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Blockchain and intellectual property: a stronger chain of knowledge or a knowledge strongly chained?

SUMMARY: 1. Introduction. – 2. Legislation. – 3. Blockchain and IP. – 4. Digital process. – 5. Patents. – 6. Final remarks

1. *Introduction*

Blockchain is a relatively new technology created by Satoshi Nakamoto, [2] a pseudonym for the mysterious and elusive publisher(s) of an article describing how cryptography, combined with a distributed public ledger, could be used to create a safe system for managing information. This technology, supported on another system with respect to the traditional one, is considered as «the next step in the peer to peer economy» (1) allowing to avoid centralized authorities, such as multinational companies. A "central server" is needed, where

[1] This working paper constitutes the outcome of the researches carried out by the author in the context of the "Luiss Adoption Lab" project organized by LUISS "Guido Carli" University in cooperation with Portolano Cavallo.
[2] This entity is also the creator of Bitcoin.

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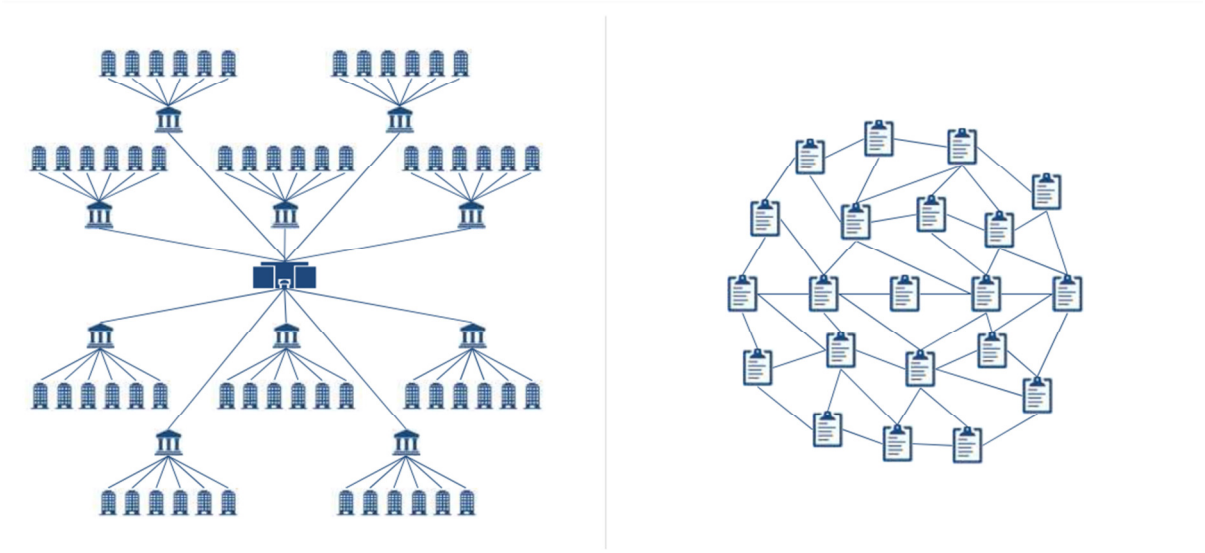
the "nodes" transmit to each other a part of the file they have received. In this way, data can spread in different computers, each one serving both as a client and as a server, able to download and to send files, respectively. The data movement from one node to another is called "data propagation" and "latency" is the time it takes for data to travel from their starting point to the point of destination.



Example of peer to peer network [Presentation of Giancarlo Bruno]

Blockchain is organized in "blocks" that contain information about a certain number of transactions. All the transactions are validated through electronic signatures. A copy of this information is shared in all the synchronized computers. Each block contains a reference to the previous block's hash (i.e. chaining) creating a chain of records that is considered impossible to falsify (2). No user can remove it. While destroying or corrupting a traditional ledger requires an attack on the middleman, doing the same to a Blockchain requires a simultaneous attack on every copy of the ledger simultaneously. It goes without saying that the more are the nodes connected to the Blockchain, the more this system becomes difficult to falsify.

Blockchain technology solves various kinds of problems «enabling people to coordinate individual transactions in a decentralized manner without the need to rely on a trusted authority to verify and clear all transactions».[3] This allows to create a sharing system in which every exchange of data is verified and impossible to censor (3).

2. *Legislation.*

Given the speed of its development since its introduction in 2009, Blockchain technology has gathered the interest of different countries in the world. It, needs, indeed, to be regulated for recognising its effect as legal in each state (4). A comparison to highlight strong and weak points of different Blockchain's rules can be performed on various legislations.

While in the USA legislations are growing constantly to recognise deed validity carried out with Blockchain, in Europe the process follows a different path. The European Parliament members (MEPs) voted Jakob von Weizsäcker 's proposal,[4] titled «MEPs call for virtual currency watchdog to combat money laundering and terrorism». This seems to indicate that MEPs voted in favour of a severe approach to the regulation of Blockchain technology. However, the title is misleading, as noted by the International Business Times, since von Weizsäcker's proposal clearly states that this technology should not be distressed by strong regulation at this early stage. The approach chosen by European institutions could be summarised with the following sentence: «How do we regulate all this legal-ish innovation? Harsh regulation will kill the innovation. No regulation will likely result in enormous meltdowns. Strategy is hard to define here» (5).

[3] See also J. BONNEAU et al., *Research Perspectives and Challenges for Bitcoin and Cryptocurrencies Decentralized Blockchain Technology and the rise of lex cryptographia* (p. 19).
[4] Since 2014 Jakob von Weizsäcker is a member of the European Parliament where he is a member of the Committee on Economic and Monetary Affairs.

As mentioned above, in the USA and in other Countries a different approach was followed to tackle Blockchain regulation: at least eight US States have worked on bills accepting or promoting the use of Blockchain technology this year, and a couple of these States have already passed them into law. The State of Arizona recently passed a bill that explicitly defines and supports Blockchain technology for public use. Meanwhile, Nevada's Senate authorized the use of Blockchain technology and smart contracts by Nevada residents.[5] Other States, such as Illinois, Maine and Hawaii, are conducting a deep investigation about the technology, its applications and the several aspects of Blockchain that could help the economic development of these States. The most relevant and recent legislation surfaced in Vermont, where every fact or transaction verified through use of Blockchain is "authentic", with a legal bearing in a court of law. Every registration or operation performed through Blockchain could be used in court as a proof: it certifies information about facts and about the subject who brings them about (6).

Gulf Cooperation Council (GCC) countries, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates, are also interested in this new phenomenon. Marmore MENA Intelligence is a research subsidiary of the Kuwait Financial Centre, Markaz, that recently released a ten-page report titled «From Bitcoin[6] to Blockchain». This report examines the potential impact that Blockchain technology could have on various industries in the GCC region. The GCC region has been generally slow to adopt disruptive technologies because of a lack of investments. In contrast with majority of GCC countries, Dubai strives to build everything on a Blockchain and to obtain the transparency of products through a shared ledger service for Islamic investments. The objective is to take advantage of Blockchain technology's benefits to simplify government and bureaucratic processes (7).

[5] Smart contracts are a kind of contracts which entails to carry out automatically transactions upon certain conditions and to verify the execution of these transactions through a "performance guarantee".
[6] Bitcoin is a digital currency using Blockchain Technology and it is independent from any government or bank.

A comparison among different approaches for a single State could be useful to choose the best way to apply Blockchain technology. The European approach is the softest and most flexible one: it allows to study the technology and to adapt its regulations in relation to any future change. On the other hand, a detailed rule could be a cutting-edge tool for any government, considering the impressive impact that Blockchain now has and will have in the future in our lives.

It is noteworthy to state that, if each country gave a mandatory regulation of Blockchain, international coordination would be prevented and the application of such a versatile technology would be limited.

3. *Blockchain and IP*

Blockchain technology is characterised as being "open" and "free", allowing a free access for all privates to the system, resulting in a high versatility. At the beginning, it was used for Bitcoin cryptocurrency, but in the future its applications could be various. Since Blockchain gives the possibility to trace every transaction carried out on the internet, it would ensure more transparency, reduce payment scams and guarantee an increased storage and reward users (8). Those capabilities entail an increasing use of Blockchain in various fields:

- Finance: security of settlement and possibility to cut-out middleman; decreased price of transactions.
- Contracts: conclusion and verified execution of transactions, simplifying legal process;
- Patent and copyright: through the identification of ownership of works;
- Produced traceability: sharing of key and verifiable information about product's history and creation;[7]

[7] Presentation of T. SCHAEFFER -Blockchain Engineer at Provenance.

- Energy: energy monitoring and simplifying electricity trading and sharing for solar owner.[8]

It is unthinkable to summarise the innumerable applications of Blockchain in a single list. Blockchain technology finds a series of new uses on a daily basis.

Blockchain could play a relevant role in the intellectual property field and, particularly, in the management of the private interest in the identification, attribution and payment of a digital work.[9] If Blockchain ensures more transparency and recognises, for example, the ownership of a photo, a romance and any other form of art, without manipulations, it is clear that it could play a key role in copyright protection.

Blockchain raises the issues about digital property, including the intellectual property system applied to intangible works. Property is defined by law as set of registers which determines the ownership of things. Therefore, all this information is concentrated in one entity which must to be trusted by users. The interest behind property, according to Penner (1997)[10] is the interest to use, or to determine the use of things, exclusively. This interest is satisfied if two elements are ensured: the exclusion right and the right to see property recognised by the others. This idea of property could allow to deduce that the basis of property is the "information", therefore property is information. Taking this way of thinking as valid, Blockchain could represent a self-sufficient system that allows the universal recognition of the Blockchain as property by other users and the respect of exclusion rights, without the need of an authority.

Therefore, one of the challenges faced by supporter of Blockchain is to use it for solving well-known problems on intellectual property. This realm is characterized by an insufficient protection for the two parties involved, both creators and users. Often, indeed, both parties do not have the same information about the same work. For example, if a creator uploads its

[8] Presentation of F. SONNET - solar energy Blockchain Advisor.
[9] Digital work is an artistic work created using digital technology.
[10] James Penner wrote *The idea of property in law* (1997) where he elaborated a theory of property. Is also possible to apply this theory to Blockchain.

work on the Internet, such as an image, the consumer will not know anything about the right on this work and the creator will not have information about who is using the work and for what. A lack of transparency is recorded in the IP system: a browser, like Google, allows all users to copy and use an image without any limitation. This could entail, constantly, a violation of intellectual property rules. Moreover, this means an infringement of the creator's right to be payed and to get recognized their work. Therefore, the necessity of a new kind of protection derives from a new circumstance: art, music, innovations, trademarks and all the other objects of IP landscape are changing and are adapting to a digital domain. In parallel to common art, "net art" is born, and music is shared online on different platforms.

There are two conflicting interests for intellectual property to be protected: one covers with the possibility for the community to be informed and to take part in cultural life and education. The second one is the author's interest called "material interest", that is the interest to obtain the commercialization of their original work. There is an unequal treatment between the creator of a physical work and creator of an immaterial work. This asymmetry would entail, in general, a smaller production of creative and cultural works, as well as a smaller participation in cultural life and a distrust in law.

«The debate is about the nature of intellectual property law and how principles that are used to govern ownership and protection of tangible physical property could or should also apply to the intangible digital space» (9). Specific questions should be raised: if creations of human mind are changing, is the protection for tangible property adequate for these new products?

If the answer is no, what could be a solution? Blockchain has been used as a solution for ensuring a broader transparency in the contractual process and for recording, in detail, history of ownership, provenance, value of a digital work. Indeed, Blockchain consists of a database where all the information is public and synchronized in real-time (10) and no one can delete information once it has been added. Every block, with its unique cryptographically generated code, ensures that transaction records are not duplicated and anyone could prove

the validity of the block. Any computer can read, verify and give visibility to the transaction. Recognising the legal significance of facts carried out with Blockchain means finding a potential solution for providing perfect provenance of works.

Today the web offers different digital places where it is possible to record and protect original works against forgery. Their main purpose is to prevent these works from unauthorised through of a registration certificate as proof of authenticity. The next section is dedicated to their use.

4. *Digital process*

Monegraph's Blockchain-based licencing and cataloguing system may certainly facilitate financial compensation of artists. It is a platform that grants licenses, advertisments and sponsorship for supporting users, guaranteeing a wage to media owners and doubling their audiences. Monegraph's platform is very persuasive with its promises: it mentions «a new self-sustaining ecosystem» in which artists support each other and express themselves in a proper way: by protecting their media contents. Indeed, some of their slogans are "Call to Creators: Take Control of Your Media" or "Everyone can do it"[11]. Everyone can upload a photo, a video or another media file, while respecting a set of conditions. One must: be the creator of the work, have the legal authority to sell the work, have the source file. This allows creators to choose the most suitable license according to their needs. It supports four different licenses: two for non-commercial use and two commercial licenses. The fee is guaranteed through the registration on "Stripe", a platform for online payments. Stripe enables a direct

[11] See at https://monegraph.com/home: «The world's most talented content producers and their publishing partners use Monegraph to establish secured media rights transactions with hundreds of specialized online publishers (websites, blogs, subscriptions services). This self-syndication ability multiplies the points of distribution, enabling a content owner to reach new audiences and unlock incremental revenue opportunities. By effectively sharing transaction payments across the value chain — with Monegraph directly compensating the publisher/distributor, the creator of the media, and associated talent — Monegraph helps the media owner incentivize distribution channels to expand reach».

compensation from the buyers to the sellers. This mechanism appears to personify the capitalist ideal, favouring private property models over collective cultural ownership.

Is Blockchain a financial technology or «wealth of possibilities for mutual prosperity» (11)? Since throughout the twentieth century art has become more fully integrated with the logic of capital, has the digital emerged as an effective container for financial activities?

Digital art, also called net art, is a new generation of human skill, characterized by the use of digital tools, such as Photoshop, Gnu Image Manipulation Program[12] and PicMonkey.[13] These programs offer different creative possibilities and allow the development of genuine masterpieces. The web is full of digital artists who use their informatics abilities to express their style. Alberto Seveso is one of the most relevant Italian digital artists. He uses art to promote famous companies, such as Sony or Nike. The value and price of digital art are items of deep discussion: some are convinced that it is impossible to make a comparison between works created through the use of digital tools and the classic forms of art, that include paintings and sculptures. These are recognised as precious objects worthy of collection. The same value is not attributed to digital art. However, if art is defined as being produced by human activities using a specific technique or method[14] it is easily understood that digital art should be equivalent to traditional art. Using colours and images in amazing creative and innovative way shouldn't be considered a form of an art work? Similarly, a digital picture which imparts a lesson or brings up an emotion and which makes shake soul shouldn't receive the same treatment of a physical work? Nowadays new markets are rising to valorise digital artworks. Despite being notorious to fence in creative expression as private property, Monegraph creates a market where authors of digital works are supported and financialised.

[12] GIMP is a cross-platform image editor for graphic designers, photographers, illustrators and scientists.
[13] PicMonkey is an online photo editing and design service.
[14] See this definition in Corriere Della Sera dictionary under the item "arte".

5. *Patents*

A partially different point could be made about patents, as part of intellectual property. Patents have a relevant impact on our life because they protect innovations aimed to solve every day or health problems: they may expand the options and wellness of all people. Therefore, ensuring a real protection to them appears to be even more urgent. In February 2017, Science and Technology Options Assessment (STOA)[15] published a document addressed to the member States and staff of the European Parliament about "How Blockchain could change our life". It concerns the different uses that Blockchain could have in various field of "everyday life": currencies, patents, electoral system, public service, electricity trading … This title was possibly chosen to impress. However, the effects that this technology could have if it were applied to its maximum potential do not have to be underestimated. The chapter about patents is called "Patents: protecting innovators while incentivising innovation", a pun that is very incisive. The title goes to the heart of the issue: how to protect and how to incentive – two different rights, two different current interests, two different problems right now. The patent system is an exclusive right that recognises the innovators to sell, use and produce the protected invention for a specific time –for a minimum term of 20 years by the registration (WIPO).[16] The applicable system for the protection of intellectual property shows an unsuitable regulation. The patent system shows problems that prevent the innovators from exploiting their ideas: they often receive no payment and their work is frequently not properly attributed. One of the reasons is due the fact that the patent system is complex and insufficient for a new generation of innovations. Every State uses a different protection and regulation and all these situations involve some firms preferring to take the risk of

[15] The STOA Panel forms an integral part of the structure of the European Parliament. It is composed of 25 Members of the European Parliament.

[16] WIPO - World Intellectual Property Organization- is an international organization created in 1967 «to encourage creative activity, to promote the protection of intellectual property throughout the world» (Preamble, second paragraph of the Convention).

bringing their innovations to the market without any patent protection at all. Impacts and development are expected with the application of Blockchain to the patent system: an incentive for creators to develop innovations, as these will find a protection. Promotion of innovation is entailed, whilst making new possibilities available for the community. Moreover, publication of patents entails a growth of fair competition, avoiding monopolies and to guaranteeing an implementation of works. Equally, a fair competition on this field ensures the possibility for consumers to choose the best option for themselves (12). Blockchain could allow common policies in patent system within and outside the European Union, and therefore a better disclosure of technical innovations and solutions to technical problems.

6. *Final remarks*

This article was meant to discuss intellectual property problems with respect to a regulation no longer suitable: a constantly evolution of "digital" content increases uncertainty correlated to its protection. Property ledgers, used for tracking legal rights, are hard to access, find and research, and easily to manipulate or duplicate. In contrast, Blockchain promises to simplify this process and create an efficient, certain and secure system (13).[17] In the intellectual property system, Blockchain could became an institution able to replace legal institutions. Fairfield (2014) suggests that Blockchain technology has the potential to disrupt and reshape existing legal norms regarding digital property rights. He affirms that the law of intellectual property does a poor job safeguarding intangible digital property rights, and suggests a replacement in the form of a new law of information property that could also provide governance for distributed ledgers. He does not suggest a replacement of legal structures,

[17] Cfr. J. A. Fairfield, 2014. «BitPropert», *Southern California Law Review*, Vol. 88:805, pp. 872-873.

but rather suggests a hybrid solution of «bitproperty» (14).[18] While it is unsure if Blockchain could be an institution of property, it's global impact is evident. Blockchain should be regulated through an international approach, without denaturalising the technology: regulating it as a protocol for tracking information about opposite interests in property field. Furthermore, a discussion that includes different entities, such as multinational, industry, consumer and jurist is necessary to have a multi- disciplinary perspective and apply a proper approach.

Finally, studying the impact of Blockchain in this realm, it is impossible not to consider the sphere of human rights, often omitted. Blockchain technology appears like "deus ex machina",[19] which solves concretely and optimally the situation. On the contrary, allowing inventors and artists to deny access of their works to people should be an infringement of the idea of open source, of the right to be informed and to take part in a development of science and culture (15). Goods that could increase social wellness become private and not freely accessible, would go against public interest. Reflecting on this issue means having to consider in a separate way the different intellectual property categories: in copyright field, Blockchain could be a credible solution to incentive art and to recognise ownership of works. Instead, in the patent system, if Blockchain is used to govern effects, some limitations should exist to prevent basic inventions and techniques to be denied to people with less financial means.

Not all people have the same possibility to enjoy technological progress and Blockchain could become that insurmountable wall between who can and who cannot. Technological progress, as well as art and culture, really have the power to improve our lives and this is an inviolable right for humanity. An evidence of this is traceable in the Article 15 par. 2,3 and 4 of the International Covenant on Economic, Social and Cultural Rights, that states:

[18] METAPHILOSOPHY «Blockchain Technology as an institution of property», 48, 5, October 2017, p. 668.

[19] This expression (in ancient Greek "ἀπὸ μηχανῆς θεός") is used to talk about someone or something who solves an unsolvable problem with an unexpected intervention.

«2. The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for the conservation, the development and the diffusion of science and culture.

3. The States Parties to the present Covenant undertake to respect the freedom indispensable for scientific research and creative activity.

4. The States Parties to the present Covenant recognize the benefits to be derived from the encouragement and development of international contacts and co-operation in the scientific and cultural fields».