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## Impact of Technological Blockchain Paradigm on the Movement of Intellectual Property in the Digital Space

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**Abstract:**

*The article is dedicated to investigate the problem of influence of cutting edge digital technology on the virtual and real legal relations, related to the movement and the turnover of intellectual property.*

*Using the method of analyzing modern definitions of blockchain, and relying on the political-economic theory of social redistribution of wealth, authors define the term blockchain and its principles as a technological paradigm.*

*Authors conclude the fact that blockchain can be used to guarantee intellectual property rights and it should be accepted at the national level.*

*As a mechanism of a trusted environment, blockchain allows to reduce transaction costs and increase the level of commercialization of intellectual property.*

**Keywords:** *Blockchain, intellectual property, paradigm, smart contracts, digital civil transfer, digital economy.*

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## **1. Introduction**

The 21<sup>st</sup> century has become the epoch of technological revolutions, which have led to the paradigm transformation in the ways rights and legal provisions of socio-economic phenomena are approached, which is explained by the wide-spread use of information technology. Blockchain and other digital technology set the new paradigm of human existence, disrupting the traditional hierarchical systems and forming new physical dimensions (Japparova and Rupeika-Apoga, 2017).

The emergence of civil digital transfer and blockchain transactions with results of intellectual activity, require the necessary information collection and analysis regarding the character of changing rights and obligations of parties, impacting their interest regarding the deal, which in turn increases the value of intellectual products and stimulates the formation of values (Saksonova and Kuzmina-Merlino, 2017).

The topic is very relevant, especially given all the mention given to the digital economy in legislation, presentations by leaders of the IT industry, are in one way or another connected to the universe on non-material assets and their “tokenisation” with the use of blockchain. Experts in different fields, competent enough to discuss and hypothesize regarding the topic of blockchain, have diverging points of view. Some believe that blockchain is a new method of trust. Others associate blockchain with bitcoin and other cryptocurrencies. Lawyers are more pragmatic in defining blockchain. They define blockchain as an electronic book of in-out transactions, storage of information about rights, automated business process. Obviously, the views about new technology and its potential are so basic and reflects reality, similar to the flight equipment that Icarus used when compared to the high-speed aircrafts. Therefore let us define blockchain at first, as the expression used by Walter (1988) regarding the need to agree on the definitions given the conditions of paradigm and mental changes that we talk about is highly relevant.

## **2. Methodological approach toward understanding blockchain**

Organizational and technological composition of blockchain can be associated with a data base or some sort of register. However, such comparison is only applicable if we compare the shape. In a sense, the system of blocks is significantly different from any traditional data base.

First of all, the subjects forming the system are equal and interact on the principals of social consensus, trust and self-interest. Secondly, blockchain registers may not only be used for storage, but also to determine and transfer synchronized, automated, coded information about any property. It is also widely used and consumed. Thirdly, the presence of technological capabilities to transfer and exchange electronic code between the right holder and consumer creates the price for the object, defined by the agreement between parties, demand, expressed by the number of users of the code. And finally, active data based of non-material assets require the presence of

one party, responsible for the actualization and the preservation of data. Therefore, any operations by right holders regarding the objects in the register need to be delivered to the administrating subject (for example, the use of agreements for EVM, invention, industrial sample, trademark, selective achievement). Such organization implies the trust from the right holders to the subject, that is administrating the register or other data bases.

The content of blockchain is related to the problem of social benefits redistribution with or without government involvement, which has been carefully investigated since Aristotle. He related the meaning of fairness and equality with the approach of redistributing privileges and material benefits in society (Vovchenko *et al.*, 2017).

The epoch of industrial revolution and development of money exchange relations, has given the opportunity to formulate the main principles of redistribution, and the problem of social redistribution of national wealth has become the subject of special research amongst the representatives of political economy (A. Smith, D. Ricardo, K. Marx and others). Thus, according to A. Smith (1935), the development of wealth of nations is directly related to the means of exchange and income distribution within the society. Radical changes in the view on redistribution is related to the social nature of redistribution. In the framework of this approach the problems of public income distribution between social groups has been investigated, discovering the main tendencies to change the distribution shares (Albekov *et al.*, 2017).

Finally, in the 19<sup>th</sup> century, the representatives of the theory of social redistribution have proven, that redistribution is not regulated by economic laws, but by legal norms and customs, depending on the political organization in the society. Thus, E. Durning (1893) devotes a special role to the social-legal factor as a necessary requirement for economic redistribution in various historical periods.

Smith's (1935) idea that normal functioning of the public system doesn't need the centralized government regulation, was accepted and developed by the economists in the 20<sup>th</sup> century. For example, H. Demsetz (1973) investigated such means of coordinating the economic system, as technology, consumer preferences and price manipulation. In turn, R. Coase (2007) has proven the impossibility of successful centralized economic management. He has explained the theory of transaction costs as the barrier for exchange development and agreement between individuals regarding the use of imperfect information. Blockchain technology is in fact the method to reduce transaction costs. It simplifies contract composition and distributes resources via price mechanism.

The working of R. Coase (2007) firstly presented in the 30s, may serve as an instruction to ensure profitability and stability of blockchain startups. We suppose, that he has explained the reasons for a short lifespan amongst these firms. In fact, he mentioned, that the inventions and other innovations, that simplify and improve the management techniques lead to firm growth. Larger firm size in turn produces more

transactions, which is the reason for decreasing effectiveness of the company, due to the misbalance of organizational costs within the firm and marketing costs, which disrupt the balance between initiatives and management.

Therefore, blockchain is a new technological paradigm, that establishes the physical environment for scientific and applied sphere of human activity, related to extraction of cumulative value, transformation into the digital form and transfer via the automated exchange without third parties.

### **3. Applications of blockchain in the sphere of intellectual property**

The use of blockchain technology has been simplified for the user to the maximum level. Digital image of intellectual property is registered by the rights holder in the journal. Attestation services of the platform ensure the legitimacy of the statement about ownership of non-material assets. These attestation services use hashing or time intervals.

Hashing in a sense is a method of coding the exact content of the initial file, via a mathematical algorithm of data synchronization. The result of the process is a hash, a line of 64 symbols, that serve as a unique identification of the file. The small size of hash makes it possible to integrate it as text into any blockchain transaction, thereby creating a mark, that is protected from any changes over time. Thus, blockchain becomes a register of approved digital objects.

Non-material assets are registered in register-journals and are managed by those, possessing secret key. The sale of the asset is performed via the use of smart-contracts (works as a trading platform), eliminating human factor and performed automatically, which is accompanied by the transfer of the secret key to the purchasing customer. The principles of blockchain functioning are established by the decentralized system of digital image distribution of material and non-material assets, as well as forms of the distributed register, based on the third generation of IT technology. These include:

- All the participants have information access, however no one has control over the information;
- The system doesn't have a hierarchy, amongst the many blockchain nodes, there is no dominant node;
- System of transactions is transparent and pure, each operation is available to everyone, who has access to the system;
- Trust for the system is defined by the number of users.

Record of all transactions is unchanged and with the help of hash (electronic code) it is possible to compare and verify the real object and image of the initial information, which was the basis for the code.

Full range of capabilities of application of blockchain in the intellectual property sphere cannot be forecasted today, that's why we decide to focus on the current projects. The problem of forming the registers of intellectual property results, used in the digital ecosystem has a number of interrelated aspects. Above all, digitalization of intellectual property has resulted in mass breaching of rights of non-material asset owners. Partly, the situation is explained by the absence of available legal ways of intellectual resources transfer in the Internet network, that are both beneficial for the owner and the user.

In the sphere of copyright object use, the use of blockchain is actualized via the emergence of author rights in the majority of participants of the Bern Convention without any registration. Platforms that are currently active, based on blockchain can be grouped based on the type of the service provided. A range of platforms like "Proof of Existence" (2017) allows the creators of art, EVM programs and other objects, that are easily transformed into digital form to easily prove author right and the dates of documentation. Cryptographical operation of hash creation is performed on the client side, which is in turn included into the transaction, that in turn is included into the block.

The use of platforms of Blockai type allows the right holders to control the transfer of results of intellectual property in the Internet and agree on terms with third parties. After the registration, the creator is issued with a digital certificate of legitimacy, that allows third parties to identify the author of the object or any other right holder.

The breakthrough in the sphere of digital Internet property protection and commercialization are the projects that are similar to Monegraf, Ascribe (2017) that perform the registration of intellectual property rights and contain instruments of automatic protection of published multimedia objects, such as internet websites, computer games, virtual museums and libraries and etc. Wide spreading of various cryptocurrencies creates the economic system of registration, storage, approval and transfer of exclusive rights.

The most important principles of blockchain functioning are "*if you don't pay – you will not get it*" and high "*hacking resistance*" attract attention of the market participants. Based on the blockchain, almost all of the streaming services have been tested in order to eliminate piracy. This problem hasn't been solved, despite implementation of hard-line laws and severe punishments in all the courts around the world. Now the legal methods have given space to high technology.

Blockchain can serve as a guarantor for the intellectual rights. An example of this is the project by Ujo in cooperation with the singer Imogen Heap, which has made possible to overcome the inefficient music industry with the use of blockchain. The singer has released a song "Tiny Human" on the blockchain platform and users were able to buy the licenses for download, transfer, remix and synchronization via smart-

contracts. Each payment has been automatically broken down into the block-chain and was sent to Imogen Heap. This example demonstrates, that authors can use blockchain for better control and use of their artwork, improvement of collaboration and fair rewards. New systems of distribution of audio-visual content can also interest authors due to different reasons. It allows them to stop paying for the services of recording studios, distributors and other rights protecting organizations. The need for all these services will disappear.

The sphere of patent rights contains different solutions for protection of risks and the opportunity to prove the uniqueness of the invention, software or artwork at any time. The most “safe” way – is to provide a copy, certified by the notary. This is a complicated procedure, especially for the companies, that create something every day, or lines of code that require protection. A modern solution has been offered by the Bernstein company, which is the notary services based on blockchain, in order to establish the right for the innovation. The document uploaded to the platform remains confidential, however it can later be proven, that it existed on the date of its upload and hasn't been changed. It is also possible to claim the publication of this document if required, and use it for protection, in order to prevent third party patenting it after the publication. Platform is available since April 2017.

In order to stop patent trolling, the Ministry of Digital Commerce in Great Britain has created a Blockchain Intellectual Property Council (BIPC) in 2017. The aim of BIPC is the development of global patent protective strategy, that will block patent trolling in its embryonic stage. The members of BIPC are the companies, active blockchain users Chain, Digital Asset, IMB, Microsoft, CoinDesk, Blockstream, Bloq, Civic, Cognizant, Deloitte, Digital Currency Group, Ernst&Young, Gem, Medici Ventures, T0.com, TMX and Wipfli. Despite the creation of patent information storage, related to block chain, BIPC will study various models for its protection.

The number of patent filings and trademarks, related to blockchain is rapidly increasing. At the moment the data base of Europatent contains 65 filings, that contain the word “blockchain” and 69, which mention “bitcoin”. Couple of years ahead and these disruptive patents can become extremely valuable. Millions of lines of code can also represent a highly valuable IP-address.

Protection of intellectual property and material assets – is one of the most rapidly developing directions (Blockchain authentication for detecting fake products). At the moment there is a number of applications, that have been developed to track and identify such products, as diamonds or fashionable products and preventing their duplication, such as Blockverify, Everledger and VeChain. The latter represents the solution for chain management, which can be used to track any element of deal with intellectual IP-network. Smart blocking contracts will improve the reliability of digital systems in the interest of Intellectual Property rights holders and interested parties.

Agrello based in Estonia, has currently made a lot of noise. The company accepts the requests for processing legally binding intellectual contracts, which are produced with the help of digital technology and are reflected in the public block chain.

Therefore, technologies, that implement block chains, solve many problems related to transaction, for example confidentiality, security, completeness, reduction of transaction costs, automatic registration of smart contracts, payments, collaboration and etc. The most important problem with the activity of modern blockchain platforms is the inability to check the rights of ownership for the digital object from the client. However, this problems will be resolved after the introduction of digital face identification, performing the hashing of the document.

#### **4. Potential of Blockchain in Transforming the Intellectual Property Transfer in Russia**

We consider important to focus on the factor, impacting the development of use of blockchain technology related to the government and other regulating entities regarding exchange transactions in the sphere of digital economy. The attitude of government towards legalization of legal rights and obligations resulting from blockchain transactions (not centralized regulation) will determine the quality of development of innovation projects and investment climate in the digital sphere.

After negative and passive-spectating attitude from the government towards the digital commercialization of intellectual property in the last couple of years, last year has been notable for the emergence of a number of international and government organizations regarding digitalization of the system of government control, with wide-spread use of technology for decentralized register and information storage about material and non-material assets (Estonia, Switzerland).

Standardization of blockchain technology on the international level is implemented by the international technical committee targetting blockchain standardization (Blockchain and Distributed Ledger Technologies), which includes 35 countries. The turn of Russian government towards digitalization has started in 2015, when the President of the Russian Federation has announced the revolutionary significance of new technology. In fact, V.V. Putin has rejected the view that the presence of rich material resources gives Russia the opportunity not to engage in technically demanding and complex digital technologies. President has pointed, that stone age has finished, but not because there were no more stones left. He believes that the use of blockchain will allow the country to make a breakthrough into the future. It is hard to disagree, which is why in the modern world, things lose value very quickly. Information becomes more valuable than money. Obviously, it is about the information that contains value, and satisfies the standards of digital property. That's why the modern society is becoming the society of authors – creators of technology and other non-material assets.

In 2017 a number of state blockchain projects have emerged in Russia, that are related to property register, state and city portals and services. In order to coordinate these projects, at the end of September, the State Duma has established the Expert Council in blockchain technology and digital economy. For development and integration of state projects, the Center for practical implementation of blockchain technology “The Orbit”. Overall, according to TAdviser (2017a), last year 38 (out of 50) legal parties have been created. These relate their activity to blockchain technologies, software development for EVM, legal activity, scientific development in the sphere of biotechnology, renting out intellectual property and etc.

With support from the Ministry of Education in the October 2017, an initiative has been created in order to create and integrate blockchain platforms for knowledge transfer and author rights management. It is expected, that the platform will become the environment for production and transfer of exclusive rights. According to the Ministry of Education, the platform will contribute towards quicker establishment of author rights on scientific-technological objects, as well as the creation of a fair model of exclusive rights transfer, and will simplify and make cheaper (due to elimination of third parties and brokers) the access to copyright.

We suppose, that a serious threat for the state-initiated startups in the sphere of commercialization of intellectual property is the centralized approach towards implementation of blockchain projects and prioritized development of closed distribution systems; the absence of legislative basis for the deals closure in the digital space and acceptance of civil transfer; legal fragility of the sphere of utilization and data analysis, order of data access and responsibility for non-sanctioned use; inability to legitimately describe the results of intellectual activity in the form of digital models.

## **5. Discussion and results**

Therefore, modern digital transformation of socio-economic state of human lifestyle has once again made the problem of scarce and valuable resource distribution, relevant. Modern order of agreement setting results in significant costs for parties, as it requires preliminary communication, agreement preparation, presence of mediators and others. As a result, the majority of the deals become so expensive that there is no point of agreement. Redistributions of non-material assets, using blockchain technology is based on the market principles, minimizing transaction costs, resulting in increasing value of intellectual property results. However, initial separation of legal rights of subjects, affects the effectiveness of the system of non-material assets redistribution on the basis of blockchain. The absence of legislative acceptance of rights of blockchain transaction participants will result in inability to implement optimal rights distribution.

We regard intellectual contracts as a natural way of digital economic transition. The forms of agreements are never accepted by forever, and smart-contracts allow to use



non-material and material assets with a greater return, and hence smaller costs. The anxiety related to the difficulties of establishing intellectual contracts, due to the inability of parties to agree on the conditions of mutual benefit distribution and uncertainty of results are vague, as intellectual contracts represent the ready-made solutions, accounting for the necessary transformations in case of change of the legal disposition.

Rephrasing the Couse theorem, (2007) let's conclude, that the owner of the intellectual product who the contract needs to agree with, is defined by state law, and the value of the products and the effectiveness of their use depends on the ways of distribution and social costs which arise as a result.

Blockchain technology allows to reduce transaction costs of intellectual property significantly and hence, improve the level of commercialization. Given this, the aim of government legal regulation remains the legalization of digital transfer of intellectual property and provision of balance between private interest of right holders and users, as well as public benefit in the sense of availability of free transfer of results of intellectual activity, which is of humanitarian significance.

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