets and related providers*. Orlando, US: FATF. Retrieved from: <https://www.fatf-gafi.org/publications/fatfrecommendations/documents/public-statement-virtual-assets.html>
- Financial Action Task Force. (2014). *Virtual Currencies – Key definitions and potential AML/CFT risks*. Paris, France: FATF. Retrieved from: <https://www.fatf-gafi.org/media/fatf/documents/reports/Virtual-currency-key-definitions-and-potential-aml-cft-risks.pdf>
- Hardjono, Th., Lipton, A., & Pentland, A. (2020). *Privacy-preserving claims exchange networks for virtual asset service providers*. Retrieved from preprint archive. (arXiv:1912.06871v2[cs.CR])
- Houben, R., & Snyers, A. (2020). *Crypto-assets – Key developments, regulatory concerns and responses*. Luxembourg: European Parliament’s Committee on Economic and Monetary Affairs. Retrieved from: [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/648779/IPOL_STU\(2020\)648779_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/648779/IPOL_STU(2020)648779_EN.pdf)
- International Financial Reporting Standards Foundation. (n.d.). *IAS 1 Presentation of Financial Statements*. London, UK: IFRS Foundation. Retrieved from: <https://www.ifrs.org/issued-standards/list-of->

- standards/ias-1-presentation-of-financial-statements/#about
- International Financial Reporting Standards Foundation. (n.d.). *IFRS 5 Non-current assets held for sale and discontinued operations*. London, UK: IFRS Foundation. Retrieved from: <https://www.ifrs.org/issued-standards/list-of-standards/ifrs-5-non-current-assets-held-for-sale-and-discontinued-operations/#about>
- Kud, A. (2019). Substantiation of the term “digital asset”: Economic and legal aspects. *International Journal of Education and Science*, 2(1), 41–52. doi:10.26697/ijes.2019.1.06
- Organisation for Economic Co-operation and Development. (2020). *The tokenisation of assets and potential implications for financial markets*. Paris, France: OECD Blockchain Policy Series. Retrieved from: www.oecd.org/finance/The-Tokenisation-of-Assets-and-Potential-Implications-for-Financial-Markets.pdf
- Pypenko, I. S., & Kud, A. A. (2019). Genesis of IT economy: from cryptocurrency to digital asset. *International Journal of Education and Science*, 2(2), 56. doi:10.26697/ijes.2019.2.41
- Swiss Financial Market Supervisory Authority. (2018). *Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs)*. Bern, Switzerland: FINMA. Retrieved from: <https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung>
- Cayman Islands Monetary Authority. (2020, May 25). *Law of the Cayman Islands “Virtual asset (service providers)”*. Retrieved July 3, 2020, from Cayman Islands Monetary Authority Web site: https://www.cima.ky/upimages/commonfiles/VirtualAssetServiceProvidersLaw,2020_1594210684.PDF
- Eurasian Economic Commission. (2019). Kriptoaljuty i blokchejn kak atributy novoj jekonomiki [Cryptocurrencies and blockchain as attributes of the new economy]. *EEC*. Retrieved from: <http://www.eurasiancommission.org/ru> [in Russian]
- Kud, A., Kucheriavenko, N., & Smychok, E. (2019). *Tsifrovye aktivy i ikh ekonomiko-pravovoe regulirovanie v svete razvitiia tekhnologii blokchein* [Digital assets and their economic and legal regulation during development of blockchain technology]. Kharkiv, Ukraine: Pravo. [in Russian]
- Gosudarstvennaja Duma of the Russian Federation. (2020, July 31). *Federalnyj zakon Rossijskoj Federacii “O cifrovyh finansovyh aktivah, cifrovoj valjute i o vnesenii izmenenij v otdelnye zakonodatelnye akty Rossijskoj Federacii”* [Federal Law of the Russian Federation “On digital financial assets, digital currency and on amendments to certain legislative acts of the Russian Federation”]. Retrieved July 31, 2020, from the Official Internet portal of legal information: <http://publication.pravo.gov.ru/Document/View/0001202007310056> [in Russian]
- Verkhovna Rada of Ukraine. (2019, December 6). *Zakon Ukrainy “Pro zapobihannia ta protydivu lehalizatsii (vidmyvanniu) dokhodiv, oderzhanykh zlochynnym shliakhom, finansuvanniu teroryzmu ta finansuvanniu rozpovsiudzhennia zbroi masovoho znyshchennia”* [Law of Ukraine “On prevention and counteraction to legalization (laundering) of proceeds from crime, financing of terrorism and financing of proliferation of weapons of mass destruction”]. Retrieved July 17, 2020, from Verkhovna Rada of Ukraine Web site: <https://zakon.rada.gov.ua/laws/show/361-20#Text> [in Ukrainian]

Феномен віртуальних активів: економіко-правовий аспект

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Анотація

Вступ: Сучасні умови проривних цифрових технологій продовжують породжувати нові явища та феномени. Одними з них стали віртуальні активи в усьому різноманітті своїх видів, середовищ існування тощо. Встановлено, що на сьогодні не існує чіткого розуміння віртуальних активів та усталеної класифікації, а термінологічний апарат потребує уточнень в економіко-правовому аспекті.

Мета дослідження: На підґрунті вивчення основних тенденцій цифровізації економічної галузі та становлення сучасного термінологічного апарату охарактеризувати феномен віртуальних активів у економіко-правовому аспекті.

Матеріали і методи: Для дослідження феномену віртуальних активів у економіко-правовому аспекті використано комплекс теоретичних методів: аналізу та синтезу, порівняння, узагальнення, систематизації та інтерпретації результатів.

Результати: Вивчення основних тенденцій цифровізації економічної галузі дозволило виокремити ключові ознаки віртуального активу; класифікувати суб'єктів системи обліку цифрових даних на базі технології розподіленого реєстру в сфері застосування віртуальних активів, а також обґрунтувати взаємозв'язок та взаємодію між цими суб'єктами (“постачальники послуг” – “споживачі послуг”). На підґрунті визначення критерію “похідність від первинного активу” та з урахуванням об'єктивних властивостей кожного виду віртуального активу й способів їх застосування нами запропонована така

класифікація віртуальних активів розподіленого реєстру: токенований актив і криптоактив. Запропонований сучасний термінологічний апарат сфери застосування віртуальних активів містить такі терміни та їх визначення: система обліку цифрових даних на базі технології розподіленого реєстру, розподілений реєстр, токен розподіленого реєстру, ідентифікатор, токенований актив, цифровий актив, первинний актив, криптоактив, користувач системи обліку цифрових даних на базі технології розподіленого реєстру, постачальник послуг, споживач послуг.

Висновки: Використання різноманітних методів дослідження дозволили виокремити ключові ознаки

віртуального активу й здійснити класифікацію суб'єктів системи обліку цифрових даних на базі технології розподіленого реєстру та обґрунтувати взаємозв'язок і взаємодію між цими суб'єктами у сфері застосування віртуальних активів.

Запропоновані класифікація віртуальних активів розподіленого реєстру та сучасний термінологічний апарат із характеристикою сутності основних понять проблеми дослідження.

Ключові слова: віртуальний актив, токенований актив, цифровий актив, криптоактив, ідентифікатор, технологія розподіленого реєстру, розподілений реєстр.

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