

OVERVIEW OF CRYPTO ASSETS FROM INTELLECTUAL PROPERTY PERSPECTIVE

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Abstract

Technology is now guiding our everyday life. Things that were created years ago and not used or used in a small manner gain popularity now. This is the case of blockchain technology which in the latest years becomes very popular. This technology started from the blockchain created for the cryptocurrency Bitcoin which also determined the creation of other cryptocurrencies. At the end of 2021, the cryptocurrency market worth over \$ 2.2 trillion, many people investing in it. Cryptocurrencies are considered as „an example of digital innovation”¹

Cryptocurrencies are crypto assets that work on blockchain technology. However, they are not the only existing crypto assets, others gaining popularity in the last two years as we will see in this paper. In addition, blockchain technology is now reinvented to be used in many fields, other than the financial one and we will see some examples in this paper.

The purpose of this paper is to present the relation of blockchain technology with crypto assets, how they interact and finally how do they fit in the current legal frame of intellectual property law, more precisely if they can be protected by intellectual property rights and what are the legal challenges they face. The analysis will take into consideration also the Romanian legal frame.

Keywords: *copyright, patents, non-fungible token, code, database.*

1. Introduction

We live in a digital world. Our lives are guided by technology and most of us cannot anymore imagine life without it, returning for example in times when we had to buy goods only from physical stores or to have the wallet full of coins to pay for the goods. We might say that our lives become easier and more comfortable due to the technology which allows us to buy the goods with a simple click from the comfort of our homes and pay them using also just a click or bringing the phone or the card close to a device. More importantly, technology helped us a lot during Covid-19 pandemic and allowed us to remotely carry out our working activity and not going any more to the office.

Nowadays we are surrounded by news, discussions, conferences, seminars about crypto assets, which are new developed technologies. As always have been, the opinions regarding these technologies are divided in pro and against and is normal to be like that because it is in human nature to be conservatory and to be skeptical to new creations that might affect their way of doing things. Some see only the risks, the disadvantages, and the work they have to do to get out

of their comfort zone and embrace the new technology and others see only the benefits and the advantages.

There are multiple types of crypto assets such as financial tokens, non-fungible tokens, digital assets (such as utility tokens, cryptocurrencies, and stable coins). Some authors define „crypto asset” as „a digital asset that can be represented by a particular quantity of cryptographic tokens that someone holds of that asset”¹ and the International Organization for Standardization („ISO”) is defining it in „Vocabulary” as „digital asset implemented using cryptographic techniques”.

But we cannot talk about „crypto assets” without referring firstly to blockchain technology. Many crypto assets, such as cryptocurrencies, financial tokens, non-fungible tokens are functioning based on the blockchain technology.

Also, this technology is already used in many other industries and is suggested also to be used even in intellectual property field to create the so-called „smart intellectual property rights”, such as database for trademarks to „track the entire life cycle of a right”², but as we will see later, this technology is already implemented by many institutions or is envisaged to be implemented.

We are not proposing in this paper to discuss in detail about the technical aspects of blockchain and

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¹ Expression used in the answer given on behalf of the Commission on 02.08.2018 https://www.europarl.europa.eu/doceo/document/E-8-2017-007564-ASW_EN.html to the question related to blockchains asked by the European Parliament on 07.12.2017 https://www.europarl.europa.eu/doceo/document/E-8-2017-007564_EN.html (accessed on 07.02.2022).

¹ Luis-Daniel Ibanez, Michal R. Hoffman, Taufiq Choudhry, *Blockchains and Digital Assets*, p. 2, https://www.eublockchainforum.eu/sites/default/files/research-paper/blockchains_and_digital_assets_june_version.pdf (accessed on 29.03.2022).

² Birgit Clark, *Blockchain and IP Law: A Match made in Crypto Heaven?*, WIPO Magazine, 2018, https://www.wipo.int/wipo_magazine/en/2018/01/article_0005.html (accessed on 28.03.2022).

crypto assets. The purpose of this paper will be to present the relationship between cryptocurrencies and non-fungible tokens, and their liaison with blockchain technology and the way such technology may be applicable in the intellectual property field. Also, we will analyse to establish if they can be protected by intellectual property laws, with a focus on the Romanian laws. Our analysis is divided in two parts, the first part addressing the notions of „blockchain”, „cryptographic system”, „blockchain”, „cryptocurrency”, „non-fungible tokens” and the second part addressing the protection by intellectual property of blockchain, cryptocurrencies and non-fungible tokens.

2. Presentation of notions

2.1. Short history of blockchain technology

Blockchain is the foundation of cryptocurrencies, the latter working with this technology. However, even if blockchain „can exist and evolve with or without cryptos”, „nearly all cryptos depend on blockchain technology and they would likely disappear without it”³, existing only few cryptos that do not need blockchain to operate, such as 1980s eCash and 1990s Digicash, which were developed as computer code that included advanced cryptography⁴.

There is not unanimity regarding the first use of blockchains. Some authors say that it was first invented by Stuart Haber and Scott Stornetta in 1991, „as a way to timestamp digital documents to verify their authenticity”⁵. Even Stuart Haber thinks of himself to be the creator and inventor of blockchain together with his colleague Scott Stornetta⁶.

However, during our research we have found out that the notion of „blockchain” has its source in a rudimentary form back in the 1970s, when the internet as we know it today was created⁷, we calling this source as the ancestor of the current blockchain.

The inventor Horst Feistel submitted in 1971 to the USA Patent Office his patent application registered

in 1974 for „Block cipher cryptographic system” which was assigned to IBM. The invention envisaged the encryption of „a block of binary data under the control of a key consisting of a set of binary symbols” to „ensure complete privacy of data and information that is stored or processed within a computing system”, having in view the growing use at that time of remote-access computer networks which provide a larger number of subscriber access to „Data Banks” for receiving, storing, processing and furnishing information of a confidential nature.⁸

In 1976, the inventors William Friedrich Ehrsam, Carl H. W. Meyer, John Lynn Smith and Walter Leonard Tuchman requested to the USA Patent Office the registration of their patent for „Message verification and transmission error detection by block chaining”⁹. This invention also was assigned to IBM and it was based on cryptographic apparatus having as purpose the secure transmission of multi-block data messages from a sending station to a receiving station.

Only after these two inventions and others based on cryptography, Stuart Haber and Scott Stornetta came, in 1991, with their paper¹⁰ suggesting the timestamping of documents by using the „family of cryptographically secure collision-free hash functions” to be able to establish the priority of intellectual property rights related to text, audio, picture and video works. In their paper, it is not used the notion of „block”. However, it is used the notion of „chains” with respect to the „chain of timestamps”¹¹.

In 2008, when Satoshi Nakamoto¹² released the Bitcoin cryptocurrency together with the white-paper „*Bitcoin: A Peer-to-Peer Electronic Cash System*”¹³, neither he used the notion of „blockchain” when describing the electronic cash system. He used the notions of „block” and „chain” separately, saying that an electronic coin is a chain of digital signatures. However, it seems that his creation was inspired by Stuart Haber and Scott Stornetta’s „Surety” service, many papers of these authors being cited by Satoshi Nakamoto in his white- paper.

³ Rajendra Kulkarni, *Origins of Blockchain*, 2019, Kulkarni, Rajendra, *Origins of Blockchain* (June 1, 2019). Available at SSRN: <https://ssrn.com/abstract=3399644> or <http://dx.doi.org/10.2139/ssrn.3399644> (accessed on 12.03.2022).

⁴ *Ibidem*.

⁵ Daniel Oberhaus, *The World’s Oldest Blockchain has been hiding in the New York Times since 1995*, 2018, <https://www.vice.com/en/article/j5nrx4/what-was-the-first-blockchain> (accessed on 12.03.2022).

⁶ Stuart Haber, *Blockchain: Decentralization is Central*, Speech at the TEDxBeaconStreet, 2019, <https://www.youtube.com/watch?v=AmQyJoTdnwo&t=91s> (accessed on 12.03.2022).

⁷ Nathalie Dreyfus, *Marques et internet. Protection, valorisation, défense*, Collection Lamy Axe Droit, Lamy, 2011, p. 18.

⁸ Application number 05/158360 filed on 30.06.1971 and registered under no. 3798359 on 19.03.1974.

⁹ Application number 05/680404 filed on 26.04.1976 and registered under no. 4074066 on 14.02.1978.

¹⁰ Stuart Haber, W. Scott Stornetta, *How to Time-Stamp a Digital Document*, *Journal of Cryptology*, 1991, <https://link.springer.com/content/pdf/10.1007/BF00196791.pdf> (accessed on 12.03.2022).

¹¹ Following this article, Stuart Haber and Scott Stornetta created the timestamping service named „Surety” which „ensures the integrity of electronic records, files or any digital content by establishing that they were created at a specific point in time and have not been tampered ever since”. <http://surety.com/> (accessed on 12.03.2022).

¹² Is the pseudonym used by the creator of Bitcoin cryptocurrency. It is not known yet if the pseudonym refers to a single person or to a group of people.

¹³ Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 2008, <https://bitcoin.org/bitcoin.pdf> (accessed on 12.03.2022).

2.2. Cryptographic system

We may notice from the above section that blockchain is created based on cryptographic system.

In the Bible there is a verse (Ecclesiastes 1:9) saying that „What has been, will be again, what has been done will be done again; nothing is new under the sun”.

In intellectual property field, we may interpret this saying by arguing that everything existed before, and we only reinvent things and give them new use and purpose, or we improve them to better serve us in our times. Anyway, no new creation is entirely new, at least not in our times; everything is based on something that existed before and this is normal because each creation takes into consideration the available past and contemporary knowledge and information.

In our case, blockchain technology also is not totally new, it lays down on the cryptographic system, which was used since ancient times in Egypt, Greece, and Rome, more exactly since men started to organise themselves in little groups and later in societies. The cryptographic system was used for sending encrypted messages to avoid the situation in which other persons than the recipient, including the enemy, would read the message.

Cryptographic system (*i.e.* the creation of the cryptologic system) together with cryptanalysts (*i.e.* techniques applied to uncover the secret writing), more exactly the encoding and decoding is part of the „cryptology”, which is the study of secret writing. „Crypto” comes from the Greek „crypto” which means „hidden” or „secret”¹⁴.

This system evolved during the time, from the system of Caesar which involved substituting the fourth letter of the alphabet, namely D for A and so forth. After the fall of the Roman empire, cryptology vanished and reappeared in Renaissance era, being used by Roger Bacon¹⁵ to keep scientific truths secret¹⁶, Geoffrey Chaucer¹⁷ who „encrypts (in his work) six short passages of instructions on how to use the equatorium”¹⁸ and even by Queen Mary of Scotland¹⁹. The cryptographic system was used intensively during

World Wars, when were invented Enigma machine²⁰ and Colossus machine²¹.

In all times, the system involved the recipient to have a key to decipher the message.

Nowadays, cryptographic system is used by blockchain technology, cryptocurrencies and even for the protection of personal data, as an obligation of all processors and controllers. Of course, today cryptographic system is adapted to the current technologies, and it is based on mathematics, computer science, electrical engineering, communication science and physics and focused not only to encrypt messages and data, but also to authenticate the sender/receiver, the electronic signatures.

Cryptographic system is defined today by the ISO Standard 22739:2020 as „discipline that embodies the principles, means, and methods for the transformation of data in order to hide their semantic content, prevent their unauthorized use, or prevent their undetected modification”.

2.3. The notion of blockchain

Even if first proposals of blockchain use were in the 1970s, this technology is still considered „relatively new” and it „has not (yet) been subject to a legal definition”²².

Despite the fact that blockchain technology does not have a legal definition, the ISO has developed and published seven ISO standards for blockchain and distributed ledger technologies referring to (i) Vocabulary (2020), (ii) Privacy and personally identifiable information protection considerations (2020), (iii) Reference architecture (2022), (iv) Taxonomy and Ontology (2021), (v) Overview of and interactions between smart contracts in blockchain and distributed ledger technology systems (2019), (vi) Security management of digital asset custodians (2020), (vii) Guidelines for governance (2022) and ten more are under development²³. Under the ISO Standard referring to Vocabulary, blockchain is defined as „distributed ledger with confirmed blocks organized in

¹⁴ <https://www.dictionary.com/browse/crypto-#:~:text=Word%20Origin%20for%20crypto%2D,hidden%2C%20from%20krupstein%20to%20hide> (accessed on 16.03.2022).

¹⁵ Roger Bacon (1220 – 1292) was a Franciscan monk, philosopher.

¹⁶ John F. Dooley, *History of cryptography and Cryptanalysis. Codes, Ciphers and Their Algorithms*, Springer, 2018, p. 16, https://books.google.ro/books?hl=ro&lr=&id=q61qDwAAQBAJ&oi=fnd&pg=PR7&dq=The+history+of+cryptography&ots=37szNpsivd&sig=vqHv1ytGcbs8w197XypvN1phIwY&redir_esc=y#v=onepage&q=The%20history%20of%20cryptography&f=false (accessed on 03.04.2022).

¹⁷ Geoffrey Chaucer (1340 – 1400) was an English poet, author and civil servant best known for *The Canterbury Tales*.

¹⁸ John F. Dooley, *op. cit.*, p. 17.

¹⁹ Queen Mary of Scotland (1542 – 1587), who’s encrypted letters were deciphered and bring her the death execution being accused by treason against Queen Elisabeth I of England.

²⁰ This machine is invented by the German inventor Arthur Scherbius (1878-1929).

²¹ This machine is invented by the English engineer Tommy Flowers (1905-1998) to help solve encrypted German messages.

²² Gönenç Gürkaynak, İlay Yılmaz, Burak Yeşilaltay, Berk Bengi, *Intellectual property law and practice in the blockchain realm*, Computer Law & Security Review, 34, 2018, p. 851, <https://www.gurkaynak.av.tr/docs/8c65a-ip-law-and-practice-in-the-blockchain-realm.pdf> (accessed on 02.04.2022).

²³ ISO/TC 307 Blockchain and distributed ledger technologies, <https://www.iso.org/committee/6266604.html> (accessed on 02.04.2022).

an append-only, sequential chain using cryptographic links”.

The notion of blockchain received many definitions during the time. As example, we mention two of the definitions: „blockchain is a type of database stored on many computers in a peer-to-peer network and is particularly adapted for recording transactions”²⁴ or „blockchain is a decentralised database, without intermediary allowing to automate, authenticate and timestamp a transaction by guaranteeing its immutability and tamper-proof. It can also ensure confidentiality of data through encryption”²⁵, therefore, all such actions will be made without the support of a trusted third person.

Based on the above definition, blockchain is considered to have the following characteristics: distributed public database, more precisely shared by its different users, without central authority, reliable and inviolable (tamper-proof). Therefore, blockchain may be compared to the accounting register: public, unforgeable, and verifiable. Blockchain is considered unforgeable because each modification to a transaction from a chain makes that transaction inconsistent and for altering a part of the chain, one must be able to alter the entirety of the blocks starting with the modified transaction as fast as the entire world network, which cannot happen²⁶.

Blockchain technology is used for:

- a) Assets transfer using cryptocurrencies;
- b) Blockchain applications as distributed ledger technology (DLT) ensuring a better traceability of products and assets;
- c) Smart contracts, which are autonomous programs automating executing the contractual clauses once started without human intervention. In IP domain for example, they may be used for transactions with patents to verify the assignment, the validity, to negotiate the sale purchase-agreement, to pay and notify the IP offices about the transactions²⁷ and they are also used by non-fungible tokens („NFT”).

Blockchain can be private or public. The public blockchain, for example the one used by Bitcoin, „records all transactions on the network and is totally transparent to all participants”²⁸, everybody having the possibility to participate to the network, while for private blockchains, one needs to obtain the permission from the system to become part to the network.

As we might think, blockchain technology is not used only in financial services. In 2012, arose the first discussions on how to use blockchain technology in fields other than digital payments²⁹ and nowadays, it can also be used in many other industries, including in the public sector, these additional applications being known as „Blockchain 2.0.”³⁰. For example, blockchain may be used to fight against IP counterfeiting. In this regard, the European Union Intellectual Property Office („EUIPO”), one of the most open institutions to use new technologies, launched in 2019 the „Anti-Counterfeiting Blockathon Forum”, its Executive Director stating that „In today’s fast-moving world, we need to use the latest technology to keep a reliable record of the origin of goods and their progress through international supply chains. Blockchain’s ability to create permanent and unchangeable records makes it one of the best candidates to deliver results on the ground”³¹.

In April 2021, almost two years after the press release launching the „Anti-Counterfeiting Blockathon Forum”, EUIPO announced³² that trademarks and designs databases were using blockchain „to bring super-fast, reliable, and secure delivery of IP rights information”. A few months later, in July 2021, Malta was the first EU country which transferred 60.000 records to trademarks and designs databases through the blockchain network³³.

Also, in IP field, there are people suggesting using the blockchain technology to eliminate the IP offices as intermediaries in registrations of designs, patents, trademarks and also to reduce the costs of registration

²⁴ Yuhon Tom Zhang, *Blockchain. What is it and what are its IP issues?*, Robic, 2017, <https://www.robic.ca/en/publications/blockchain-ip-issues/> (accessed on 02.04.2022).

²⁵ B. Barraud, *Les blockchains et le droit*, Revue Lamy Droit de l’Immatériel, 2018, p. 48 *apud*. Jean-Bernard Auby, *Les conditions de la régulation publique des blockchains. Le droit au défi des blockchains*, Revue francophone de la propriété intellectuelle, Special Number, February 2021, p. 7.

²⁶ Jean-Guillaume Dumas, Pascal Lafourcade, Ariane Tichit, Sébastien Varrette, *Les blockchains en 50 questions. Comprendre le fonctionnement et les enjeux de cette technologie innovante*, Dunod, 2018, 2019, p. 6.

²⁷ Paul Cosmovici, *La blockchain et la propriété intellectuelle peuvent-elles faire ensemble un pas de deux ou vont-elles trébucher et tomber à terre?*, 2021, <https://blogs.pme.ch/paul-cosmovici/2021/12/03/la-blockchain-et-la-proprietie-intellectuelle-peuvent-elles-faire-ensemble-un-pas-de-deux-ou-vont-elles-trebucher-et-tomber-a-terre/> (accessed on 02.04.2022).

²⁸ Kevin Werbach, *Trust, but Verify: Why the Blockchain Needs the Law*, Berkeley Technology Law Journal, vol. 33, no. 2 (2018), p. 503, <https://www.jstor.org/stable/26533144> (accessed on 02.04.2022).

²⁹ Gönenç Gürkaynak, İlay Yılmaz, Burak Yeşilaltay, Berk Bengi, *op. cit.*, p. 848.

³⁰ Yuhon Tom Zhang, *op. cit.*, *loc. cit.*

³¹ EUIPO Press release, *Using blockchain in the fight against counterfeiting – EUIPO launches a Forum to support concrete solutions in that field*, 2019, https://eipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/News/Blockchain_Forum_launch_PR_en.pdf (accessed on 29.03.2022).

³² EUIPO, *EUIPO connects to TMview and Design View through blockchain*, 2021, <https://eipo.europa.eu/ohimportal/en/web/guest/news/-/action/view/8662923> (accessed on 29.03.2022).

³³ EUIPO, *Malta is the first EU country to join the IP register in Blockchain*, 2021, <https://eipo.europa.eu/ohimportal/en/web/guest/news/-/action/view/8793606> (accessed on 29.03.2022).

and enforceability³⁴. Others³⁵ suggest using such technology to eliminate the collective management bodies as intermediaries which collect the remuneration for artists and interpreters from the users of their works, such use making easier the entire procedure, ensuring a better knowledge of the amounts to be collected by a certain artist and being cheaper for the artist.

In France, blockchain technology is used since 2019 by the Trade Registry for increasing the transparency and efficiency of the management of legal transactions related to business life³⁶.

At EU level, it was created the European Blockchain Services Infrastructure (EBSI) at the initiative of the European Commission and the European Blockchain Partnership whose purpose is to „accelerate the creation of cross-border services for public administrations and their ecosystems to verify information and to make services more trustworthy”³⁷. Romania is also a member of EBSI and EBSI may be used by public administrations, businesses and also by citizens.

There are also private users of blockchain technology in intellectual property domain. In this domain, the blockchain is used as a database, as a technology to authenticate products and as a smart contract, such use being considered a „true legal revolution allowing to save proof, track products and execute smart contracts which simplify rights exploitation”³⁸. It is also suggested to be used as database in the music industry to establish a link between the musical creation of an author and its interpretation by multiple artists, such link allowing to ensure a better remuneration for the owners which are part of the creation chain³⁹. However, with respect to private blockchains in IP domain, there are authors who outline the fact that the advantage of blockchain represented by the impossibility to erase an information, might also constitute a disadvantage when false information is registered in the chain⁴⁰.

2.4. The notion of cryptocurrency

Following a survey made by Deloitte during the period March 24 and April 10, 2021, it is thought that digital assets, such as cryptocurrencies, may replace

traditional currencies in the following five to ten years⁴¹.

Taking into consideration that cryptocurrencies are used as currencies in the digital environment, prior to analyse the notion of „cryptocurrency” and its use, we propose to make a short presentation about the apparition of traditional currencies.

It is not possible to say exactly when the currency was invented. It is considered that traditional currencies appeared from people need to replace the barter, being easier to obtain the needed products by exchanging money instead of other products. The first use of coins is considered to be in Lydia, a kingdom tied to ancient Greece and located in modern-day Turkey, in years 640 BC and the first use of banknotes in China in years 600 BC. Many years, the coins were made from gold or silver and in Europe the coins were used until AD 1600 since precious metals could be melt from the conquered colonies and used to make coins. In 1944, first global financial institutions were founded, namely the International Monetary Fund and the World Bank.

Currencies as we know them today are the product of an evolution taking into consideration that they evolved from barter to coins, banknotes, cards, electronic wallets, other financial instruments, such as checks, promissory notes. Currencies have three cumulative functions, and it is considered that „any object which does not fulfil the below functions is not a real currency. The functions are the following⁴²:

- a) Intermediary and exchange mean of products and services between individuals;
- b) Store of value;
- c) Account unit.

From our point of view, currencies represent a creation and they started to be used frequently when people put their trust in the respective currencies, being based on a convention. Nowadays, the trust is given by the fact that the currencies are issued and controlled by an intermediary, namely by the central banks and other banks. However, this trust may be broken having in view that banknotes and financial instruments may be forged. Especially, international currencies are affected by forgery, mainly the US dollar.

³⁴ See Gönenç Gürkaynak, İlay Yılmaz, Burak Yeşilaltay, Berk Bengi, *op. cit.*, *loc. cit.*

³⁵ Dragoş Bogdan, Mihai Stănescu, *Blockchain și copyright*, 2021, https://www.juridice.ro/748698/blockchain-si-copyright.html#_ftnref2 (accessed on. 02.04.2022).

³⁶ Press release, *La blockchain dédiée à la gestion du RCS*, 2019 <https://www.cngtc.fr/fr/actualite.php?id=143> (accessed on 29.03.2022).

³⁷ <https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/What+is+ebsi> (accessed on. 02.04.2022).

³⁸ Vincent Fauchoux, *Panorama des applications de la Blockchain en propriété intellectuelle*, <https://blockchainyourip.com/blog/blockchain-panorama-applications-proprie-intellectuelle> (accessed on. 02.04.2022).

³⁹ Hervé Jacquemin, Andra Cotiga, Yves Pouillet, *Les blockchains et les smart contrats à l'épreuve du droit*, Collection du CRIDS – Faculté de droit de l'UNamur, Larcier, 2020, p. 294.

⁴⁰ Hervé Jacquemin, Andra Cotiga, Yves Pouillet, *op. cit.*, p. 308.

⁴¹ Deloitte Insights, *Deloitte's 2021 Global Blockchain Survey. A new age of digital assets*, 2021, p. 5. https://ro.register-deloitte.com/forms/registration.html?docid=263&utm_source=CP&utm_medium=RO&utm_campaign=deloitte-global-blockchain-survey (accessed on. 02.04.2022).

⁴² Jean-Guillaume Dumas, Pascal Lafourcade, Ariane Tichit, Sébastien Varrette, *op. cit.*, pp. 45, 112.

Cryptocurrencies are digital assets that operate as „medium of exchange”⁴³, which are secret, and we think that their name has to do with the fact that the identity of the person owning a cryptocurrency may not be established.

When referring to „cryptocurrency”, we may notice that many notions are used to designate this currency, such as „virtual currency”, „decentralised virtual currency”, „cybercurrency” or in Romania even „surrogate currency”⁴⁴.

The ISO Standards referring to Vocabulary defines „cryptocurrency” as „crypto-asset designed to work as a medium of value exchange”.

The European Central Bank uses the notion of „virtual currency” and defines it as „a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community”⁴⁵.

In Romania also, it is used the notion of „virtual currency” and it is defined in the same manner by two normative acts as „digital representation of value that is not issued or guaranteed by a central bank or public authority, that is not necessarily linked to a legally established currency and does not have the legal status of money or currency, but is accepted by natural or legal persons as a means of exchange and can be transferred, stored and traded electronically”⁴⁶. The definitions were introduced in the Romanian legislation in 2020 by the anti-money laundering laws and in 2021 by the Criminal Code.

The CJEU mentions that the „virtual currency has no purpose other than to be a means of payment”⁴⁷.

From the above definitions, we may notice that cryptocurrencies are used without the state’s guarantee and what is more important is that according to a French author, the cryptocurrencies raise constitutional issues considering that the creation and the control of currencies are since a long time the exclusive right of states, national constitutions expressly stating this right of states⁴⁸.

Like the traditional currencies, virtual currencies must also fulfil some functions⁴⁹, such as:

a) They must be non-forgable, meaning the impossibility of non-authorised user to create a currency;

b) The impossibility to spend twice the same unit of the currency;

c) The possibility to identify the cheater if a forgery takes place to be sure that an innocent person is not accused.

What is characteristic to cryptocurrencies is that they are the biggest application in blockchain technology, and they allow each participant to be part of the system in the blockchain, meaning that each participant will validate the transactions. The relationship between blockchain and cryptocurrency is given by the fact that blockchain is a way of storing data, while cryptocurrency, as measure of value, represents the very data that is stored on blockchain, it does not exist in any other form⁵⁰.

The most known cryptocurrency is Bitcoin created by Satoshi Nakamoto and launched in 2008, when the economic crisis started to affect the entire world.

In present, there are more than 9.000 cryptocurrencies in use⁵¹, although not all of them are popular nor attract investors, most known ones being Bitcoin and Ethereum.

Bitcoin is characterised by the European Central Bank⁵² as follows:

a) digital token that can be exchanged electronically;

b) not recognised as a currency because it is not issued by a central public authority;

c) not a generally accepted form of payment;

d) not granting protection to users;

e) not offering stability to owners;

f) speculative asset (having in view that its value is determined by the public interest, being based on supply and demand).

We consider that these characteristics are applied by the European Central Bank for all cryptocurrencies, not only Bitcoin and we may add that these currencies do not have a legal exchange rate because no person is obliged to accept such currency as payment.

⁴³ Peggy Keene, *The Rise of Cryptocurrency*, 2018, <https://www.klemchuk.com/ideate/the-rise-of-cryptocurrency> (accessed on 03.04.2022).

⁴⁴ Vâlcea Court, civ. s. II, decision no. 693/2020, <http://www.rolii.ro/hotarari/5f8111b1e490096405000029> (accessed on 03.04.2022).

⁴⁵ European Central Bank, *Virtual currency schemes*, 2012, p. 13, <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf> (accessed on 12.03.2022).

⁴⁶ Art. 2 (t¹) from Romanian Law no. 129/2019 on preventing and combating money laundering and terrorist financing and amending and supplementing certain acts with its subsequent amendments, published in the Official Gazette of Romania no. 589/18.07.2019 and art. 180 (4) of the Criminal Code with its subsequent amendments, published in the Official Gazette of Romania no. 510/2009.

⁴⁷ CJEU, Case no. C-264/14, *Skatteverket*, p. 24.

⁴⁸ Jean-Bernard Auby, *op. cit.*, p. 12.

⁴⁹ Jean-Guillaume Dumas, Pascal Lafourcade, Ariane Tichit, Sébastien Varrette, *op. cit.*, p. 45.

⁵⁰ Frank Gerrata, interview, *La brevetabilité de la blockchain et de la crypto-monnaie (vidéo) – Propriété intellectuelle*, 2021, <https://thepressfree.com/la-brevetabilite-de-la-blockchain-et-de-la-crypto-monnaie-video-propriete-intellectuelle/> (accessed on 29.03.2022).

⁵¹ According to the registry of Coin Market Cap <https://coinmarketcap.com/> (accessed on 29.03.2022).

⁵² European Central Bank, *What is bitcoin*, 2018, updated in 2021, <https://www.ecb.europa.eu/ecb/educational/explainers/tell-me/html/what-is-bitcoin.en.html> (accessed on 12.03.2022).

Some countries, such as France, England, Canada and more recently USA announced their intention to develop as an alternative to cryptocurrencies, their own digital currency indexed on the national currency to mitigate the risk of people losing their trust into traditional currencies. Such digital currency is named „central bank digital currency” or as some authors call it „state cryptocurrency”⁵³ and it „would be reliable and retain its value over time”⁵⁴.

Therefore, Canada launched the Project Jasper in 2017 having as goal „to better understand how the technology could transform the future of payments in Canada”⁵⁵. England launched in 2020 a discussion paper⁵⁶ on central bank digital currency and the USA in 2022⁵⁷. In neither country this type of currency was not yet introduced.

Recently, following Ukraine’s invasion by Russia and the international sanctions imposed to Russia for its actions, the Bank of England thought to regulate the cryptocurrencies because „they could be used to circumvent financial sanctions imposed to Russia (...)”⁵⁸.

More interestingly is that Venezuela is until present the sole state to have adopted its own cryptocurrency, whose value is based on oil. Venezuela has launched in 2018 the *petro* cryptocurrency. It is said that this cryptocurrency was created „to circumvent international sanctions against it [Venezuela] and revive the country’s flailing economy”⁵⁹.

Following the trends, Facebook announced in 2019 its intention to launch its own cryptocurrency named Libra⁶⁰, which should have been a stable coin, meaning a cryptocurrency without the volatile characteristic and only with few people mining the coins and validating the transactions. An important difference from „traditional” cryptocurrencies would have been that Libra would give access of participants to the system only as clients⁶¹. However, this project was rejected by regulators.

While there are not many litigations in relation to blockchain and cryptocurrencies in Romania there are already settled few disputes. One of the disputes⁶²

related to a cryptocurrency started in 2018 and was settled by the court in 2020. This dispute refers to an action regarding the observance of contractual dispositions, namely the observance of payment obligations by the company A which asked company B to provide consultancy and marketing services for the event of launching the OPIRIA tokens, more precisely the PDATA cryptocurrency and the services had as object to draft the white-paper, the economic data of tokens, to design the opiria.io website, to create the software smart contracts for the launching event, etc.. Therefore, the issue to settle by the court did not concern the IP, but the payment obligation towards the company B which was not observed by the company A, issue that the court dismissed based on the fact that since company B had the key to the virtual wallet, the payment could have been done by it.

2.5. The notion of non-fungible token

The „token” is defined by the ISO Standard Vocabulary as „a collection of entitlements”.

The literature establishes that the token „designates a form of digital value issued and exchanged using blockchain technology”, being different than other cryptocurrencies because the token is not born from a blockchain, but it operates „over it”⁶³.

The Romanian law does not provide a definition for this notion. However, monetary, and financial French code defines it as „any intangible asset representing, in digital form, one or more rights, which may be issued, recorded, stored or transferred by means of a shared electronic recording device that enables to identify, directly or indirectly, the owner of that asset”.

From this definition we notice four characteristics, namely:

- a) an intangible movable good;
- b) representation in digital form of one or multiple rights;
- c) the capacity to issue, record, store or transfer the token through a shared electronic recording device;
- d) the possibility to identify the owner of the good.

⁵³ Julien Mouchette, *Les usages publics de la blockchain. De quoi les „cryptomonnaie d’Etat” sont-elles le nom?*, Revue francophone de la propriété intellectuelle; Special Number, February 2021, p. 71.

⁵⁴ UK central bank digital currency <https://www.bankofengland.co.uk/research/digital-currencies> (accessed on 12.03.2022).

⁵⁵ Project Jasper, 2017, https://www.payments.ca/sites/default/files/project_jasper_primer.pdf (accessed on 12.03.2022).

⁵⁶ Bank of England, *Central Bank Digital Currency: opportunities, challenges and design*, 2020 <https://www.bankofengland.co.uk/paper/2020/central-bank-digital-currency-opportunities-challenges-and-design-discussion-paper> (accessed on 12.03.2022).

⁵⁷ Board of Governors of the Federal Reserve System, *Money and Payments: The US Dollar in the Age of Digital Transformation*, 2022, <https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf> (accessed on 26.03.2022).

⁵⁸ Huw Jones, David Milliken, *Bank of England sketches out first regulatory approach to crypto*, 2022, <https://www.reuters.com/business/finance/bank-england-sketches-out-regulatory-approach-crypto-2022-03-24/> (accessed on 26.03.2022).

⁵⁹ Jake Frankenfield, *Petro (PTR)*, 2022, <https://www.investopedia.com/terms/p/petro-cryptocurrency.asp> (accessed on 26.03.2022).

⁶⁰ It was renamed Diem.

⁶¹ For more information, see Deyan G., *Facebook’s Cryptocurrency [Libra Explained]*, 2022, <https://techjury.net/blog/facebook-cryptocurrency/#gref> (accessed on 29.03.2022).

⁶² Timiș Court, civ. s. II, decision no. 107/2020 <http://www.rolii.ro/hotarari/5e69a2a4e49009d821000044> (accessed on 03.04.2022).

⁶³ Alice Barbet-Massin, Faustine Fleuret, Alexandre Lourimi, William O’Rorke, Claire Pion, *Droit des crypto-actifs et de la blockchain*, LexisNexis, Paris, 2020, p. 31.

In this definition are not included the cryptocurrencies and NFTs as long as they are acquired as such and not for claiming a right on issuer⁶⁴.

There is no legal definition of NFTs. The online version of Cambridge Dictionary offers the following definition of NFT: a unique unit of data (=the only one existing of its type) that links to a particular piece of digital art, music, video, etc., and that can be bought and sold⁶⁵, adding that NFTs track the ownership and guarantee the authenticity of digital art.

The literature defines them as „crypto-assets over blockchains, having identification codes and unique metadata which allow them to differentiate one from another, being characterised by uniqueness, indivisibility, non-interchangeability”⁶⁶. This means that by comparison with cryptocurrencies which are identical like any other currency, and which may be exchanged one with another, a NFT cannot be exchanged with another NFT, this being unique, like a painting of Picasso, for example.

Others define NFTs as „digital objects such as a drawing, animation, piece of music, photo, or video with a certificate of authenticity created by blockchain technology”⁶⁷. Therefore, NFTs are used to represent works such as photos, videos, audio, and other digital files and any digital work can be transformed into an NFT, even physical goods that are priorly made to be represented in digital form.

The first NFT ever is the one created by Kevin McCoy in 2014 named „Quantum”, which is an animated octagon.

Most NFTs work on Ethereum blockchain and they may be bought with the cryptocurrency Ether, but there are NFTs that work also on other types of blockchains, and they will be bought with the currency of that specific blockchain.

We all know about the famous NFTs all over the world; however, Romania is not behind in this domain and we may mention the NFT project launched on February 13rd, 2022⁶⁸ by a team of lawyers consisting of 2,000 unique kittens created by a Romanian designer, which are available on Elrond blockchain⁶⁹, and which may be acquired with eGold cryptocurrency.

On this blockchain also will be launched the NFT collection of SanoPass, which in addition to the digital art also offers a full health subscription for persons choosing a way of life based on prevention⁷⁰.

The Romanian wine producer GRAMMA Wines purchased, at the end of 2021, 27 NFTs from the collection „Ancestors” launched also on Elrond. After the purchase, the wine producer transformed the NFTs in physical etiquettes in one of its limited editions of wine bottles⁷¹.

We see that NFTs are used in creative domains. But how do they work? Briefly, one has to have an account with an intermediary (i.e. blockchain technology) and a wallet with cryptocurrencies. Once this step is finished, any image may be uploaded to the platform and the platform will transform it into data in the blockchain, the result consisting in a code, a metadata file, the NFT not being the actual image itself. In addition, when the NFT is sold, „it is not sold a signed copy of a work, but a sort of a signed receipt of a work, where the ownership is not of the work itself, but ownership of the receipt”⁷².

In conclusion, NFTs are working by using blockchain, cryptocurrencies and smart contracts.

3. Protection by intellectual property right

Taking into consideration that most of crypto assets are functioning based on blockchain technology, we will first analyse the protection by intellectual property rights („IPR”) of the blockchain technology.

3.1. Protection of blockchain

We have noticed from the above sections, that crypto assets are based on blockchain technology, and we are wondering if blockchain technology may be protected by intellectual property rights under the Romanian law.

Blockchain technology is in fact a computer software program created in open source and by its functioning it creates a chain of blocks which will store the past information about transactions in case of cryptocurrencies, about execution of agreements in

⁶⁴ *Idem*, p. 33

⁶⁵ Cambridge Dictionary, <https://dictionary.cambridge.org/dictionary/english/nft> (accessed on 03.04.2022).

⁶⁶ Oana Dragomir, *Criptoactivele. Perspectivă teoretică, tehnică și normativă*. Revista Română de Drept al Afacerilor no. 4 / 2021.

⁶⁷ The Economic Times, Panache, *The first NFT ever created, „Quantum”, goes under the hammer*, 2021, <https://economictimes.indiatimes.com/magazines/panache/the-first-nft-ever-created-quantum-goes-under-the-hammer/articleshow/83253657.cms> (accessed on 03.04.2022).

⁶⁸ Juridice.ro, *Primul proiect NFT al unei echipe de avocați din România*, 2022, <https://www.juridice.ro/768325/primul-proiect-nft-al-unei-echipe-de-avocati-din-romania.html> (accessed on 03.04.2022).

⁶⁹ Elrond blockchain is founded in 2018 in Sibiu, Romania, by three Romanian founders and it is known mostly for its cryptocurrency eGold.

⁷⁰ Mihaela Pântea, *Startup-ul SanoPass lansează pe blockchain-ul Elrond prima colecție de NFT-uri cu utilitate în sănătate*, Biz, 2022, <https://www.revistabiz.ro/startup-ul-sanopass-lanseaza-primele-nft-uri/> (accessed on 03.04.2022).

⁷¹ Gabriel Bařliga, *GRAMMA Wines lansează etichete noi bazate pe NFT-uri din colecția „Strămoși” lansată pe Elrond*, Biz, 2021, <https://www.revistabiz.ro/gramma-wines-lanseaza-etichete-noi-bazate-pe-nft-uri-din-colectia-stramosi-lansata-pe-elrond/> (accessed on 03.04.2022).

⁷² Andres Guadamuz, *The treachery of images: non-fungible tokens and copyright*, Journal of Intellectual Property Law & Practice, vol. 16, no. 12, 2021, p. 1371.

case of smart contracts, etc. „In other words, it is an assembly of special rules which exchange data or the collective behaviour of processes or network computers, having as purpose of carrying out one or more tasks that contribute to the harmonious functioning of a general entity”⁷³.

Therefore, from its characteristics, blockchain technology is qualified to be protected under copyright law, namely under Law no. 8/1996 on copyright and related rights⁷⁴, herein called as „Romanian copyright law”, both as a computer software program and as well as a database.

It is important to underline, that under Romanian copyright law, the right is born as of the creation of the work, either finished or unfinished, without the necessity to register the creation in a public registry nor to make other formalities.

3.1.1. Protection as a computer program

In relation to computer software programs, Romanian copyright law states that „the protection of computer software includes any expression of a software, application software and operating systems, expressed in any language, whether source code or object code, preparatory design material, and manuals”.

Also, Romanian copyright law excludes from protection the idea, processes, methods of operation, mathematical concepts and principles underlying any element of a computer program, including those underlying its interfaces.

As such, the protection of computer programs by copyright is limited strictly to its expression, the functionality of the computer program not being important and not obtaining protection by copyright.

In this view is oriented also the case-law of CJEU which states that „neither the functionality of a computer program nor the programming language and the format of data files used in a computer program in order to exploit certain of its functions constitute a form of expression of that program”⁷⁵.

This means that one can write another program with another expression (form of expression, different code lines, different succession of logical steps, etc.) but with the same functionality to replace the first one, without this procedure to raise an issue from copyright

perspective⁷⁶ because otherwise it would mean to grant protection to ideas which are expressly excluded from copyright protection. Or, „the reuse of an idea or theme does not constitute an act of copyright infringement, but only the reproduction of the form in which that idea or theme is expressed”⁷⁷.

The Bitcoin cryptocurrency was implemented in open source software and is freely available. That means that the developers cannot protect their code, being obliged to make it freely available. Therefore, it is said that „one cannot assert a legal claim or title on blockchain technology itself and may only claim a right on a patentable invention or copyrightable work that is created through, based on or derived from blockchain, and only if the work or invention fulfils the applicable legal prerequisites”⁷⁸.

3.1.2. Protection as a database

The provisions related to databases were transposed into Romanian law from the Directive 96/9/EC on the legal protection of database („EU database directive”) and they establish two types of protection, namely a protection through copyright if the database represents an intellectual creation and a protection through *sui-generis* rights (*i.e.* special rights granted to persons who made substantial quantitative and qualitative investment to obtain, verify or present the contents of a database).

Protection through *sui-generis* rights. At the section regarding *sui-generis* rights, Romanian copyright law defines a „database” as „a collection of works, data or other independent items, whether or not protected by copyright or related rights, arranged in a systematic or methodical way and individually accessible by electronic or other means”.

From this definition, we understand that it is not compulsory that the elements from the database to be protected by copyright and that a database must fulfil four cumulative conditions⁷⁹. Therefore, we might say that „even a blockchain with uncopyrightable facts such as financial transactions can be protected as a database”⁸⁰, but before jumping to conclusions, we suggest analysing and see if blockchain technology meets the four conditions.

⁷³ Thibaut Labbé, *Les usages publics de la blockchain. Blockchain et administration de la justice*, Revue francophone de la propriété intellectuelle; Special Number, February 2021, p. 61.

⁷⁴ Republished in the Official Gazette of Romania no. 489/2018.

⁷⁵ CJEU, Case no. C-406/10, SAS Institute Inc., p. 39.

⁷⁶ Dragoş Bogdan, Ana-Maria Teodorescu, *Software: creativitate și protecție juridică*, 2021, <https://www.juridice.ro/749942/software-creativitate-si-protectie-juridica.html> (accessed on 03.04.2022).

⁷⁷ Ciprian Raul Romițan, *Condiții cerute pentru protecția operelor în cadrul dreptului de autor*, Revista de Științe Juridice, no. 1/2007, pp. 90,91, <https://drept.ucv.ro/RSJ/images/articole/2007/RSJ1/A10RomițanCiprian.pdf> (accessed on 27.03.2022).

⁷⁸ Gönenç Gürkaynak, İlay Yılmaz, Burak Yeşilaltay, Berk Bengi, *op. cit.*, p. 851.

⁷⁹ For more details about the analysis of blockchain as constituting a database, see Hervé Jacquemin, Andra Cotiga, Yves Pouillet, *Les blockchains et les smart contrats à l'épreuve du droit*, Collection du CRIDS – Faculté de droit de l'UNamur, Larcier, 2020, pp. 253-262.

⁸⁰ Sebastian Pech, *Who owns the Blockchain? How copyright law allows rights holders to control blockchains?*, Journal of Business & Technology Law, vol. 16, Issue 1, 2021, p. 69, <https://digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=1326&context=jtbl> (accessed on 27.03.2022).

The first condition refers to database as a collection of works, data, or other items which „involves the fact that the database must be composed of multiple elements grouped in the same place to form a whole unit”⁸¹. The blockchain technology fulfils this condition considering that each block contains a series of information.

The second condition establishes that the works, data, or other items must be independent. The law does not define the „independence”, but in a preliminary ruling, the CJEU established that the materials are independent if they „are separable from one another without their informative, literary, artistic, musical, or other value being affected”⁸². In case of a blockchain, each block constitutes an independent element in relation to the whole chain, „the individual information, like a financial transaction (having) autonomous information value”⁸³ and therefore this condition is met.

The third condition establishes that the works, data, or other items must be arranged in a systematic or methodical way. This means that data must be arranged according to specific rules⁸⁴. We consider this condition to be also fulfilled by blockchains having in view that each block is arranged chronologically, and the network can verify the validity of each information.

And the fourth condition refers to the fact that works, data, or other items must be individually accessible by electronic or other means, in other words the elements of a database are individually accessible if they can be retrieved⁸⁵. In case of blockchains, the users of certain applications may access and consult the chain in its entirety but also an individual block from the chain and this condition is also met by blockchains.

Therefore, we may conclude that the operator of a blockchain, but also the participants in the blockchain network can have rights over the information stored on the blockchain.

In addition to the above conditions, to be in the presence of a database protected by *sui-generis* rights, we must demonstrate also the „substantial quantitative and qualitative investment made to obtain, verify or present the contents of a database”. The law does not establish to what this syntagm is referring to. However,

the CJEU established in its case-law⁸⁶ that this syntagm refers to:

a) „investment in the creation of that database as such”⁸⁷;

b) the „resources used to seek out existing independent materials and collect them in the database, and not to the resources used for the creation as such of independent materials”⁸⁸;

c) the „resources used, with a view to ensuring the reliability of the information contained in that database, to monitor the accuracy of the materials collected when the database was created and during its operation”⁸⁹.

Regarding the condition of the substantial investment, it is considered that since „Bitcoin blockchain, for example, uses (...) special equipment and large amount of computational power” translating into a high amount of electricity consumed, „energy costs alone are more than sufficient to qualify as a substantial investment”⁹⁰, being therefore accomplished this condition.

Despite that blockchain technology meets all legal conditions to be qualified as a database under the Romanian copyright law, other persons argue that, in general, there are differences between a blockchain and a database⁹¹. These differences refer to decentralisation in case of blockchain, each participant having „a secured copy of all records and all changes, so each user can view the provenance of the data” versus centralisation in case of a traditional database. The advantage of the blockchain is that any unreliable information will be immediately identified and corrected „even if a third person maliciously changed” it. In the same manner, any change made by a participant into the blockchain will determine the update of the record and its validation by all participants.

Having in view that blockchain technology meets all four conditions of a database, it results that it is protected by the *sui generis* right of a database.

Protection through copyright. Some authors⁹² asked themselves if blockchain could also be protected as database under copyright. Those authors analysed the IPR under the EU database directive, but this analysis is valid also for the Romanian law because that

⁸¹ S. Von Lewinski, *Database directive*, in M. Walter et S. Von Lewinski (dir.), *European Copyright law – A commentary*, Oxford, Oxford University Press, 2010, p. 692 apud. Hervé Jacquemin, Andra Cotiga, Yves Pouillet, *op. cit.*, p. 255.

⁸² CJEU, Case no. C-444/02, *Fixture Marketing*, p. 29.

⁸³ Sebastian Pech, *op. cit.*, p. 70.

⁸⁴ *Ibidem*.

⁸⁵ *Ibidem*.

⁸⁶ EU database directive is in force for almost 30 years, but the case-law of the CJEU is not so vast, being ruled only 10 decisions in the preliminary ruling procedure.

⁸⁷ CJEU, Case no. C-203/02, *British Horseracing Board*, p. 30.

⁸⁸ *Idem*, p. 31.

⁸⁹ *Idem*, p. 34.

⁹⁰ Sebastian Pech, *op. cit.*, p. 73.

⁹¹ IBM Blockchain Pulse, *What's the difference between a blockchain and a database?*, 2019, <https://www.ibm.com/blogs/blockchain/2019/01/whats-the-difference-between-a-blockchain-and-a-database/> (accessed on 27.03.2022).

⁹² Hervé Jacquemin, Andra Cotiga, Yves Pouillet, *op. cit.*, pp. 263-266.

EU directive was transposed into the national law through the Romanian copyright law.

We know that copyright is granted to authors for original works as of their creation. The Romanian copyright law as well as the EU copyright normative acts do not define the notion of „originality”. Therefore, the doctrine and the case-law had the task to establish the characteristics of the originality. The doctrine has established that „for this condition to be considered fulfilled, the author must not limit himself to a mechanical execution of the work, by ordinary technical means, without making his own contribution in terms of the substance of the ideas which constitute the work in question”⁹³. Thus, the work must bear „the stamp of the personality, of the individuality of the author”⁹⁴. In present, the notion of „originality” is harmonised at EU level following the interpretations given by the CJEU⁹⁵ which indicates the following:

a) copyright can only apply to an object, (...), which is original, being the author's own intellectual creation;

b) an intellectual creation is owned by an author when it reflects his/her personality. According to Romanian case law, the author's personality may be manifested both in the form of expression and in the elements of fantasy, choice, selection of material or mental processing⁹⁶;

c) this situation is found when the author has been able to express his/her creative capacities during the creation of the work by making free and creative choices. According to the doctrine, „at the basis of creative activity lies the author's imagination, the way in which he/she knows how and succeeds in expressing his/her thoughts and feelings”⁹⁷. In addition, the creation of an original creative work „means choosing, analysing, comparing, hesitating, calling on all the resources of taste, intelligence, sensitivity, in a word, creating in a personal way”⁹⁸;

d) the author must be able to give a „personal touch” to the work he/she created.

Regarding blockchain technology, having in mind the characteristics of the „originality”, the conclusion of the authors⁹⁹ was that blockchain cannot be protected as database under copyright and we share this opinion because in blockchain technology the author has few free creative choices, and the content of the database is frequently established by the technical necessities of the structure.

Of course, the information contained in the blockchain may be protected under copyright, but if it meets the criteria of originality. Here also, it is considered that under EU law, the compilation of information stored on a blockchain is not subject to copyright protection in most cases¹⁰⁰.

3.1.3. Protection as patent¹⁰¹

Patents are granted to incentivize innovation and they provide the IP right holder with a legal right to prevent others to make, use, sell, and import that invention for a certain period.

According to art. 27 of the TRIPS Agreement but also to art. 6 (1) of the Romanian law no. 64/1991 on patents („**Romanian patents law**”), patents are available for any inventions, in all fields of technology under three conditions: (a) to be new, (b) to involve an inventive activity and (c) to be capable of industrial application.

As we mentioned earlier, blockchain is a computer program. Having in view that computer programs are protected by copyright, can they also be protected by patent laws?

As a rule, Romanian patents law includes computer programs in the inventions category, as long as the patent application or the patent do not relate to such objects or activities considered in themselves, more precisely when the invention do not refer to the computer program as such, „without any reference to a running device”¹⁰², by a computer program as such being understood „a non-technical program”¹⁰³.

⁹³ Yolanda Eminescu, *Dreptul de autor. Legea nr. 8 din 14 martie 1996 Comentată*, Lumina Lex Publishing House, Bucharest, 1997, p. 77.

⁹⁴ E. Ulmer, *Urheber und Verlagsrecht*, ed. III, 1980, Springer Verlag, Berlin, Heidelberg, New York, pp. 119-125 apud. Yolanda Eminescu, *op. cit.*, p. 77.

⁹⁵ CJEU, Case no. C-145/10, Painer, pp. 87, 88, 89, 92.

⁹⁶ HCCJ, civ. s. I, Decision no. 4244/2011.

⁹⁷ Viorel Roş, *Dreptul proprietăţii intelectuale. Vol. I. Dreptul de autor, drepturile conexe şi drepturile sui-generis*, C.H. Beck Publishing House, Bucharest, 2016, p. 209.

⁹⁸ Aurelian Ionaşcu, Mircea Mureşan, Nicolae Comşa, *Dreptul de autor în Republica în R.S.R.*, Academiei Publishing House, Bucharest, 1969 apud. Viorel Roş, *op. cit.*, p. 209.

⁹⁹ Hervé Jacquemin, Andra Cotiga, Yves Poulet, *op. cit.*, pp. 263-266.

¹⁰⁰ Sebastian Pech, *Who owns the Blockchain? How copyright law allows rights holders to control blockchains?*, Journal of Business & Technology Law, vol. 16, Issue 1, 2021, p. 71, <https://digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=1326&context=jtbl> (accessed on 27.03.2022).

¹⁰¹ The first recorded patent in the world for an industrial invention was granted in 1421 in Florence to the architect and engineer Filippo Brunelleschi (<https://www.britannica.com/biography/Filippo-Brunelleschi> - accessed on 03.04.2022). The patent gave him a three-year monopoly on the manufacture of a barge with hoisting gear used to transport marble. It appears that such privileged grants to inventors spread from Italy to other European countries during the next two centuries (William Weston Fisher, *Patent*, Encyclopedia Britannica, May 27, 2019. <https://www.britannica.com/topic/patent> (accessed on 03.04.2022).

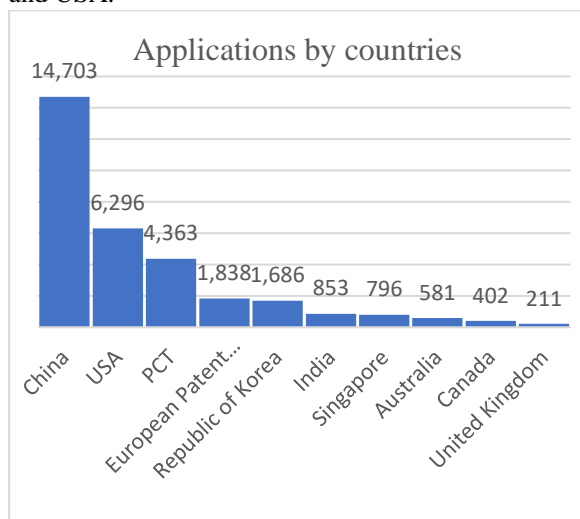
¹⁰² Dragoş Bogdan, Ana-Maria Teodorescu, *op. cit.*, *loc. cit.*

¹⁰³ EPO Board of Appeal, Case no. T 1173/97 <https://www.epo.org/law-practice/case-law-appeals/recent/t971173ex1.html> (accessed on 03.04.2022).

This rule is not stipulated only by the Romanian patents law, but also by the TRIPS Agreement and Patent Cooperation Treaty („PCT”) and if we do not carefully read the legal provisions, we might think that computer programs cannot be protected by patents.

In case blockchain technology would provide a solution to a technical issue, it could also be protected under the patent laws. However, Bitcoin and its blockchain technology are not patented and experts say that „this lack of intellectual property protection [...] allows for Bitcoin and similar cryptocurrencies to improve, grow, and innovate in terms of speed, block time, and use” because „coders have been allowed to copy Bitcoin’s code, improve on it, and since then, newer cryptocurrencies that have spawned can now boast turnaround times in the seconds”¹⁰⁴.

However, by analysing the WIPO’s Patentscope database¹⁰⁵, we may notice that since 2014 until present there are more than 32.800 patents related to blockchain published, the majority having applicants from China and USA.



The most recent interesting patents published from our point of view, refer to „Smart voting system using blockchain”¹⁰⁶, „Method for Alzheimer disease classification using machine learning based EEG Image

segmentation with blockchain technology”¹⁰⁷, „Smart device and tracking system”¹⁰⁸.

3.2. Protection of cryptocurrency

We have mentioned in the above sections that cryptocurrencies are types of currencies functioning on the blockchain technology, not being guaranteed by a central bank, and being created by private individuals or private companies, their use being optional, each person having the possibility to use or not to use cryptocurrencies.

3.2.1. Protection by copyright law

Having in view the above aspects, we are wondering if cryptocurrencies may be protected by the Romanian copyright law. If we analyse the dispositions of this law, we notice that it does not offer protection to payment means. The Romanian copyright law does not offer a definition of the payment means, but the literature¹⁰⁹ established that the main payment means are represented by national currencies, foreign currencies, checks, promissory notes, cards, international coins (special drawing rights).

The reason for excluding the payment means from the copyright protection is based on the public use¹¹⁰ of such payment means. Other authors argue that payment means „involve a creative activity and have originality” and that their exclusion „from copyright protection does not mean that they are not protected and neither that the person who created the work which became [payment mean] does not have a right to reward for his/her creation. This right exists, but it will not be protected by copyright, the transfer of copyright of such creations having the effects of a nationalization”¹¹¹.

Therefore, the question is if cryptocurrencies may be characterised as being part of the public domain¹¹².

Prior to answer this question, we propose to establish what public domain means. Although there is

¹⁰⁴ Peggy Keene, *The intersection of Cryptocurrency and Intellectual Property Law*, 2018, <https://www.klemchuk.com/ideate/cryptocurrency-and-intellectual-property-law> (accessed on 27.03.2022).

¹⁰⁵ The search was made after the word „blockchain” https://patentscope.wipo.int/search/en/result.jsf?_vid=P11-L1J6WB-61989 (accessed on 03.04.2022).

¹⁰⁶ Application number 202211013685 / 14.03.2022 in India Office, https://patentscope.wipo.int/search/en/detail.jsf?docId=IN355391636&_cid=P11-L1J8ZY-72511-1 (accessed on 03.04.2022).

¹⁰⁷ Application number 202211010850 / 28.02.2022 in India Office, https://patentscope.wipo.int/search/en/detail.jsf?docId=IN355007109&_cid=P11-L1J8ZY-72511-1 (accessed on 03.04.2022).

¹⁰⁸ Application number 17506449 / 20.10.2021 in USA Office https://patentscope.wipo.int/search/en/detail.jsf?docId=US350352067&_cid=P11-L1J8ZY-72511-2 (accessed on 03.04.2022).

¹⁰⁹ Teodor Bodoaşcă, *Discuții privind conceptul de operă (de creație intelectuală) și condițiile de fond pentru protecția ei juridică*, Revista Dreptul, no. 5/2016.

¹¹⁰ *Ibidem*.

¹¹¹ Viorel Roș, *op. cit.*, pp. 183, 184.

¹¹² The notion of „public domain” should not be confused with the notion of „public domain” as used in administrative law. The fact that a work has fallen into the „public domain” means that the monopoly on the exploitation of the work, recognised in favour of the holders of the right for a limited period, has ceased and that, from that moment, the work (...) is part of the common heritage of mankind, available to all and may be freely used. Viorel Roș, *op. cit.*, p. 362.

no clear definition of the public domain in any state¹¹³, the public domain can be viewed¹¹⁴:

a) in a narrow sense - it refers to works whose protection by an intellectual property right has expired;

b) in a broad sense - encompasses:

(i) works whose protection by an intellectual property right has expired;

(ii) the common fond, namely information which by its nature has never been protected by an intellectual property right (e.g. ideas, theories, concepts, scientific discoveries, processes, methods of operation or mathematical concepts, official texts of a political, legislative, administrative or judicial nature and translations thereof, news and press information, etc.);

(iii) the consensual public domain or voluntary public domain, namely works protected by copyright which are voluntarily put to free use by authors or copyright holders. They are considered to represent a „breathing space“¹¹⁵ for our culture and knowledge because they allow free interaction between them and any person, and according to legal doctrine¹¹⁶, the public domain is the rule, while protection through intellectual property rights is the exception.

Works in the public domain can be used by anyone at any time without further consent being required.

Coming back to our inquiry if cryptocurrencies may be characterised as being part of the public domain. To find a response to this question, we must analyse two conditions. Are cryptocurrencies addressing to the population and must be known by all citizens?

From our perspective, in order fall in the public domain, these two conditions must be cumulatively met. Cryptocurrencies are addressing to the population since any person may buy and sell units of cryptocurrencies. As for the second condition, cryptocurrencies are not compulsory to be used, nor to be accepted as payment for products and services. Therefore, cryptocurrencies do not have to be known by all citizens. There is also an exception, namely the case when a cryptocurrency is adopted as national currency, as it happened in September 2021 with

Bitcoin in El Salvador. However, even if Bitcoin is recognised as a national currency in El Salvador, it seems that most companies in the country do not use it for their business, only 14% of the respondents to a survey saying they have transacted in Bitcoin since it became national currency¹¹⁷.

Having in view that the two above conditions are not cumulatively met, we might say that cryptocurrencies are not part of a public domain, but of the private domain. This means that may be protected by copyright and no other person may make a business from the same cryptocurrency launched by another person.

3.2.2. Protection by trademark law

In addition to copyright, cryptocurrency may be protected by trademark laws, but not as easy as other products and/or services because „[a] cryptocurrency may not qualify as a product or service if its sole function is merely as a medium of exchange, such as a traditional currency. However, a good or service associated with a function could enable a cryptocurrency name to be trademarked“¹¹⁸. The creators of cryptocurrencies are advised to register the name of their cryptocurrency if they do not want to be in the same situation as the creators of Dogecoin which faced challenges to use their name in the USA because other persons had sought registration for the name¹¹⁹.

3.2.3. Protection by patent law

In case a cryptocurrency fulfils the conditions of a patent mentioned in one of the above sections, it may be protected as such. However, in USA, for example, patent applications for cryptocurrencies were rejected because they were found „abstract“ and to be simply „organizing human activity“. To successfully register a patent related to cryptocurrencies, „[a]pplicants must show that they have actually changed the underlying (blockchain) technology to achieve a specific result“¹²⁰, in other words that the new envisaged technology for protection brings a solution to a known technical issue.

¹¹³ Séverine Dusollier, „Scoping study on copyright and related rights and the public domain“, World Intellectual Property Organization, p. 6, www.wipo.int/meetings/fr/doc_details.jsp?doc_id=161162 (accessed on 27.03.2022).

¹¹⁴ Melanie Dulong de Rosnay, Hervé Le Crosnier, „Propriété intellectuelle. Géopolitique et Mondialisation“, CNRS Editions, 2013, Les Essentiels d'Hermès, 978-2-271-07622-9, halshs-01078531, p. 20, <https://halshs.archives-ouvertes.fr/halshs-01078531/document> (accessed on 27.03.2022).

¹¹⁵ Public domain manifesto, <https://publicdomainmanifesto.org/manifesto/> (accessed on 27.03.2022).

¹¹⁶ Melanie Dulong de Rosnay, Hervé Le Crosnier, *op. cit.*, p. 28.

¹¹⁷ Michael D McDonald, *El Salvador's Companies Barely Bother With Bitcoin*, 2022, <https://www.bloomberg.com/news/articles/2022-03-18/el-salvador-s-businesses-barely-bother-with-bitcoin-study-finds> (accessed on 27.03.2022).

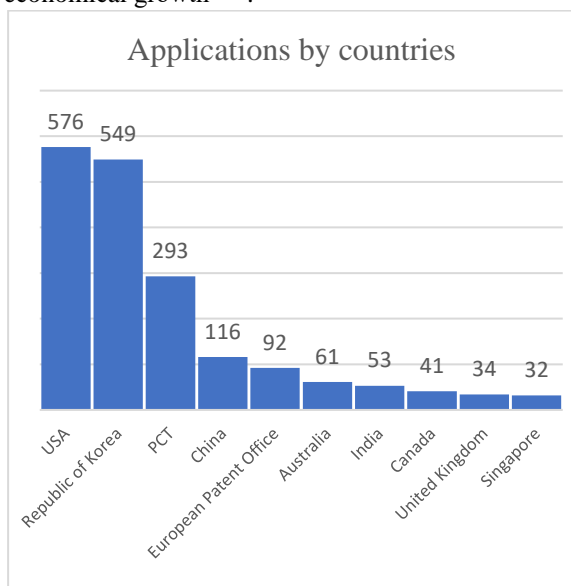
¹¹⁸ James E. Rosini, Christopher Gresalfi, *Timely Trademarks Are Important to Crypto: Dogecoin Disputes Illustrate Potential Naming Issues*, *The National Law Review*, vol. XI, no. 280, 2021, <https://www.natlawreview.com/article/timely-trademarks-are-important-to-crypto-dogecoin-disputes-illustrate-potential> (accessed on 27.03.2022).

¹¹⁹ Derek Andersen, *Dogecoin Foundation registers name and logo as trademark within the EU*, 2022, <https://cointelegraph.com/news/dogecoin-foundation-registers-name-and-logos-as-trademarked-within-in-the-eu> (accessed on 02.04.2022).

¹²⁰ Jonathan Solomon, *Patent Protection for Cryptocurrencies and Blockchain Technology*, 2021, <https://www.inhouseops.com/2021/08/patent-protection-for-cryptocurrencies-and-blockchain-technology/> (accessed on 03.04.2022).

However, by analysing the WIPO's Patentscope database¹²¹, we may notice that since 2014 until present there are more than 1.900 patents on cryptocurrencies published, the majority having applicants from USA and Republic of Korea.

The most recent patents published involve also the artificial intelligence and machine learning and most interesting patents, from our point of view, refer to „The effect of Bitcoin & Cryptocurrency on digital marketing & Business”¹²², „Method and system for real-time exchange of non-fungible tokens (NFT) in a distributed ledger based network”¹²³, „Machine learning to analyse the impact to crypto currency on economical growth”¹²⁴.



3.3. Protection of non-fungible tokens

As previously mentioned, NFT is not a work of art, but a „token of that work (of art)”¹²⁵.

Usually, the buyers do not receive copyright over the purchased good, except for few situations, more precisely when the NFT is working on a platform that is developed with copyright transfer; however, there are not many such platforms.

Also, having in view that NFT is not a work, buyers do not purchase the work itself, „but rather a

digitally signed ledger entry of a work”¹²⁶, in other words they buy the code in which the respective work is written. This may be compared to a copy of a book purchased from a bookstore or at an auction which does not transform the buyer into a copyright holder of the content of the book, but only into the owner of a physical support¹²⁷ of the content.

While there might not be issues regarding the legal protection by IPR of an image under NFT made after the own work of an artist if copyright conditions are fulfilled, most important one being the originality, for certainty there are legal issues when an NFT copies the image of a third person's work, including but not limited to designs, trademarks, works protected under copyright such as photos, paintings etc., in other words if an NFT is infringing the IPRs of third persons.

For instance, we have the case of Hermès Birkin bag which was reinterpreted in a NFT by the artist Mason Rothschild and was named „Metabirkin”. In this case, Hermès sued the artist for trademark infringement, trademark dilution and cybersquatting based on its earlier registered trademarks¹²⁸ which refer to (i) the name „Birkin” and to (ii) the shape and look of the bag. Even if this lawsuit is judged based on USA law, it will be interesting to see the court's decision considering that there are general rules of trademarks which are applicable in most jurisdictions, namely that trademarks are protected, as a rule, only for the goods and/or services they are registered for. Also, the most interesting aspect to see is if the court will consider that the artist infringed Hermès trademarks, having in view that the later are registered for products, namely for leather or imitation leather goods, while the NFT is only a code that runs an image in the digital world.

From our perspective, the court should rule in favour of Hermès because irrespective of the fact that NFT is not a leather bag *per se*, the author used without permission, in the online environment, the design of the bag and the trademark.

There are authors arguing that NFTs are not infringing IPRs, even if they are created without authorisation, because it does not exist a direct relationship between NFTs and the work that was used

¹²¹ The search was made after the word „cryptocurrency” https://patentscope.wipo.int/search/en/result.jsf?_vid=P11-L1J6WB-61989 (accessed on 03.04.2022).

¹²² Application number 202211011145 / 02.03.2022 in India Office, https://patentscope.wipo.int/search/en/detail.jsf?docId=IN355007631&_cid=P11-L1J7P1-65989-1 (accessed on 03.04.2022).

¹²³ Application number 202241010924 / 01.03.2022 in India Office https://patentscope.wipo.int/search/en/detail.jsf?docId=IN355008215&_cid=P11-L1J7P1-65989-1 (accessed on 03.04.2022).

¹²⁴ Application number 202241008070 / 16.02.2022 in India Office https://patentscope.wipo.int/search/en/detail.jsf?docId=IN352550272&_cid=P11-L1J7P1-65989-1 (accessed on 03.04.2022).

¹²⁵ Andres Guadamuz, *op. cit.*, p. 1372 about the sale of a tweet, explaining that the tweet was never for sale, being in fact sold an NFT of it.

¹²⁶ *Idem*, p. 1377.

¹²⁷ We mention this as a response to the actions of a book's buyer at a public auction who believed he had acquired the copyright over that book <https://www.theartnewspaper.com/2022/01/17/nft-group-shamed-jodorowsky-dune-book-copyright> (accessed on 04.04.2022).

¹²⁸ For more details, the complaint of Hermès International and Hermès of Paris, inc against Mason Rothschild, https://media-exp1.licdn.com/dms/document/C561FAQFKSHDkqULgsw/feedshare-document-pdf-analyzed/0/1643212129525?e=2147483647&v=beta&t=3_q8Zn7fDJRXBPE-UulyZhyyJIiwke6zfe5cpNRZJIAQ (accessed on 04.04.2022).

to create them¹²⁹. We do not agree with this point of view because the infringement does not relate to the NFT code, but to the image ran by the NFT code. Is like we would say that the image of a famous painting or that the image of a Ferrari car together with its trademark could be used in a video game without constituting infringing of the IPRs.

NFTs are at the beginning of their journey and even if there are many opinions saying that they will change the art world for better, making more secure the rights of authors, we have our doubts because we think that NFTs will open new ways to produce counterfeits of works in the digital world, NFTs being possible to be created without the permission of the author of the original work.

4. Conclusions

Blockchain, cryptocurrencies and NFTs are still new, not many people are used to them or open to use

them in their activities. However, they started to be explored more in recent years.

We noticed from this paper that blockchain, cryptocurrencies and NFTs are linked together, they are interacting with one another and the latter two are functioning on the blockchain technology. While blockchain technology is independent, cryptocurrencies and NFTs are dependent to blockchain.

They also have a strong link with the IP, being able under certain conditions to be protected by different rights, such as copyright, trademarks, patents.

Only time will tell if they survive and would be used by an increasing number of people. Also, from our point of view, in case they will survive, the legislators should think to regulate them in order to establish specific rules for them.

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¹²⁹ Andres Guadamuz, *op. cit.*, p. 1385.

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