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ORIGINAL

# Global Digital Transformation: Ensuring the Protection of IP Rights

## Transformación Digital Global: Garantizar la Protección de los Derechos de Propiedad Intelectual

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## ABSTRACT

Today, intellectual property (IP) is a key global development driver. Its institution forms the basis of the economy, its virtually inexhaustible resource. Against the backdrop of large-scale and rapid digitalisation of public life, intellectual property is acquiring the functions of a toolkit for forming an up-to-date digital market, which requires a study of the transformation of the IP institution. The article aims to analyse the key trends in developing the system of intellectual property rights protection against the background of the digitalisation of global society. It examines the functionality of IP in the new digital era and outlines the main related risks and challenges. The study finds that rapid informatisation has become a key cause of large-scale infringements of IP rights. It examines modern innovative technologies and effective approaches in the practical experience of developed countries in protecting intellectual property rights. The article analyses modern scholars' positions regarding assessing the current level of IP rights protection. It highlights the need to integrate advanced digital technologies in terms of the IP protection strategy and identifies and analyses the most effective ones. The study establishes that this process may require separate targeted measures within the legislative and legal regulation framework. It has been proved that this problem should be addressed through a comprehensive global upgrade of IP legislation to introduce and strengthen a generally favourable legal regime that considers innovation trends to the maximum extent possible. It is substantiated that today, upgrading traditional legal approaches to protecting intellectual property rights is necessary.

**Keywords:** Intellectual Property; Copyright; Digitalisation; Information Technology; Artificial Intelligence; Mental Activity.

## RESUMEN

Hoy en día, la propiedad intelectual (PI) es un motor clave del desarrollo mundial. Su institución constituye la base de la economía, su recurso prácticamente inagotable. En el contexto de la digitalización rápida y a gran escala de la vida pública, la propiedad intelectual está adquiriendo las funciones de un conjunto de herramientas para la formación de un mercado digital actualizado, lo que requiere un estudio de

la transformación de la institución de la PI. El artículo tiene como objetivo analizar las tendencias clave en el desarrollo del sistema de protección de los derechos de propiedad intelectual en el contexto de la digitalización de la sociedad global. Examina la funcionalidad de la PI en la nueva era digital y describe los principales riesgos y retos relacionados. El estudio concluye que la rápida informatización se ha convertido en una causa clave de las infracciones a gran escala de los derechos de propiedad intelectual. Examina las tecnologías innovadoras modernas y los enfoques eficaces en la experiencia práctica de los países desarrollados en la protección de los derechos de propiedad intelectual. El artículo analiza las posiciones de los estudiosos modernos con respecto a la evaluación del nivel actual de protección de los derechos de propiedad intelectual. Destaca la necesidad de integrar las tecnologías digitales avanzadas en la estrategia de protección de la propiedad intelectual e identifica y analiza las más eficaces. El estudio establece que este proceso puede requerir medidas específicas dentro del marco legislativo y de regulación jurídica. Se ha demostrado que este problema debe abordarse mediante una actualización global y exhaustiva de la legislación en materia de propiedad intelectual, con el fin de introducir y reforzar un régimen jurídico generalmente favorable que tenga en cuenta, en la medida de lo posible, las tendencias en materia de innovación. Se ha demostrado que, hoy en día, es necesario actualizar los enfoques jurídicos tradicionales para la protección de los derechos de propiedad intelectual, dado el importante impacto del desarrollo tecnológico.

**Palabras clave:** Propiedad Intelectual; Protección de Derechos; Digitalización; Tecnología de la Información; Inteligencia Artificial; Derechos de Autor; Actividad Mental.

## INTRODUCTION

Modern digital solutions gradually transform the surrounding reality, penetrating social life everywhere. Modern technologies have a significant impact on how the results of intellectual activity are formed and used, as well as on the specifics of the legal protection of property rights arising from them.

Despite the active development of social relations in the information and intellectual sphere, the Internet is an environment that is virtually unhindered by infringement of patents, copyright and other types of intellectual rights.[1] The spread of the electronic form of expression of an intellectual product in the information environment and the formation of entirely new challenges regarding copyright and related rights have significantly weakened the author's disposal powers over his or her creative result. The dilemma of artificial intelligence and copyright is particularly relevant to this issue.[2]

The development of the modern information society requires improvement of legislative and legal regulation in the field of intellectual property, given that the phenomenon of "piracy" is ubiquitous.[3] Digital technologies simplify the process of "piracy" and often make it impossible to apply traditional approaches to protecting intellectual property rights, which requires the search for new variations of protective concepts in the current environment.[4] At the same time, the potential of "inverse" involvement of digital processes - from simplifying "piracy" to effectively combating it - deserves special attention.

IP rights enforcement is a topic of research interest for modern scholars. In particular, Samsithawrati et al.[5] investigate the increase in IP infringements caused by mass digital distribution. The authors insist on a more effective law enforcement process for cross-border infringements based on strong international cooperation and propose to focus on raising public awareness of the issues under study. At the same time, Brueckmann[6] analysing the role of IP enforcement, contribute to forming an institutional view of the enforcement system. In continuation, studying the level of IP protection in the European community, focuses on two key areas of IP protection against the active development of innovative technologies - databases and computer programmes.

Modern researchers (in particular, Auriol et al.[7]) identify incentives for IP rights protection and propose a universal model of gradual innovation. They argue that intellectual property rights guarantees intensify the potential for exports to advanced economies while slowing down technology transfer and investment in new developments. Dür & Mödlhamer[8] also share a dualistic vision of the IP rights protection system. The authors summarise that power asymmetries in synergy with asymmetries in innovation capacity stimulate profound differences in approaches to IP enforcement internationally.

Grimaldi et al.[9] propose three key strategies for protecting IP rights: defensive, improvised and collaborative. The defensive strategy involves protecting existing intellectual assets from infringement by other entities through licensing and agreements on using intellectual property. An improvised strategy involves managing the IP portfolio based on a preliminary assessment of the entire portfolio and choosing which components should be retained, developed, and licensed. This helps to optimise the value of the company's IP portfolio. The researchers suggest that the most effective cooperation strategy is aimed at productive interaction with other organisations and integration into new markets. Companies can enter into partnership agreements with each other to share intellectual assets and develop them.

In continuation, Brandl et al.[10] investigate the relationship between the level of innovation and the effectiveness of the IPR protection system. The authors argue that the greater involvement of multinational companies in the domestic innovation systems of developing countries causes their rapid approximation to advanced standards of IP rights protection, including in the cross-border context. The researchers' conclusions are continued by Neves et al.[11], who, based on a meta-analysis, summarise that IP rights positively impact innovation and economic growth. At the same time, the level of impact on innovation development in developing countries is much weaker than in developed countries.

Among the publications of recent years, scientific achievements in the development of the digital environment and its impact on the IP protection system deserve special attention. In particular, Saurabh and Ghoshal[12] study the evolution of the IP law phenomenon and its typology, identify the author's main problems in the digital world, and propose vectors for their solution. Anam[13] reviews current legislative developments and problems with their practical implementation. The researcher focuses on understanding the problems, trends and solutions in protecting IP rights in the context of the dynamics of digital technologies. At the same time, Akinduyite[14] explores the dilemma of artificial intelligence and copyright, arguing that traditional and new rules should preserve the status quo, rejecting the reality of AI authorship.

Contemporary researchers, such as Okene et al.[15], analyse legal regimes in the international context of combating digital piracy, the impact of streaming technologies and the global reach of digital content. At the same time, Sun et al.[16] create a theoretical and methodological framework for data-driven intellectual property management from a holistic bibliometrics perspective, analysing current challenges and outlining areas for future research.

Although modern scholars' work has made a significant scientific contribution to the topic's development in recent years, the problem remains relevant. It requires a comprehensive study, considering the rapid dynamics of the digital environment.

*Aims:* The purpose of this article is to analyze the effectiveness of modern strategies for developing intellectual property rights protection systems using digitalization tools.

## METHOD

### Design and scope of the study

The study examines the development of the intellectual property rights protection system in the context of ensuring the rule of law, improving the sectoral legislative framework, implementing an effective international anti-piracy policy, and developing legal instruments for copyright protection. The research is conducted in the context of global digitalisation.

### Data collection and sources

A comprehensive analysis of scientific articles and professional publications published in various scientific sources was conducted. We selected primary sources from influential journals indexed in well-known databases (Scopus, Web of Science). Priority was given to papers published between 2019 and 2024. The keywords used for the search were "intellectual property, intellectual rights, rights protection, digitalisation, information technology". The criteria for including and excluding publications were the spatial and temporal indicators and the level of information reliability. The methods used to assess the risk of bias in the included studies include brainstorming and causal analysis. Literature selection criteria included journal quality, relevance to industry topics, and availability of peer-reviewed content. Initially, more than fifty industry publications were collected, and about thirty were used for the study according to the criteria.

### Analytical framework and methods

Analytical approaches such as analysis, synthesis, generalisation, comparison, and abstraction were used to identify cause-and-effect relationships.

### Evaluation criteria

The study's limitations include the lack of access to complete and up-to-date official data and the difficulty of experimentally testing theoretical conclusions.

## RESULTS

The era of rapid digital development has led to the transformation of approaches to legal support amid the widespread use of information technology. The benefits of digital innovation require reliable protection of intellectual property rights as important assets of great value. Intellectual property is becoming particularly vulnerable due to the unimpeded possibilities of copying and counterfeiting IP objects in the digital world.

In addition, the issue of confidentiality in this area is currently a pressing one, as unethical use of data, unauthorised data exchange, data integration, and unauthorised public disclosure have become commonplace

on the Internet. In the context of the digital environment, it is difficult to understand the essence of fair use, regulate access and control clear violations of intellectual property legislation, and ensure that intellectual property owners effectively enter international markets, which requires the integration of practical, innovative remedies.[17,18]

The direct dependence of the total investment volume on the level of intellectual property rights protection exacerbates the situation. Unifying the law and balancing public and private interests is particularly important in this context. Taken together, this forms the basis for a new concept of attitude to intellectual property rights as a strategy for social progress.

The process is not new to date. Quite a few steps have been taken to protect intellectual property rights, including the creation of the World Intellectual Property Organisation, the development of a common approach to the definition of intellectual property and its rights, the codification of intellectual property rules, and the adoption of several international industry agreements. At the same time, integrating innovative technologies requires special attention to increase the protection of intellectual property rights and prevent the risks of the digital environment (table 1).

**Table 1.** Innovative technologies for the protection of intellectual property rights.

| Digital technology | Industry-specific applications |
|---|---|
| Technical protection measures (TPM) | Digital rights management (DRM) technology allows publishing companies to protect music, video, and text works from unauthorised use. Publishers charge the author for using a work. |
| Digital rights management (DRM) technologies | They involve identification methods, file access control, protection against tampering and damage, and preventing illegal users from accessing content through an identification system and licence agreements. |
| Blockchain | It implements the register of intellectual property rights and cataloguing. It integrates an innovative contracts system and computer software code for conducting business interactions without unnecessary costs and administrative procedures. |
| Electronic labelling | The digital system automatically generates a unique marker attached to file copies. It allows you to reliably protect documents in electronic circulation when printing, sending, and copying. |
| Digital signature technology | The digital signature contains information about the sender to link the software product, preventing illegal copying of content and guaranteeing the authenticity of documents. |
| Digital watermark technology | A digital pattern or signal is integrated into a digital document. A unique identifier conveys information about copyright ownership or permission. The legal owner of the rights to the work can remove these watermarks if necessary. |
| Cryptography | A traditional mechanism for encrypting information is to present it incomprehensible to unauthorised users during transmission or distribution. However, once decrypted, the protection is completely lost. |

**Source:** compiled by the author based on Kovalenko[19], Izbash[20]

Analysing table 1, it is worth noting that a standard feature for all the above technologies is the lack of proper legal and regulatory framework and inadequate regulation at both national and international levels. This leads to several controversial issues regarding their use and integration directly into intellectual property rights protection, preventing the international legal field from finding a consensus.

DRM technologies play a crucial role in controlling access to digital content, which mitigates the risks of unauthorised copying and distribution. At the same time, it is necessary to consider potential problems with restricting users' rights arising from using DRM. An example of this is the case of Super Cassettes Industries Ltd v Myspace Inc & Anr. Delhi High Court[21] in the Delhi High Court when one of the companies allowed the posting and distribution of copyrighted music without proper permission. The court emphasised balancing IP rights and users' freedoms.[22]

Digital development makes the issue of fair use of copyrighted works particularly relevant. Fair use is critically important for artistic, educational, and research purposes. At the same time, the debatable nature of the problem is expressed in the aspects of the scope and relevance of fair use. In particular, in 2017, the Delhi High Court heard the case of India TV Independent News Service Pvt. Ltd. v. Yashraj Films Pvt. was considered by the Delhi High Court, where the court explored the limits of transformative works and commentaries subject to its jurisdiction.[22]

Among the main problems in the field of IP rights protection, which are prospectively determined by digitalisation processes, are the following: [6,11,23]

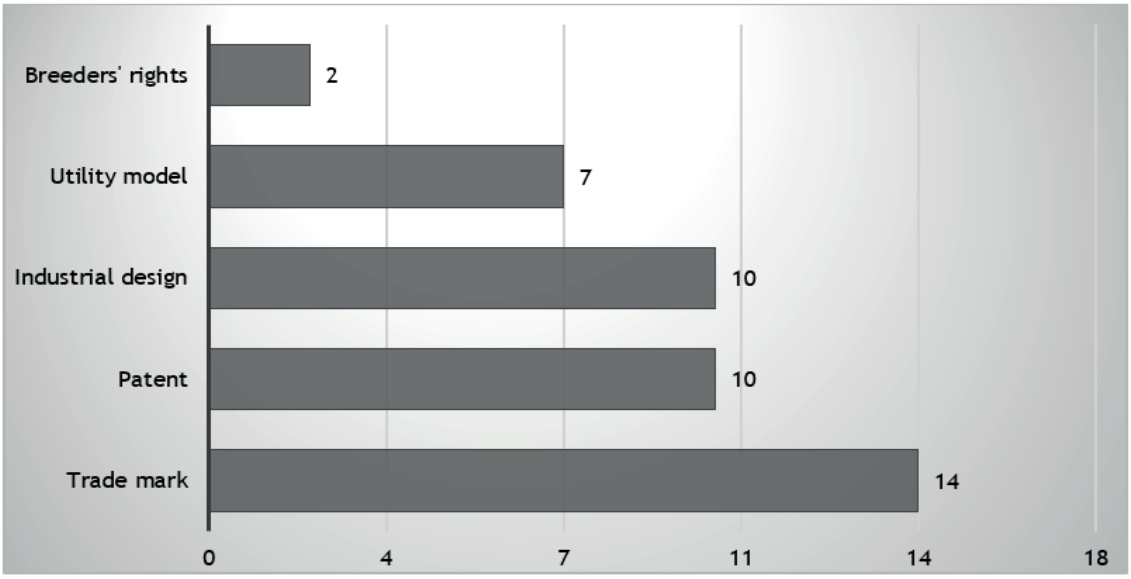
- complication and intensification of the processes of illegal copying and distribution of the results of creative and intellectual activity of others via the Internet;

- difficulty in identifying rights when digitising ancient works;
- identification of copyright and related rights to intellectual property results using artificial intelligence technologies;
- high-quality of identical fakes of artworks;
- the complexity of protecting patent rights in the virtual reality space;
- the problem of identifying the right holder in the case of a complex item in digital ontologies;
- the problem of using blockchain technology to record copyrights in the absence of reference legislative norms;
- the issue of openness of patent archives;
- the problem of the legitimacy of the image of a person and the corresponding legal protection.[24,25]

On a global scale, IP rights protection's legal and regulatory aspects are not codified and accumulated in a single legal act. Therefore, different laws in different countries may or may not protect them. Nevertheless, there are already best practices that can guide the development of national legislation on protecting IP rights in the digital environment.

In particular, in Singapore, which is positioned as a model of a strong IP protection regime, in 2021, the Singapore IP Office (IPOS) published the Singapore IP Strategy (SIPS) 2030, which proposed innovative solutions to support IA/IP-based businesses. Among the developments is IPOS MOBILE GO, the world's first mobile application for registering trademarks in 10 minutes, where you can extend the term of intellectual property rights. In addition, to streamline the patent protection procedure, Singapore is integrating "fast-track programmes" for obtaining patents, trademarks and design grants.[22] At the same time, IP law is an exclusive right with a territorial character, which creates additional obstacles to comparing the effectiveness of IP protection systems in this area in the international dimension. As for Ukraine, the innovations set out in the new Law of Ukraine "On Copyright and Related Rights" No. 2811-IX dated 01.12.2022 are appropriate and thoroughly elaborated. At the same time, the effectiveness of implementing this law is determined by several factors, including the level of compliance with the law by organisations and the protection of authors' rights in court proceedings. In the context of the European community, the European Union Directive on Copyright and Related Rights in the Digital Single Market[26] is positioned as a key document aimed at developing the digital economy and protecting the interests of both copyright owners and users.

Trends in the prevalence of recorded infringement of various types of IP rights indicate the effectiveness of IP rights registration as a means of protection. According to European statistics,[27] 15 % of owners of registered IP rights reported that they had suffered from infringement of these rights (figure 1). These infringements most often concerned trademarks (14 %), with a slightly lower percentage of design and patents (10 % each). The digital landscape contributes to increased risks of IP infringement, while at the same time, modern economic processes cannot develop without innovative digital support. This requires more attention to transferring digital solutions to the IP rights protection system, as they are currently more evident in the phenomenon of "piracy".

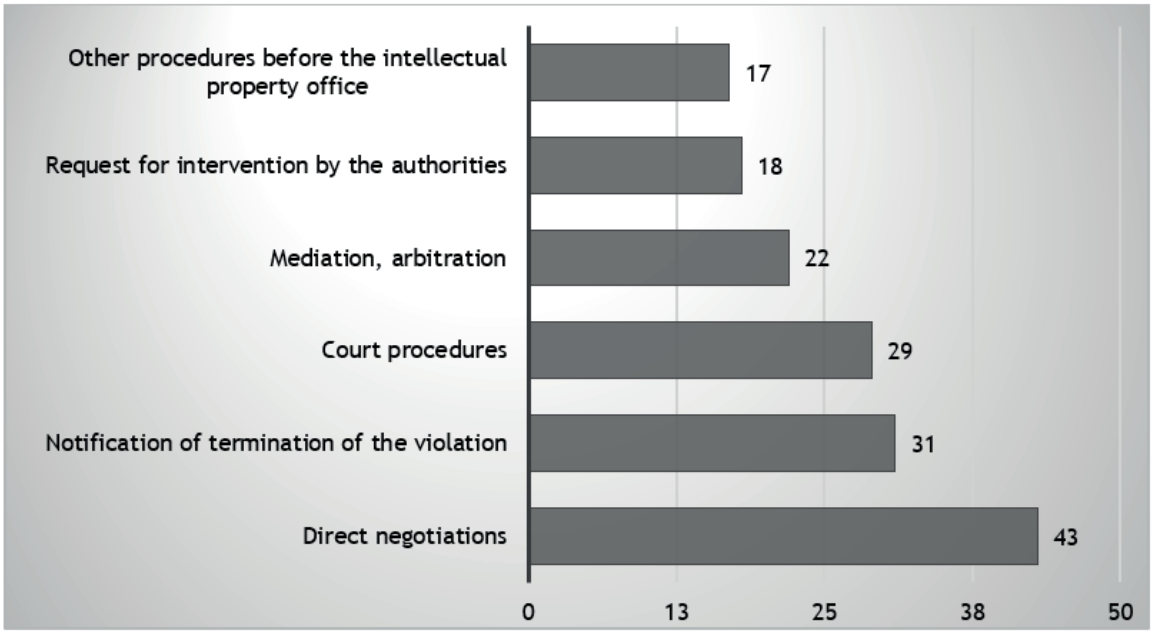



**Source:** EUIPO[27]

**Figure 1.** Number of infringements of intellectual property rights by type, %

The most common ways to obtain IP rights within the European Community are the initiation of litigation (29

%), direct negotiations (43 %), and filing a notice of termination of infringement (31 %) (figure 2).




**Source**: EUIPO[27]

**Figure 2.** Ways to enforce infringed intellectual property rights, %

Given the above disadvantages of uncontrolled information exchange in the digital environment, it is necessary to optimise sectoral legislation in the following areas:

- the law should directly regulate the procedure for using modern technical means of protection, guaranteeing authors a wide margin of appreciation for self-defence of their rights;
- increased liability for IP infringement;
- minimising the possibility of using workarounds.[28]

In order to ensure the proper protection of IP rights in the digital environment, it is currently considered insufficient to use only jurisdictional methods. Practical technical approaches to the protection of IP rights include, first and foremost, the following: technological protection measures (TPM), digital rights management (DRM), cryptography, digital watermarks, digital signatures, electronic labelling, and blockchain. Particularly noteworthy are the identified advantages of blockchain for protecting IP rights: additional opportunities for management of intellectual property rights, clear user identification, and the ability to create registers.[29] At the same time, a new form of legal relations in this area is emerging - digital.

Ukraine's acquisition of EU candidate status formalized its European integration prospects and marked the beginning of a new stage in its relations with the EU. This status gave additional impetus to the implementation of a range of internal reforms in various areas and opened access to special EU financial programs to prepare for accession. It should be noted that on March 18, 2024, the CMU approved the Ukraine Facility plan, which provides for more than a hundred reforms in 15 sectors, including intellectual property, to be implemented by the government and parliament over the next four years for the development and recovery of Ukraine, as well as the formation of effective national legislation in line with European standards.

In other words, in order to harmonize legislation with the EU acquis, a methodology is needed that provides for special tools for balanced and effective law-making and subsequent law enforcement.

Such a methodology for the implementation of European integration reforms should include, in particular:

- selecting areas for harmonization of laws and determining the competent state bodies to carry out this harmonization;
- accelerated procedures for the adoption of draft laws aimed at harmonizing legislation with EU law;
- compliance with international standards of law-making and national legislative techniques, as well as best practices in law-making among EU member states;
- taking into account European principles of law enforcement.

It should be noted that EU law is supranational law, which not only takes precedence over national law but is also directly applicable by national authorities. In its landmark case 26/62 Van Gend en Loos, the EU Court

defined EU law as a new legal order that creates rights and obligations not only for states but also for individuals and legal entities. For example, when Ukrainian law-making bodies bring national legislation into line with Regulation (EC) No. 178/2002 of the European Parliament and of the Council of January 28, 2002, laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, food safety, it should be noted that the provisions of that Regulation are directly applicable in all EU Member States. This means that there are no national legislative acts reflecting the provisions of the Regulation, and in the event of a dispute, the parties to the dispute may refer directly to the provisions of that Regulation. The situation in Ukraine is completely different, as the provisions of this Regulation must be incorporated into national legislation, which is contrary to the very nature of EU law but consistent with the practice of harmonising legislation.

In wartime, the issue of compliance with the principle of the rule of law becomes more complicated. On the one hand, the state has the right to take all possible measures to protect its citizens from armed aggression. On the other hand, restrictions on rights and freedoms must not be excessive and must not violate fundamental human rights. A pressing issue today is the deepening of scientific knowledge about the formation of "emergency" laws and "emergency lawmaking" as a historically new type of lawmaking in independent Ukraine, which characterizes the corresponding legal regime or state of emergency, i.e., the introduction of the concept of lawmaking with regard to the different nature of legal regimes and their consequences. After all, the planning of law-making activities should be based on a comprehensive analysis of objective changes in social relations and the re-evaluation of basic social values, based on re-examined scientific views of scholars on new directions in the development of legal science and the resolution of theoretical and practical aspects of this issue. while the specific nature of the formation of emergency laws does not allow for either planning or consideration of scientific approaches and concepts.

The Law of Ukraine "On Law-Making" does not single out emergency laws as a separate group, although it regulates the specifics of adopting normative legal acts during a state of war or emergency. According to Article 7 of this Law, during a state of war or emergency in Ukraine or in certain areas thereof, a legal regime of an emergency ecological situation, and if there is no objective possibility to comply with the requirements of this Law in full, subjects of law-making activity may adopt (issue) regulatory legal acts without complying with certain requirements of the Law.

Thus, the peculiarities of adopting emergency legislation lie in the fact that normative legal acts are adopted without planning, developing a draft concept, assessing the impact on social relations, assessing the draft's compliance with Ukraine's obligations in the field of European integration and EU acquis, organizational and technical support for the preparation of the draft act, conducting public consultations, etc.

In general, it can be argued that The IP rights protection system must meet modern requirements, providing for actions aimed at preventive protection and timely elimination of violations, as well as subsequent legal restoration of infringed rights through jurisdictional and non-jurisdictional forms of protection. At the same time, innovative technologies should reduce risks and make it impossible to misuse the IP object.

## DISCUSSION

After analysing several industry publications, we can identify the main scientific approaches to assessing the current state of IP rights protection. In particular, Abdullah et al.[1] argue that rapid digitalisation and its direct impact on IP rights protection are key factors in innovative development. Meanwhile, the weak level of law enforcement in the area under study contributes to the spread of piracy. Campi & Dueñas[2] emphasise the need to reform sectoral law to ensure guarantees of IP rights protection.

Cardozo[3] found that countries with strong IP legislation emphasise the importance of ensuring the originality of intellectual inventions to develop the economy as a whole. Conversely, levelling the protection of IP rights will inevitably lead to their massive infringement, which will have a destructive impact on overall economic development.

Li & Pei[4] analysed the current state of protection of intellectual property rights and existing problems in legal regulation and summarised the need to expand a multidisciplinary approach to research in this area with the involvement of qualified international experts in developing appropriate digital competence frameworks. The current sectoral legislation does not meet the requirements of the times. Therefore, the objects of IP law regulation often do not correspond to the legal means and instruments applied to this object. The authors propose a model of a new form of digital law with changing content, which will act as a flexible regulator of relations in the IP field.

In continuation, Mavani et al.[30] note that in today's conditions, it is advisable to adapt the existing norms and institutions of intellectual property law to the digital society as much as possible, for which it is necessary to introduce fundamentally new models of legal regulation and mechanisms of their interaction. After all, the instability and imperfection of the regulation of legislative interaction in this area do not ensure the proper level of the owner's rights to use their privileges.

Researchers Uchida[31] and Zade et al.[32] proposed a stage of globalisation of intellectual property rights protection, which includes the stage of harmonisation (formation of comparable, identical legislation that allows differences in the legal regime of protection, but at the same time guarantees equality of national and foreign citizens and companies); the stage of standardisation (collective establishment of contracts, agreements, rules and standards, as well as mandatory liability for infringement of intellectual property rights); the stage of control (compliance with standards by international.

Comparing the conclusions of modern authors with the results of our study, it is worth noting that all scholars unanimously emphasise the need to develop a system of IP rights protection in the digital society and argue for reforms in this area. Today, innovative development is the driving force behind economic growth, and proper protection of intellectual property rights will allow us to maximise our contemporaries' creative and scientific potential.

## CONCLUSIONS

The purpose of the study was to analyze the effectiveness of modern strategies for developing the intellectual property rights protection system with the use of digitalization tools. It has been proven that the intellectual property rights protection system must meet modern requirements, providing for measures aimed at preventive protection and timely elimination and further legal restoration of violated rights through jurisdictional and non-jurisdictional forms of protection. Innovative technologies for the protection of intellectual property rights include digital signatures, electronic labeling, technology protection measures (TPM), digital rights management (DRM), digital watermarks, cryptography, and blockchain.

Sector-specific legislation should be optimized to guarantee authors broad freedom to protect their rights, strengthen liability for intellectual property rights infringements, and minimize the possibility of circumvention. Further research should develop proposals for improving intellectual property regulation, taking into account country-specific characteristics.

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## CONFLICT OF INTEREST

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