

Reconsidering the Concept of a Thing in Terms of the Digital Environment: Law Towards an Understanding of a Digital Thing

Roman Maydanyk

Taras Shevchenko National University of Kyiv, School of Law, Kyiv, UKRAINE

Nataliia Maydanyk

*Vadym Hetman National Economic University of Kyiv, Kyiv, UKRAINE
School of Law*

Nataliia Popova

*National Academy of Legal Sciences of Ukraine, F. G. Burchak Scientific and
Research Institute of Private Law and Entrepreneurship, Kyiv, UKRAINE
Department of Eneterpreunerships*

Received: 29 May 2022 ▪ Revised: 10 June 2022 ▪ Accepted: 24 June 2022

Abstract

This article deals with the issues of reconsidering the concept of thing in terms of the digital environment and the formation of understanding of the digital thing. In terms of digitalization, the legal systems of civil and common law are characterized by the further development of digital objects of law towards of reflecting the material world combined with the features of the digital legal environment. The need for unambiguous regulation of relations regarding the use of new technologies necessitates the implementation in law of a new legal tools that can revolutionise commerce and non-commercial activity, which include, first of all, specifically digital things. Digital things are fundamental component of the digital legal environment, which are being recognized as existing in digital form objects of civil rights. The accommodation of digital legal objects requires a reconsidering of the concept of property and things towards the introduction of a broad understanding of thing, a kind or digital analogue of which are digital things as part of the person's property, which are appropriated (acquisition and termination) and participated in a civil turnover under the general rules of material things, taking into account the features of the digital environment provided by law, contract or the essence of the digital thing. This necessitates the formation of conceptual legal provisions on property and a broad understanding of things, concepts and types of digital things. The authors of this research propose to reconsider the understanding of property (1) and thing (2) towards of their broad understanding in terms of digitalization, to define the concepts and legal nature (3) and types of digital things (4), to use the functional methodological approach of the digital thing (5) and the resulting features of the virtual asset as a digital thing (6).

Keywords: digital legal environment, things, property, digital things, virtual assets.

1. Introduction

In terms of digitalization, the legal systems of civil and common law are characterized by the further development of digital objects of law towards of reflecting the material world combined with the features of the digital legal environment.

When regulating social relations in terms of digitalization, the law must unambiguously regulate them. Considering the changes occurring in society, it must take into account changes in existing relations and, undoubtedly, the emergence of fundamentally new relations concerning digital objects (Fedorenko & Hejgetova, 2019).

The world is moving rapidly towards a paradigm in which most commerce between commercial parties, and significant part of non-entrepreneur activity, happens either partially or entirely digitally (The Law Commission's review of the law on digital assets and smart contracts: /DLA Piper Global Law Firm, 2020).

A revolutionary challenge for the legislator in this aspect is modern technologies, crypto assets and other digital things, smart-contracts, and artificial intelligence systems, which are changing today's society at a tremendous speed (Konobeevskaya, 2019: 330-334; Ogorevc, 2019).

The need for unambiguous regulation of relations regarding the use of new technologies necessitates the implementation in law of a new legal tools that can revolutionize commerce and non-commercial activity, which include, first of all, digital things.

Digital things are fundamental component of the digital legal environment, which are being recognized as existing in a digital form object of civil rights.

The accommodation of digital legal objects requires a reconsidering of the concept of property and things towards the introduction of a broad understanding of thing, a kind or digital analogue of which are digital things as part of the person's property, which are appropriated (acquisition and termination) and participated in a civil turnover under the general rules of material things, taking into account the features of the digital environment provided by law, contract or the essence of the digital thing.

This necessitates the formation of conceptual legal provisions on property and a broad understanding of things, concepts and types of digital things.

The authors of this research propose to reconsider the understanding of property (1) and thing (2) in terms of digitalization towards of their broad understanding, to define the concepts and legal nature of digital things (3) methodological approaches to understanding the digital things (4), digital things and property ratio (5), narrow and broad understanding of digital things (6) and the resulting peculiarities of varieties of digital things, in particular virtual asset (7), digital securities (8) and digital money as a digital things (9).

2. Reconsidering concept of property

The legal systems of civil law do not contain a unified understanding of the category of "property". The laws of civil law under the property means things, as well as property claims (Article 128 of the Civil Code of the Russian Federation) and property liabilities (Article 190 of the Civil Code of Ukraine), which are considered as the sum of active and passive values (Article 458 of the Civil Code of Moldova), or the totality of all assets and liabilities belonging to the person (section 495 of the Civil Code of the Czech Republic). In some legal systems, the category of "property" is considered in a narrower sense, which includes things, money, securities, other property; property rights are not property (Article 1.97 of the Civil Code of Lithuania).

The concept of “property” has different meanings. In some cases, this concept is used to denote specific things, in others – as a set of rights and liabilities of the subject, in others, property means a set of things, rights of claim, and debts (liabilities) (Sukhanov et al., 1998: 294).

In the latter case, property is a set of things, property rights and liabilities that characterize the property status of the carrier (asset and liability) – universal succession (Suleymenov, 2006: 205). In the doctrine of law, property is considered in a broad and narrow sense (*Ibid.*: 205).

In a broad sense, property is recognized as a set of property, ie, subject to monetary valuation, legal relations in which a person is; purely personal relationships do not belong here. The content of property is expressed in the set of things that belong to a person on a certain subjective right (property asset), and in the set of obligations imposed on the person (property liability) (Shershenevich, 1995: 95).

In order for property to be recognized as the subject of relations, it must be the subject of civil turnover, property, in turn, must be legally capable. The legal personality of a thing can be determined by its properties of good by default, i.e., without the influence of human forces and will. Legal capacity is determined solely by the status and recognition of property as an object of civil turnover, and, as a consequence, the subject of social relations (Dosmaganova, 2009: 78-81).

Proponents of a narrow understanding of property consider property as a collection of things that are objects of ownership and other property rights. Some proponents of this approach believe that the concept of property in civil law science has two manifestations (“face”): “property values” and “property rights” (Dosmaganova, 2009: 78, 79).

In this case, the liability, according to the representatives of this approach, cannot be compared with property values and property rights, because in contrast to them has exactly the opposite characteristics: satisfaction of rights and interests of another person, providing material goods to another person, alienation (transfer to comply with the provisions of the law or contract), endowing certain rights and responsibilities of others, etc.

Property obligations (liabilities) are not the property itself as a thing, but the satisfaction of the interests and rights of the party through active action of the obligated party. The obligation for the obligated person is the state and the ground for the unconditional performance of active actions (inaction) in order to meet the requirements of the authorized party.

According to its legal (functional) purpose, property is a generic category that includes separate objects for property good. The literature states that “a clear distinction should be made between property as a generic category and objects of ownership as one of its varieties” (Dozorzev, 1998: 232-233).

At the same time, the objections of opponents of the proclamation of the object of ownership of the category “property” are generally based on the idea that the proclamation of obligations and responsibilities as the object of ownership or even extension to them in any part of the legal regime object of ownership, of course, are erroneous and can only cause misunderstandings in practice (Dozorzev, 1998: 233).

The thesis that in its own (institutional) sense the category “property” covers the whole set of property goods that can be the object of disposal of a subject of civil law deserves support (Lapach, 2003: 18-20).

In the modern law of the countries of continental law there is a tendency to introduce a broad understanding of property as the sum of active and passive values belonging to an individual.

This approach is based on the general idea of recognizing a person's right to own property as an element of his or her legal personality. An element of a person's legal personality is the right to own property.

In our opinion, it is expedient to consider property as the totality of all property goods, property rights and obligations due to individuals and legal entities (which can be assessed in monetary terms), which are considered as the sum of active and passive values related to each other. All things of a natural or legal person are part of its property.

3. Broad understanding of things

One of the main characteristics of the legal status of the object of civil law is its turnover. In addition, it contains the existing subjective rights and obligations regarding this phenomenon. From the standpoint of law, what is important is not the thing itself as a set of physical and chemical characteristics, but the legal significance given to this object by virtue of positive law, which is embodied in subjective rights and responsibilities (Senchishchev, 1998: 140-150).

The science of civil law in general recognizes things provided by nature and man-made objects of the material world, which have useful values and properties.

Noteworthy is the classical understanding of the thing as an object of the material world, which has a legally recognized physical form, through which it receives its external expression and is for the holder a certain property interest. Based on this definition, the author identified three essential features of the thing: (1) thing – a material substance, something that is outside the human person; (2) individual certainty of the thing; (3) property interest related to the thing (Skryabin, 2008: 304).

A more detailed definition is to understand a thing as existing independently of the subject of spatially limited objects and phenomena of the material world that exist in the natural state, or adapted by objective law as an object of subjective rights, including certain types of energy assimilated by man (Gumarov, 2000: 78-84).

The understanding of a thing exclusively as a subject of the external (material) world is called into question by civil law, the practice of its application and the doctrine of law. The law, along with things as objects of the material world, allows the coexistence of intangible "things", such as money and securities, which can have both cash (documentary) and non-cash (non-documentary) form.

In addition, along with things as objects of the material world, the current civil legislation recognizes two other types of things. These include things directly named by such law, but which are not always objects of the material world (in particular, the property complex of the enterprise and condominium), as well as things that are certainly absent in nature, the existence of which is allowed (e.g., share in companies). In the literature, the appearance of such things in civil turnover is explained by the goals of its optimization, as well as a certain increase in the status of such things (Gumarov, 2000: 78-84).

One can agree with this approach to the existence of intangibles, because non-cash or non-documentary form of securities and money are characterized by similar value to the owner, if the money were expressed in cash, i.e., be tangible. Tangible and intangible things have a very real material value and can be attributed to material goods. Similarly, this conclusion can be applied to things that exist exclusively in digital, other intangible (disembodied) form, because digital and other disembodied things have a very real material value and are of similar value to the owner, if digital (disembodied) things were expressed in material form.

Thus, the science of civil law under things usually means provided by nature and man-made objects of the tangible and intangible world, which have useful values and properties.

There are several essential features of the definition of a thing: a thing is a material substance existing outside a person's personality, or an intangible substance, directly called such by law. This means that everything must have an external expression – the body of the thing. In our opinion, for the ownership and other property rights, corporeal or incorporeal (digital, etc.) substance is important to own it, if there is a possibility for the subject of law to exercise dominance over the thing.

Incorporeality (immateriality) does not preclude the possibility of qualifying a digital, other incorporeal object as a digital or material thing. Rather, since the doctrinal requirements of the corporeality (materiality) of things still exist in the legal system, the digital thing must be considered an intangible thing recognized as an exception to the rule.

There is also individual certainty of the thing. This quality of a thing should be considered as a set of individual properties and qualities, both internal and external, through which it is separated from the circle of others like it. Individual features of a thing: (a) may appear during its operation; (b) defined by law or contract of participants in civil turnover; (c) the property interest is connected with the thing. Property interest is always related to the value of the thing, the removal of its useful properties and qualities, its transfer to another person, and so on.

If the interest is lost, the holder of the thing commits actions aimed at terminating his right (for example, destitute things) (Dosmahanova, 2009: 80) or titleless actual possession. Objects of civil law that do not fall under this definition of things may not be objects of property rights, other property rights, actual possession and they should not be subject to other subjective civil rights (e.g., contractual, personal, etc.).

If the interest is lost, the holder of the thing takes action aim to terminate his right (for example, derelict things) or titleless actual possession. Objects of civil law that do not fall under this definition of things, may not be objects of ownership, other property rights, actual possession and they should not be subject to other subjective civil rights (e.g., contractual rights, personal, etc.).

In our opinion, things within the meaning of the law should be regarded all property items that may be individual or collective property of a natural or legal person (tangible things), and intangible items and property rights, insofar as they are part of the property (intangible things).

Material things are objects of the material world that are perceived by the senses and for which there may be civil rights and obligations.

Intangibles are intangibles items that are perceived by the senses (digital things, electricity, etc.) and property rights that are perceived only by consciousness and not by human feelings (property rights), as they are part of property.

The defining features of a thing are the ability of property in tangible or intangible form to be an individual or collective belongings, to be in legal domination due to the subordination of the will of the person, to have economic value and to serve for use.

The law of many European countries has a broad understanding of things, which makes it possible to recognize things as objects of the tangible and intangible world, in particular, that exist in the digital environment.

Thus, according to §285 of the Austrian General Civil Law Code (Allgemeines bürgerliches Gesetzbuch, ABGB, AGCLC) a thing should be recognized as everything that is separate from the individual and serves to use the latter, in turn § 353 AGCLC in the definition of

property proceeds from the fact that the content of this right applies to all physical and non-physical things. Thus, the editors of the Austrian General Civil Law Code, relying on Kant's idea of the unknowability of the world in the context of the concept of "thing in itself", came to the need for a dichotomy of rights to property and personal. At the same time, the subject sphere of the concept of thing and, in accordance with the sphere of regulation of property law itself, included everything that went beyond the relations of persons (Pfersche, 1893: 45; Zeiller, 1811-1813: 90).

A fairly broad understanding of a thing provides for Civil Code of Ukraine, which, along with the definition of a thing as an object of the material world (Article 179), recognizes property rights as a non-consumable thing and real rights (Part 2 of Article 179).

Thus, according to the Civil Code of Ukraine (Article 179 (2), Article 190), property rights may arise both in respect of objects that have a bodily substance and those that do not have such a substance, namely, in respect of property rights. The Civil Code of Ukraine does not provide for the emergence of property rights in respect of objects that have exclusively digital, other virtual substance.

The lack in the Civil Code of Ukraine of a clear understanding of intangible (disembodied) thing, in particular digital thing as a non-consumable thing, complicates the development of modern forms of property relations, the formation of uniform law enforcement practice in digital society, which determines the feasibility of introducing the division of things into tangible and intangible, including digital things.

4. The concept and legal nature of digital thing

The immateriality of the substance of a digital thing determines its existence in the form of a unique set of information that individualizes the digital object and makes it possible to distinguish it from other objects of civil rights.

Information, having no material properties, is the same object of the external world as things, which allows it to participate in civil turnover, acting as an object of proprietary rights, including property rights (Razuvaev, 2021). In this case, the structure of information includes disparate elements that create a message that is a single object.

Such elements are: first, data that have the character of coded data about real or imagined events (facts) in the logical space of reality (Withenstein, 1994); secondly, the signal is a tangible data carrier transmitted by the communication channel; third, representation, ie purely mental reproduction of information in the mind of the sender and recipient of information (Shannon, 1963).

An important feature of information is the partiality, which provides the ability to measure in quantitative units the information contained in the message. The measure of information is determined by Hartley's formula: $I = K \log_2 N$, where N is the power of the alphabet or the number of characters used in it, K is the length of the message, and I is the amount of information in bits (Hartley, 1928: 37). This allows each record in the database to be subject to legally significant actions in the presence of relevant technologies, which can be done in relation to ordinary things, including possession, transfer, consumption, fixation, protection, etc. (Laptev, 2018: 201).

Thus, modern technologies contribute to the individualization of transmitted messages, followed by the establishment of subjective, including property rights of participants in civil traffic. Moreover, the specifics of such objects, up to the minimum payment units (satoshi equal to 10^{-8} bitcoins) used in the peer-to-peer payment system, allows you to track its movement – from the first transaction to the last, with the participants of such transactions remain as anonymous as possible, i.e., essentially depersonalized (Nakamoto, 2018).

Simply put, in virtual reality there is often a situation in which digital property (electronic money, domain names, gaming property, other records in databases) acquire its unique individual “face”. This process generally corresponds to the tendency of individual authors to lose their material properties under the influence of computer technology (Kuhta, 2014).

However, the owners of digital assets in this capacity often remain impersonal, anonymous, that is, there is a reversal of the relationship between things and entities that take place in the material world. Finally, in terms of mental representations that correspond to digital objects, the objectivity of the latter is beyond doubt. In fact, if there is a mutual consensus among the participants in a legally significant situation that something is the subject of agreements recognized by the community as a whole, whatever its nature, its reality will not need additional legal justification (Razuvaev, 2021).

Currently, the concept of information is being transformed by the emergence of the digital environment, where everything that exists in it is in its form data (digital data, digital objects). An e-book can be an illustration of digital data (digital object) – as a digital form that replaces a real (tangible) book.

According to the traditional understanding, information is any data. However, not all information is digital data or a digital object. Therefore, it is necessary to distinguish simple information from digital data or digital objects. Any information is processed data. Simple information is a specific object of legal relations, which characterizes such properties as: moral aging, the possibility of unlimited reproduction, a variety of forms of fixation (transformation), impossibility of destruction, impossibility of separation from the person transmitting it (physical inalienability), mass, universality, inexhaustibility etc.

Digital data (digital objects) is a negotiable intangible asset that exists in the form of a set of symbols, the value of which is determined solely by the demand for them. Digital data are not subject to moral aging, cannot be disseminated indefinitely due to the specifics of technology, can be destroyed, are exhaustive, and can be separated from the person who transmits them. As a result, digital data can be disposed of in the same way as material things are disposed of.

This makes it expedient to rethink the modern understanding of information and to distinguish simple information as a public good (as a kind of commons) from digital data as a digital thing (as a digital thing). Digital data is an object of civil rights, which characterizes the ability to be in legal dominance due to the will of the individual, to have economic value, to serve for use and to be individually or jointly assigned on the basis of intellectual property (if digital data is protected by law as intellectual property). property), property rights (digital data that are not subject to intellectual property rights) or possession. Information that is not part of a person’s property, has no monetary value, or is not available for search and discovery (usually metadata) is not a digital thing.

The concept of a digital thing is based on the inherent general characteristics of any thing, which include their ability to belong to a person, be in his legal dominance, have economic value and serve for use, as they are part of property, taking into account the intangible features the nature of the digital thing.

Unlike material things, which are perceived by the senses as items of the material world, digital things are intangible assets that exist only in virtual, namely in digital form and are perceived by the senses, and not just consciousness.

Along with the general features of any thing, the defining feature of a digital thing is that this object of the digital environment exists and is in turnover only in digital form, and for which civil rights and obligations can arise only by making (changing) records to the information system.

By its legal nature, a digital thing is an independent type of thing, which is covered by the provisions of the Civil Code on material things, unless otherwise provided by law or does not follow from the essence of the digital thing.

A digital thing is an object of the digital environment that exists and is in civil turnover circulation only in electronic form in accordance with the rules of the information system in which the identification and circulation of digital things is provided, and for which civil rights and obligations may arise, in particular by making (changing) entries in the information system. Digital data that is not part of a person's property, has no monetary value, or is not available for search and discovery (usually metadata) is not a digital thing.

5. Methodological approaches to understanding the digital things

In terms of the digital society, the methodological basis of the existence and turnover of digital things, other property intangible objects are determined by two conceptual approaches: the first involves the recognition of intangible objects as a type of thing; the second is the extension of the legal regime of things, ie equating them to things in a certain respect.

According to its content, the extension of the legal regime of property to digital things, other intangible assets that are part of a person's property (dematerialized energy – gas, electricity, etc., cryptocurrency and other virtual assets, property rights, securities, non-cash and other intangible property), mainly provides for the emergence, termination and turnover of such intangible property in accordance with the provisions of the Civil Code on things, with certain exceptions specified in law.

By its legal nature, the extension of the legal regime of property to these intangible objects is designed to equate them to things using the legal method, which involves creating their own individual legal regime for each intangible property, which often leads to duplication, legal conflicts, gaps and forced application of analogy in law in determining the legal regime of these intangible assets.

The existence of various inconsistent with the legal regimes of property intangible objects that are part of a person's property, necessitates unification of the concept of property and the legal regime of property intangibles equated to it by introducing in the Civil Code of Ukraine a broad understanding of things by dividing things into tangible and intangible; the latter are intangible things that are perceived by the senses (digital things, etc.), or only consciousness (property rights), and not available to human feelings, as they are part of a person's property.

Methodologically, the provisions of the Civil Code on tangible and intangible things are based on a single (unified), functional approach to understanding the thing as an object of civil rights, according to which any tangible and intangible property that is part of a person's property and can be in the domination of the person, all the provisions of the Civil Code on things apply, unless otherwise (i.e., exceptions to the general rule) is provided by law or does not follow from the essence of the object of civil rights. A unified understanding of things will provide an opportunity to create general rules for the existence (appropriation) and turnover of all property objects, which are functionally things from the point of view of civil law, which will contribute to the formation of a single civil law environment (Maydanyk, 2021: 273).

6. Digital things and property

Modern legal systems have not clearly defined the place of virtual assets and other digital things in the system of civil rights objects. One of the topical issues is the classification of virtual assets and other digital things as property.

The law of civil law countries (in particular, Germany, France, Ukraine, etc.) traditionally recognizes two types of property: things (any objects of the material world, or material goods that can be physically owned), and other (intangible) property (any proprietary good, which embodies the contractual, other enforceable subjective right).

The definition of “virtual currencies” first appeared in circulation in 2009 and was enshrined in EU Directive 2018/843 of the European Parliament and the Council of Europe of 30 May 2018 (Directive (EU) 2018/843, 2018).

On 22 October 2015, Court of Justice of the European Union classified bitcoins as “contractual” means of payment and, examining the legal nature, recognized them for VAT purposes not as goods or services, but as a means of payment. This decision equated virtual currencies with traditional currencies in terms of taxation. According to the court ruling, transactions for the exchange of traditional currencies for bitcoins should be exempt from value added tax, as EU rules prohibit the collection of such tax on transactions for the exchange of currencies, banknotes and coins (Judgment of the CJEU, 2015).

Currently, in the vast majority of countries, cryptocurrency is classified as an intangible asset or commodity, most often it is not legal tender. At the same time, cryptocurrency transactions are equated to barter transactions (Great Britain, EU countries, Australia, Canada, USA, Japan).

The law of Ukraine, which does not contain a general normative definition of the concept of digital things, regulates its individual types, in particular, virtual assets.

In accordance with paragraph 13 of Part 1. Article. 1 of the Law of Ukraine “On Prevention and Counteraction to Legalization (Laundering) of Proceeds from Crime, Terrorist Financing and Financing of Proliferation of Weapons of Mass Destruction,” a virtual asset is a digital expression of value that can be traded in digital format or transferred and can be used for payment or investment objectives (Law of Ukraine № 361-IX, 2019). From the concept given in this Law, it is difficult to understand to which group of objects of civil rights virtual assets belong, in particular, whether they are property.

In turn, the Law of Ukraine “On Virtual Assets” recognizes digital assets as intangible assets, also leaving unanswered questions about the relationship with the concept of “property” (Law of Ukraine № 2074-IX, 2022).

Thus, the Ukrainian legislator adheres to the already established approach in world practice and recognizes cryptocurrency not as money but as a commodity, and proposes to apply the general provisions of the mine contract to cryptocurrency transactions.

Given that this law of Ukraine has been adopted relatively recently, the case law on this issue has not been finalized, which leaves open the question of the admissibility of recognizing the property of digital things, including digital assets. In most Ukrainian court decisions, cryptocurrency is regarded by Ukrainian courts not as a means of payment but as an asset, and a contract of sale or supply, where cryptocurrency is determined by the parties as a means of payment for goods, is regarded by courts as contracts. At the same time, the courts emphasize that bitcoin is not a thing within the meaning of Art. 179 of the Civil Code of Ukraine.

The decision of the Darnytsya District Court of Kyiv in case № 753/599/16-ts of 24 March 2016 (Judgment of Danytsya district Court of Kyiv, 2016) concerning the claim for recovery of arrears of bitcoin work of the programmer deserves attention. The programmer fulfilled the terms of the contract – developed and created software in accordance with the terms of reference with the transfer of their results to the customer, but the latter did not transfer bitcoins to the programmer. The court noted that the plaintiff incorrectly chose the method of protection of the infringed right, as it establishes the obligation of the defendant to transfer ownership of goods in

the form of digital bitcoin products totaling UAH 10,000, ie virtual items that have no signs of the material world. Obviously, in this case, the case law was not in favor of those who decided to use bitcoins as payment under the contract (Tilna & Khomyak, 2021).

The ambiguity of the position of the courts on the legal nature of virtual assets is evidenced by the decision of the Malynivsky District Court of Odessa of 13 March 2018. This court ruling states that bitcoin as a cryptocurrency is a type of digital currency, the creation and control of which are based on cryptographic methods, which is a monetary surrogate by virtue of the provisions of Article 32 of the Law of Ukraine “On National Bank of Ukraine” (Kirjan, 2021).

Instead, Art. 1 of the Law of Ukraine “On the National Bank of Ukraine” stipulates that a monetary surrogate – any documents in the form of banknotes other than the currency of Ukraine, issued by the National Bank of Ukraine and made for payments in business, except currency values. No cryptocurrency falls under the signs of a monetary surrogate (Kirjan, 2021).

A joint statement by financial regulators on the status of cryptocurrencies in Ukraine dated November 30, 2017 states: “The NBU, NSSMC and Natskomfinposlug are convinced that the complex legal nature of cryptocurrencies does not allow them neither by electronic money, nor by securities, nor by a monetary surrogate.” Financial regulators have promised to further work on improving the legislation, and after the abolition of the above letter of the NBU, the status of cryptocurrencies remained uncertain (Joint Statement of Financial Stakeholders concerning the Status of Cryptocurrencies in Ukraine, 2017).

In a statement, regulators also noted that there is no single concept of cryptocurrency, and the definition varies from “goods”, “means of payment”, “unit of account” to “intangible digital asset”, “investment asset”, “financial asset”, “separate type securities”, “virtual currency”, “Digital currency”. Not surprisingly, the regulator has not defined a general concept, as each crypto asset is unique and depends on the method and purpose of use.

In the context of the prospects of legislative implementation in the law of Ukraine, the concept of “digital thing” deserves special attention registered in the Verkhovna Rada of Ukraine on 17 December 2021 draft Law of Ukraine of 15 December 2021 № 6447 “On Amendments to the Civil Code of Ukraine civil rights projects” (Bill № 6447, Bill).

The bill provides for amendments to the Civil Code, in particular, Articles 115, 177, 179, which define among other objects of civil rights digital things, their essence as an object of the digital environment, which is in circulation only in digital form, and which may emerge civil rights and responsibilities, and outline the range of digital things that are virtual assets.

The explanatory note states that the continuous and daily development of new information technologies has led to the emergence of new objects of civil rights, which are intangible benefits that exist exclusively in digital form and are designed to satisfy certain interests of civil law participants. Today, such objects are defined as virtual assets, digital content, online accounts, money and securities that exist exclusively in digital form.

The ability of these objects of civil rights to meet the interests of individuals and legal entities in the digitalization of public relations and their involvement in property turnover in the digital environment of economic development necessitates to determine the legal nature, legal basis of the legal regime of these objects’ legal mechanisms of their property turnover.

7. Narrow and broad understanding of digital things

Currently, the legal literature is essentially forming a narrow and broad understanding of the digital thing.

Digital things Virtual property in the wide sense refers to a broad category of intangible and immaterial property objects that can be regarded as objects of real-world property law. Examples include website addresses, email addresses, bank accounts, stocks, options and derivatives. It also includes digital goods, such as digital versions of books (e-books), computer or smartphone programs or applications (apps), television series and movies, as well as digital music (albums and tracks) as objects of virtual property. The term digital thing is also often used in the narrow sense to refer to property found in virtual worlds. This includes virtual or digital objects found inside such virtual worlds, as well as property objects and rights that relate to a virtual world. For example, a player's virtual world account serves as a single object of virtual property that represents the total patrimonial worth of everything contained in that account.

In the legal literature, it is proposed to recognize a digital thing as digital content to which he is entitled, an e-mail account, online or other online account to which he is entitled (Maydanyk, 2019: 15, 17).

In our opinion, the development of law enforcement practice will be determined by the tendency to gradually recognize a broad understanding of the digital thing, which will cover both virtual assets, money and securities that exist exclusively in digital form and digital content of the person to which he is entitled. an e-mail, online, or other online account to which it is eligible.

In this regard, noteworthy is the broader understanding of the digital thing, which includes virtual assets, digital content, online accounts, money and securities that exist exclusively in digital form.

8. Virtual asset as a digital thing

The current stage of property law is characterized by the emergence of new types of “intangible” property that have the characteristics of goods (virtual assets, cryptocurrency, “virtual property” (“cyber property”), etc.), which puts on the agenda the nature and place of virtual assets in system of objects of civil law.

Virtual assets in the sense of crypto-tokens can be divided into certain types: currency coin - cryptocurrency; security token and equity token - investment tokens; utility token - a token used for the operation of the service; NFT is an irreplaceable token that certifies the uniqueness of a particular digital object.

Legislation and legal doctrine of common law and civil law countries reflect two approaches to determining the legal status of virtual assets as an object of civil rights. Thus, the common law family states are characterized by the use of the category “right of claim” or “property”.

In countries of the legal family of continental law, it is more common to use the legal regime of “intangible assets” (Bashkatov, Heindler, Völkel et al., 2018) or in some cases “things” (*Ibid.*, 2018). However, some scholars have expressed reservations about the use of these concepts in the Federal Republic of Germany (hereinafter – “Germany”) and Japan, where property rights primarily concern material objects (Walch, 2017: 22).

The reason for this statement is the decision of the court of first instance in Tokyo in the bankruptcy case, where the court ruled that Bitcoin cannot be the object of property rights, because under Japanese civil law, the concept of property is limited to material things. physically occupy a certain space. According to the court, the need for protection of rights cannot be a reason to classify Bitcoin as a “thing” (Case Claiming the Bitcoin Transfer. Tokyo District Court, 2015). At the same time, other researchers point out that in Germany the right to property, despite its close connection with civil law, has a constitutional and legal nature and is seen as the basis of freedom

and personal development (Rueckert, 2019: 7) (Shevchuk, 2006). The Federal Constitutional Court of Germany in the case of groundwater noted that “both private and public law equally determine the constitutional legal status of the subject of property rights. The codification of private law, formalized by the Civil Code, is not the only source for determining the content and boundaries of property” (Shevchuk, 2006). Accordingly, the lack of material form or the inapplicability of existing concepts of German civil law to virtual assets are unlikely to be an obstacle to the protection of property rights in relations related to their circulation.

In England, on the other hand, virtual assets, despite their intangibility, cryptographic authentication, distributed registry technology, and decentralization, are considered property. At the same time, the private key is classified as information (United Kingdom Jurisdiction Taskforce, 2019: 21-22).

In this context, English case law deserves attention, which distinguishes simple information from information on which there are subjective civil rights. Thus, in the *Your Response v. Data team Business Media*, the Court of Appeal did not accept that a lien could be possible over intangible property (a database).

In this case, the court noted that “when information is created and recorded, there are clear differences between the information itself, the material medium on which the information is recorded, and the rights that arise in relation to information. While material material and rights are considered property, information itself is never [considered]. According to the court, if the database was subject to possession and could be the subject of security and possession of it could be retained for payment and issued or transferred subject to payment, it would be possible to approach the qualification of information as property” (English case of *Your Response v. Data team Business Media, van Erp*, 2016: 73-74).

Ukrainian law recognizes virtual assets as intangible assets that are subject to civil rights. According to the Law of Ukraine “On Virtual Assets” of September 8, 2021 № 1719-IX virtual asset is an intangible asset that is the object of civil rights, has value and is expressed by a set of data in electronic form. The existence and turnover of a virtual asset is ensured by the system of ensuring the turnover of virtual assets (Article 1); features of the turnover of virtual assets are determined by the Civil Code of Ukraine and this Law (Article 4) (Law of Ukraine “On virtual assets”).

In the Ukrainian jurisprudence, virtual assets are the subject of scientific debate and are considered intangible good (Skrypnyk, 2020: 80), digital things (Maydanyk, 2019: 15, 17), special property (Patachyts & Filatova-Bilous, 2021: 62-77).

The concept of a virtual asset as an intangible good is based on recognizing it different from the thing and property rights of intangible property of civil rights, the existence and turnover of which is determined by the Civil Code and a special law (Law of Ukraine “On Virtual Assets”). The understanding of a virtual asset as a digital thing is based on the proprietary concept, which provides for the recognition of a virtual asset as a thing or the extension of the legal regime of the thing. Recognition of a virtual asset as a special asset involves the classification of all these digital assets according to their economic purpose.

The thesis that cryptocurrency is a kind of code consisting of a set of symbols and can satisfy property interests deserves support. This object has economic value, affects financial interest, and therefore can be considered as an object of property rights from the standpoint of the ECtHR. Given the fact that the list of objects of civil law in accordance with Art. 177 of the Civil Code of Ukraine is open, cryptocurrency can be fixed as a separate object (*sui generis*), but here it is possible to apply real rights by analogy and attribute cryptocurrency to a variety of property (such legal fiction, for example, exists in relation to electricity under consideration as a thing) (Nekit, 2018).

Given that a virtual asset has no physical form, has economic value and is an object of property rights, such an object of civil rights is likely to be recognized as law enforcement practice as property.

Thus, in the practice of law enforcement in Ukraine there is currently an approach according to which cryptocurrency cannot be considered a thing and/or property rights, because it is not an object of the material world, has no individual features and cannot be identified, usually does not certify therefore, it is not subject to the legal regime of property and property law.

At the same time, in addition to things and property rights, according to the Central Committee of Ukraine, objects of civil rights also include other property, results of works, services, results of intellectual, creative activity, information, and other tangible and intangible benefits.

The Ukrainian literature substantiates the view that cryptocurrency cannot be classified as a service, because “unlike the latter, it is not consumed in the process of its use (Article 901 CC of Ukraine)” (Chapljan, 2018: 154). Cryptocurrency can be considered the result of work “only in the case of its extraction at the request of another person” (Chapljan, 2018: 154), which in practice is extremely rare. At the same time, cryptocurrency cannot be considered an object of intellectual property, because “the emergence of cryptocurrency occurs mechanically through mining and not as a result of creative activity” (Rueckert, 2019: 7).

It should be noted that to extend the legal status of information to a virtual asset is not correct. The right to information under the Civil Code of Ukraine is a personal intangible right, respectively, the category of “property rights” to information as personal intangible property is not applicable (Kokhanovska, 2020), which, in turn, does not correspond to the legal nature of virtual assets (Zabrodska, 2020: 80).

In view of this, the literature substantiates the expediency of recognizing virtual assets as property in accordance with the Central Committee of Ukraine (Zabrodska, 2020: 81).

The qualification of a digital thing as property reflects the features of this intangible asset due to its presence in digital form.

This legislative and doctrinal approach to the understanding of virtual assets in general may be, but does not fully reflect the legal nature of this object of civil rights. Recognition of a virtual asset as property that is not a thing and a property right leaves unanswered questions about the legal regime of cryptocurrency, in particular the existence and turnover of this object of civil rights.

In our opinion, it is necessary to take into account the presence of three defining features that together qualify any individual information as a digital thing. A digital thing must belong to a person and be part of his property (1), have a value that can be valued (2), and be available for search, discovery (usually metadata) (3).

In this regard, a digital item can be recognized as property if the relevant information is part of a person's property, has a value that can be valued, available for search and discovery (usually metadata).

It is not a digital thing “simple information”, i.e., it is publicly available data that does not have the necessary features of a digital thing or an object of civil rights in general.

Any virtual asset is a digital commodity that is part of cyberspace, such as files, which are the elementary particles that make it up. Digital goods are intangibles that can be stored, delivered and used electronically [Vangie Beal, 6].

Due to their virtuality, electronic objects (digital goods) are not material things, but they have all the features of things (goods). They are a sequence of data (numbers), which is characterized by certainty, expressed in structural characteristics (for example, a file depending

on the format has its own name, structure and quality, as well as size, usually measured in bytes), which usually distinguishes them from among other homogeneous digital goods, individualizing them. Digital goods or electronic goods are intangible goods that exist in digital form (Vangie Beal, 6) and usually have the characteristics of a digital thing, defined by individual characteristics (Maydanyk, 2021: 272).

The main difference between such a virtual asset as cryptocurrency from non-cash funds and electronic money is that the cryptocurrency is in the direct possession of the person and not related to the actions of third parties (banks). Therefore, unlike non-cash funds and electronic money, the rights to cryptocurrencies are not the right to claim against a bank or another person, but directly the rights to cryptocurrencies.

Thus, cryptocurrency is an intangible commodity that exists only in the form of digital code (record) in the blockchain system and is characterized by a special functional orientation – use as a universal medium, but without the ability to perform the functions of a means of payment, but is a negotiable object of ownership that can be transferred, stored or sold electronically (Maydanyk, 2018: 11-15).

Given their turnover and functional orientation, regarding the legal relationship related to the circulation of cryptocurrencies, it is advisable to extend the legal regime of property rights, virtual assets (cryptocurrencies) should be classified as a digital thing that is a kind of intangible thing (*res incorporales*), i.e., things which is perceived not by feelings available to man, but only by consciousness (Maydanyk, 2019: 15-17).

9. Digital securities

A type of digital thing is digital securities, which are accounted for using technologies in the system of decentralized public register (blockchain, etc.).

Digital security is an electronic document of the prescribed form with the relevant details, which exists in the form of an entry in the e-book, certifies monetary or other property rights, determines the relationship between the issuer of digital security (issuer) and the person entitled to digital security, and provides for the fulfillment of obligations under such security, as well as the possibility of transferring rights to securities and rights to securities to others, the issue (issue) and turnover of which is provided by the information system of decentralized (distributed) public register (distributed ledger) .

By their legal nature, digital securities are equated to securities virtual assets, the issue (issue) of which is ensured by the technology of distributed ledger.

A distinction must be made between digital securities and digitized securities. Thus, digital securities – electronic records (blockchain tokens – “blockchain tokens”) in the e-book (William Hinman, 2018). However, it should be emphasized that digital securities do not exist in documentary form. Instead, digitized securities are documentary securities, the ownership of which is presented in an electronic record (Tkachenko & Luzkevych, 2020: 188).

Intermediate place between digital securities and dematerialized securities is occupied by securities that are in circulation (they are bought and sold) through digital banks. Thus, a pilot project has been launched in Ukraine, which provides for the opportunity to buy shares of international companies directly in the digital bank Sense SuperApp. Such securities purchase agreements comply with the current legislation of Ukraine. All payments are made in the national currency of Ukraine (hryvnia). Customers do not need to send funds abroad. The shares were admitted to circulation in Ukraine by the National Commission on Securities and Stock Market. The National Depository of Ukraine has confirmed the possibility of accounting for such shares in

the depository system of Ukraine (Customers of Alfa-/bank Ukraine began to buy shares through a digital bank Sense SuperApp., 2021).

By their legal nature, securities traded through digital banks are not likely to be digital securities in the full sense, as opposed to digital securities that are accounted for using technologies in a decentralized public registry (blockchain, etc.). the issue and circulation of securities through digital banks is provided by an information platform that is not fully understood as a distributed registry technology. In this case, the digital regime of such securities is limited only by their turnover, but their issuance takes place according to the general rules of ordinary, non-digital securities.

It should be noted that the existence of digital securities is the subject of scientific debate. Thus, the representatives of the so-called “documentary approach” insist on the recognition of securities only documentary securities, which are things that belong to movable property. As for the so-called uncertificated securities, they are considered not as securities, but only through the fixation of property rights. As uncertificated securities have no material value, they cannot be recognized as things and, accordingly, as objects of property rights. Proponents of this approach note the following features of securities: documented form of existence (a security is a document); observance of the established form and obligatory requisites at drawing up (registration) of a security; fixing specific property rights of the security holder; the obligation to present the security as a document in the exercise or transfer of property rights (Tsybulnikova, 2016: 167). This purely materialized approach presupposes an understanding of the concept of security, which covers only documents that exist in paper form, but not documents on technical media (Penzov, 2003: 163-164). This approach does not comply with current legislation, which distinguishes between securities that exist in tangible (paper) and intangible (electronic, dematerialized) form, and trends in securities markets. For example, today the shares of joint stock companies in Ukraine are issued exclusively in dematerialized form and exist in the form of electronic records in electronic books (electronic registers) of depositories.

This approach reflects the global trend towards dematerialization of securities. In most economically developed countries, the process of dematerialization of securities is almost complete and in many stock markets only paperless securities are in circulation. Therefore, in the doctrine of law, some scholars define a security as a monetary document, which is an official information of the issuer fixed on a tangible medium, the acquisition of which leads to mutual rights and obligations between the issuer and the owner of such a document. In this case, the material carrier can be a computer record (Aljochin, 2002: 29-34).

10. Digital money: Digital currency of the Central Bank

10.1 *Digital money*

As a result of the ongoing processes of digitization of social relations, a specific means of payment that do not coincide with non-cash money, are electronic money and “digital money” (cryptocurrency), the nature of which remained unresolved by the legislator, appeared in the current legislation.

In general, electronic money means money or financial obligations, the exchange and settlement of which is carried out using information technology.

EU Directive 2009/110/EC defines electronic money on the basis of three criteria: electronic storage; transfer to the recipient only after their receipt by the bank; the payer, natural or legal person, cannot be their issuer (Directive 2009/110/EC, 2009).

The regulation of e-money legal regime usually is carried out outside the national Civil Codes of relevant countries. The regulatory basis for the use of such type e-money are the special

laws in the field of e-commerce (Law of Ukraine “On the Payment System and transfer of funds in Ukraine”, 2001; Law of Georgia “On Payment Systems and payment services”, 2012).

The legislation of Ukraine defines electronic money as units of value stored on an electronic device, accepted as a means of payment by persons other than the person issuing them, and is a monetary obligation of this person, performed in cash or non-cash (para. 15.1 art. 15 of the Ukrainian Law “On the Payment System and transfer of funds in Ukraine”, 2001).

A similar definition of electronic money is provided in Georgian law.

The legislation of Ukraine defines electronic money as a value equivalent to funds received by an electronic money provider from users for carrying out payment service transactions, which is stored on payment instruments and which is recognized as a means of payment by its issuer and other persons. The ratio of electronic money and the funds received in its stead, as set by the electronic money provider, shall be the same at all stages of the activity of the provider (para. 7 art. 2 of the Law of Georgia “On Payment Systems and payment services”, 2012).

In essence, the EU Directive gives the same definition, but does not limit the range of issuers by type of institution: the issuance of electronic money can be carried out by both banks and other institutions in accordance with established requirements.

From a legal point of view, the defining feature of electronic money is that, on the one hand, it is a means of payment and, on the other hand, the issuer's obligation to be fulfilled in traditional non-electronic money. In other words, e-money is always followed by either a bank or a bank account with real money (Polyvka Nazar, 2015).

E-money is a kind of so-called “electronic money”, because it is based on money that is provided for use without opening a bank account, information about which is stored in electronic form. The use of this “monetary value” is carried out by transferring it within the framework of applicable forms of cashless payments using information and communication technologies, electronic data carriers (electronic means of payment) (Kuzmina & Bogdanova, 2019: 393-409).

The Laws on e-money do not directly define the nature of e-money, their place in the system of civil rights objects, their correlation with the category of non-cash money, do not fix their value as a legal tender, which is absolutely necessary for the organization of certain types of obligations, bankruptcies and hereditary relationships.

The solution of these issues is undertaken in the doctrine. The most frequently considered options are the qualifications of e-money as a property right of claim (Kazachenok, 2017: 47-50) of “their holder to the operator for issuing a certain amount of cash or non-cash money” (Savel'ev, 2016) or, otherwise, a monetary claim to the obligator (issuer) expressed “in electronic form, which is transmitted when paying from the payer to the recipient” (Savel'ev, 2017: 136–153).

Defining e-money as a property right solves the problem of their qualification for the sphere of bankruptcy and inheritance relations, among the objects of which property rights are presented, but do not define the relationship of the category under consideration to objects that are legal means of payment, i.e., to money.

It is generally accepted that in the sphere of civil legal relations, the main function of money is to be a means of payment, a means of paying off debt. The national Laws of the countries consider the national currency to be a legal tender and establishes the rule that payments are made by cash and non-cash payments (in particular, Article 192 of CC of Ukraine; Article 140 of CC of Russian Federation).

At the same time, the Laws of some countries (in particular, article 15 of the Law of Ukraine “On the Payment System and funds transfer in Ukraine”; Article 18 of the Law of Georgia “On payment systems and payment service”) separate the e-money funds from cash and non-cash money funds, denoting, in particular, the specificity of their transfer, and does not indicate their relationship to money and legal means of payment, which creates certain legal uncertainty.

Meanwhile, as monetary funds expressed in national currency, they are provisionally provided to the obligator (“at the entrance”) in order to fulfill monetary obligations to third parties (“at the exit”). It is logical to assume that e-money funds did not lose their payment function even during the period of being accounted by the obligator. In the economic turnover, they perform the function of a means of payment to third parties, which in fact is reflected by some acts of foreign law. Thus, Directive 2009/110/EC “On the establishment, operation and supervision of organizations involved in electronic money” indicates that electronic money is accepted as a means of payment (Khrustaleva, 2016: 55-62).

In this respect, the position of some Central Banks of some countries define the concept of e-money funds as “a non-cash money, accounted for by credit institutions without a bank account and transferred using electronic means of payment”.¹

The development of new technologies and the information environment has given rise to a phenomenon that has the same electronic digital form of its existence as e-money funds, usually referred to as “virtual currency”, “digital currency”, “cryptocurrency”, “digital money”.

The new edition of the European Central Bank report, prepared in February 2015, provides the following definition of virtual currency, “A digital representation of value not issued by a central bank, a credit institution or an e-money issuer, which can under certain circumstances serve as an alternative to money.” This definition, according to A. I. Savel’ev, suggests that “at present, the European Central Bank does not consider virtual currency either as cash (the economic aspect) or as a means of payment (the legal aspect)” (Savel’ev, 2016).

This phenomenon has become widespread in the most modern countries and is called “digital money”, which usually includes cryptocurrency as a certain set of electronic data (digital code or designation) created in a decentralized information system that does not certify the right to any object of civil rights that are not recognized by legal means of payment, but can be used by the clients of this system to make payments (Bill No. 424632-7 “On Amendments to Parts One, Two and Four of the Civil Code of the Russian Federation”, 2018).

Cryptocurrency is significantly different from fiat money, ie legal tender, the nominal value of which is set, provided and guaranteed by the state through its authority and power, and which have no independent value.

Cryptocurrency is not supported by the issuer's obligations and is not an expression of any fiat money, its value is determined by the ratio of supply and demand for it among its users; it is a high-tech phenomenon that exists exclusively by its internal mathematical algorithm and performs the function of money, without being electronic money.

The question of whether cryptocurrencies are money remains to most countries open now. For example, the United States has already established a precedent that defines cryptocurrencies as “currency or another form of money.” The position of American judges was confirmed by the Financial Crimes Enforcement Network (FinCEN), which in 2013 described

¹ See: *The Information letter* of the Central Bank of the Russian Federation “On providing customers – individuals with information about the features of electronic money transfer services” dated 11 March 2016, No. IN-017-45/12 (together with the Memo “On electronic cash means”): “this is non-cash money in rubles or foreign currency, accounted for by credit institutions without opening a bank account and transferred using electronic means of payment.”

Bitcoin as “a form of money.” However, another influential US Internal Revenue Service (“IRS”) has determined that for federal tax purposes, cryptocurrency should not be treated as a “form of money” but as property (Polyvka Nazar, 2015).

In Germany, for example, Bitcoin has the status of “private funds”. The German Federal Financial Supervisory Authority (BaFin) defines it as private funds that are used as payment and replace traditional currency in civil law contracts. In accordance with BaFin's legally binding decision on units of account within the meaning of section 1 (11) sentence 1 of the Kreditwesengesetz (KWG), Bitcoins are financial instruments. Units of account are comparable to foreign exchange with the difference that they do not refer to a legal tender. Included are also value units which function as private means of payment in barter transactions and any other substitute currency that is used as means of payment in multilateral accounting on the basis of contracts under private law. This legal classification applies in general to all VCs. What software they are based on or which encryption technologies they apply is immaterial in this respect. By contrast, VCs are not legal tender and so are neither currencies nor foreign notes or coins. They are not e-money either within the meaning of the German Payment Services Supervision Act (Zahlungsdiensteaufsichtsgesetz – ZAG); they do not represent any claims on an issuer, as in their case there is no issuer. The situation is different for digital means of payment which are backed by a central entity that issues and manages the units. Such companies usually carry out e-money business pursuant to section 1a of the ZAG (e-money) (Federal Financial Supervisory Authority. Virtual Currency (VC), 2017).

In the Russian Federation the location of digital money in the system of civil rights objects is usually classified as property rights or is indicated in the category of conditional monetary units, which would allow using digital money as a means of payment for a product, work or service (Civil Code of the Russian Federation, 1996).

In its Opinion, the European Banking Authority (EBA) defines virtual currencies (VCs) as a digital representation of value that is neither issued by a central bank or public authority, nor necessarily attached to a legal tender. VCs are accepted by natural or legal persons as a means of exchange and can be transferred, stored or traded electronically (EBA Opinion on “virtual currencies”, 2014).

Digital money cannot be equated with e-money funds. The researchers note the obvious similarity of these phenomena, which manifests itself in a purely electronic-digital form of existence; accounting without using a bank account; using “as a cash equivalent” (Savel'ev, 2017: 136-153).

Due to its technology, cryptocurrency does not fall under the definition of “electronic money” because it does not contain the issuer's obligation to repay it, does not have a single issuance center, and is not tied to any cash or non-cash funds. In turn, “non-cash funds” under the laws of most countries can exist only in the form of bank accounts. Banks do not participate in the process of issuance and circulation of cryptocurrencies, so cryptocurrency cannot be considered “money”.

Cryptocurrency units are not nominated in the currency of any state, i. e. they have no nominal value, while behind e-money funds are the funds that are provided for the operator's use; cryptocurrency has a special mechanism of occurrence, which is characterized as decentralized emission (Tsindeliani & Nigmatulina, 2018: 18-25); in contrast to e-money funds, cryptocurrency does not constitute a right of claim to a specific person, the right to a specific object, does not exist as an object of obligation relations. Therefore, the understanding that cryptocurrency does not apply to e-money funds, is not a form of their existence, prevails in the domestic doctrines of many countries (Kuzmina & Bogdanova, 2019: 393-409).

Cryptocurrency does not fall under the definition of “payment system”, as the main and mandatory function of the payment system is to transfer funds. Whereas only cryptocurrency (Bitcoin, etc.) is transferred through the cryptocurrency wallet, which is not cash (Polyvka Nazar, 2015).

10.2 Digital currency of the central bank: E-hryvnia

The idea of central banks issuing their own digital currencies in recent years has been in the spotlight of regulators around the world, including the central banks of the European Union. Some countries have already taken practical steps to release the Central Securities Depository in “real life” (Singapore, Tunisia, Senegal and, conditionally, Venezuela). The reasons for this interest were, in particular, the rapid growth of the role of innovation in the financial sector, the emergence of new payment technologies and services, trends and the desire to reduce the share of cash in circulation in many countries.

The Central bank digital currency (CBDC) is a digital form of existing fiat money issued by the central bank and is a legal tender (Tommaso Mancini Griffoli et al., 2018).

According to the European Central Bank, the digital currency of the central bank is a digital form of fiat money that is publicly available, issued by the state and has the status of legal tender (Cryptocurrencies and tokens, 2018).

The Bank for International Settlements defines the digital currency of the central bank as liabilities of the central bank, expressed in the existing unit of account, which serves as both a medium of exchange and a means of preservation (Central bank digital currencies, 2018).

The National Bank of Ukraine has begun to study the possibility of issuing its own digital currency (the national currency of the National Bank, CBDC) – the hryvnia. The study of this issue began in 2016. In 2018, a pilot project was launched to issue e-hryvnia for retail payments on the blockchain platform.

Depending on the scheme of use, the digital currency of the central bank may have all or part of the basic functions of fiat money, such as a measure of value, a means of circulation, a means of payment, a means of preserving and accumulating value, and world money. Depending on the scheme of use, the digital currency of the central bank must effectively perform the functions of fiat money. In particular, this digital currency held in accounts may be a medium of exchange (the accounts in which it is held may be opened both in the central bank and in commercial banks within a public-private partnership). Accrual of interest on the digital currency of the central bank can ensure the accumulation of value that corresponds to the rate of return on other risk-free assets, such as short-term government securities.

According to the combinations of properties of the digital currency of the central bank, researchers identify the following schemes of its use: as the digital equivalent of cash; for interbank settlements; as an instrument of monetary policy; as the equivalent of an account opened with the central bank. To implement this digital currency, central banks are considering using distributed registry technology (DLT) or traditional databases.

Digital currency is designed to be an alternative tool for retail payments, along with existing tools and instruments of retail payments in today's market – cash, payment orders, payment cards and electronic money, which are characterized by their inherent advantages and disadvantages.

Thus, electronic money is used to pay for goods and services and P2P transfers between users – individuals, and partially cover the need for quick payments for small amounts.

At the same time, the amounts of transactions with the use of electronic money are limited by the limits established by current regulations of the National Bank.

The issuer of electronic money is an authorized commercial bank. To ensure the issuance of electronic money and the implementation of operational and technological functions of the bank on the basis of the agreement may involve another legal entity – the operator of payment infrastructure, which must be entered in the Register of payment systems, payment systems; participants of these systems and operators of payment infrastructure services.

The National Bank considers the digital currency of the central bank as an alternative means (tool) for making instant payments for small amounts by individuals. The advantages of the digital currency of the central bank can be ease of use, security (repayment and payment are guaranteed by the National Bank), fast acquisition of user status, speed of settlements.

The pilot project of the National Bank of Ukraine's own digital currency – electronic hryvnia or e-hryvnia is considered a digital currency issued by the NBU, can be described as the national digital currency, which is a fiat currency, 1:1 ratio is not a revenue instrument, therefore, a means of payment, not savings. At the same time, E-hryvnia can be both an anonymous digital currency of the central bank and with user identification, as each option has its advantages and disadvantages.

The introduction of e-hryvnia in the payment market of Ukraine is considered according to one of the two top-level models (schemes) of interaction between participants: centralized or decentralized. If the decentralized model is chosen, the e-hryvnia will no longer fall under the definition of the central bank's digital currency, as this digital currency will not be issued by the central bank, but by payment market participants controlled by the regulator.

At the time of the Pilot Project, the centralized model of e-hryvnia issuance was chosen as simpler, clearer and more transparent in terms of its regulation, through the introduction of the National Bank's Distributed Registry (DLT) information platform, namely its private variety.

During the practical part of the Pilot Project (September – December 2018) the National Bank issued a limited amount of e-hryvnia (equivalent to UAH 5,443), and project participants carried out the following operations: creation of their own e-wallets; installation of mobile applications of e-hryvnia wallets on their own devices with Android or iOS operating systems; replenishment of e-wallets in a non-cash way using NPS SPACE cards through a specialized virtual terminal integrated with the Platform. e-hryvnia transfers between wallets (P2P transfer); trade operations (replenishment of mobile phone balance with e-hryvnia, LifeCell mobile operator); charitable contributions to help soldiers of the Joint Forces Operation; exchange of e-hryvnia for non-cash funds using NPS "SPACE" cards.

According to the form of issue, the digital currency of the central bank is money stored in electronic form, the issuer of which is the central bank; with decentralized type of verification; with a fixed cost. The availability of the central bank's digital currency depends on its issuance scheme (it is available to individual market participants or "for all") (Analytical note on the results of the pilot project on the implementation of the platform "Electronic hryvnia" and electronic money of the National Bank of Ukraine (e-hryvnia)).

Thus, the digital currency of the central bank is a digital form of fiat money (currency of Ukraine – hryvnia), which is legal tender, issued by the state, or payment market participants under the control of the state regulator, whose circulation technology provides distributed registers or other information system.

11. Conclusions

The globalization of the digital society is manifested in the global trend towards unification of homogeneous legal phenomena in the digital environment, which leads to the introduction at all levels of law (global, international, national) based on a functional approach broad understanding of things, which extends to tangible and intangible goods capable of being an individual or joint belonging of a person, be in its legal dominance, have economic value and serve for use.

A digital thing is an object of the digital environment that exists and is in civil turnover circulation only in electronic form in accordance with the rules of the information system in which the identification and circulation of digital things is provided. Digital data that is not part of a person's property, has no monetary value, or is not available for search and discovery (usually metadata) is not a digital thing.

Digital things should include a virtual asset, money and securities that exist exclusively in a digital form, as well as digital content and online account to the extent that are alienated part of the property of person as the private person.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public commercial, or not-for-profit sectors.

The authors declare no competing interests.

References

- Aljokhin, B. (2002). The securities market is the economic basis of the power vertical. *Securities Market*, 12, 29-34.
- ... (2019). Analytical note on the results of the pilot project on the implementation of the platform “Electronic hryvnia” and electronic money of the National Bank of Ukraine (e-hryvnia). National Bank of Ukraine. Kyiv [Electronic Resource]. Access Mode: https://bank.gov.ua/admin_uploads/article/Analitichna_zapiska_E-grivnya.pdf?v=4.
- Bashkatov, M., Heindler, F., Völkel, O. et al. (2018). *A comparative analysis on the current legislative trends in regulation of private law aspects of digital assets*. University of Aberdeen Centre for Commercial Law Working Paper Series. № 1. URL: <https://www.abdn.ac.uk/law/documents/A%20Comparative%20Analysis%20on%20the%20Current%20Legislative%20Trends%20in%20Regulation%20of%20Private%20Law%20Aspects%20of%20Digital%20Assets.pdf>. (Last accessed: 22 March 2020)
- ... (2015). Case Claiming the Bitcoin Transfer. Tokyo District Court, № 25541521. 9 p. 6-7. URL: https://www.law.ox.ac.uk/sites/files/oxlaw/mtgox_judgment_final.pdf. (Last accessed: 18 March 2020)
- Casting Light on Central Bank Digital Currency (2018). IMF Staff Discussion Note, Tommaso Mancini Griffoli, Maria Soledad Martinez Peria, Itai Agur, Anil Ari, John Kiff, Adina Popescu, Celine Rochon, 12 November 2018. <https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2018/11/13/Casting-Light-on-Central-Bank-Digital-Currencies-46233>.
- Central bank digital currencies, Committee on Payments and Market Infrastructures (2018, March). Bank for International Settlements. <https://www.bis.org/cpmi/publ/d174.pdf>.

- Civil law: In 2 volumes (1998). Volume I: Textbook / Editor-in-chief E. A. Sukhanov. – 2nd edition, rev. and edit. M.: BEK.
- Chaplyan, S. (2018). Legal status of cryptocurrencies. *Foreign Trade: Economics, Finance, Law*, 2, 148-165. URL: [http://zt.knteu.kiev.ua/files/2018/02\(97\)/17.pdf](http://zt.knteu.kiev.ua/files/2018/02(97)/17.pdf). (Access date: 3 April 2020)
- Court of Justice of the European Union (CJEU) (2015). JUDGMENT OF THE COURT (Fifth Chamber), 22 October 2015. In *Case C 264/14* [Electronic resource]. Access: <https://curia.europa.eu/juris/document/document.jsf?docid=170305&doclang=EN>.
- Cryptocurrencies and tokens, ECB FXCG update. https://www.ecb.europa.eu/paym/groups/pdf/fxcg/2018/20180906/Item_2a_-_Cryptocurrencies_and_tokens.pdf.
- ... (2021). Customers of Alfa-/bank Ukraine began to buy shares through a digital bank Sense SuperApp.; Statistics of the first hoursof work. 31 December 2021 [Electronic Resource]. Access mode: <https://nabu.ua/ua/kliyenti-alfa-banku-ukrayina-pochali-kupuvati-aktsiyi-cherez-tsifroviy-bank-sense.html>.
- ... (2016). Decision of the Darnytskyi District Court of the City of Kyiv of 24 March 2016, case № 753/599/16-ts [Electronic resource]. Access mode: <https://verdictum.ligazakon.net/document/56686444>.
- ... (2009). Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions amending Directives 2005/60/EC and 2006/48/EC and repealing Directive 2000/46/EC (Text with EEA relevance). OJ L 267, 10 October 2009, pp. 7-17. [Electronic Resource]. Access Mode: <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32009L0110>.
- ... (2018). Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, and amending Directives 2009/138/EC and 2013/36/EU (Text with EEA relevance) [Electronic resource]. Access: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L0843>.
- Dosmaganova, A. D. (2009). The concepts of “Property” and “Thing” in civil law. *Bulletin of the Institute of Legislation of the Republic of Kazakhstan*, 4(16). 78-81.
- Dozortsev, V. A. (1998). Principal features of property rights in the Civil Code. In *Civil Code of Russia. Problems. Theory. Practice. Collection of memory of S. A. Khokhlov*, Editor-in-chief A. L. Makovsky.
- Draft Law “On Amendments to the Civil Code of Ukraine aimed at expanding the range of objects of civil rights,” № 6447 of 17 December 2021 [Electronic resource]. Access mode: http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=73472.
- ... (2016). English case of Your Response v. Data team Business Media; van Erp, Ownership of digital assets? EuCML 2016, p. 73-74.2 [2014] EWCA Civ 281. <https://doi.org/10.1515/eplj-2016-0009>
- EBA Opinion on “virtual currencies” (2014). EBA/Op/2014/08 4 July 2014 [Electronic Resource]. Access Mode: <https://www.eba.europa.eu/sites/default/documents/files/documents/10180/657547/81409b94-4222-45d7-ba3b-7deb5863ab57/EBA-Op-2014-08%20Opinion%20on%20Virtual%20Currencies.pdf?retry=1>.
- ... (2017). Federal Financial Supervisory Authority. Virtual Currency (VC). updated on 11 December 2017. [Electronic Resource]. Access Mode: https://www.bafin.de/EN/Aufsicht/FinTech/VirtualCurrency/virtual_currency_node_en.html.
- Fedorenko, N. V., & Hejgetova, S. E. (2019). Digital rights in civil legislation of Russia. In *Institute of Scientific Communications Conference*, Springer, Cham.

- ... (2011). Federal law of the Russian Federation “On the National Payment System” No. 161- FZ dated 27 June 2011. *Fundamental Freedoms // Russian Justice*. – 2003. – No. 1. – p. 18-20.
- Gumarov, I. (2000). The concept of a thing in the modern civil law of Russia. *Economy and Law*, 3, 78-84.
- Hartley, R. V. L. (1928). Transmission of Information. *Bell System Technical Journal*, 7(3).
- Jewell, D., Eames, A., & C. James (2020). The Law Commission’s review of the law on digital assets and smart contracts: Can English law accommodate these emerging technologies? DLA Piper Global Law Firm. 9 November 2020. [Accession mode]: <https://www.dlapiper.com/ko/korea/insights/publications/2020/11/the-law-commissions-review-of-the-law-on-digital-assets-and-smart-contracts/>.
- ... (2017). Joint statement of financial regulators on the status of cryptocurrencies in Ukraine from 30 November 2017 [Electronic resource]. Access mode: <https://bank.gov.ua/ua/news/all/spilna-zayava-finansovih-regulyatoriv-schodo-statusu-kriptovalyut-v-ukrayini>.
- Khrustaleva, A. V. (2016). Elektronnyye denezhnyye sredstva v Rossiiskoi Federatsii i Evropeiskom soiuze [Electronic cash in the Russian Federation and the European Union]. In *Bankovskoe pravo [Banking law]*, 3, 55-62.
- Kiryan, B. (2021). They turn around: as the Verkhovna Rada confirmed the existence of cryptocurrencies. [Electronic resource]. Access mode: <https://mind.ua/openmind/20231048-voni-obertayutsya-yak-verhovna-rada-pidtverdila-isnuvannya-kriptoaktiviv>.
- Kokhanovska, O. (2020). Information as an intangible asset and protection of information rights in accordance with the Civil Code of Ukraine. Supreme Court of Ukraine: website. URL: [http://www.viaduk.net/clients/vsu/vsu.nsf/\(documents\)/6700A809B011484FC2257B7B004D77FF](http://www.viaduk.net/clients/vsu/vsu.nsf/(documents)/6700A809B011484FC2257B7B004D77FF). (Access date: 3 April 2020)
- Konobeevskaya, I. M. (2019). Digital rights as a new object of civil rights: Proceedings of Saratov University. New series. Series “Economics”. *Management. Right*, 19(3), 330-334.
- Kukhta, M. S. (2014). Design in the information society: the disappearing function of a thing. *Proceedings of the Academy of Technical Aesthetics and Design*. No. 2.
- Kuzmina, I. D., & Bogdanova, I. S. (2019). Some problems of digital environment influence on the content of civil law object and subject categories. *Journal of Siberian Federal University*, 12, 393-409.
- Lapach, V. A. (2003). The concept of “property” in Russian law and in the Convention on the Protection of Human Rights and Fundamental Freedoms. *Russian Justice*, 1, 18-20.
- Laptev, V. A. (2018). Digital assets as objects of civil rights. *Bulletin of the Nizhny Novgorod Academy of the Ministry of Internal Affairs of Russia*, 42(2), 199-204.
- ... (2021). Law of Ukraine “On Virtual Assets” of 8 September 2021, № 1719 IX [Electronic resource]. Access mode: https://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=69110.
- ... (2020). Law of Ukraine “On the prevention and prevention of legalization (removal) of incomes, obsessed with a malicious way, financing of terrorism and financing of the development of a mass crime,” from 6 December 2019. No. 361-IX / Verkhovna Rada of Ukraine. Vidomosti of the Verkhovna Rada for the sake of Ukraine, No. 25. Art. 171.
- ... (2022). Law of Ukraine “On virtual assets” dated 17 February 2022, No. 2074-IX [Electronic resource]. Access mode: <https://zakon.rada.gov.ua/laws/show/2074-20#Text>.
- ... (2001). Law of Ukraine “On the Payment Systems and funds transfer in Ukraine” (Vidomosti Verhovnoi Rady Ukrainy (VVR), 2001, № 29, st. 137) [Electronic Resource]. Access mode: <https://zakon.rada.gov.ua/laws/show/2346-14#Text>.
- ... (2012). Law of Georgia “On payment systems and payment services” from 25 May 2012, No. 6304-Is. [Electronic Resource]. Access mode: <https://www.matsne.gov.ge/ka/document/download/1673253/1/en/pdf#:~:text=A%20legal%20person%20and%20an,is%20returned%20to%20the%20payer>.

- Maydanyk, R. A. (2021). General approaches and principles of regulation of real legal relationships in terms of recodification and Europeanization. In *Recodification of civil legislation Ukraine: Challenges of the time: Monograph* (pp. 245-283), under general Edit. N. S. Kuznetsova. Odessa: Publishing House 'Gelvetika'.
- Maydanyk, R. A. (2019). Reconsidering of property law in modern terms // *Property Law: priorities and prospects. Proceedings of Kyiv Legal Readings* (pp. 8-32). Kyiv, 22 March 2019 / R. A. Maydanyk, Y. M. Romanyuk et al.; Edit. R. A. Maydanyk. K.: Alerta.
- Maydanyk, R. A. (2018). Cryptocurrency: problems of legal regulation. *Current issues of the private rights: materials of scientific practice* (pp. 11-15). Conf. dedicated 96th anniversary of his birth. V. P. Maslov (Kharkiv, 14 February 2018). Kharkiv: Pravo.
- Nakamoto, S. (2018). Bitcoin: A Peer-to-Peer electronic cash system. URL: https://www.usssc.gov/sites/default/files/pdf/training/annual-national-training-seminar/2018/Emerging_Tech_Bitcoin_Crypto.pdf.
- Nekit, K. (2018). The legal nature of cryptocurrencies in Ukraine: reflections on the bill. 22 March 2018 [Electronic resource]. Access mode: <https://blog.liga.net/user/%D0%B5nekit/article/29829>.
- Oesterreichischen Monarchie. Wien (1811–1813). Bd. IV. S. 90.
- Ogorevc, M. (2019). Cryptocurrency as money: A trading strategy solution (August 12, 2019). Available at SSRN: <https://ssrn.com/abstract=3436041> or <http://dx.doi.org/10.2139/ssrn.3436041>
- Ovcharenko, A. S. (2020). Legal regulation of virtual assets and cryptocurrencies in Ukraine: the current state of prospects // *Legal Scientific Electronic Journal*, 4, 200-202. DOI <https://doi.org/10.32782/2524-0374/2020-4/47>
- Patachyts, N. O., & Filatova-Bilous, N. Yu. (2021). Prospects for determining the legal regime of cryptocurrency in domestic civil law, taking into account the experience of foreign countries. *Forum Prava*, 67(2), 62-77. [Electronic resource]. Access mode: https://forumprava.pp.ua/files/062-077-2021-2-FP-Patachyts.Filatova-Bilous_9.pdf.
- Pentsov, D. A. (2003). *The concept of "security" and legal regulation of the US stock market*. St. Petersburg: Jurid. Press Center.
- Pfersche, E. (1893). *Oesterreichisches Sachenrecht*. Wien.
- Polyvka Nazar (2015). Cryptocurrencies and "various bitcoins". *Legal Newspaper Online*, № 22-23, 468-469. [Electronic resource]. Access mode: <https://yur-gazeta.com/publications/practice/informacyne-pravo-telekomunikaciyi/kriptovalyuti-i-riznomanitni-bitkoini.html/>.
- Razuvaev, N. (2021). Цифровая трансформация субъективных гражданских прав: проблемы и перспективы [Digital transformation of subjective civil rights: Problems and prospects]. *Theoretical and Applied Law*, 1(7). 18-38. <https://ssrn.com/abstract=3820349>.
- Rueckert, C. (2019). Cryptocurrencies and Fundamental Rights. *Journal of Cybersecurity*, 5(1). URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2820634. (Last accessed: 17 March 2020)
- Savel'ev, A. I. (2016). *Elektronnaia kommersiia v Rossii i za rubezhom: pravovoe regulirovanie* [Electronic commerce in Russia and abroad: Legal regulation]. Moscow, Statut.
- Savel'ev, A. I. (2017) Kriptovaliuty v sisteme ob"ektov grazhdanskikh prav [Cryptocurrencies in the system of civil rights]. *Zakon [Law]*, 8, 136-153.
- Shershenevich, G. F. (1995). *Textbook of Russian civil law* (according to the edition of 1987). Moskva.
- Suleimenov, M. K. (2006). *Selected works on civil law*. Scientif. ed. V. S. Em. M.
- Senchishev, V. I. (1998). The object of civil law. In *Actual issues of civil law* (pp. 140-150). Ed. M. I. Braginsky. M.

- Skryabin, S. V. (2000). Property law in the Republic of Kazakhstan: Comparative legal commentary on Hugo Mattei's book "Basic Principles of Property Law". [Text] / S. B. Scriabin. Almaty, SPS "Jurist".
- Shannon, K. (1963). Mathematical theory of communication. In K. Shannon, *Works on information theory and cybernetics* (pp. 245-246). M.: Izd-vo inostr. Literature.
- Shevchuk, S. (2006). *Judicial protection of human rights: The practice of the European Court of Human Rights in the context of the Western legal tradition*. K: Referat.
- Skrypnyk, V. L. (2020). *Theoretical and methodological problems of objects of civil rights: monograph* / V. L. Skrypnyk. – Kremenchuk: Type. Scherbatykh OV.
- Tilna, K., & Khomjak, A. (2021). *Cryptocurrency in court decisions*. Law Clinic of the Yaroslav the Wise National University of Law. 28 May 2021. [Electronic resource]. Access mode: <http://legalclinic.nlu.edu.ua/2021/05/28/kryptovalyuta-u-rishennyah-sudu/>.
- United Kingdom Jurisdiction Taskforce (2019). Legal Statement on Cryptoassets and Smart Contracts. The LawTech Delivery Panel. URL: https://35z8e83m1ih83drye280o9d1-wpengine.netdna-ssl.com/wpcontent/uploads/2019/11/6.6056_JO_Cryptocurrencies_Statement_FINAL_WEB_111119-1.pdf. (Accessed: 25 March 2020)
- Tkachenko, N. V., & Lutskevich, O. V. (2020). Scientific interpretation of the economic nature of digital securities. Scientific notes of the National University "Ostroh Academy". Series "Economics": a scientific journal. Ostrog: NaUOA Publishing House, March 2020. № 16 (44), pp. 184-190. [Electronic resource]. Access mode: file:///C:/Users/Admin/Downloads/nataliakrushynska,+028_%D0%A2%D0%BA%D0%B0%D1%87%D0%B5%D0%BD%D0%BA%D0%BE+%D0%9D%D0%B0%D1%82%D0%B0%D0%BB%D1%96%D1%8F_%D0%9B%D1%83%D1%86%D0%BA%D0%B5%D0%B2%D0%B8%D1%87+%D0%9E%D0%BB%D0%B5%D0%BA%D1%81%D0%B0%D0%BD%D0%B4%D1%80_184-190.pdf.
- Tsibulnikova, V. Yu. (2016). *The securities market: A textbook*. Tomsk: FDO, TUSUR.
- Tsindeliani, I. A., & Nigmatulina, L. B. (2018). Kriptovaliuta kak ob'ekt grazhdansko-pravovogo i finansovo-pravovogo regulirovaniia [Cryptocurrency as an object of civil, financial and legal regulation]. In *Finansovoe pravo [Financial Law]*, 7, 18-25.
- ... (2016). The Information letter of the Central Bank of the Russian Federation "On providing customers – individuals with information about the features of electronic money transfer services" dated 11 March 2016, No. IN-017-45/12.
- Vangie Beal (2021). Digital Goods, *WEBOPEDIA* (5 February 2021, 06:40 AM), webopedia.com/definitions/digital-goods/#:~:text=In%20electronic%20commerce%2C%20digital%20goods,or%20download%20from%20the%20Internet.
- Walch, A. (2017). The path of the blockchain lexicon (and the Law). *Boston University Review of Banking & Financial Law*, 36, 713-765. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2940335. (Last accessed: 2 March 2020)
- Wittgenstein, L. (2022). Logico-philosophical treatise. In L. Wittgenstein, *Philosophical works*. M.: Gnosis. (Date of access: 27 May 2022). [goods/#:~:text=In%20electronic%20commerce%2C%20digital%20goods,or%20download%20from%20the%20Internet](http://webopedia.com/definitions/digital-goods/#:~:text=In%20electronic%20commerce%2C%20digital%20goods,or%20download%20from%20the%20Internet).
- William Hinman (2018). Dir., Div. of Corp. Fin., SEC, *Digital asset transactions: When Howey met Gary (plastic), remarks at the Yahoo Finance all markets summit: Crypto* (14 June 2018). URL: <https://www.sec.gov/news/speech/speech-hinman-061418>.
- William Hinman (2018). Dir., Div. of Corp. Fin., SEC, *Digital asset transactions: When Howey met Gary (plastic), remarks at the Yahoo Finance all markets summit: Crypto* (14 June 2018). URL: <https://www.sec.gov/news/speech/speech-hinman-061418>.
- Zabrodskaya, O. S. (2020). *Legal regulation of the circulation of virtual assets: master's thesis*. K.

Zeiller, F. (1811-1813). Commentar ueber das allgemeine buergerliche Gesetzbuch fuer die gesammten Deutschen Erblaender der Oesterreichischen Monarchie. Wien, Bd. IV. S. 90.

