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LEGAL CHALLENGES OF THE IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY IN THE MANAGEMENT OF COPYRIGHT AND RELATED RIGHTS

ABSTRACT: The reform of collective management of copyright and related rights, along with the organization structures, is being carried out within the framework of the European Union and at the domestic legislative level. All of the legislative activities can be viewed in two ways: one part focuses on establishing a solid framework for organizations to manage collective copyright and related rights, while the other aims to adapt this institute to the circumstances where the internet and digital content prevail. Blockchain is an open-source innovation that, through a revolutionary approach, can change the execution of transactions between individuals, legal entities, and machines. The establishment of a clear legislative framework in the domain of digital property creates the assumption that this type of technology can be applied in many areas of social life, with the emphasis placed on its implementation in the domain of collective management of copyright and related rights to improve the work and functioning of organizations. Blockchain technology could be used as a tool to overcome certain problems in the operations of collective copyright and related rights organizations, primarily: inefficiency, lack of economy, and lack of transparency. On the other hand, we must not overlook the possibilities aimed at improving the status of authors and

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ensuring adequate compensation for the use of their works on the internet. The challenges of implementation are multifaceted and essentially of a legal and technical nature, and the terms blockchain, smart contracts, and cryptocurrency are currently subjects of intense debate in legal theory and practice around the world.

***Keywords**: collective management, copyright, blockchain technology, EU legislation, Internet.*

1. Introduction

In the recent period, no new technology has attracted as much attention and interest from the public as blockchain. Blockchain represents an open-source innovation with a revolutionary approach. It can change the execution of transactions between individuals, legal entities, and even machines. The concept of this technology represents a new computer architecture designed to coordinate all human activities on a much larger scale than was previously possible (Savelyev, 2018).

The establishment of legislative framework in the domain of digital property has created the possibility that this type of technology can be used in many areas of social life in Republic of Serbia (Law on Digital Property of the Republic of Serbia, 2020). The basic hypothesis of the paper is that the crisis in the functioning traditional concept of copyright in the digital era is in direct correlation with the exponential development of information and communication technologies, and that it is possible that science and the development of technologies will offer potential solutions for overcoming the existing conflict (Marković, 2014). Emphasis in the work is placed on implementing the blockchain technology in the domain of collective management of copyright and related rights to improve the functioning of organizations. On the other hand, we should not lose sight of the possibilities that this type of technology enables, aimed at improving the status of authors, i.e. providing adequate compensation for the use of their works on the Internet.

The first part of the paper is devoted to the presentation of legislative activities at the international and domestic level, which aims to improve the collective management of copyright via the Internet. The second part includes an overview of the possibility of improving the concept of management of copyright through the implementation of innovative blockchain technology. Finally, the last part deals with the analysis of some legal issues, which the implementation of this technology entails.

2. Reform of the system of collective management of copyright

Due to the exponential development of information and communication technologies and the increasing use of author's works on the Internet, as well as more and more reasoned criticism directed at the efficiency in work of collective management organizations (hereinafter CMOs), a redefinition of certain segments in the work of CMOs has been started. The European Parliament adopted Directive 2014/26/EU of the European Parliament and of the Council of 26 February 2014 on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online use in the internal market (hereinafter: Directive on collective management of copyright). The main reason for the adoption is that the European legislator sees in the necessity of harmonizing regulations concerning the functioning of CMOs in EU member states. Special attention is directed to the articles of the directive that regulate the lack of transparency in the work of CMOs towards their members and right holders. Therefore, the non-transparency is reflected in the inability of the authors to review all data related to the use of their author's works, income and distribution, primarily due to the technical inefficiency of such a check. Also, ineffective financial management of income collected by CMOs represents a weak point in their work. If you add to all this the fact that the Internet as a global network knows no borders, a situation arises those results in the fragmentation of the online music services market in the EU. The existing situation is further complicated if we consider the high consumer demand for access to digital content and innovative services, including those that transcend national borders (Directive 2014/26/EU).

Regardless of the innovative approaches and certain revolutionary concepts that are reflected in the introduction of competition among CMOs, we can state that the mentioned EU reform was carried out with a lot of caution. The argument for the claim is based on several facts. First, the long discussions about the reform of the collective management system, the fact that the subject matter was dealt with first by a recommendation, then by a resolution (Commission Recommendation 2005, European Parliament resolution, 2007). The significant support in the EU Parliament that was present during the adoption of Directive 2014/26/EU on the collective management of copyright suggests that it is the result of a wider dialogue and consensus on the directions in which the collective management of copyright

should be developed in the future. Another aspect is the limited scope of the Directive, which is limited in many ways – it refers to the internet, i.e. online rights to music content in several national areas. Therefore, other author's works are excluded from the scope of the Directive. One of the reasons lies in the fact that the distribution and use of music content is perhaps the most common in the online environment. The next reason is perhaps of a practical nature. If the European legislator has thought long-term, it is to be expected that the model that is now applied exclusively to musical works on the Internet, if it proves to be effective, will be applied in the future to collective management of other author's works. Essentially, we can regard this initiative as an experiment intended to guide future legislative efforts. Competition among CMOs has been formally introduced. However, during the standardization process, considerable attention has been given to the potential negative impact on the status of smaller CMOs. There are significant concerns regarding whether the "European passport" concept will genuinely safeguard smaller European CMOs from the pressures of a free market. Without such protection, these organizations may struggle to find a role with the complexities of multi-territorial licensing, potentially leading to their extinction. Consequently, it remains unclear if the "European passport" can prevent the further weakening of small CMOs, especially given their limited presence in the online market. The challenges raised call into question the effectiveness of the "European passport" in preserving Europe's cultural diversity and protecting the interests of economically weak participants in the competitive market (Vujičić, 2022).

At the beginning of 2019, amendments to the Copyright Act of the Republic of Serbia (Law on copyright and related rights, 2009) were adopted, which introduce novelties with the aim of better, more efficient and economical functioning of CMOs. The changes and additions mentioned to the law went in the direction of closer regulation of areas that were the subject of long-standing discussions and misunderstandings between authors, users and representatives of CMOs. It is more precisely determined what should be contained in the distribution plan, as a basis for the distribution of collected fees (Article 165). This amendment aims to prevent the arbitrariness of individuals or organs of the CMOs when assessing the distribution of collected revenues. The issue of costs incurred by CMOs in their work is clearly defined, with the aim of ensuring that the CMOs spend the collected funds economically, without jeopardizing the basic function (Article 184). Also, the goal of this amendment is to ensure that CMOs manage the rights of their members in a quality and efficient manner, exclusively in their interest. Furthermore, the

content of the report submitted by the CMOs to the supervisory authority, which must be based on clear and verifiable data, is regulated in detail. Such reports should ensure transparency in the work of CMOs, as one of the basic principles in the work of these entities and enable the competent authority to perform quality and efficient supervision (Article 190). Finally, the determination of fee tariffs is regulated in more detail as one of the most important issues for establishing an efficient and effective system of collective management of copyright (Articles 170 and 171).

3. Legal challenges of blockchain technology implementation

No one can remain indifferent to the possibilities and scope of blockchain technology, but it is necessary to thoroughly approach the problems and unknowns that are a consequence of the application of this technology. Namely, the terms blockchain, smart contract, cryptocurrencies are currently the subject of lively discussions in legal theory and practice around the world. No one can remain indifferent to the possibilities and scope of blockchain technology, but it is necessary to approach the problems and challenges that are a consequence of the application of this technology. Although much of the public is excited about the possibilities of blockchain, there are many challenges related to cryptocurrencies and the risks associated with them. It could be said that cryptocurrencies form an essential part of the blockchain system.

The use of cryptocurrencies has facilitated the global payment system, which is freed from the complicated formalities associated with opening a bank account and other details related to international transactions. Although the concept of cryptocurrencies itself is often disputed and their speculative nature is emphasized, the fact that bitcoin and ether have real market value and liquidity cannot be disputed. In addition to the above, this financial instrument does not require the fulfillment of any formalities, has a global character and is available to anyone with internet access. This type of currency does not have an inflationary character, precisely because it was initially determined that no more than twenty-one million bitcoins could exist. A large number of the above characteristics of cryptocurrencies make them an ideal payment instrument on the Internet (Savelyev, 2018). As we have already stated, the domestic legislator (Article 2, paragraph 1, Item 2) has regulated the area of digital property according to which: “virtual currency is a type of digital asset that has not been issued and the value of which is not guaranteed by the central bank or other public authority, which is not necessarily linked to legal

tender and does not have the legal status of money or currency, but is accepted by persons or companies as a means of exchange and can be bought, sold, exchanged, transferred and stored electronically" (Law on Digital Property of the Republic of Serbia, 2020).

Perhaps the most significant legal issue in the context of this analysis is the establishment of a legal framework that would regulate "smart contracts". The term "smart contract" is of recent date and could be defined as a set of rights and obligations expressed in program code. Therefore, such contracts represent a part of the programming code stored in the blockchain database, which allows for recording and reading transactions. The main characteristic that distinguishes "smart contracts" from classic ones is precisely the digital form, that is, the fact that these contracts are made in program code. Another characteristic is their automatic effect on the obligations of the contracting parties within the blockchain, in that its conclusion and implementation are taken care of by the program code. In technical terms, this means that when predefined conditions are met, then the defined logic can be executed in the form of a transaction. The software is programmed to maintain the obligation of one party until the fulfillment of the contractual obligation and thus represents an instrument that overcomes the problem of lack of trust between contracting parties who are physically distant (Savelyev, 2018).

The Law on Digital Assets in Article 2, Paragraph 1, Item 39 defines a smart contract in more detail as: a computer program or protocol, based on distributed database technology or similar technologies, which, in whole or in part, automatically executes, controls or documents legally relevant events and actions in accordance with an already concluded contract, whereby that contract may be concluded electronically through that program or protocol. If we look at "smart contracts" within the existing concept of contract law, the question arises how to apply the traditional rules related to termination, amendments and additions to the contract of the contract, as well as actions if the contracting party does not respect the assumed obligations? Furthermore, the question arises how to define the responsibility of the parties if the "smart contract" does not work due to faulty code or a malicious IT attack? For now, there are no adequate answers to the above-mentioned questions.

It should be noted that the Republic of Serbia is among the first countries in the world to create a comprehensive regulatory framework for the field of digital assets, which is a basic assumption for the implementation of blockchain technology. On the other hand, the terms blockchain, "smart contract" and "cryptocurrency" do not have a universal definition at the international level. What inspires optimism is the fact that the International Organization for

Standardization (ISO) is currently working on the analysis of certain aspects of smart contracts from both a technical and an appropriate legal perspective. Given the scope and topic of the research, it is unlikely that results will be available in the short term. In addition, ISO documents are not binding but will be significant for analysis in the context of drafting legal solutions in individual legal systems (Savelyev, 2018).

4. Collective management of copyright and related rights and the possibility of blockchain technology implementation

The fundamental principles of modern business are grounded in a diverse array of transactions. One of the primary challenges in conducting these transactions is the mistrust that often exists between contracting parties, which has been mitigated through the institution of mediation. The globalization of markets and the advent of the global computer network have enabled businesses to expand beyond national borders, further complicating the entire business environment. Given these limitations and challenges, there is a growing need for technology that can facilitate the liberalization of transactional business models while ensuring security, speed, efficiency, and resistance to fraud. This technology, known as blockchain, is characterized by its structure: it comprises numerous records grouped into blocks, and these blocks are linked together to form a chain. As the network of these blocks and chains essentially functions as a digital database, the term "digital ledger" has also come to describe this technology. In this context, blockchain can be viewed as a financial ledger that reliably records who possesses how much money and details past financial transactions between parties. By significantly altering the current approach to transaction execution, blockchain offers solutions to these challenges, making the entire process more accessible and publicly verifiable (Minović, 2017).

Bearing in mind the existence of a new legislative framework for CMOs, it would be useful to explore other possibilities that could further improve their functioning. Blockchain technology has introduced many revolutionary elements in a very short period and its application has been recognized in many spheres of social life. Considering the above, in this part of the paper, the research is focused on the possibility of applying this technology, to facilitate the functioning of the system of collective management of copyright.

CMOs are not a commercial or business company established for the purpose of making a profit. Therefore, the organizations do not have a lucrative goal, but are specialized in accordance with the statute, for the management

of certain rights regarding certain copyrighted works. To achieve its goals and fulfill its tasks, the organization obtains funds from: membership fees, voluntary contributions, the budget of the socio-economic community, as well as other sources in accordance with the law. The income that the organization collects in the form of a fee for the use of the copyrighted works belongs to the right holders. However, a certain amount that the organization collects is retained by it to cover operating costs. It is usually an approximate amount of between 15 and 30% of the total funds collected. The difference between the amount that the organization collects in the name of copyright and the amount of its operating costs is a room for discussion about the efficiency of the organization's work (Marković, 2011).

Business efficiency is a requirement placed on CMOs. The online services market is primarily dynamic and is not subject to excessive delays, given the dynamic market competition. Inefficiency of organizations is often the main topic of criticism of these entities. There is an undeniable need for greater efficiency and faster licensing, but sometimes negotiations with streaming providers need to cover all the most important aspects to adequately protect the position of authors or rights holders. The above necessarily requires a longer period. Given the above, we could conclude that the speed and efficiency of organizations should in no way jeopardize the position of authors/right holders. As for transparency in the work of organizations, the impression is that this is an area that causes major problems in the relationship between rightsholder's, users and the organization itself. Directive 2014/26/EU on the collective management of copyright should ensure the smooth functioning of CMOs, as well as the creation of conditions for greater transparency in the operations of these entities. CMOs are, among other things, obliged to establish an adequate system that should enable their members to participate in the decision-making process and ensure a high level of financial management (Vujičić, 2022).

We can conclude that main shortcomings in the work of the CMOs are listed as: uneconomical, inefficient, as well as lack of transparency in work. Bearing in mind the superiority of blockchain technology in the segment of forming autonomous databases, this possibility could be used to form a central database of author's works with all the necessary information, which would be available to the public. Namely, the absence of a central database that contains information about copyright and related rights creates significant problems when trying to determine the right holder to enable the use of such content. Information about holders of copyright and related rights is scattered in various databases of publishers and other entities, which have no interest

in sharing them. All this results in considerable transaction costs for the users of such digital content, who sometimes must refrain from using a certain author's work due to unclear legal status. Considering the interest of the public and bearing in mind the large amount of information on the authors' work at their disposal, it would be expedient to create a central database of copyright works, based on blockchain technology, of course, in accordance with the scope of work of an CMOs (Savelyev, 2018).

The biggest misunderstandings among authors are created by the principle of distribution of compensation, which in some cases can be unfair, that is, in disagreement with the factual situation. As one of the principles during distribution, present in many CMOs, the scope of use of the work is taken, and not the fact of how much the user values an individual work (Milić, 2018). In many CMOs, there is a system in which the minutes of use of works classified as artistic are multiplied by a special coefficient, so that the authors of less commercial works receive a higher fee. The mechanism is, therefore, conceived on the principle of solidarity, to enable the authors to enjoy the advantages of this form of management of rights and to have the possibility to live from their work.

There is a noticeable trend of bureaucratization of CMOs for the collective management of copyright, which results in an excessive number of employees in these entities, and accordingly, it is often mentioned that the labor costs are disproportionately high. The implementation of blockchain technology could overcome some of the shortcomings mentioned. An algorithm, or program code, could replace the engaged workforce in certain work processes, which would significantly lower the costs of CMOs and reduce the risk of errors that are the product of the human factor. On the other hand, collection and redistribution of income to authors' accounts could be done in real time, which would further improve the current functioning system. Each transaction, that is, a record in the blockchain network, after confirmation, becomes permanent without the possibility of deletion and is directly linked to the previous transaction. This fact has the effect that all records on the blockchain network are chronologically ordered from the date of creation and are available through access to the distributed network. Therefore, the transparency in the application of this technology is indisputable, and with its implementation, the collection of fees, as well as the distribution to authors, could be visible to all interested parties online (Milić, 2018).

Particular attention should be paid to payments that would be made using blockchain through cryptocurrencies. Namely, this type of payment could be a potential solution to the problem of fair compensation for authors in the

context of using works on the Internet. An important factor is the possibility of using smart contracts that would enable automatic and immediate payments to contracting parties, as well as control of license expiration after the scheduled time. Through research, we examine certain characteristics of smart contracts that are relevant to the topic of the paper. Smart contracts enable automation of licensing and royalty distribution. When an author's work is used (for example, a song is streamed or a e-book is downloaded), the terms encoded in the smart contract automatically trigger specific actions, such as payments to the copyright holders, which eliminates the need for intermediaries like CMOs or publishers. This can significantly reduce delays, errors, and administrative costs in royalty payments. For example, if a song is played on a streaming platform, a smart contract could automatically execute a payment to the songwriter, performer, and any other rightsholders based on predefined terms. On the other hand, cross-border copyright issues are complex, with different countries having varying laws and enforcement mechanisms. Smart contracts, based on blockchain technology, can offer a universal platform for copyright management that transcends national borders. Once the terms of the smart contract are encoded, they can be applied globally, which may simplify enforcement and reduce jurisdictional issues.

So, fees for the use of author's work could be designed to offer fairer conditions for authors, as well as all other subjects, holders of copyright and related rights. This type of application has already seen its form in the form of a service prototype, based on the blockchain. Namely, it is the *Peer Tracks* website (https://peertracks.com/), which allows authors to menage their copyright and related rights individually. The service works by attaching a "smart contract" every time a piece of music is uploaded to the specified platform and generates income in accordance with the contractual obligations. This type of service enables absolute transparency, and rights holders can monitor the realization of their income, but also communicate with the users of their work (Savelyev, 2018).

Reaffirmation of individual management of copyright is present in the modern period, especially in activities related to the Internet. It is conditioned by technological progress that significantly reduced the transaction costs of individual management and made it more acceptable for authors. In addition, it is conditioned by sociological, cultural and political factors that are reflected differently. Internet actors – authors and copyright holders, whose work has greater commercial potential, strive to eliminate intermediaries to achieve greater profits. Others, on the other hand, strive to share their original work with as wide an audience as possible, while not giving importance to the

commercial effect of the work. The third again strives for non-realization of the right, which is reflected in the sharing of protected objects with a special type of licensing, without compensation. This form of exploitation of the author's work is widely used in the digital age and offers numerous possibilities so far. Regardless of the above, individual management in the Internet environment does not have the potential (at least not soon) to significantly threaten the system of collective management of copyright and related rights.

5. Conclusion

The pandemic of the COVID-19 virus has disrupted the global economy and undoubtedly left consequences for almost every segment of social life. Remote work in environments when national states close their borders to prevent the spread of the virus, has resulted in the accelerated development of digitalization of business, so that business entities can carry out the process appropriately in the new environment. Bearing in mind the above, blockchain technology could be used as an instrument to overcome certain problems in the work of CMOs. Without a doubt, blockchain has enabled the formation of a central database within the scope of the CMOs work, providing a new model for data storage security, which is based on the principle of decentralization. Its main feature is transparency, which means that all data within the blockchain is public, cannot be arbitrarily changed, and can be easily reviewed. Changing a record in the blockchain is difficult, almost impossible, and requires consensus according to the protocol, from most users. Thus, the integrity of the record is ensured by the basic properties of the underlying code, not through the identity of the system operator. The program code could replace the engaged workforce in certain segments of work. The collection and redistribution of income to the authors' accounts could be done in real time and be visible to all interested parties online. Payment of royalties for the use of author's work, which would be carried out using blockchain through cryptocurrencies, could be a potential solution to the problem of fair remuneration for authors in the context of the use of works on the Internet. An important factor in the application of this technology is the possibility of using smart contracts that would enable automatic and immediate payments to contracting parties. In addition to all the possibilities mentioned, it should be emphasized that in the future, the blockchain could enable individual management of copyright and related rights in situations where it could not be effectively applied until now. The reform of the collective management of copyright and the functioning of

CMOs is carried out both at the level of the European Union and in domestic legislation. All the legislative activities can be viewed in two ways: one part is aimed at designing a solid framework of CMOs, while the other is aimed at adapting this institute to the circumstances dominated by the Internet and the use of digital content. We are witnessing fundamental changes in the traditional concept of collective management of copyright in the last period, in terms of establishing a more efficient and economic framework for the functioning of CMOs, greater transparency in the work of these entities, as well as adapting to the digital age. Changes at the level of the European Union have been accompanied mostly in the domestic legislative system with the same aspiration – to provide answers to the challenges of the modern era.

The fact is that the articles of the Directive 2014/26/EU on the collective management of copyright, which foresee the possibility of entrusting certain tasks of representing the musical repertoire on the Internet for multi-territorial licensing, have not been fully implemented in Serbian Law. This attitude is understandable for several reasons. The first is the fact that the mentioned model is recent, innovative, and its effects cannot yet be objectively predicted. Another reason lies in the fact that the Republic of Serbia is not formally a member of the European Union and that the obligation to implement acts is of limited scope. The third and perhaps the most important reason is the need to protect national CMOs from market competition in which they would be unequal competitors. If the economic strength of individual EU member states and their CMOs is considered, a significant disproportion in material, logistical, technical-organizational terms is noticeable when comparing CMOs from the territory of the Republic of Serbia.

Although blockchain offers the possibility of improving the work of CMOs in terms of greater transparency, efficiency and economy in work, we must look at the potential challenges when using the mentioned technology. First, this technology requires significant financial resources for implementation, i.e. adapting the algorithm to business processes. Another important thing is the fact that the technology mentioned is of recent date and that it takes time to notice potential flaws in its software architecture. The third and perhaps the most important is the unstable cryptocurrency market, bearing in mind that we are witnessing almost daily oscillations in their value. If blockchain technology is implemented, it is necessary to carry out the entire procedure cautiously, while respecting the specifics of the collective management of copyright, the interests of authors and users of the author's work.

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PRAVNI IZAZOVI PRIMENE BLOKČEJN TEHNOLOGIJE NA OSTVARIVANJE AUTORSKOG I SRODNIH PRAVA

APSTRAKT: Reforma kolektivnog ostvarivanja autorskog i srodnih prava i ustrojstva organizacija, se vrši u okviru Evropske unije i na domaćem zakonodavnom nivou. Sve navedene zakonodavne aktivnosti, mogu se posmatrati dvojako: jedan deo je usmeren na uspostavljanje čvrstog okvira organizacija za kolektivno ostvarivanje autorskog i srodnih prava, dok je drugi usmeren na prilagođavanje ovog instituta okolnostima u kojima dominira internet i korišćenje digitalnog sadržaja. Blokčejn predstavlja inovaciju otvorenog koda koja revolucionarnim pristupom može da promeni izvršavanje transakcija između pojedinca, pravnih lica i mašina. Uspostavljanje jasnog zakonodavnog okvira u domenu digitalne imovine stvara pretpostavku da se ovaj vid tehnologije primeni u mnogim oblastima društvenog života, a akcenat je stavljen na implementaciji u domenu kolektivnog ostvarivanja autorskog i srodnih prava u cilju unapređenja rada i funkcionisanja organizacija. Blokčejn tehnologija bi mogla biti iskorišćenja kao instrument pomoću kojeg bi se prevazišli određeni problemi u radu organizacija za kolektivno ostvarivanje autorskog i srodnih prava, a pre svega: neekonomičnost, neefikasnost, kao i nedostatak transparentnosti u radu. S druge strane ne treba izgubiti iz vida mogućnosti koje su usmerene ka poboljšanju statusa autora, odnosno obezbeđivanja adekvatne naknade za korišćenje njihovih dela na internetu. Izazovi koje primena sa sobom nosi su višeznačni i višeslojni i u suštini su pravne i tehničke prirode, a pojmovi blokčejn, pametni ugovor i kriptovaluta su trenutno predmet žustrih rasprava u pravnoj teoriji i praksi širom sveta.

***Ključne reči**: kolektivno ostvarivanje, autorsko pravo, blokčejn tehnologija, zakonodavstvo EU, internet.*

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