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COLLECTIVE COPYRIGHT MANAGEMENT IN THE DIGITAL AGE: EU CHALLENGES AND UKRAINE'S ADAPTATION

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Abstract. The article addresses the impact of digital technologies on the collective management of copyright and related r4ights in the EU. It provides an overview of innovative technologies such as blockchain, digital platforms, and smart contracts, highlighting how these advancements transform the monitoring, licensing, and distribution of royalties. The article examines the potential for integrating modern digital technologies into the operations of collective management organisations in Ukraine. It highlights the challenges these organisations encounter concerning copyright and related rights, particularly in the context of the globalisation of digital content and the rise of streaming services. A focal point of the discussion is the necessity for adapting national governance models to align with European standards. Furthermore, the article emphasises that for Ukraine to integrate into the digital legal landscape successfully, it is essential to adopt international best practices in the realm of copyright.

Key words: collective management, copyright, digital technologies, blockchain, smart contracts, European Union, Ukraine, metadata.

Introduction. Current developments in the intellectual property sector demonstrate the growing influence of information technology on the mechanisms of collective management of copyright and related rights. The introduction of digital platforms and blockchain technologies contributes to the automation of royalty payment processes, increasing transparency and improving the efficiency of collective management organisations (CMOs).

The creation of digital registries of rights holders and their works, as well as the use of smart contracts, helps to reduce the risk of inaccuracies and abuse in the payment process, ensuring a fair distribution of remuneration among authors, performers, and other rights holders. Smart contracts allow for the automation of financial transactions according to established terms and conditions, reducing administrative costs and minimising the impact of the human factor.

In addition, the proliferation of digital content requires new approaches to licensing rights and increased cooperation between CMOs at the international level. With the rapid growth of streaming services and online platforms, traditional national licensing models are becoming less effective. This is prompting the creation of unified digital databases and the expansion of international partnerships between CMOs, allowing for faster identification of rights holders and their works.

Given the growing influence of information technology on the mechanisms of collective management of copyright and related rights in the EU, Ukraine has new opportunities to improve its national intellectual property protection system. In general, technological innovations are fundamentally changing approaches to copyright management, making them more efficient, transparent, and adapted to the needs of the digital environment. The successful implementation of digital technologies in the field of intellectual property can make rights management more efficient and fairer, ensure rapid adaptation to the needs of the global market, and stimulate the development of Ukrainian creativity and innovation. However, this requires a comprehensive approach, including legislative changes, educational initiatives, and active cooperation between national and international market participants.

Purpose of the article. The purpose of this article is to provide a thorough analysis of the impact of digital technologies on the collective management of copyright and related rights, with a particular focus on the new challenges and opportunities facing Ukraine. The primary objectives of this study are twofold: first, to identify the most effective international practices for leveraging digital technologies in the context of collective management organisations (CMOs); and second, to adapt these practices for the effective management of copyright and related rights in Ukraine.

Analysis of the Latest Research. Problems of the impact of digital technologies on the collective management of copyright and related rights have been addressed by many foreign and domestic scholars. The foreign doctrine has effectively tackled these issues, as demonstrated by the insights of Dana Mereckova, Lucius Klobucnik, and Marianne Levin. Within the Ukrainian academic community, the complexities surrounding these issues have garnered significant attention from scholars such as L. Maidanyk, O. Orliuk, and O. Shtefan. L. Maidanyk has specifically studied NFT and copyright law in Ukraine. O. Shtefan has examined the objects generated by a computer program (artificial intelligence).

The examination of international CMO practices and their adaptation in the context of European integration reforms in Ukraine has not been sufficiently explored. This gap is particularly significant given the ongoing war and the subsequent reconstruction efforts, underscoring the importance of this study.

Main text. The Collective Management of Copyright and Related Rights Institute is a necessary and important component of the intellectual property market, one of the main tasks of which is to ensure the enforcement of proprietary copyrights and related rights holders. It plays a key role in protecting the interests of rights holders by ensuring the efficient collection and distribution of royalties and the provision of related services in a rapidly changing digital environment.

As technology evolves, collective management of copyright requires continuous updating of working methods, implementation of modern digital solutions, and adherence to high data processing and analysis standards. CMOs must not only adapt to technological changes but also actively integrate the latest tools to improve their processes. This includes creating a reliable technical infrastructure, implementing automatic work identification systems, using global metadata standards, and expanding transparent and accurate licensing opportunities.

Much of the work of CMOs is focused on processing large amounts of data, including information about rights holders, works, and rights to use them. Data such as identifiers, names and pseudonyms of authors, titles of works, and shares in rights and licensing agreements are critical to the effective functioning of CMOs. Their accuracy and timely updating helps avoid errors in the distribution of royalties, reduces administrative burdens, and helps to increase trust between rights holders and collective management organisations.

In the digital age, collective management of copyright and related rights has become a much more complex and demanding process. It requires introducing innovative technologies to monitor the use of works, automate financial transactions, integrate databases, and create effective mechanisms to combat piracy. Using metadata technologies, blockchain, and automated analysis systems allows CMOs to quickly track infringement, identify popular works, and predict changes in the intellectual property market.

Metadata. Information about the owners of rights in musical works is crucial for accurate licensing, collection, and distribution of royalties. The lack of a single, comprehensive database accessible to all music industry participants significantly complicates rights management processes.

Today, many databases contain information about musical assets, including compositions and recordings. However, none are complete or error-free, leading to payment problems. Incomplete or inaccurate data can result in rights holders not receiving the correct fees, and royalties are distributed among major labels and publishers according to their market share, without fair redistribution to individual authors and performers.

Metadata is a fundamental aspect of the modern music industry, which constantly generates and processes huge amounts of data, including:

– Identification data of works and sound recordings (song titles, artists, International Standard Musical Work Code (ISWC), International Standard Recording Code (ISRC), etc.).

– Data on rights holders (names of composers, lyricists, performers, publishers, labels and their ownership shares).

– Financial data on the distribution of royalties (payments, deductions, revenue redistribution mechanisms).

These identifiers are commonly called music identifiers and are usually part of a larger set of metadata.

The main problem is that this data is often duplicated, scattered across different databases, or contains inconsistencies. This makes it difficult to accurately identify rights holders and royalty payments. As a result, artists and composers may not receive the remuneration they are entitled to.

– CMOs face delays in payments due to the need to clarify data.

– Licensing agreements are delayed due to the lack of a single source of legal information on works.

Collective management organisations use metadata to identify the correct recording and the respective rights holders, for example, for remuneration and royalty distribution purposes and in their day-to-day processes when users of recorded music report their usage.

Technically, metadata is a set of information embedded in a digital audio or audio-visual file. It is information about the content of that file or other things related to it in various ways, such as information about copyright holders or content styles.

In the field of recorded music, copyright organisations and collective management organisations (CMOs) are undergoing a rapid transition towards becoming international data businesses.

A variety of data types, including phonogram usage data and rights holder data, are received, processed, and subsequently transformed into a substantial volume of diverse data outputs for the benefit of phonogram rights holders, particularly concerning compensation and royalty transactions.

In the digital age, as the volume of music content continues to grow, effective metadata management becomes a prerequisite for the proper functioning of CMOs and for ensuring transparency of payments to rights holders.

Music business insiders stress the importance of eliminating the metadata chaos by creating a single global database containing all the necessary information about rights holders, ownership percentages, and licensing terms. Automate the processes of collecting and distributing royalties.

– Reduce the administrative costs associated with verifying rights information.

– Increase the level of transparency and fairness of payments to authors and performers.

– Encourage effective interaction between CMOs in different countries and international digital platforms.

Effective metadata management is, therefore, an important part of the modern music industry and the activities of CMOs, contributing to transparency, accuracy of payments, and the development of the global music rights ecosystem (Gramex, Finland: 2024).

Blockchain. Given the new forms of distribution, it is important that collective management organisations not only protect the rights of rights holders but also ensure a fair distribution of revenues generated from using their content in the new digital environment. One of these new technologies is blockchain.

The emergence of blockchain technologies worldwide over the last decade has led to their rapid spread in various areas of the digital environment. Recently, more and more attention has been paid to the possibility of using them to protect intellectual property, as these technologies are characterised as secure, tamper-proof, transparent, highly resistant to various failures and errors, and fully traceable and controlled by their developers. The use of blockchain technology can increase efficiency and

authenticity in establishing copyright and related rights, reducing counterfeiting, and licensing through smart contracts (Maidanyk, 2022: 16).

Because of its distributed nature and the immutability of data, blockchain technology offers an efficient way to connect rights holders and consumers, enabling direct and transparent financial exchanges without intermediaries. Blockchain can track money flow from rights holders to end users, allowing a more accurate determination of who is entitled to receive royalties for using their works and when. This ensures a fairer and more efficient distribution of revenue, which is important in an environment where traditional monetisation models do not always adequately address the needs of all industry participants.

A few products that try to use blockchain's potential have already been developed. Some of them function as distribution platforms, and they aim to enable music creators to upload their music directly onto the platform and provide it to users who can stream it, download it, rate it or even share it through social networks.

The first is the eMusic platform, which provides services for artists, labels, service providers, and end-users. The artists can upload their music, including the metadata, and determine to what service providers their works can be distributed and for what purpose (to enable downloading, streaming or licensing). Record labels can use eMusic as a distributor for their music and profit from its royalty reporting and distribution system. Other service providers can buy access to the content that eMusic offers (Mareckova, 2024: 77).

In 2020, eMusic became the first major music service to launch a digital token, the eMU, which can be used to transact value on its own blockchain platform, creating a unique opportunity to build a sustainable music ecosystem to benefit artists, fans, and music services. Based on blockchain technology, the eMU is a secure and decentralised form of digital currency that makes payments to artists more efficient and transparent. It allows music artists to keep more of the royalties they earn for purchases and plays and real-time visibility into how their music is being consumed and by whom (Medium, official website:2020).

For the purpose of CMO, tokens can represent a work of authorship, a piece of rights management information, the terms of use of a work of authorship or a unit of virtual currency. The token holders can be rights holders, users or end-users. The distributed ledger can be a database of who owns rights to a certain work of authorship, who has bought a licence, how much was paid for it, how works were used and much more, as it records the ownership and transactions of tokens. Thus, there are enough possibilities that CMOs might use for their functioning (Mareckova, 2024: 76).

First, CMOs could create and maintain the database of musical works and sound recordings and the rights holders thereto, as they have the necessary metadata. The database could also be designed to enable rights holders to adjust information. In that case, the system would need a reliable identity management and authentication process so that persons other than the rights holders could not edit the data.

The database could be updated reliably, as only the true rights holders would be able to change the ownership of the token or tokens that represent the respective rights. Further, blockchain could facilitate the licensing activities of CMOs. Smart contracts allow the conditions of providing a license to be encoded in them so that the licenses are easily concluded and executed. If all CMOs took part in the system, users might not need to pick up a license for every jurisdiction or for every part of the repertoire separately. It could also automatically process royalties and redistribute the collected amount among the rights holders. CMOs could do that because they also receive information on using musical works. This information could eventually be processed with the help of blockchain, which could solve the issue of transparency, i.e., artists would know how their works are used. Blockchain could also function as a payment system if it enabled monetary transactions between account holders (Mareckova, 2024: 70).

An example of the successful use of blockchain technology and smart contracts is a pilot project created by three leading companies (Teosto (Finland), BMAT (Spain), and Revelator (USA)), using Original Works as a blockchain infrastructure for IP Royalties in 2019.

Teosto, CMO in Finland, was founded nearly one hundred years ago by Finnish composers and music authors to protect their rights and promote their interests. Nowadays, it's the biggest community of over 40,000 music authors in Finland.

BMAT (Spain) is a music innovation company with a mission to index all music usage and ownership data.

Revelator (USA) offers a platform that empowers artists, labels, and distributors by making rights management, royalty distribution, digital operations, analytics and supply chain logistics understandable and accessible to everyone.

The pilot has established a new standard for compensating rights holders (songwriters and music publishers) more efficiently by utilising near real-time monitoring of BMAT radio performance royalties alongside Teosto's proprietary data set and employing Revelator's Data Management Platform with Original Works' smart contract-enabled Artist Wallet.

The pilot followed the radio broadcasts of three works on Finnish radio channels. Teosto provided the metadata, splits, and user information for three songs and nineteen rights holders.

Revelator queries BMAT for radio plays of those three songs several times per day. Whenever new radio plays were reported, Teosto used the Original Works Network to transfer royalty payments to the smart contract representing the underlying musical work.

The smart contracts automatically and immediately disseminate payments to the digital wallets of the rights holders. There is a wallet for each of the rights holders involved; payments are made in Original Works tokens, which rights holders can convert to the fiat currencies of their choice once the project reaches the production stage. The pilot was done by simulating the payments in a test blockchain environment, and no real money was distributed during testing (Teosto, official website, Finland: 2019).

Thus, the use of technology, smart contracts, can be an important tool to solve a number of problems for collective management organisations of copyright and related rights, including improving transparency, metadata accuracy and fair distribution of revenues, making it a promising technology for the future management of rights in the digital environment.

Blockchain in the EU legal framework. Blockchain technologies have great potential to improve and modernise the processes of collective management of copyright and related rights, which is already relevant in the European Union. The European Commission is playing an active role in developing standards for blockchain, involving and working closely with all relevant organisations worldwide.

Standards are an important key to the success of any emerging technology, and blockchain is no exception. The right standards, set at the right time in developing a technology, can ensure interoperability, build trust in the technology and help ensure ease of use. In this way, they support its development and pave the way for mass adoption. The technology standards landscape is complex and encompasses a large number of supranational, national and industry organisations. Some of the most important organisations in the European blockchain standards landscape include.

• **StandICT:** Provides an ICT standardisation observatory (EUCOS) and a mechanism to support the participation of European experts in international standardisation (StandICT.eu).

• **European standardisation organisations**: Important European standardisation organisations relevant to blockchain are the European Telecommunications Standards Institute (ETSI, in particular ISG PDL), the European Committee for Standardisation (CEN), and the European Committee for Electrotechnical Standardisation (CENELEC), in particular through their Joint Technical Committee 19 (JTC19).

• **Supranational and sectoral organisations**: Important global organisations relevant to blockchain standards are ISO (specifically ISO TC307), ISO/IEC JTC1, and ITU-T.

• **National standardisation bodies**: Most national IT standardisation bodies are also working or expected to work on blockchain-related topics.

• **Open standards bodies**: Include the IEEE, the Organisation for the Advancement of Structured Information Standards (OASIS), and the Internet Engineering Task Force (IETF).

• **INATBA**: The International Association of Trusted Blockchain Applications, through various working groups, also contributes to standards discussions at the European and global levels (An official EU website, Blockchaine standards).

• On 10 April 2018, the European Blockchain Partnership was established. The European Blockchain Partnership (EBP) is an agreement between the EU countries on developing blockchain technologies and creating a blockchain infrastructure for public services. It was signed on 10 April 2018 by 21 European Union member states, and now the partnership includes 30 countries, including EU member countries, Liechtenstein, Ukraine, and Norway (An official EU website, European Blockchain Partnership:2018).

The partnership has started to create the European Blockchain Services Infrastructure (EBSI). It will enable the legal use of blockchain within the EU. Eventually, it should help to develop blockchain technology throughout Europe. EBSI is aimed to improve the ability of states to provide services across Europe in a secure, citizen-centric way. Subsequently, this should make it easier for residents and businesses in the region to live, work and do business.

The partnership and the European Commission manage the infrastructure. EBSI makes it possible to benefit from public blockchains by accelerating cross-border services for EU citizens and public administrations.

• On 21 May 2024, the Commission adopted the decision creating the EUROPEUM-EDIC, a new legal entity established by a consortium of 10 Member States, which will further deploy and expand the exploitation of the European Blockchain Services Infrastructure. The EUROPEUM-EDIC should also support cross-border cooperation between public authorities on Web3 and decentralised technologies, promoting innovation and interoperability of such solutions with other technologies . (An official EU website, Blockchain creation of EUROPEUM-EDIC:2024).

In EU countries, there are also initiatives that use blockchain to improve collective rights management systems. For example:

• **EU Blockchain Observatory and Forum**: On 1 February 2018, the European Commission, with the support of the European Parliament, established the Observatory and Forum. It is an initiative of the European Union that explores the potential of blockchain technologies in various fields, including copyright. It provides recommendations for integrating blockchain into various sectors of the economy, including copyright (An official EU website, EU Blockchain Observatory and Forum:2018).

European Digital Rights (EDRi): EDRi is constituted by a network of non-governmental organisations (NGOs), experts, lawyers and academics working to protect and promote digital rights across the continent. For almost two decades, it has served as the foundation of the digital rights movement in Europe. EDRi experts and advocates are also exploring the use of blockchain technologies to enforce intellectual property rights, particularly to improve control over the use of copyright in the digital environment (EDRI, who we are:2024).

However, to fully realise the benefits of such innovations, it is important to consider the broader framework of copyright protection at the level of international organisations.

The following challenges and obstacles must be addressed:

1. Legal uncertainty: While the technology under discussion has been demonstrated to have considerable potential, there are questions regarding its legal regulation and ability to comply with the copyright rules in different EU countries. The regulation of blockchain rights and their integration with existing rights licensing structures can present significant challenges.

2. Reduction of centralised bodies: CMOs, which play a pivotal role in managing authors' rights, may be reluctant to alter their operational models, as blockchain technology challenges their traditional intermediary function between authors and users of their works.

3. Finally, technical difficulties must be considered. The technology underlying blockchain is not yet sufficiently advanced to process the large amounts of data required for copyright management at the level of international organisations.

The development prospects of blockchain technology are manifold. The potential of blockchain technology to enhance mechanisms for monetisation and copyright protection, particularly within the digital domain, is a subject of considerable interest.

The utilisation of blockchain technologies in the collective management of copyright in the EU has the potential to enhance the efficiency and fairness of the system. However, it is imperative to address the legal and technical challenges that must be surmounted to ensure the successful integration of blockchain in this domain.

Ukraine. A significant body of research has already demonstrated the efficacy of a variety of European and global models of collective management of copyright and related rights, and their implementation in Ukraine has the potential to enhance the functioning of this system markedly. In particular, European countries are actively using digital technologies to collect, record and distribute royalties, ensuring high transparency and fairness in payments to rights holders. The utilisation of contemporary information platforms and automated management systems has been demonstrated to facilitate the minimisation of bureaucratic impediments, the reduction of administrative expenditures, and the acceleration of the monitoring process of work utilisation.

The implementation of the Partnership and Cooperation Agreement between Ukraine and the European Communities for the period 1996-2014, and the subsequent Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their Member States, on the other, in 2014, has had a profound impact on Ukrainian legislation. This integration has significantly reshaped the legal landscape of Ukraine. In signing the agreement above, Ukraine undertook harmonising its national legislation with EU *aquis*.

Due to the National Intellectual Property Authority (Decree No. 943-r of 28 October 2022) and the enactment of the Law of Ukraine «On Copyright and Related Rights» (Law of Ukraine No. 2811-IX of 01 December 2022), Ukraine made considerable headway in the field of intellectual property during the period under review. This is evidenced in the European Commission's seminal report on Ukraine's advancement in accordance with the Enlargement Package, which was published in November 2023 (Commission Staff Working Document, 2023). Nevertheless, shortcomings remain in the fight against piracy and counterfeiting, as Ukraine continues to serve as one of the four primary transit points for counterfeit goods destined for the EU. Furthermore, Ukraine must continue harmonising its national legislation with the EU copyright *acquis* and enhance the functioning of collective copyright management and related rights.

In June 2022, Ukraine became an observer in the European Blockchain Partnership. The overarching objective of the initiative is to establish a pan-European blockchain framework to integrate the digital economic sphere of the European Union and Ukraine.

The integration of Ukraine into the European Blockchain Partnership is expected to enhance collaborative efforts in implementing blockchain technology within state registries and services, thereby contributing to establishing a highly efficient regulatory environment, particularly in the context of the virtual asset market.

This assertion was made by Oleksandr Borniakov, the Deputy Minister of Digital Transformation for IT Development, appointed as the Ukraine Representative in the European Blockchain Partnership.

For Ukraine, this represents a unique opportunity to learn from the best European practices to implement blockchain technologies in state registries and services in the future. Ukraine has become

the 30th country and the second country outside the European Union after Norway to participate in a project to use blockchain technology to provide cross-border public services (Governmental Portal, official website:2022).

The potential for the transformation of intellectual property in Ukraine through the utilisation of blockchain technologies is a subject that has been the focus of considerable attention. With the backing of the Ministry of Digital Transformation of Ukraine, the Web3 Institute team has analysed pilot blockchain initiatives within the public sector, encompassing the financial, transport, logistics, and ancillary sectors. This study demonstrated the significant potential of blockchain technologies to protect data from cyber threats, prevent corruption, and enhance management processes.

In order to enhance the efficacy of blockchain implementation in public services, the Ministry of Digital Transformation is developing a Sandbox tool for high-tech products that employs blockchain and artificial intelligence technologies.

The Sandbox constitutes a series of measures designed to facilitate the exploration and investigation of high-tech products that leverage artificial intelligence and blockchain technologies in their entirety for optimal functionality across diverse domains. The Sandbox is designed to address critical concerns related to safety, compliance with legislation and standards, patent purity, intellectual property rights, and market demand.

The pilot project is overseen by the Ministry of Digital Transformation, with the IP Office serving as a participant, along with other government agencies. The IP Office will provide expert advice and recommendations on both intellectual property protection and product launch.

As stated by Olena Orliuk, Head of the IP Office, this initiative represents a substantial advancement in the realm of state innovation.

The Sandbox will be open to companies that create solutions for education and science, medicine and biotechnology, the agricultural sector, public services, and the digital economy.

The duration of the Sandbox programme has been set for two years, concluding at the end of 2026, and its primary operational mechanism will be through the Innovation Development Fund's web portal (IP Office, official website:2024).

This experience can be successfully adapted to the development of intellectual property, particularly in the area of collective property management, copyright and related rights. The following key perspectives are identified:

1. Protection of copyright. The utilisation of blockchain technologies facilitates the establishment of immutable registers of rights, thereby ensuring a substantial degree of copyright protection. Each record of a rights registration or transaction is recorded in the blockchain, making it impossible to forge or alter. This is particularly important in the digital age, when piracy and infringement are becoming increasingly problematic.

2. Automation of rights management. Smart contracts, a constituent element of blockchain technology, can significantly streamline the management of rights. They facilitate the automated execution of license agreements, the distribution of revenues among rights holders, and the enforcement of contracts without the necessity for intermediaries. This will render the process of rights management more transparent and efficient, thereby reducing the potential for abuse.

3. Transparency and the fight against piracy. One of the most significant challenges for intellectual property is the fight against piracy and the illegal use of works. The utilisation of blockchain technologies has the potential to establish a transparent system for tracking the utilisation of copyrighted works, facilitating the detection of rights infringements and the expeditious distribution of royalties. Furthermore, implementing blockchain technologies can aid in combating counterfeiting and the production of illegal copies of products, a problem pervasive across numerous industries.

4. Internationalisation and global interoperability. The potential of blockchain to facilitate international rights management is significant. The technology reduces the establishment of universal

registries, thereby enabling authors and rights holders from diverse international backgrounds to engage and establish agreements more easily. Additionally, it allows the monitoring of the utilisation of their intellectual property on a global scale. This is particularly significant for Ukrainian authors and businesses operating in international markets.

5. Using blockchain to automate the registration and management of rights will reduce administrative costs and the risk of corruption, as blockchain ensures transparency and the impossibility of changing records once created. This facilitates streamlined procedures, rendering them more accessible to rights holders, thereby reducing the burden on government agencies and collective management organisations.

The integration of blockchain technologies within the domain of intellectual property, particularly in the context of collective management of copyright and associated rights, has the potential to markedly enhance the efficiency and transparency of management processes. It can ensure superior protection of the rights of authors and rights holders and generate novel prospects for advancing international cooperation. The experience of pilot blockchain projects in the public sector of Ukraine is a significant step towards adapting these technologies in the field of intellectual property, which opens up new horizons for the institution of collective management of copyright and related rights.

Conclusions. In the context of rapidly evolving digital environments, CMOs encounter a multitude of challenges necessitating prompt adaptation and the development of innovative solutions. Contemporary organisations are compelled to process voluminous quantities of digital data emanating from online platforms and emergent media, necessitating the utilisation of state-of-the-art instruments for collecting, processing and storing this information. Collective management organisations must adapt their systems to ensure transparency, efficiency and fair distribution of revenues to content creators. This necessitates the integration of contemporary technologies, such as blockchain, along with automated rights management platforms.

The utilisation of blockchain in the operations of collective management organisations represents a promising domain that holds the potential to enhance transparency, accuracy, and efficiency in royalty distribution. The technology has the potential to automate accounting and payment processes, reduce administrative costs, and provide faster access to funds for rights holders. CMOs can utilise distributed ledger technology to establish ‘smart IP registries’ as a centralised solution overseen by the CMO as an accountable body. This would create an immutable record of events pertaining to registered IP rights, including the registration, utilisation, licensing or transfer of works. This will effectively address the collection, storage and production of evidence.

However, despite the benefits, blockchain implementation has significant challenges, including high implementation costs, large amounts of data to process, and the need to harmonise standards across all market participants. Without unified coordination and widespread adoption of blockchain solutions by all the key players in the industry, this technology may prove to be only a partial rather than a comprehensive solution.

Metadata has been shown to play an essential role in this process, as it is the basis for accurately tracking the use of works in the digital environment. Given the ever-increasing amount of data generated during the licensing and distribution of content, it is imperative for CMOs to enhance their systems to manage metadata efficiently to ensure more accurate and effective rights registration. The development of blockchain and new metadata management technologies will significantly reduce the likelihood of errors and misuse, thus increasing the transparency and fairness of royalty distribution.

In Ukraine, although blockchain technologies are gradually gaining popularity in various sectors of the economy and finance, their use in the collective management of copyright and related rights faces a number of challenges and limitations. The integration of blockchain technologies has the potential to establish a contemporary ecosystem that would foster the growth and development of creative industries, particularly in the domain of collective management of copyright and related

rights. Creating such an ecosystem would facilitate the implementation of advanced copyright protection systems within the digital environment, thereby enabling artists and rights holders to gain more precise and timely control over their respective creative output.

The advent of blockchain technology has engendered the conception of decentralised registries, wherein each author and rights holder is empowered to register their rights directly, govern the utilisation of their works, and procure remuneration for their utilisation, thereby circumventing the necessity for intermediaries. Utilising blockchain technologies facilitates the expeditious and secure distribution of royalties to authors and other rights holders. This will not only increase the income of artists but will also allow for the creation of transparent and reliable systems for collecting and distributing funds. Furthermore, integrating smart contracts into copyright agreements has the potential to streamline the process, enhancing its efficiency and convenience for both rights holders and content users.

This, in turn, will not only improve the existing models of monetising creativity but also open up new opportunities for Ukrainian artists in the international arena. Moreover, it is anticipated that this will contribute to the development of creative industries, strengthen the protection of intellectual property rights, and increase transparency and efficiency in the collective management system of copyright and related rights.

However, it is important to acknowledge that this transition will be accompanied by a number of challenges, including legal uncertainty, inadequate digital infrastructure, and a lack of international integration. The potential for blockchain to enhance efficiency and transparency in this domain is significant, offering a promising avenue for advancing Ukrainian creative industries and attracting international partners.

In light of the rapid digital transformation of the copyright landscape, this research highlights the urgent need for Ukraine to align its collective rights management system with international standards. The proliferation of digital content and the limitations of national licensing models underscore the importance of developing unified databases and fostering cross-border cooperation among CMOs. Future research should explore effective strategies for integrating technological innovations into the national copyright infrastructure.

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