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Civil-law aspects of using deepfake content in the context of copyright and personal data protection

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Abstract. The relevance of this study stems from the rapid development of generative technologies that enable the creation of heavily modified or fully synthesised content using artificial intelligence, particularly deepfakes. Such content not only creates an illusion of authenticity but also poses a threat to the protection of intellectual property rights and personal non-property rights, giving rise to significant legal challenges in the digital environment. The aim of the article was to formulate and justify civil-law approaches to the regulation of deepfake content usage in the context of copyright and personal data protection, considering the challenges of society's digital transformation. The study employed methods of systems analysis, legal-logical generalisation, formal legal method, and comparative legal research, considering international norms and doctrinal sources. It was established that current Ukrainian legislation does not define deepfake content as a separate legal category, and existing legal mechanisms are fragmented and do not cover all aspects of responsibility for its creation and distribution. Gaps were identified in the regulation of derivative digital works, the protection of biometric features of individuals, and the procedures for identifying violators in the context of automated content generation. The study proved that without proper regulatory response, deepfake technologies may be used as tools of manipulation, identity forgery, and digital defamation. The research emphasised the need for an interdisciplinary approach that integrates legal, technical, and ethical aspects of deepfake regulation. Special attention was given to legal liability in cases of automated content creation without direct human authorship. The importance of digital transparency and informed consent was highlighted as key principles of legal regulation. The results of the study can be used to improve national legislation and to develop international legal mechanisms in the field of artificial intelligence

Keywords: digital environment; artificial origin; automated creation; digital transformation; synthetic media manipulation

Introduction

The rapid development of artificial intelligence technologies intense learning, has led to the emergence of deepfake – media content created or modified using algorithms that can realistically imitate real people's appearance, voice and behaviour. Using such content raises serious legal challenges in civil law, especially in the context of copyright and personal data protection. On the one hand, deepfake may infringe the copyrights of the creators of the original content used without permission or proper licensing; on the other hand, it raises questions about unacceptable interference with privacy and violation of the right to control one's image, voice or behavioural characteristics, which are protected as personal data. In this regard, there is a need to develop an effective legal mechanism that would ensure a balance between technology innovativeness and individuals' rights. The urgency of the problem is exacerbated by the lack of clearly defined approaches to qualifying violations committed with the help of deepfake technologies, making it difficult to bring to justice and effectively protect subjects' rights. At the same time, international practice demonstrates a variety of models

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of legal regulation in this area, which creates preconditions for borrowing best practices and adapting them to national legislation. Therefore, the study of the civil law aspects of using deepfake content is of particular importance both in the scientific field and in the context of ensuring legal order in the digital environment.

An analysis of scientific sources on the civil law aspects of using deepfake content in the context of copyright and personal data protection allows to identify four key research areas. The first area covers the issues of digital transformation and cybersecurity. T. Kulchytskyi *et al*. (2024) analysed the legal framework for digital security, focusing on the need to adapt legislation to new digital challenges. A.A. Zavadskyi (2023) emphasised the need to regulate AI and deep synthesis technologies, including deepfake, considering the European experience. Further research should be complemented by the creation of a separate legal regime for artificially generated content, as well as an analysis of Ukrainian case law on diplomatic fakes. The second area focuses on the protection of personal data. For example, V. Ivkova & I. Opirskyi (2024) analysed the risks associated with the unauthorised collection and use of personal information in the OSINT context, which creates the basis for the abuse of deepfake technologies. N. Afshari & A. Mohammadi (2023) considered the violation of privacy due to the use of synthetic media and emphasise the need to expand legal mechanisms for protecting the individual. M.D. Murray (2024) examined the balance between the rights to privacy and publicity, proposing updated approaches to digital consent. In further research, it is advisable to pay attention to creating a unified digital identification mechanism and developing technical standards for verifying the authenticity of images.

The third area concerns copyright challenges. In particular, K. Tyagi (2023) offered an interdisciplinary analysis of the conflicts between copyright, moral rights, and deepfake technologies, paying attention to the limits of the permissible transformation of the original. C. Jasserand (2024) considered misleading headshots a threat to reputational rights, emphasising the legal uncertainty of the category of generated facial images. Aspects that have received insufficient attention include establishing clear criteria for originality in digital creativity and clarifying the user's role in generating synthetic content. The fourth area is international approaches to regulation. B. Van der Sloot & Y. Wagensveld (2022) described the challenges faced by law in the so-called "synthetic society" and justify the need for new norms. A. Wróbel (2024) analysed the Polish model of legal response to deepfake, noting its fragmentation even in the context of the GDPR. Y. Apolo & K. Michael (2024) raised the issue of the reliability of video evidence in court, pointing out the difficulties of examining deepfake content. A.C. Heugas (2021) compared the regulation of image rights in the US and the EU, emphasising the need to harmonise protection mechanisms. I. Aristova *et al*. (2020) substantiated the creation of specialiied courts to protect intellectual and personal rights in the digital environment. Aspects that have received insufficient attention include the unification of international liability standards for the use of deepfakes and the development of ethical codes for AI applications in the media.

Thus, the research analysis showed that the civil law aspects of using deepfake content require a comprehensive approach, including updating copyright laws, strengthening legal protection of privacy, adapting European standards, and developing effective judicial and regulatory mechanisms. Despite the growing interest in deepfake issues, several key aspects remain unresolved. In particular, the legal definition of deepfake content has not been formulated, which makes it impossible to qualify it as an object of copyright or related rights. The limits of transformation under which the created product is considered a derivative work are unclear, and there are no clear criteria for the legitimacy of using someone else's images, voice or stylistic features in digitally generated content. The legal status of such elements often remains outside the scope of current regulation, creating serious gaps in protecting personal non-property rights. The problem of automated content creation without the participation of a specific author has also been insufficiently studied, making it difficult to establish liability. The absence of deepfake labeling mechanisms, imperfect response procedures, and limited integration of international experience leave the field unregulated.

The purpose of the article was to substantiate the civil law approaches to regulating the use of deepfake content in the context of copyright and personal data protection, taking into account the challenges of the digital transformation of society. Objectives of the article were: to determine the technological nature, characteristics and forms of expression of deepfake content as a product of digital generation; to study the legal aspects of creating and using deepfake in the context of copyright and protection of personal non-property rights; to dentify gaps in current legislation and provide practical recommendations for improving legal protection mechanisms in the digital environment.

Materials and Methods

This research used a mixed methodological approach that combined traditional legal analysis with elements of interdisciplinary study. The main goal was to understand how deepfake technologies affect civil law, especially in the fields of copyright and personal data protection. The doctrinal legal method was used to study laws, legal concepts, and academic opinions. This method helped to analyse how current legal norms work and where there are gaps in regulating deepfakes. It also allowed for the identification of legal definitions that are still unclear or missing in national and international law.

A comparative legal method was also important. It was used to study how different countries respond to deepfake technologies. To identify existing gaps in the legal framework, a comparative analysis was conducted between current Ukrainian legislation (Civil Code of Ukraine, 2003; Law of Ukraine No. 2811-IX, 2022) and relevant international standards and doctrines.This approach enabled the systematic detection of discrepancies between existing legal regulations and the evolving requirements of the digital environment. By comparing laws from the EU, Germany, France and Ukraine, the research identified both common trends and differences. This helped to find possible legal solutions that could be adapted to the Ukrainian context. The content analysis method was used to study specific legal texts, such as international regulations (e.g., Regulation of the European Parliament and of the Council No. 2016/679, 2016 (GDPR); Regulation of the European Parliament and of the Council No. 2022/2065, 2022), draft laws (like the U.S. Congress Act No. H.R.5586, 2023), court decisions, and expert reports. Special attention was paid to documents that discussed image rights, biometric data, and the use of AI in media.

In addition, the systemic-structural approach helped to understand how different parts of the legal system (civil, media, digital, and data protection law) are connected when dealing with deepfake-related issues. It showed how legal problems often require solutions not from one area of law, but from several at once. The research materials were collected through academic databases like Scopus, HeinOnline, and Google Scholar, along with official publications from the European Commission, World Intellectual Property Organisation (WIPO), and Council of Europe. The study focused on legal and ethical risks related to the unauthorised use of personal images, voices, and behaviour in AI-generated content. The analysis included practical examples from court cases, legal commentaries, and national digital strategies. Altogether, this methodological framework allowed the research to build a clear picture of how legal systems respond to deepfake technologies and where improvements are needed to better protect intellectual and personal rights in the digital era.

Results and Discussion

Deepfake content is one of the most sophisticated manifestations of modern artificial intelligence technologies based on deep learning, in particular, generative adversarial networks (GANs), to create or modify images, video, and audio with high realism. Its technological nature is based on the automatic training of computer models on a large amount of data, which makes it possible to imitate facial expressions, intonations, movements, and other features of real people or objects. As a result, a new digital product may look identical to the real thing, although it is essentially a synthesised artificial object. Such content is actively used in various fields, from mass culture and advertising to educational programmes and cyber threats (Jasserand, 2024). Its functionality constantly expands: modern deepfake systems can adapt to voice samples, reproduce body language, synchronise lips with artificially generated speech, and automatically create a video sequence based on a text script. This provides flexibility in creating media products and, at the same time, raises concerns about its use in contexts of deception, manipulation, or invasion of personal space (Table 1).

Table 1. General characteristics, forms and functionalities of deepfake content

Feature	Contents	Application examples
Technological basis	Generative deep learning algorithms, including GANs, autoencoders, neural networks	Using GANs to create videos with new faces based on samples
Types of content	Video, audio, images, combined multimodal content	Voice replacement in audio, face overlay in real video
Forms of expression	Full generation (creation from scratch), partial modification (replacement of individual elements), motion simulation	Animation of historical figures, synthesis of famous people's addresses
Functional features	Lip synchronisation, intonation imitation, emotion generation, speech adaptation	Automatic dubbing of videos with other voices, creation of deep narratives
Purposes of use	Entertainment, advertising, art, education, disinformation, cyberattacks	Social apps for creating video memes, fake political appeals

Source: compiled by the author on the basis of A. Lee & P. Woo (2022), A.A. Zavadskyi (2023), N. Afshari & A. Mohammadi (2023), M.D. Murray (2024)

In practice, deepfake content is actively used in the open media space and specialised services. In the entertainment industry, mobile applications that allow users to interactively change their faces in photos or videos or duplicate the voices of celebrities have become popular. In digital art, deepfake creates immersive installations and visual content that would be impossible to realise using traditional means. For example, Lucasfilm, in the movie Star Wars: The Rise of Skywalker, used deepfake technologies to "restore" actress Carrie Fisher, who died before the end of filming (Screen Rant, 2019). Another striking example is the Reface (n.d.) platform, developed by Ukrainian experts, which allows users to change faces in videos using neural networks and has become globally

popular due to the simplicity and high quality of content generation. At the same time, along with the positive developments, there has been a sharp increase in the number of fake appeals by public figures, manipulative videos in information campaigns, and commercials created without the parties' consent. For example, in 2022, a video was circulated in which the President of Ukraine, Volodymyr Zelenskyy, allegedly called for surrender; this deepfake was quickly exposed, but the fact of its appearance became an example of an information attack in wartime (Allyn, 2022). As a result, deepfake content appears as a technologically advanced but legally ambiguous digital product that combines the potential for innovation with a high risk of violating ethical and legal norms.

The legal use of other people's works when creating deepfake content requires a clear distinction between primary and derivative copyrighted works. Since most deepfake products are based on existing audio, video, or visual materials, the key question is whether the result of the generation is a new work subject to legal protection or a derivative work requiring the permission of the copyright holder (Lee & Woo, 2022). The degree of transformation, the level of creative contribution, the nature of use, and the purpose of creation play a crucial role in determining the legal status. Particularly difficult are cases where content is created automatically, without clear authorship, which gives rise to legal conflicts in the field of intellectual property. To summarise approaches to the classification of such objects, it is advisable to analyse the types of deepfake content in terms of source, form of processing, and legal consequences (Table 2).

Table 2. Legal classification of deepfake content in relation to primary and derivative works

Type of material used	Signs of the legal status of the created content	Terms of legitimate use	Application examples
Copyrighted work (video, music, images)	Derivative work, provided that the structure or image of the work is preserved in a modified form	Requires permission of the copyright holder; may be licensed or quoted in accordance with the law	Replacing an actor's face in a movie clip or re-arranging a music video
Fragments from the public domain or works whose protection period has expired	New or derivative work, depending on the scope of the transformation	Free use is allowed in the absence of restrictions	Creating a video based on works of the nineteenth century or historical documents
Individual elements of the work (image, style, voice, facial expressions)	Mixed status: can be recognised as either a new work or an infringing interpretation	Depends on the level of originality, transformation and commercial use	Generate a promotional video using the style or visual code of a famous movie
Full generation of new content without direct copying	May be considered a primary work if it is the original result of creative activity	Does not require consent unless related or personal rights of third parties are violated	Creating a video based on a text description using generative AI
Combined use of several sources	Mostly classified as a derivative work; the level of modification is important	May require permissions for each element used	Mix audio and video fragments from different sources into a new video

Source: compiled by the author on the basis of A. Lee & P. Woo (2022), K. Tyagi (2023), C. Jasserand (2024), A. Wróbel (2024)

In practice, the legal status of deepfake products remains ambiguous, as each case requires an individual assessment, considering the content sources used, the nature of the transformation, and the presence of a commercial purpose. As part of the legal regulation in Ukraine, there are currently no special rules directly related to deepfake content. However, the general provisions of the Law of Ukraine No. 2811-IX (2022), as well as articles of the Civil Code of Ukraine (2003) regulating the right to work and the procedure for using derivative works, apply. In particular, Article 433 of the Civil Code of Ukraine stipulates that the object of copyright is works expressed in an objective form, including audiovisual, computer and other products created by creative labor. Suppose deepfake content is created by modifying an existing protected work. In that case, it is classified as a derivative and requires the right holder's consent by Article 440 of the Civil Code of Ukraine.

At the international level, no separate regulatory act is dedicated to the legal status of deepfake content. At the same time, the provisions of the Berne Convention for the Protection of Literary and Artistic Works (1979) apply, according to which the author has the exclusive right to authorise adaptations, translations, and other modifications of his or her work. Within the framework of WIPO, there are Treaties on Copyright (WIPO Copyright Treaty, 1996) and Performances of Phonograms (WIPO Performances and Phonograms Treaty, 1996), which recognise digital forms of use of works and cover protection in the digital environment. The European Union, although not directly regulating deepfake, introduced the Regulation of the European Parliament and of the Council No. 2022/2065 (2022) and the Regulation of the European Parliament and of the Council No. 2021/0106 (2021), which set requirements for transparency of digital content, including that created using generative models,

and provide for liability for infringement of intellectual property rights in the digital space (Tyagi, 2023). Thus, the legal framework is gradually adapting to new challenges. However, legal uncertainty remains, which requires further development at both the national and international levels, with a clear distinction between primary and derivative digital works generated with the participation of artificial intelligence. In the context of the proliferation of deepfake content, the effectiveness of legal protection mechanisms in reproducing a person's appearance, voice or behavioural traits without their consent becomes particularly relevant. Such actions may violate personal non-property rights, including the right to image, voice, privacy and dignity. Different jurisdictions develop their approaches to responding to these judicial and administrative violations. For a scientific assessment, it is appropriate to compare Ukrainian and European law enforcement experience (Table 3).

Table 3. Protection of personal non-property rights in the context of deepfake: Ukrainian and European experience

Jurisdiction	Types of violations	Protection mechanisms
Ukraine	1. Unauthorised use of a person's image in deepfake content. 2. Imitation of voice for commercial purposes	1. Claim for protection of the right to the image, demanding a ban on distribution. 2. Appeal to the court or regulator regarding the violation of the individualisation of a person
France	Voice imitation for commercial use without consent	Administrative response, removal of content, notification of the subject
Germany	Using the appearance of a public figure without participation in the project	Court ban on video distribution, compensation for non-pecuniary damage
EU	Processing of personalised deepfake content by without the person's consent	Filing a complaint with the national regulator, exercising the "right to be forgotten"

Source: compiled by the author on the basis of German Civil Code (2002), Civil Code of Ukraine (2003), CNIL (2022), N. Afshari & A. Mohammadi (2023), A. Wróbel (2024), Code of Relations Between the Public and the Administration (2024), EU Data Protection Authorities (DPA) (2024)

In the European Union, in addition to the Regulation of the European Parliament and of the Council No. 2016/679 (2016), case law and the practice of national regulators are relevant (Van der Sloot & Wagensveld, 2022). In France, for example, in 2022, the National Commission for Informatics and Liberties considered a case of using a deepfake voice to fraudulently use online advertising, ordering the company to remove the content and notify the victims of the fake (CNIL, 2022; Code of Relations Between…, 2024). In Germany, a court ordered an online platform to remove a deepfake video featuring a well-known TV presenter, although she had never participated in the project (German Civil Code, 2002). Both examples demonstrated the real-world application of judicial and administrative protection mechanisms, even in complex digital environments. In Ukraine, the Law of Ukraine No. 2297-VI (2010) defines the basic principles of processing, storage, and use of personal information, including biometric data such as facial images and voice samples. However, it does not explicitly regulate the use of synthetically generated representations created by AI systems. This creates a legal vacuum where the protection of personal data in deepfake contexts is limited to general norms and does not ensure direct liability for algorithmic misuse of identity features (Law of Ukraine No. 2297-VI, 2010). Consequently, Ukrainian regulators and courts still rely on broad interpretations of privacy and image rights to address cases of AI-generated content infringement.

At the international level, a key initiative is the U.S. Congress Act No. H.R.5586 (2023), which proposed mandatory digital watermarks and disclosure requirements for synthetically created visual and audio content. The Act introduced obligations for content producers and platforms to label AI-generated materials and establishes civil liability for intentional distribution of unlabeled deepfakes that may cause harm to an individual's reputation or privacy. Although still under consideration, this approach reflects a trend towards the global institutionalisation of transparency standards in AI media governance. Thus, the practice of Ukraine and EU countries indicates the growing importance of the non-property component of digital identity and the need to develop specialised procedures for rapid response to violations by deepfake content.

Despite the existence of general legal norms in the field of intellectual property, personal data and non-property rights protection, the current legislation of Ukraine does not ensure proper regulation of the specifics of the use and distribution of deepfake content. The absence of a legal definition of this phenomenon makes it impossible to unambiguously qualify it as an object of an offense or legal relationship, complicating the application of existing rules in practice (Petrovskyi *et al*., 2025). Comparative legal studies confirm that a similar gap exists even in advanced jurisdictions, where regulatory fragmentation and the absence of unified standards hinder effective accountability for synthetic media dissemination. J. Meskys *et al*. (2020) highlighted the challenges posed by dispersed regulatory frameworks, while A. Fabuyi *et al*. (2024) emphasised the limitations of current standards in ensuring compliance.

Determining the legal status of persons who initiate the creation of deepfakes remains problematic, especially in the case of automated generative systems, when the issue of authorship and liability becomes legally blurred. According to A. Busacca & M.A. Monaca (2023), this ambiguity also extends to determining intent and purpose in the creation of AI-generated materials, which complicates distinguishing artistic innovation from manipulative or defamatory use. Also, current legislation does not set limits on the permissible transformation of primary works in the digital environment, which creates risks for both the copyright and moral rights of third parties (Wróbel, 2024).

A significant gap was observed in the mechanisms for identifying the source of deepfake content, which is critical for proving the fact of infringement in court which correlates with the conclusions made by N. Afshari & A. Mohammadi (2023). Empirical evidence has shown that the lack of transparent labeling mechanisms substantially reduces victims' ability to prove identity misuse, particularly in cases of non-consensual intimate content or political disinformation (Mania, 2024; Romero Moreno, 2024). In addition, there are no regulatory requirements to label or disclose the artificial origin of visual or audio content, which limits the transparency of the digital environment (Murray, 2024). Public perception research indicates that societies without explicit labeling rules are more tolerant of synthetic representations, underestimating their manipulative potential as stated by M.B. Kugler & C. Pace (2021).

An additional threat is the low level of public awareness of the technological characteristics and potential risks of deepfake, which increases vulnerability to manipulation and disinformation (Ivkova & Opirskyi, 2024). Therefore, as A. Fabuyi *et al*. (2024) emphasised, public education and awareness-raising campaigns play a decisive role in preventing harmful use of deepfakes in media and entertainment ecosystems. As a result, law enforcement practice is forced to rely on general rules that do not take into account the technological complexity, speed of dissemination, and social danger of deeply generated content, which requires the development of specialised legislative provisions.

To ensure effective protection of intellectual and personal rights in the context of the spread of deepfake technologies, it is advisable to initiate the development of a comprehensive legal category of deepfake content as a separate object of digital legal relations. At the legislative level, a clear definition of such content should be introduced, taking into account the method of its creation, the purpose of its use, and the level of transformation of primary works or personal characteristics. It is necessary to provide for mandatory labeling of artificially generated content containing a reproduction of a person's image or voice, as well as liability for its distribution without informed consent. In the field of copyright, it is advisable to regulate the legal status of derivative works created using deep learning algorithms, with requirements for obtaining permission from the copyright holder or the person whose identity elements are used. It is also recommended that a procedurally simplified procedure be provided for responding to violations, including the possibility of filing applications with digital platforms and relevant data protection authorities to promptly block or remove content. In addition, at the level of international cooperation, it is advisable to initiate the unification of approaches to the legal regulation of deepfake, taking into account EU standards and Council of Europe practice, which will contribute to legal certainty and strengthen interstate responsibility in the digital environment.

Conclusions

In the course of this research, thr appropriate conclusion would be that deepfake content is not just a technological novelty, but a serious legal challenge that current civil law systems are not yet ready for. As deep learning algorithms continue to develop, they give rise to complex digital products that can reproduce human appearance, voice, and behaviour with impressive accuracy. At the same time, this progress brings with it significant legal risks – particularly in the areas of copyright and the protection of personal non-property rights. Based on the analysis, it was found that Ukrainian legislation does not yet provide a clear legal definition of deepfake content, which complicates its qualification in legal disputes. This makes it difficult to clearly separate what is a derivative work from what could be considered a violation of moral or copyright rights. Moreover, there are no detailed rules for how consent should be obtained when someone's face or voice is used in AI-generated content.

The absence of labeling requirements (such as an obligation to indicate when a video or voice recording was generated by AI) only deepens the problem. Without such transparency, it is almost impossible for ordinary users or even courts to distinguish real content from synthetic. In Ukraine's current legal context, where many digital challenges are still unregulated, this creates space for potential abuses – especially in times of war, when information security plays a key role. In comparison with European practice, Ukraine could benefit from adapting certain tools, such as simplified takedown procedures, the "right to be forgotten" in relation to deepfakes, and rules from the upcoming EU Artificial Intelligence Act. It is also worth considering the creation of specialised judicial or administrative procedures to quickly respond to violations caused by the use of synthetic content.

To summarise, it was recommend developing a full-fledged legal category of deepfake content within civil law, which would regulate its definition, the degree of permissible transformation, and requirements for consent. The issue of authorship in AI-generated works also needs

attention, especially in cases where content is produced automatically and without direct human input. Further research should focus on real case studies, technical tools for verifying content authenticity, and possible cooperation with digital platforms that host user-generated media. Only through a combination of legal, technical, and ethical approaches can the society build an effective system to protect people's rights in the digital environment.

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Цивільно-правові аспекти використання deepfake-контенту в контексті авторського права й захисту персональних даних

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Анотація. Актуальність дослідження зумовлена нестримним розвитком генеративних технологій, що дають змогу створювати глибоко змінений або повністю синтезований контент за допомогою штучного інтелекту, зокрема deepfake. Такий контент не лише створює ілюзію достовірності, а й ставить під загрозу дотримання прав інтелектуальної власності й особистих немайнових прав, викликаючи суттєві правові виклики в цифровому середовищі. Мета статті полягала у формулюванні й обґрунтуванні цивільно-правових підходів до врегулювання використання deepfake-контенту в контексті авторського права та захисту персональних даних з урахуванням викликів цифрової трансформації суспільства. У межах дослідження використано методи системного аналізу, логіко-юридичного узагальнення, формально-юридичний метод, а також метод порівняльного правознавства з урахуванням міжнародних норм і доктринальних джерел. Установлено, що чинне українське законодавство не містить окремого поняття deepfake-контенту, а наявні правові механізми є фрагментарними й не охоплюють усіх аспектів відповідальності за його створення та поширення. Виявлено прогалини в регулюванні статусу похідних цифрових творів, захисту біометричних ознак особи, а також у процедурі встановлення правопорушника в умовах автоматизованої генерації контенту. Доведено, що без належного нормативного реагування deepfake-технології можуть використовуватися як інструмент маніпуляцій, підміни ідентичності й цифрової дискредитації. Дослідження підкреслило необхідність міждисциплінарного підходу, що поєднує юридичні, технічні й етичні аспекти регулювання deepfake. Особливу увагу приділено проблематиці юридичної відповідальності в разі автоматизованого створення контенту без безпосередньої участі автора. Акцент зроблено також на важливості цифрової прозорості й інформованої згоди як ключових принципів правового врегулювання. Результати дослідження можуть бути використані для вдосконалення національного законодавства та розроблення міжнародних правових механізмів у сфері штучного інтелекту

Ключові слова: цифрове середовище; штучне походження; автоматизоване створення; цифрова трансформація; синтетична маніпуляція медіа

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Poland's experience in organising the monitoring of legal support for scientific and technological, and innovative activities

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Abstract. The purpose of the study was to determine how the control of legal support for scientific, technical, and innovation activities was implemented in Poland. Legislative acts of the Republic of Poland, Germany, and France were examined. The study employed the following methods: system analysis, comparative-legal method, formal-legal method, content analysis, and synthesis. The instruments for stimulating innovation – tax reliefs for research and development activities (ulga B+R), the Innovation Box mechanism, and public-private partnership mechanisms in the innovation sphere – were also explored. The article analysed how Poland implemented the monitoring of legal norms' effectiveness through digital tools (including Open System of Funds and Government Legislation Centre, ex-ante and ex-post evaluations, as well as through public consultations and legislative transparency. An institutional model was presented, providing coordination between state authorities, scientific institutions, and independent auditors, particularly the Supreme Audit Office. A comparative analysis of legal support approaches for scientific, technical, and innovation activities in Poland, Ukraine, France, and Germany was carried out. The study also examined countries' rankings in the Global Innovation Index 2024, according to which Germany ranked 9th, France 12th, and Poland 40th. Based on the conducted analysis, a set of practical recommendations was formulated regarding the implementation of elements of the Polish experience in the Ukrainian legal framework, including the introduction of digital monitoring mechanisms, business tax incentives, and the creation of institutional infrastructure for innovation support. It was determined that implementing a comprehensive legal model similar to Poland's could enhance the effectiveness of Ukraine's state innovation policy and harmonise it with European standards. The practical significance of the study lies in developing a clear algorithm for introducing European experience in organising the monitoring of legal support for scientific, technical, and innovation activities in Ukraine to increase the effectiveness of national innovation policy

Keywords: intellectual property; tax incentives; state strategy; digital tools; innovation management

Introduction

In the 21st century, scientific, technical, and innovation activities (STIA) have been the strategic foundation of sustainable development and economic competitiveness. The effectiveness largely depended on efficient legal regulation and the continuous monitoring of legal support. The relevance of legal monitoring increased under the conditions of the digital economy, integration into international scientific and innovation networks, and the necessity to adapt to European Union (EU) standards. The legal framework for STIA covered both general provisions on science and innovation and specific instruments such as research funding, intellectual property (IP) protection, public-private partnership (PPP) incentives, and tax reliefs. At the same time, the monitoring mechanism – the evaluation of efficiency, relevance to contemporary needs, and harmonisation with international practice – was no less important than the adoption of legislation itself. It enabled the timely

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identification of gaps, removal of barriers, and improvement of knowledge management. A country that succeeded in creating an effective model of legal monitoring in the field of STIA was Poland. After joining the EU in 2004, Poland underwent a transformation from a post-socialist model to full integration into the European scientific and innovation area. Through the digitalisation of legal processes, active involvement of civil society, expert engagement, and systemic evaluation of the legal framework, the country formed an effective model of innovation management aligned with EU standards.

In the field of legal support for innovation activity, one persisting issue was the low level of effective integration between science and business, which hindered the commercialisation of research results and slowed the development of national innovation systems. This problem was examined by I. Jonek-Kowalska (2021), who analysed the activities of Polish research institutes between 2014 and 2019 under legislative reforms aimed at stimulating the commercialisation of research outcomes. The author identified a positive trend of increased financial autonomy of institutes, openness to cooperation with business, and partial reduction of dependence on budgetary funding. Similar aspects – though with an international emphasis – were discussed by S.I. Kubiv *et al*. (2020), who focused on the innovation potential of Eastern European countries, highlighting inefficiencies in intellectual property rights use and the limited role of state funding in developing innovation exports.

Another problem was the insufficient adaptation of modern innovation management theories to the specific characteristics of individual states, which complicated strategic planning. D. Zieliński *et al*. (2024) studied this issue using "horizon scanning" and "trend radar" methods to identify seven promising technological directions for Poland by 2030. The conclusions indicated potential for strategic management of national innovation policy through expert assessment of technological trends. Similarly, Y. Kharazishvili *et al*. (2021) employed foresight techniques to model long-term scenarios for Ukraine's integration into the European research area, drawing on Polish experience. The researchers emphasised the need to transform foresight into a tool with clear quantitative benchmarks that would enable adaptive strategic management of the innovation system. At the macro level, one of the challenges in innovation policy implementation was the unexpected effects of integrating European innovation strategies into national contexts, especially in post-socialist countries. This issue was studied by A. Karpińska (2020), who analysed the "science and innovation paradox" in Poland – a phenomenon where formal compliance with EU requirements did not lead to a significant increase in innovation capacity. The author identified four types of paradoxes – of entrepreneurship, resources, financing, and absorptive capacity – which together signalled a gap between the normative framework of innovation policy and the actual capabilities of the academic sector. Another challenge was the uneven innovation development of EU countries, which complicated policy unification.

A further problem concerned the unclear role of local governments in supporting and implementing innovation, as well as the lack of systemic analysis of innovation activity dependence on municipality type. N. Derlukiewicz *et al*. (2021) established that the type of municipality significantly influenced the nature of innovations, most of which were related to information and communication technologies, e-governance, and cross-sectoral cooperation. The study emphasised the importance of institutional capacity and local resources for innovation. Unequal access to open innovation platforms among professional groups also remained an issue. J. Ober (2022) discovered that barriers to implementing open innovation varied by respondents' positions, requiring differentiated management solutions. Despite existing research on the legal support of innovation policy, the issue of monitoring legal regulation of STIA in Central and Eastern European countries remained insufficiently covered, particularly regarding institutional mechanisms, digital tools for legal assessment, and the participation of academic and business sectors in the legal dialogue. The purpose of this study was to examine Poland's experience in organising the monitoring of legal support for scientific, technical, and innovation activities. The research objectives were to study Poland's legal approaches to managing STIA, compare the Polish experience with that of other EU countries (France, Germany), and assess the potential for adapting the Polish experience to the Ukrainian context.

Materials and Methods

The methodological basis of the study consisted of a combination of several methods applied to the corresponding sources. The formal-legal and comparative-legal methods were used to analyse the legislative acts of the Republic of Poland. These include the Law of Poland No. 2201 (2017), Law of Poland No. 21 (1992), and Law of Poland No. 80 (1991). The analysis also covered the Industrial Property Law (2000), Law of Poland No. 96 (2010), and Law of Poland No. 1668 (2018). In addition, Law of Poland No. 534 (2019), Law of Poland No. 19 (2008), and Law of Poland No. 9 (1991) were examined. Using content analysis, documents of Poland's strategic planning were examined, such as Resolution No. 16 (2013) and the National Regional Development Strategy (2025). The purpose of examining these materials was to identify legislative mechanisms for supporting innovation, principles of research funding, and features of state policy implementation in the field of STIA. Based on system analysis, the entire body of sources was studied as an integrated structure, and the synthesis method allowed the generalisation of the obtained results and formulation of conclusions.

Within the study, several strategic and institutional programmes aimed at supporting scientific, technical, and innovation activities were analysed. The Smart Specialization Poland (n.d.) programme was examined to explore mechanisms for forming regional smart specialisation strategies. The Innovation Box programme was also analysed to investigate the application of a preferential income tax rate on profits derived from qualified intellectual property rights (Innovation Box tax…, n.d.). The Smart Growth Operational Programme 2014-2020 (2015) was analysed to study practices of supporting science-business consortia and commercialising research results. The Bridge Alfa programme was explored to assess the role of venture financing in innovative projects (Research in Poland, n.d.). The STRATEGMED programme was studied to evaluate support for biomedical research and the implementation of innovative health technologies ([NCBR] Strategmed…, 2023). Within the Regional Operational Programme (ROP) Podlaskie Voivodeship, the funding of the company "Dary Natury" for creating research and development (R&D) infrastructure was analysed (Polish natural products…, 2019). The Biznesmax programme providing credit guarantees for innovative and environmental projects was examined (Biznesmax – ERDF guarantee…, 2023). The First Business – Start up Support programme was also studied, which offered grant and preferential support for business creation (Start-up funding for…, 2024), as well as the e-Pionier programme implemented on the basis of pre-commercial procurement for developing prototype solutions (MVPs) (PIONIER-LAB…, 2020). In addition, Poland's participation in international PPP formats was analysed, particularly within the European Research Area Network (ERA-NET) and Horizon 2020 programmes, where the National Centre for Research and Development (NCBR) (n.d.) acted as the national coordinator of competitions (Poland: NCBR, n.d.; NEURON, n.d.). In the broader European context, the activities of the European Innovation Council (EIC) were examined, including its instruments – EIC Pathfinder, EIC Transition, and EIC Accelerator – aimed at supporting start-ups and small and medium-sized enterprises (SMEs) (European Innovation Council, n.d.a; n.d.b; n.d.c). For quantitative analysis of funding, the European Structural and Investment Funds (2015) Report was used.

To broaden the analytical perspective, materials from France and Germany were also used. In particular, The Future Investment Programme (2018), Search Code (n.d.), and Smart Specialisation Strategy (About S3…, n.d.) were analysed. The study also examined the Regional Development Strategy (SRDEII Île-de-France…, 2022) and the Noé Bretagne Strategy (The Noé Brittany…, n.d.). In addition, Germany's High-Tech Strategy (Federal Ministry of Education and Research, n.d.) and the Basic Law for the Federal Republic of Germany (1949) were considered. For comparison with the Ukrainian context, the Law of Ukraine No. 2404-VI (2010), Law of Ukraine No. 40-IV (2002), and Law of Ukraine No. 848-VIII (2015) were analysed. The study also examined Global Innovation Index (GII) data for 2020-2024 for Germany, France, and Poland, to determine the dynamics of innovation development (Germany ranking in…, 2024; France ranking in…, 2024; Poland ranking in…, 2024).

Results

The legal regulation of STIA in Poland is one of the instruments for shaping an effective innovation policy, ensuring technology transfer, stimulating applied science, and integrating academic knowledge into the sphere of entrepreneurship. The Polish model is based on a complex of interrelated strategic documents, legislative acts, and institutions that ensure the implementation of state policy in this field. Its key feature lies in the integration of science, business, and the state on the principles of partnership and the combination of regulatory mechanisms with economic incentives for innovative activity. One of the main documents is the Resolution No. 16 (2013), which outlines the long-term directions of Poland's socio-economic development under the conditions of globalisation. The document defines innovation as the main driver of modernising the economy and society, envisages an increase in expenditure on R&D to 2% of gross domestic product (GDP), the development of regional Smart Specialisation strategies (About S3…, n.d.), the digital transformation of education, and the strengthening of human capital. The strategy emphasises the need for close integration between science and business, which corresponds to European approaches to the development of innovative ecosystems. An additional reference point is the National Regional Development Strategy (2025), which focused on improving Poland's competitiveness through investments in knowledge, new technologies, and the development of cooperation between science, industry, and the state. The strategy defined four priority areas: the modernisation of education, the digitalisation of the economy and administration, market-oriented research, and the stimulation of innovative activity among enterprises. These strategic directions are actively implemented and deepened through the system of existing legislative and regulatory acts that create legal mechanisms for implementing the objectives in the field of STIA. The main role in the legal framework for STIA in Poland is played by sectoral laws, each of which contributes in its own way to organising the monitoring and evaluation of the effectiveness of state policy.

Accordingly, the Law of Poland No. 2201 (2017) became a key element in creating a favourable legal environment for the development of innovative entrepreneurship and stimulating research activity in the private sector in Poland. This legislative act does not create new legislation from scratch but introduces significant

amendments to already existing laws regulating financial, tax, and administrative activities of innovation entities. Such an approach demonstrated the flexibility and responsiveness of the Polish legislator to the needs of the innovation ecosystem through targeted yet systemic adjustments. One of the innovations introduced by this Law is the implementation of tax incentives for R&D. This was achieved by amending the Law of Poland No. 2201 (2017) and the Law of Poland No. 80 (1991). The key provision here is Article 18d of the Law of Poland No. 21 (1992), which defined the "R&D relief" (ulga B + R). According to this provision, taxpayers who incur qualified R&D expenses have the right to deduct up to 100% of these costs (or even more, depending on the type of enterprise and the nature of the expenditure, as refined by later amendments) from the taxable base (Law of Poland No. 80, 1991). This means that enterprises may double-count certain expenses: once as operating costs and once as tax deductions. Qualified expenses include, in particular, the costs of salaries of employees engaged in R&D, the purchase of materials and raw materials, the use of laboratory equipment, and the depreciation of research instruments. This mechanism was designed to directly stimulate private sector investment in innovation by reducing the tax burden and increasing the attractiveness of innovative activities.

Monitoring the effectiveness of this provision involves analysing data on the number of enterprises that used the relief, the volume of declared qualified expenses, and the impact on the overall level of R&D investment in the private sector. The Law also aims to simplify IP commercialisation mechanisms. This is achieved through amendments to the Industrial Property Law (2000) and other related acts. The purpose of these amendments is to accelerate and simplify the procedures for registering patents, utility models, industrial designs, and trademarks, as well as to create clearer rules for the licensing and transfer. Overall, the Law of Poland No. 2201 (2017) represents a significant step towards improving Poland's innovation climate. Its main contribution lies in creating systemic tax incentives and optimising legal procedures that directly influence the attraction of private capital into R&D and the acceleration of innovation commercialisation. Monitoring its effectiveness requires a comprehensive approach that includes both quantitative indicators (investment volumes, tax deductions) and qualitative ones (number of innovative enterprises, level of commercialisation, evaluation of administrative burden). This Law, together with other legislative and strategic documents, forms an integrated system of support and monitoring of STIA in Poland.

Next is the Law of Poland No. 1668 (2018), which comprehensively regulates the higher education and science system in Poland, replacing previous acts. Its most important aspect for monitoring is the introduction of a new system for evaluating the quality of scientific activity. Part II, Chapters 5 and 6 (Articles 263-356), detail the processes of periodic assessment of the quality of scientific activity and scientific disciplines conducted by the Science Evaluation Commission (KEN). This directly forms the basis for monitoring scientific achievements and the compliance with established standards, as well as influencing the distribution of basic funding for universities and research institutions. The Law establishes parameters for classifying and ranking scientific institutions and universities based on the scientific achievements (Article 388). This makes it possible to track the dynamics of development in higher education institutions and research institutes, as well as the effectiveness of implemented reforms. Part II, Chapter 1 (Articles 111-209) regulates the process of obtaining academic degrees (Doctor and Doctor habilitatus) and academic titles. Monitoring allows for tracking changes in the scientific human resources and the effectiveness of training new research personnel. The Law also encourages international cooperation and the internationalisation of scientific activity (Articles 16, 21, 23). This requires tracking the international activity of Polish science, including the number of joint projects and publications with foreign partners. Overall, this Law defines the organisational and qualitative aspects of monitoring, creating a framework for assessing the performance and efficiency of scientific research and its international competitiveness.

The final specialised legislative act is the Law of Poland No. 96 (2010). This Law is central to monitoring the implementation of state policy in the field of applied research and innovation. It establishes the tasks and functions of the NCBR as the key institution supporting R&D, particularly applied research, and the implementation of its results into the economy. Article 2 of this Law details the tasks of the NCBR, which include managing research and development funding programmes, supporting the commercialisation of research results, and promoting cooperation between science and business. Monitoring involves analysing the implementation of these tasks. The Law defines the procedures for competitions, grants, and programmes implemented by the NCBR. Articles 14-16 regulate the mechanisms for providing financial support. This requires monitoring the procedures for project selection, implementation, and achieved results, including the number of implemented innovations and attracted investments. The NCBR often acts as an expert and consultant for the government, which is also part of its mandate. Monitoring the activities of the NCBR, based on this Law, allows for tracking progress in research commercialisation, supporting technological development, and contributing to economic growth. It also makes it possible to assess to what extent the legal framework of the NCBR's activities contributes to achieving Poland's strategic goals in STIA.

Additionally, it is worth noting the Law of Poland No. 534 (2019). This legislative act established a

national network of over 30 research institutes. The purpose of the Law is the institutional integration of applied research with market needs, providing comprehensive solutions "from idea to technology", attracting private investors, and optimising costs through a network structure (Article 3). The Łukasiewicz Network has become an important platform for effective coordination of applied research and its implementation in production, which, in turn, requires separate monitoring of its effectiveness and contribution to innovation development (Franaszek *et al*., 2021). A complement to these institutional and organisational mechanisms is the legislation on public-private partnerships, which creates legal and financial conditions for cooperation between the state and business in implementing innovative projects. The Law of Poland No. 19 (2008) defines the legal framework for cooperation between the state and business in joint projects, including in the field of innovation. The Law provides for: joint financing of science parks, technology transfer centres, and innovation platforms; the involvement of European structural funds (Horizon Europe, Smart Growth); simplified procedures for the participation of small and medium-sized enterprises in PPP projects (innovations of 2020); increased transparency of contract conclusion through digitalisation and public procedures; guarantees of tax stability for private partners.

PPPs are actively used in Poland to implement regional innovation projects, create science parks, incubators, and technology transfer centres, which increase the efficiency of using public resources and stimulate investment (Solak, 2024). Thus, Poland has created a multi-level legal system that integrates national development strategies, innovation legislation, and public-private partnership mechanisms. This system ensures effective interaction between the state, science, and business, combining regulatory governance with financial and organisational incentives. The Polish experience demonstrates that the complexity, transparency, and adaptability of legal regulation contribute to building an innovation-oriented economy, which can serve as an example for countries with transition economies, including Ukraine, in the process of modernising the legal framework in accordance with European standards.

In the context of ensuring the effectiveness and compliance of legislation in the field of STIA, Poland demonstrates a comprehensive approach to monitoring legal norms. This process is multifaceted and includes the use of modern digital tools, regular evaluation of effectiveness, ensuring transparency, and active engagement of civil society, as confirmed by numerous sources and practices. One of the key directions is the implementation of digital tools that enhance the efficiency of monitoring legal norms. The central element of this process is the Unified Electronic Registers of Legislation. An example of such a platform is the Internetowy System Aktów Prawnych, which serves as the official source of Polish legislation, where all current laws, decrees, and other legal acts, including those related to STIA, are published. This system provides easy, quick, and free access to information for all interested parties – researchers, innovators, entrepreneurs, lawyers, and the public. This not only promotes transparency but also facilitates tracking legislative changes and ensuring compliance with legal norms.

The next direction of monitoring is the use of platforms for electronic consultations. These are online tools that allow collecting feedback from the public, businesses, and the scientific community regarding draft legal acts or existing norms. An example of such a platform is the governmental portal where draft laws are published for public discussion (for instance, the Rządowe Centrum Legislacji portal, which primarily serves for publication but also includes mechanisms for submitting comments). These platforms increase the inclusiveness of the law-making process by allowing stakeholders to express the opinions and suggestions, which is valuable for forming high-quality and effective legislation in the field of STIA. This approach is consistent with the recommendations of the Organisation for Economic Co-operation and Development (2012) concerning regulatory quality improvement, which emphasise the importance of transparency and public consultation. Thus, digital tools in Poland play a central role in ensuring transparency, accessibility, and efficiency in monitoring legal norms, which forms the foundation for developing a stable and supportive environment for scientific, technical, and innovation activity.

It is worth noting that in Poland, the effectiveness of legislation is not limited merely to its existence but also includes regular assessment of its real impact on the field of STIA. This approach is systematic and consists of several key stages that ensure continuous improvement of the legal framework. Poland actively practises *ex-ante* and *ex-post* evaluations. *Ex-ante* evaluation is conducted before adopting a new law or introducing significant changes. It involves a detailed analysis of potential consequences, risks, and benefits of the new regulation for the field of STIA. At this stage, economic, social, and environmental assessments may be conducted, allowing forecasts of the regulation's impact on various aspects of society and the economy. These assessments serve as a tool for informed decision-making and minimising potential negative effects. For example, within the framework of the regulatory impact assessment procedure in Poland, ministries and agencies are required to conduct a detailed analysis of the impact of draft laws before submitting the draft laws to the Council of Ministers (Colombo *et al*., 2022). *Ex-post* evaluation, in turn, is carried out after a certain period of the legislation's implementation. Its goal is to assess the actual effectiveness of adopted norms and the extent to which the established objectives have been achieved. This process may include statistical data analysis, such as the

number of patents, the volume of R&D investments, and the number of newly created start-ups, which provide a quantitative assessment of the legislation's impact. In addition, qualitative methods are used, including stakeholder surveys, focus groups, and case studies, which allow for gathering feedback from direct participants in the process and identifying practical problems in the application of legal norms (Sukiennik, 2023). Examples of such assessments can be found in reports by NIK or NCBR, which periodically publish analyses of the effectiveness of state programmes and support instruments for STIA (Legal basis for the…, n.d.).

The next component is monitoring implementation. This involves regularly tracking how effectively the adopted legal norms are being implemented in practice. Monitoring helps identify obstacles to the application, such as bureaucratic procedures, insufficient funding, or lack of awareness. This allows for prompt responses to challenges and adjustments in policy to ensure that the legislation aligns with the needs of the STIA sector. Transparency is the main principle of monitoring and public trust in the Polish legal system. It is ensured at several levels, guaranteeing the accessibility of information and openness of processes. A key element is the publication of draft legal acts. All draft laws and by-laws, including those related to STIA, are published on official government portals. This enables the public, experts, and stakeholders to become familiarised with forthcoming legislative changes and provide comments and proposals before the final adoption. In addition, access to monitoring and evaluation results is ensured. Reports on the effectiveness of legislation, analytical studies, and the results of public consultations are publicly available. This promotes greater accountability of public authorities and allows society to oversee how efficiently resources are used and goals are achieved in the STIA field (Wang *et al*., 2022). Transparency is also supported through open meetings and hearings. Parliamentary committees, particularly the Committee on Innovation and New Technologies of the Sejm, as well as other bodies involved in law-making in the field of STIA, conduct open sessions. This allows the public and the media to observe the process of discussion and decision-making, thereby enhancing the accountability of state institutions.

It should also be noted that the participation of civil society is an integral part of shaping an adequate and effective legal framework in the field of STIA in Poland. The involvement of scientific and innovation associations, the business community, and non-governmental organisations ensures that legislation remains relevant to the actual needs of the sector. One of the main mechanisms is public consultation. The organisation of official consultations with experts, business representatives, scholars, and civic activists on draft legislative acts makes it possible to collect a broad range of opinions and proposals. These consultations are often conducted in the form of public hearings, online surveys, and the collection of written comments. For deeper expert interaction, expert councils and working groups are created. These are advisory bodies at ministries and agencies, composed of representatives of the academic and business communities. The role is to provide expert assessments and develop specific proposals for improving legislation in the field of STIA. For instance, the Ministry of Science and Higher Education has such councils to discuss strategic directions for the development of science (Warwas *et al*., 2021). Furthermore, lobbying and advocacy opportunities are of great importance. Stakeholder groups have legal means to actively communicate the positions to legislative and executive authorities, which is a natural process in democratic countries. This ensures that the interests of various actors in the innovation ecosystem are taken into account when shaping legal policy.

The monitoring of legal norms in Poland is carried out with the participation of numerous institutions, each performing its specific role and ensuring a multidimensional approach. The Parliament (Sejm and Senate) is the key legislative body. It not only adopts laws but also exercises parliamentary oversight of the implementation. Parliamentary committees, particularly the Committee on Innovation and New Technologies, play a key role in reviewing and assessing legislative initiatives, as well as in conducting hearings and inquiries concerning issues of STIA. The government and individual ministries, such as the Ministry of Science and Higher Education and the Ministry of Development and Technology, are the main bodies responsible for developing and implementing policy in the field of STIA. These bodies also conduct primary monitoring of the effectiveness of the secondary legislation adopted by these authorities, ensuring its alignment with the country's strategic development goals. The NCBR is the key institution responsible for financing research and development. At the same time, it plays an important role in evaluating the effectiveness of STIA support instruments, as it possesses a substantial amount of data on the performance of funded projects. Its experience and data are an important source for the overall monitoring of legal support (National Centre for…, n.d.). The NIK is the supreme body of state audit. It oversees the use of public funds and the efficiency of government programmes, including in the field of STIA. NIK reports contain critical analyses and independent recommendations for improving legal regulation and the efficiency of budget spending (Legal basis for the…, n.d.). Scientific institutes and universities also contribute to monitoring by conducting independent studies on the effectiveness of public policy and legislation in the field of STIA. These institutions provide objective data and expert conclusions, which are a valuable source of information for government and legislative bodies. Finally, business associations and chambers of commerce

represent the interests of businesses and provide direct feedback on the impact of legislation on innovative activity. The participation in consultative processes is critically important for ensuring the practical effectiveness and relevance of legal norms. Such a multi-actor approach to monitoring legal norms ensures comprehensive analysis, independent oversight, and the continuous improvement of the legislative framework, which is key to the development of scientific, technical, and innovation activity in Poland.

Poland systematically employs a variety of legal instruments to stimulate STIA, creating a favourable environment for the development of the country's innovation potential. This comprehensive approach includes tax incentives, public grants, and public-private partnerships, allowing for investment attraction and sustaining the innovation cycle at all its stages. Tax incentives are among the most common and effective instruments for supporting STIA, due to directly affecting the financial benefits of companies investing in innovation. The key instrument is R&D relief. This measure allows companies to deduct additional expenses related to research and development activities from the taxable income. It covers a significant share of qualified costs such as researchers' salaries, equipment, materials, and services purchased for R&D purposes. The amount of the relief may reach 100-200% of qualified costs, which significantly reduces the tax burden on innovative companies and encourages these companies to increase investment in research and development (Białek-Jaworska *et al*., 2024). Another instrument is the Innovation Box. This mechanism allows for the application of a reduced corporate income tax rate of 5% to income derived from qualified IP rights. Such rights include, in particular, patents, industrial designs, copyrights on computer programs, and topographies of integrated circuits developed or improved within the framework of R&D. The purpose of the IP Box is to encourage companies to commercialise the innovations by motivating the companies to obtain and protect IP rights. Detailed provisions regarding the IP Box are also contained in the aforementioned income tax laws (Innovation Box tax…, n.d.).

In addition, there are incentives for promoting innovative products. These are measures granted to companies that implement innovative solutions, helping the companies cover the costs of marketing and promoting new products and services. Although less well-known compared to R&D relief, such incentives contribute to innovation commercialisation by reducing the financial burden of market entry. At the local level, property tax exemptions may be applied. In some cases, local authorities may grant full or partial exemption from property tax for facilities used for R&D or innovation activities. This applies, for instance, to science parks, technology incubators, and other innovation centres, creating favourable conditions for the development. This decision is made at the level of local self-government bodies in accordance with the Law of Poland No. 9 (1991). Grant support is another important pillar of stimulating STIA, especially for projects with a high level of risk or a long payback period, where private investment may be insufficient. The key institution responsible for allocating substantial amounts of R&D funding is the NCBR. The NCBR offers a wide range of grant programmes aimed at different stages of the innovation cycle – from fundamental research to product development and commercialisation. Examples of popular programmes include STRATEGMED (for projects in the field of medical technologies) or those funded by European funds ([NCBR] Strategmed…, 2023). These programmes serve as instruments for implementing national innovation policy and promoting the commercialisation of research results.

In addition to national programmes, Poland is one of the beneficiaries of EU structural and investment policy funds. A significant share of these funds is directed towards supporting innovation and R&D through regional operational programmes co-financed by the European Union. This includes grants for infrastructure development, support for SMEs in the field of innovation, and the development of human capital for STIA. Within the framework of the European Union's structural and investment policy implementation, Poland receives funding through a number of key funds aimed at supporting innovation activities and research and development work. One of the central programmes is the Smart Growth Operational Programme 2014-2020 (2015), which is the largest EU grant programme in the field of innovation. It is aimed at supporting consortia that combine science and business, as well as at commercialising research results and implementing regional smart specialisation strategies. Another important financial instrument is the Bridge Alfa programme, implemented under the auspices of the NCBR and financed by the European Regional Development Fund (ERDF) through the Program Operacyjny Inteligentny Rozwój (POIR) during 2014-2020 (Research in Poland, n.d.). The main objective of the programme is to enhance cooperation between scientific institutions and entrepreneurs, particularly through investments in early-stage start-ups.

ROPs, implemented across all 16 Polish voivodeships, also play a significant role. A considerable share of ROP funds is directed towards innovation, energy infrastructure development, and transport. For example, the Małopolskie Voivodeship received up to EUR 2.92 billion in 2014-2020, much of which was directed towards supporting innovation projects. Under the Podlaskie Voivodeship ROP, the company "Dary Natury" received EUR 538,092 from the ERDF to establish its own innovative R&D infrastructure (Polish natural product…, 2019). Another element of the investment infrastructure is the Polish Development Fund (Polski Fundusz Rozwoju – PFR) Investment Fund Company (n.d.), which implements loan, guarantee, and venture capital

programmes for small and medium-sized businesses as well as for innovative enterprises. The activities of PFR are financed, among other sources, by EU structural funds, primarily within the POIR framework (Holecki *et al*., 2020). Overall, during 2014-2020, Poland received approximately EUR 86 billion from ESI funds, and with national co-financing, the total resources exceeded EUR 105 billion (European Structural and..., 2015). All the above-mentioned funds are aimed at developing infrastructure, supporting SMEs, implementing innovative technologies, and strengthening human capital in the regions. Given Poland's positive experience, such a system may be adapted in other countries, including Ukraine, to effectively launch regional innovation programmes within the framework of European funding.

In Poland, there are separate grant programmes aimed at supporting start-ups and SMEs. These programmes are specialised and provide funding to innovation-oriented companies at different stages of the development – from research projects and prototype creation to patenting, technology validation, and market entry. The administration of such grants is usually carried out through regional development agencies, state funds, or sectoral ministries whose aim is to stimulate entrepreneurship, digitalisation, and innovative activity in the SME sector. Among the financial instruments of a guarantee nature, the Biznesmax programme deserves a mention (Biznesmax – ERDF guarantee..., 2023). It is a credit guarantee mechanism aimed at innovative and environmental projects by SMEs. The programme is implemented with the support of the ERDF and was adapted to EU crisis-response initiatives during the COVID-19 pandemic (CRII/CRII Plus). Its goal is to reduce financial barriers for businesses implementing new technologies.

In the pan-European context, the activities of the EIC (n.d.a; n.d.b; n.d.c) are of great importance. The EIC implements several grant instruments for start-ups and SMEs: EIC Pathfinder (up to EUR 3-4 million for early-stage research), EIC Transition (up to EUR 2.5 million for validation), and EIC Accelerator (blended financing – up to EUR 17.5 million). These programmes are open to Polish innovative companies that meet the eligibility criteria for participation in EU framework programmes. In addition, an important mechanism for supporting start-ups in Poland is venture capital funds operating under the PFR Ventures (n.d.) – a subsidiary of the PFR. A substantial portion of these funds' resources is derived from European sources within the POIR programme framework. A separate category includes programmes for young entrepreneurs. For example, the "First Business – Start-up Support" is a government programme initiated by the Polish Ministry of Family and Social Policy and implemented through Bank Gospodarstwa Krajowego (Start-up funding for..., 2024). The programme provides grant and preferential support for individuals starting the own businesses and is financed from the state Labour Fund. All the mentioned programmes demonstrate a multi-level approach to financing innovative entrepreneurship that combines European resources, national strategy, and regional initiatives. Such a system ensures support for start-ups at every stage of the development – from research to market commercialisation – and can serve as a useful model for developing similar mechanisms in other countries, including Ukraine. The visualisation of changes in Poland's innovation development in 2020-2024 is presented in Table 1, which reflects its positions in the GII and indicators in the areas of "innovation investments" and "innovation output".

Table 1. Poland's ranking in the Global Innovation Index 2024

Year	GII Position	Innovative inputs	Innovative outputs
2020	28	38	40
2021	40	37	42
2022	38	41	36
2023	41	50	36
2024	40	45	38

Source: compiled by the author based on Poland ranking in the Global Innovation Index 2024 (2024)

Analysing Table 1, it can be concluded that Poland occupies a mid-level position (40th in 2024) in the global innovation ranking, demonstrating a moderate but unstable level of innovation development. The main challenge lies in the weakness of the investment component, which prevents higher results from being achieved. Despite some improvement in innovation efficiency during 2022-2023, the lack of stable financing and long-term strategies slows progress. PPP is a recognised and effective tool in Poland for combining the resources and competencies of the public and private sectors to implement large-scale and complex innovation projects. This approach enables risk-sharing, mobilisation of the necessary financial resources, and the utilisation of both sectors' strengths, which significantly accelerates the development of scientific, technical, and innovation activity. One of the key areas of implementing PPP policy in Poland is the joint execution of research projects. The Polish government, in particular through the NCBR, actively supports cooperation models in which research is conducted by private companies or consortia involving scientific institutions. This approach allows financial and technological risks typical for innovation activity to be distributed while

ensuring private-sector access to public infrastructure, scientific equipment, and the expertise of universities and research institutes.

Relevant mechanisms are implemented through specialised programmes and competitions administered by the NCBR, which acts as an institutional partner that partially assumes risks and simultaneously encourages private sector participation in high-tech projects. One example of this cooperation model is the e-Pionier programme, based on the pre-commercial procurement (PCP) model. This programme is implemented by the NCBR in partnership with accelerators and is aimed at engaging small teams – start-ups and independent developers – to address clearly defined public challenges. Under the PCP mechanism, the public side (represented by the NCBR or an authorised operator – Programme Component Operator) announces a call, manages contract conclusion processes, and oversees performance. Participants – Programme Component Partners (IT companies and start-ups) – develop MVPs. Based on the results of the first two calls conducted in 2017-2020, 81 MVP solutions were developed and funded, confirming the effectiveness of this model in the field of digital innovation (PIONIER-LAB…, 2020).

In addition to national initiatives, Poland actively participates in implementing international PPP formats within the ERA-NET and Horizon 2020 programmes. Specifically, the NCBR acts as the national coordinator for ERA-NET calls, co-financing the participation of Polish organisations in international research consortia (Poland: NCBR, n.d.). For instance, under the NEURON ERA-NET programme, which funds neuroscience research, Polish companies and universities can receive up to 100% funding for both fundamental and applied projects under international partnerships (NEURON, n.d.). Thus, the use of PPPs in Poland, particularly through NCBR instruments, provides several advantages: it enables effective risk-sharing between public and private sectors; grants business access to institutional and scientific infrastructure; engages private IT teams in solving public challenges; and supports high-tech development through national and international programmes. This PPP model combines the flexibility of private entrepreneurship with the possibilities of targeted state financing, thereby forming an effective innovation environment.

PPP is also actively used to establish innovation centres and clusters. This cooperation promotes the development of innovation parks, technology incubators, and specialised clusters where companies, universities, and research centres collaborate on joint projects. Such infrastructure facilities create a favourable environment for generating and commercialising innovations, fostering synergy among the various participants of the innovation ecosystem (Schulders, 2023). Another aspect of stimulating innovation through PPP is public procurement of innovations. Polish legislation actively encourages public bodies to purchase innovative solutions developed by the private sector. This creates a stable market for new technologies and products that can be used in the public sector (for example, in healthcare, energy, and digital services) (Kania, 2023). This practice not only supports innovative companies but also improves the efficiency and modernisation of public services.

Hence, the Polish government actively involves private capital in joint investment funds, including venture capital and development funds. These funds, established under PPP principles, finance start-ups and innovative companies with high growth potential that require substantial investment at early stages. Integration into the European area requires candidate countries not only to undergo political and economic transformation, but also to carry out deep legal reforms to adapt national legislation to EU standards. In this context, the experience of the Republic of Poland – which transitioned from a post-socialist state to a full EU member – is of significant scientific and practical interest. Poland's experience in legal regulation of scientific, technical, and innovation activities can serve as a reference point for Ukraine's European integration process. After gaining independence from the Soviet management model, Poland embarked on a deliberate path of European integration, officially applying for EU membership on 8 April 1994. Accession negotiations opened on 31 March 1998 and concluded on 13 December 2002 at the European Council meeting in Copenhagen.

The Accession Treaty was signed on 16 April 2003 in Athens, and on 1 May 2004, Poland became a full EU member. Thus, the institutional and regulatory preparation for membership lasted a clearly defined 10-year period (1994-2004), during which the country undertook large-scale adaptation of its domestic legal system to the *acquis communautaire* (Petrova & Pospieszna, 2021). One of the fundamental factors behind the successful implementation of this process was the presence of political will from the Polish government. Governmental structures demonstrated consistent commitment to implementing European standards, even under challenging socio-economic conditions (Kolodziejczyk, 2016). Another systemic factor was the series of economic transformations carried out during the 1990s and early 2000s, including privatisation of the state sector, price and trade liberalisation, macroeconomic stabilisation, and active attraction of foreign direct investment. These measures created a competitive economy capable of operating within the EU's internal market (De Búrca, 2022). A key milestone was the process of adapting national legislation to the *acquis communautaire* – the body of rights, obligations, and principles binding upon EU member states. This process involved not only the technical transposition of norms but also the establishment of an effective institutional infrastructure for the implementation.

Particular attention was paid to strategic sectors – including research, innovation, competition law, and intellectual property protection (Florea & Gales, 2021). As a result of these transformations, Poland not only fulfilled the EU accession criteria but also became a leading country among Central and Eastern European states in terms of economic growth, investment volume, and innovation performance. Given the structural similarities with Ukraine, Poland's model of legal system reform and innovation policy can serve as a practical roadmap for implementing European standards in science, technology, and innovation within the Ukrainian context. Poland's experience in legal support for R&D, as examined in previous sections, contains several key elements that can be implemented in Ukrainian practice. Ukraine, aspiring to European integration, must likewise adapt its legislation and institutional framework to European standards in the field of science and innovation.

In France, the system of legal regulation of scientific, technical, and innovation activities is one of the most structured and strategically oriented within the European Union. The central instrument for implementing innovation policy is the The Future Investment Programme (2018) (Programme d'Investissements d'Avenir – PIA), launched in 2010 and adapted through several successive cycles (PIA 1, 2, 3, 4). It provides long-term financing for innovation-oriented projects in health care, digital transformation, environmental transition, education, science, transport, and energy, among others. The distinctive feature of the PIA lies in the use of public-private partnership mechanisms, allowing the combination of public funds with private investments and the reduction of risks in high-technology sectors. At the same time, the Search Code (n.d.) serves as the fundamental regulatory document governing the functioning of the scientific sphere. It regulates the status of researchers, the autonomy of higher education institutions, the principles of funding scientific organisations, and provides for state support for mobility, technology transfer, and research cooperation. The Code promotes the integration of universities into the innovation ecosystem through institutional autonomy and decentralised budget management. Special attention in French legislation is paid to the commercialisation of research results. Legislative provisions establish flexible forms of IP management, including the transfer of technology rights from universities to private companies, joint patenting, and the creation of spin-offs and start-ups based on scientific institutions. In this context, innovation clusters (pôles de compétitivité) play an important role by ensuring the territorial concentration of research institutions, enterprises, and state agencies for the joint implementation of innovation projects (Fernández-González *et al.*, 2023). Moreover, France was one of the first EU countries to fully implement the concept of Smart Specialisation Strategy (S3) in regional policy during the formation of the Europe 2020 strategy (About S3…, n.d.). This enabled the concentration of state investment in the most promising sectors, taking into account the competitive advantages of each region. Unlike Poland, which began implementing S3 principles later and faced significant difficulties in regional coordination, France demonstrates a high level of institutional integration between regional and national levels in strategic innovation planning. This high-level manifests itself through a well-developed multilevel governance system: the key instrument being contracts between the state and regions (State-Region plan contracts, 2022), concluded on a multi-year basis and covering joint funding of projects in science, technology, infrastructure, and innovation. Additionally, strategic planning coordination is carried out through the National Agency for Territorial Cohesion (n.d.), which acts as a mediator between the government and regions, ensuring alignment between national programmes and regional development strategies (SRDEII Île-de-France…, 2022). Regional participation in forming national innovation policy is institutionally guaranteed: regions have a legally defined right to develop and implement the own specialisation strategies in accordance with S3 principles that align with national priorities.

An example of such an integrated approach is the Noé Brittany strategy, within which over 30 institutions – universities, research centres, clusters, and businesses – jointly implement projects in close coordination with regional authorities and national policy frameworks (The Noé Brittany…, n.d.). In view of the above, France's legal model represents a balanced approach to regulating innovation activity. It ensures not only formal interaction but also real functional alignment of strategies and funding across different governance levels – an indicator of a high degree of institutional integration. In the context of scientific adaptation for Central and Eastern European countries, including Ukraine, the French experience deserves attention regarding public-private partnership, IP management, cluster policy, and the regionalisation of innovation strategies. However, its implementation requires consideration of the specific features of Ukraine's regulatory base, institutional development, and regional ecosystem maturity. A visual representation of the dynamics of France's innovation activity during 2020-2024 is presented in Table 2, illustrating its position changes in the GII and rankings for "innovation inputs" and "innovation outputs".

Table 2. France's ranking in the Global Innovation Index 2024

Year	GII Position	Innovative inputs	Innovative outputs
2020	12	16	12
2021	11	17	10

Table 2. Continued

Year	GII Position	Innovative inputs	Innovative outputs
2022	12	13	11
2023	11	17	11
2024	12	17	10

Source: compiled by the author based on France ranking in the Global Innovation Index 2024 (2024)

Analysing Table 2, it can be concluded that France maintains a stable position within the second ten of the GII. The improvement in innovation output indicates the effective performance of institutions focused on tangible results. The legal regulation of scientific, technical, and innovation activities in Germany is characterised by a high degree of decentralisation, stemming from the country's federal structure. The main strategic document in this field is the High-Tech Strategy (HTS), first adopted in 2006 and subsequently updated several times, including in 2010, 2014, and 2020. The latest version, High-Tech Strategy 2025 (HTS-2025), was published by the Federal Ministry of Education and Research (BMBF) (n.d.) in 2020. Although not legally binding, the document functions as a framework for coordinating actions among the federal government, federal states, research institutions, businesses, and other stakeholders. HTS-2025 identifies key development directions – artificial intelligence, sustainable development, energy transition, digital transformation, medicine, biotechnology, mobility, and climate protection – which are strategically significant for the knowledge economy. The document also specifies the role of public-private partnership, interdisciplinary cooperation, and technology transfer from science to industry. The key legal foundation for implementing innovation policy is the Basic Law for the Federal Republic of Germany (1949), which, under Article 91b, stipulates that the federation and the federal states may cooperate in the field of science, research, and education when matters are of national significance (Art. 91b GG). Meanwhile, under the principle of subsidiarity, the main competences in education and science remain with the federal states. This allows each state to develop its own innovation programmes, fund universities and research centres, and design specialisation strategies at the regional level. Thus, Germany's legal system enshrines a multilevel governance model in which the states are full participants in the implementation of R&D policy.

In this context, an important instrument is the funding of research through joint programmes between the federation, the states, and research institutions. This approach is implemented via the German Research Foundation (n.d.) and the Federal Ministry of Education and Research (n.d.), which, in cooperation with financial institutions such as KfW Development Bank (n.d.), support industrial research, start-ups, and technology transfer. Moreover, HTS-2025 places particular emphasis on creating a favourable legal environment for knowledge transfer, IP management, and innovation entrepreneurship. It explicitly highlights the need to strengthen partnerships between universities and SMEs, focusing on joint patenting programmes, creation of scientific-technical platforms, and competence centres. An additional component of Germany's institutional innovation infrastructure is its research networks: Fraunhofer-Gesellschaft (n.d.), Leibniz-Gemeinschaft (n.d.), Helmholtz-Gemeinschaft (n.d.), and Max-Planck-Gesellschaft (n.d.), funded at both the federal and state levels. These organisations play a crucial role in transforming scientific results into applied technologies used in industry, energy, and IT sectors. A visual representation of Germany's innovation dynamics during 2020-2024 is presented in Table 3, illustrating its GII position changes and rankings in "innovation inputs" and "innovation outputs".

Table 3. Germany's ranking in the Global Innovation Index 2024

Year	GII Position	Innovative inputs	Innovative outputs
2020	9	14	7
2021	10	14	8
2022	8	12	7
2023	8	13	6
2024	9	13	6

Source: compiled by the author based on Germany ranking in the Global Innovation Index 2024 (2024)

Analysing Table 3, it can be concluded that Germany remains one of the leaders in innovation development, although the latest years show relative stability without breakthrough growth. The positive trend of increasing innovation outputs, even with minor fluctuations in investment levels, indicates high institutional efficiency and well-designed state innovation policy. Unlike Poland, where innovation policy is more centralised and implemented through a clearly defined vertical of state governance (for example, via the Ministry of Development and Technology and NCBR), the German model provides flexible multilevel governance in which the federal states possess broad powers. This approach not only allows innovation policy to be adapted to

local needs but also creates a competitive environment among regions for attracting resources, researchers, and investors, stimulating the overall development of the national innovation ecosystem. Thus, the German model represents an effective combination of centralised strategy and decentralised implementation, allowing rapid responses to challenges in scientific and technological development. For Ukraine, currently in the process of revising and updating its innovation policy, the German experience may serve as a reference for building a multilevel legal regulation system that accommodates both national priorities and the needs of regional innovation ecosystems. In addition, it is appropriate to present a comparative analysis of Ukraine's legal framework in scientific, technical, and innovation activities with that of Poland and other EU countries to identify key discrepancies and improvement areas.

In Ukraine, the legal regulation of scientific and technical development relies on several fundamental laws but remains fragmented, insufficiently systematic, and ineffective in stimulating innovation. Specifically, the Law of Ukraine No. 848-VIII (2015) establishes the autonomy of research institutions and provides for the creation of the National Council on Science and Technology Development; however, in practice, this autonomy is limited by low budget funding and an underdeveloped applied science market. Unlike Poland, which has introduced specific financial and institutional instruments for implementing autonomy, in Ukraine it largely remains declarative. The Law of Ukraine No. 40-IV (2002) is largely outdated and inconsistent with modern European approaches, particularly the concept of Smart Specialisation (About S3…, n.d.). It lacks effective mechanisms for science-business interaction and does not provide research incentives through tax benefits or grant programmes – which differs significantly from the Law of Poland No. 2201 (2017), where fiscal incentives and start-up support procedures are detailed. Another important element, the Law of Ukraine No. 2404-VI (2010), is rarely applied in science and innovation due to the absence of specialised by-laws, standards, and procedures (Pashchenko, 2025). In contrast, the Law of Poland No. 19 (2008) has become an effective tool for implementing innovation projects – including those supported by European structural funds – and is successfully used at the regional level.

Moreover, Ukraine lacks a developed system for monitoring innovation policy effectiveness, which makes adaptive regulation impossible. There are no legislative mechanisms for regular collection, evaluation, and publication of data on R&D results. This sharply contrasts with Polish practice, where an integrated digital reporting system (for example, Open Society Foundation, n.d.) ensures transparency, control, and policy adjustment based on outcomes. Thus, compared with Poland and other EU countries, Ukraine's legal framework for R&D is less integrated, lacks modern incentive mechanisms, shows weak coordination among government, science, and business, and is deficient in effective legal monitoring tools. This analysis highlighted the need for comprehensive modernisation of Ukrainian legislation, incorporating successful European practices – particularly strengthening financial incentives, creating digital evaluation mechanisms, and increasing transparency and accountability in innovation policy. Hence, it can be concluded that Poland, compared with France and Germany, implements an intermediate model of legal regulation of R&D that combines European strategic planning approaches with adaptation to national conditions. The main advantage of the Polish system lies in the existence of specialised laws that unite science, innovation, and business within a single legal framework, as well as functioning monitoring institutions. Ukraine, in turn, requires deeper legislative transformation, strategic framework development, tax incentives, and the creation of effective mechanisms of public-private partnership in the innovation sphere.

The conducted analysis of R&D legal regulation in Poland, France, and Germany makes it possible to formulate comprehensive recommendations for Ukraine aimed at modernising its national innovation system, increasing its efficiency, and accelerating integration into the European Research Area. These recommendations should be considered across key reform directions. The first direction concerns strategic planning and multilevel governance. Ukraine should develop a flexible national strategy for science and innovation development, similar to Germany's HTS. Such a framework document should define 5-7 key national priorities – including defence, agrotechnology, artificial intelligence, and green energy – and serve as the basis for coordinating the actions of government, regions, science, and business. It is also important to create long-term financing mechanisms similar to France's PIA, ensuring stable multiyear funding for strategic innovation projects and avoiding dependency on annual budget cycles. Additionally, it would be appropriate to implement a model of "state-regional innovation contracts", based on France's Contrats de plan État-Région, involving multi-year agreements between central and regional authorities to co-finance priority projects within national and regional smart-specialisation strategies. The next direction covers financial and tax incentives. Ukraine should introduce effective tax benefits similar to Poland's Ulga B + R (R&D tax deduction) and Innovation Box (reduced corporate tax rate for income from IP commercialisation). It is crucial to establish clear application criteria for businesses to prevent misuse. Furthermore, it is advisable to create a unified grant agency modelled on Poland's NCBR, which would become the main operator of state and donor funds and ensure transparent competitive procedures for financing research and development at all stages – from fundamental to commercial.

The final direction concerns the modernisation of institutional infrastructure. Ukraine needs to reform its public research sector, guided by the German Fraunhofer and Max Planck models. This entails the creation of specialised research networks focused on applied industrial developments and solutions to societal challenges, with joint financing from the state, regions, and private sector. It is also essential to develop innovation clusters and PPPs, following the example of France's pôles de compétitivité and Polish programmes. To achieve this, legislation must be improved, procedures simplified, risks distributed between public and private participants, and conditions created for venture fund development. Equally important is establishing a unified digital platform for monitoring regulatory acts in the R&D field – following Poland's digital platform for monitoring regulatory acts and official government portals for draft legislation – to ensure open access to legislative documents and transparent oversight of changes. The implementation of these recommendations – combining Poland's systematic approach, France's strategic vision, and Germany's decentralised efficiency – will enable Ukraine to build a balanced, sustainable, and competitive innovation ecosystem capable of responding to global challenges and fostering integration into the European Research and Innovation Area.

Discussion

The discussion of the research results allows for a deeper understanding of the identified problems in the field of monitoring the legal framework of scientific, technical, and innovation activities. The analysis of the Polish model showed that the system of legal monitoring in this country remains fragmented, declarative, and insufficiently institutionalised. Despite the existence of certain digital tools and open databases, there are no stable and integrated mechanisms for analytical generalisation of legal changes, particularly at the regional level. This complicates the formation of a timely and effective regulatory response to innovation challenges and limits the adaptability of Poland's innovation ecosystem.

Comparison with the experience of France made it possible to better understand the potential of open digital platforms in ensuring transparency and strategic integration of legal monitoring. In particular, the study by L. Bracco *et al*. (2022) demonstrated the effectiveness of the National Open Science Monitor (BSO), which functions as a publicly accessible digital tool for the collection, analysis, and visualisation of data in the field of open science. It enables the prompt identification of changes in the regulatory landscape, records the response of the academic community, and facilitates the adaptation of regulatory strategies in real time. Based on the current study, it was established that Poland, as of 2025, lacks a functional tool similar to the BSO that could provide systematic and open analytics of regulatory processes in the sphere of science and innovation. Monitoring in Poland is mostly limited to reporting within programmes such as POIR or ROP and does not include centralised analysis of legal indicators at the level of national policy. The French legal model was also identified in this study as an example of a balanced approach to regulating innovation activity. It ensures not only the presence of an effective regulatory framework but also real functional coordination of strategies and implementation tools at all levels – national, regional, and institutional. This high level of institutional integration is maintained through interaction between state bodies, scientific institutions, and local executive structures, ensuring the stability and effectiveness of innovation management.

Similarly, the experience of Germany – particularly the "coarse-fine radar" model proposed by N. Weinberger *et al*. (2013) – confirms the importance of multilevel strategic monitoring for the timely identification of future technological priorities. This approach, implemented through the BMBF, allows for the assessment not only of existing policies but also the creation of a regulatory environment capable of responding to emerging challenges – in biotechnology, digital infrastructure, and hydrogen energy. In Poland, however, similar dual-level systems are absent, and the existing mechanisms are primarily focused on administrative maintenance of current programmes rather than strategic forecasting and legal analysis. This supports the conclusion made in the present study regarding the absence of structured legal analytics and the need to implement unified analytical tools similar to the German "radar" for monitoring the effectiveness of legal acts and updating the regulatory framework in a timely manner.

The results of the study by R. Frietsch *et al*. (2024) provide a deeper understanding of the conceptual evolution of innovation monitoring systems in Germany and highlight the importance of legal stability combined with indicator analysis for effective regulatory governance. The authors argued that innovation indicators are not a static tool but evolve constantly in line with technological developments, analytical methods, and increasing political demands. This approach is consistent with the conclusions of the present study regarding the need for adaptive legal monitoring that responds to the dynamics of the innovation system. However, in Polish practice, a number of key differences have been identified that significantly limit the effectiveness of this process. The conclusion of the German researchers – that indicator monitoring must be flexible yet institutionally grounded – can be fully supported. In the present study, it was established that Poland has not achieved this balance: the system of digitalised monitoring of R&D frameworks is developing mainly within individual initiatives and is not integrated into a unified legal or strategic architecture. The lack of a stable electronic platform for the aggregation and analysis of regulatory data, along with the unclear distribution of

competences between central and local authorities, indicates a lack of institutional maturity required for the effective functioning of an indicator-based system. At the same time, the findings of the current study do not fully agree with the authors' claim that the development of indicators automatically leads to improved regulatory efficiency. As demonstrated by this research, a set of metrics alone – without full integration into the regulatory cycle – does not guarantee a transformative impact. In Poland, despite the existence of indicator reports, there is no mechanism by which these data are incorporated into law-making or governmental practice. This means that indicator analytics exist in isolation from the legal process, which contradicts the fundamental principle formulated by the German authors – that indicators must serve as a tool, not an ultimate goal. Overall, the research largely confirms the importance of developing legal analytics based on indicators, but the results of this study emphasise that the decisive factor for success lies in the integration of such analytics into management and regulatory systems.

The influence of legal formulations on innovation processes in Germany's patent legislation was examined by E. Opie (2023). The author demonstrated that clearly defined legal norms can serve as a catalyst for technological breakthroughs by providing research institutions and start-ups with simpler conditions for IP protection. Against this background, the findings of the present study revealed that Polish patent legislation does not provide sufficient predictability and clarity for innovative actors. In a study devoted to the development of business models in the renewable energy sector in developing countries, particularly in the case of Lebanon, H. Elmustapha & T. Hoppe (2020) focused on the challenges and prospects of transforming institutional and financial models in the context of the sustainable energy transition. The main attention was given to analysing barriers that arise in the process of implementing solar technologies – such as dependence on donor support, lack of financial instruments, insufficient institutional maturity, and the need to strengthen community participation. The authors emphasised the importance of knowledge transfer and consumer engagement as key factors for the successful formation of new business models in decentralised energy. The results of this study partially correspond with the findings of the present research, particularly regarding the critical role of institutional and regulatory frameworks for the successful implementation of innovations. As in the Lebanese context, the Polish system also exhibits dependence on external financial sources, especially European funds, as well as limited institutional capacity to integrate innovative initiatives into a broader strategic and legal framework. A shared feature is the emphasis on knowledge transfer and interaction with local actors – including businesses and civic organisations – to ensure the sustainability of innovative solutions. However, this study adopted a more critical perspective on the legal mechanisms that ensure the durability and scalability of innovations. Unlike the Lebanese case, where the legal context is treated as a background condition, this research argues that without structured legal monitoring, unified digital analytics, and clear distribution of competences, even promising models – such as start-ups or microfinancing – remain vulnerable to institutional instability. Thus, despite similar approaches to increasing community participation and the need for institutional change, this study stressed that the legal environment must play an active rather than passive role in creating favourable conditions for scaling innovations, particularly in transition economies.

Institutional interaction between science and business was examined by E. Wojnicka-Sycz & P. Sycz (2016), who identified such cooperation as one of the key factors of innovation efficiency in Poland. The authors emphasised the importance of promoting collaboration, knowledge exchange, and state support – particularly through grants and enterprise participation in European programmes. Meanwhile, the current study analysed the role of PPPs in the field of innovation, positioned as a promising model for mobilising resources and infrastructure to enhance the country's innovation potential. Within the framework of this study, these conclusions were partially confirmed – horizontal interactions between sectors are indeed important. However, it also demonstrated that the existence of institutional cooperation or PPP mechanisms alone does not guarantee sustainable results if these processes are not accompanied by structured legal monitoring and regulatory adaptation. Specifically, the study identified the absence of clear legal mechanisms for supporting innovation projects in areas such as technology transfer, IP protection, patent expertise, digital ethics, and compliance with international standards. This gap reduces the effectiveness of both institutional linkages and state subsidies, creating uncertainty for participants in the innovation system and limiting the capacity to realise the potential of cooperation in practice. Thus, the comparative analysis indicates that institutional interaction is necessary but insufficient unless complemented by systemic legal support – particularly through effective mechanisms of legal monitoring and forecasting of regulatory needs in the field of R&D.

A similar issue was explored by R. Rauter *et al*. (2019), who analysed how open innovation and collaboration with different partners affect corporate innovation activity – particularly regarding the combination of economic efficiency and sustainability-oriented innovation. The issue the authors addressed lies in the underexplored potential of cooperation with non-traditional partners (non-governmental organisations (NGOs), intermediaries) within open innovation and the insufficient understanding of whether economic and sustainable development goals contradict or reinforce

each other. The authors concluded that cooperation not only with universities and clients but also with NGOs and innovation intermediaries positively influences overall innovation performance, and that economic and environmental innovation goals can be achieved simultaneously rather than being mutually exclusive.

The results of the present research align in many respects with these findings, also pointing to the need for broader integration of innovative actors into the process of shaping legal policy in R&D. Like the authors, this study emphasised the role of interaction between scientific institutions, business, and civil society organisations in enhancing the efficiency of innovation processes. Furthermore, the results confirmed that sustainable development is not the opposite of economic innovation but rather an organic component of it – provided there is appropriate regulatory support and coordination. However, not all aspects of that study's conclusions can be fully agreed upon. Specifically, the authors underestimated the role of the legal environment as a prerequisite for effective implementation of open innovations, whereas the key finding of this research is that the absence of structured legal monitoring and regulatory adaptability can nullify even the most effective cross-sectoral cooperation. Cooperation with NGOs or intermediaries without support in the form of clear procedures, digital mechanisms for legal analysis, and coordination platforms will not ensure a sustainable outcome. Therefore, the role of the state and its capacity to create a legal framework for innovation interaction should be conceptualised more strongly than in the cited work. The conducted discussion of the research results made it possible to summarise the key shortcomings of Poland's system of legal monitoring in scientific, technical, and innovation activities, as well as to compare it with best practices in France and Germany. All the reviewed international studies confirm the importance of an integrated, analytical, and adaptive approach to legal monitoring, which should be based on digital platforms, indicator analysis, and inter-institutional cooperation. In this context, it is appropriate to proceed to the conclusions, which summarise the key results and outline directions for improving legal monitoring.

Conclusions

The study established that the legal regulation of scientific, technical, and innovation activities in Poland is systematic, multi-level, and integrated into the national innovation policy. The Polish model combines strategic planning, legal regulation, economic incentives, public-private partnership, and digital monitoring, creating a favourable environment for interaction between the state, business, and the scientific community, thereby stimulating innovation development. The qualitative results of the study indicated that Poland has laid the foundation for long-term innovation growth through key normative acts such as the Sustainable Development Strategy "Poland 2030", the Law on Innovation, the Law on Higher Education and Science, the Law on NCBR, and the Public-Private Partnership Law. These documents have ensured an increase in R&D expenditure to 2% of GDP (target indicator), expanded access to business support tools (ulga B + R, IP Box), transparency of funding through competitive selection, and active involvement of the private sector and European funds in innovation projects. Poland has also implemented monitoring mechanisms that include digital platforms, ex-ante/ex-post legislative evaluations, public consultations, and civil society participation.

The experience of France and Germany demonstrates the effectiveness of a comprehensive approach to regulating innovation activity that combines regulatory analytics with strategic forecasting. In Germany, the model implemented through the BMBF provides policy analysis and creates a legal environment capable of responding to challenges in biotechnology, digital infrastructure, and hydrogen energy. An important component is the dual-level evaluation system: monitoring policy implementation and verifying its effectiveness in the light of long-term trends. The Polish system, in this regard, is limited: it lacks unified tools for strategic analysis, and the existing mechanisms are focused on the administrative maintenance of programmes. This confirmed the need for tools similar to the German "legal radar", which allows for the identification of gaps and timely adaptation of legal acts. France, in turn, offers a balanced approach integrating strategies and instruments at national, regional, and institutional levels. Such coordination between government, research institutions, and local authorities ensures institutional stability and the effectiveness of innovation policy.

Ukraine is currently at the stage of forming its own model of legal support for scientific and technical development. National legislation remains fragmented, with limited autonomy of scientific institutions, insufficient business incentives, and weak integration of applied science. The absence of policy monitoring and evaluation systems complicates adaptive regulation. This highlights the need to introduce unified analytical and digital tools for developing a modern and effective innovation policy. The conducted research confirmed the feasibility of adapting the Polish model of regulatory governance in scientific and technical development to the Ukrainian context. To improve the effectiveness of innovation policy in Ukraine, it was recommended to: create a coherent legislative framework aligned with modern European approaches; implement digital tools for monitoring legal acts (similar to Polish official government portal for draft legislation); introduce tax incentives for R&D and mechanisms of public-private partnership in science; ensure sustainable financing through competitive research funds. Future research should focus on a more in-depth analysis of regulatory integration mechanisms within digital

transformations, incorporating case studies of other Central and Eastern European countries.

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Досвід Польщі стосовно організації моніторингу правового забезпечення науково-технічної та інноваційної діяльності

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Анотація. Метою дослідження було з'ясувати, як у Польщі реалізується контроль правового гарантування науково-технічної та інноваційної діяльності. Були розглянуті законодавчі акти Республіки Польща, Німеччини та Франції. В дослідженні були використані такі методи: системний аналіз, порівняльно-правовий метод, формально-юридичний метод, контент-аналіз, метод синтезу. Також, були досліджені інструменти стимулювання інновацій – податкові пільги на науково-дослідні та дослідно-конструкторські роботи (ulga B + R), механізму Innovation Box, а також механізмам державно-приватного партнерства в інноваційній сфері. У статті проаналізовано, як у Польщі реалізується моніторинг ефективності правових норм через цифрові інструменти (зокрема, Відкрита система фінансування, Урядовий центр законодавчої діяльності), ex-ante та ex-post оцінки, а також за допомогою публічних консультацій і прозорості законодавчого процесу. Представлено інституційну модель, що передбачає координацію між органами державної влади, науковими установами та незалежними аудиторами, зокрема Верховною контрольною палатою. Здійснено порівняльний аналіз підходів до правового забезпечення науково технічної та інноваційної діяльності у Польщі, Україні, Франції та Німеччині. Проаналізовано рейтинги країн у Глобальному індексі інновацій за 2024 рік, відповідно до якого Німеччина посідає 9 місце, Франція – 12, а Польща – 40. На основі проведеного аналізу сформульовано низку практичних рекомендацій щодо імплементації елементів польського досвіду в українське правове поле, зокрема запровадження цифрових механізмів моніторингу, податкових стимулів для бізнесу та створення інституційної інфраструктури підтримки інновацій. Визначено, що впровадження комплексної моделі правового забезпечення, подібної до польської, може сприяти посиленню ефективності державної інноваційної політики України та її гармонізації з європейськими стандартами. Практичне значення дослідження полягає у розробці чіткого алгоритму впровадження в Україні європейського досвіду організації моніторингу правового забезпечення науково технічної та інноваційної сфери з метою підвищення ефективності національної інноваційної політики

Ключові слова: інтелектуальна власність; податкові пільги; державна стратегія; цифрові інструменти; управління інноваціями

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Forensic psychological examination with the use of polygraph as a means of proof

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Abstract. The growing international interest in the polygraph, driven by both law enforcement demand and commercial incentives, has led to an overstated perception of its evidentiary value in legal proceedings. The purpose of this paper was to determine, based on the analysis of regulatory legal acts, academic publications, national judicial practice, and European Court of Human Rights decisions, the criteria for using the polygraph in proving as one of the methods of forensic psychological examination. The study applied a range of general scientific and legal research methods, including: the system-structural method for analysing the field of criminal proceedings and the practice of using the polygraph; historical and dialectical methods to examine the evolution of academic approaches to polygraph application; the logical-semantic method to clarify key concepts; and the comparative legal method for analysing national legislation, European Court of Human Rights decisions, and judicial practice. The study led to the following conclusions: forensic psychological examination is a comprehensive psychological study to identify the individual psychological characteristics of a participant in criminal proceedings applying a wide range of methods, one of which may be a polygraph; the decision on the use of a polygraph is made by an expert, taking into consideration technological, legal and ethical aspects; the technological aspect is that the polygraph records only the physiological reactions of the person under examination to certain stimuli, which must be assessed by the expert; the legal aspect is the presence in national legislation of clear provisions regarding the subject of a polygraph examination, the procedure for its conduct (methodology) and assessment criteria; the ethical aspect is the inadmissibility of forced or covert use of a polygraph, which provides for an explanation of the rights of the person and the procedure for obtaining written voluntary consent in accordance with the basic

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principle of legal proceedings – the right of a person not to testify against him or herself. The formulated provisions on the use of a polygraph are oriented towards practical use by criminal proceedings participants

Keywords: criminal proceeding; traces of psychological origin; physiological processes; expert research; source of evidence; polygram

Introduction

Criminal proceeding is cognitive activity regulated by the Criminal Procedure Code of Ukraine. (2022) which is aimed at detection, fixation and examining traces of a criminal offense. And traces form the basis for the formation of evidence. Since these offenses are committed in a social environment, their traces are left not only in the material environment, but also in the memory of people. They exist in the form of subjective ideal images associated with a criminal event (traces of psychological origin) which materialised into testimonies, which are a source of evidence. But the testimony can be true and reliable as well as false and unreliable. In this regard, there is a need for their evaluation and verification, which in a number of cases requires the study of the particularities of the mental processes that occur in the mind of a person – the bearer of ideal images and manifest themselves during their behaviour both during a criminal offense commission and during criminal proceedings. These issues are attributed to the competence (subject matter) of forensic psychological examination.

The preparation and conduct of forensic psychological examination in criminal proceedings have become particularly topical in connection with the appearance on the market of a computer polygraph and the promotion of its capabilities in recognising false testimony. A polygraph ("multi writing") is a computer multi-channel control and measuring system designed to record the dynamics of changes in the physiological indicators of the human body during examination to determine its psycho-emotional state in response to application of certain stimuli using a special method with subsequent reproduction on the monitor screen and storage in the form of a polygram. Thus, a technical tool designed on the basis of computer technology has appeared, which allows detection and recording the physiological reactions of a person, which can be indirectly related to the individual psychological characteristics of a person. In particular, this concerns the possibility of establishing such a psychological characteristic as the presence or absence of a tendency to lie in the person under examination. But when implementing this task, attention is not always paid (and sometimes deliberately ignored) to the problem of establishing a logical connection between a psychological stimulus (question, picture) and a certain physiological reaction of the person being examined. The professional qualifications of the expert psychologist and the degree of their mastery of the polygraph testing methodology are also important.

In Ukraine, the idea of the possibilities of using a polygraph in criminal proceedings has changed over the years under the influence of foreign experience and national investigative and judicial practice – from euphoria about the "effectiveness of a lie detector" to a critical attitude towards the possibility of using a polygraph to obtain evidence of the truthfulness or falsity of the testimonies provided. An analysis of academic publications showed that their content is quite controversial, which indicates the existence of many unresolved issues that require further research. Thus, S.M. Slowik (2020), studying the evolution of the practice of polygraphology, noted the effectiveness of its methods during interrogations. But from the point of view of evidence, polygraph tests remain unacceptable in the courts of the United Kingdom due to their unreliability. A. Katwala (2020) wrote that polygraph tests can be used to monitor convicted criminals. O. Bowcott (2020) and M. Graham (2023) noted the relevance of the polygraph for monitoring individuals who have committed sexual crimes. At the same time, O.I. Motlyakh (2021) considered forensic psychophysiological examination with the use of polygraph as a means of obtaining evidence. According to the aforementioned author, such an examination can be conducted not only by an expert, but also by an involved specialist (it should be noted that this contradicts the status of a specialist in criminal proceedings in Ukraine). Yu. Marina (2023) believed that it is advisable to use a polygraph not only in criminal proceedings, but also in activities of criminal intelligence and special forces to identify persons involved in crimes and bring them to justice. S. Hradun (2023) saw the problem in the lack of clear regulatory and legal regulation of the use of a polygraph in criminal proceedings. O. Kabanets (2023) based on an analysis of decisions of Ukrainian courts came to the conclusion that an expert who uses a polygraph during the examination of a person does not have the right to determine the truthfulness or falsity of the testimonies provided, because it is a legal assessment. Therefore, the results of the use of a polygraph at the pre-trial investigation, in the opinion of the said author, cannot be accepted by the court as a source of evidence. O. Kurman & A. Balybina (2024) noted the need for legislative regulation of the use of the polygraph in criminal proceedings in Ukraine, as well as the introduction of standardised methods of training polygraph examiners and methods of the polygraph application in criminal proceedings.

As of 2025, a preliminary conclusion can be drawn that in criminal proceedings, the use of polygraph interviewing is possible only in the form of forensic psychological examination, when it is necessary to establish

the individual psychological characteristics of a person that could significantly affect the perception of certain circumstances and the nature of the testimony about them. In accordance with the Order of the Ministry of Justice of Ukraine No. 53/5 (1998), an expert may conduct interviews with the use of a computer polygraph in order to obtain orienting information for forming answers to questions posed by the initiator of the examination. At the same time, questions remain regarding: the content and methodology of expert examination; the place of the polygraph method among other methods of psychological examination; the possibility of influencing the expert's choice of a particular research method by the prosecution or another party in order to obtain the desired result. There are also problems regarding the subject of evaluating the obtained polygraphs and the possibility of using them as sources of evidence. Taking into account the above-mentioned considerations, the purpose of this paper was to determine the possibilities for using a polygraph to obtain information that is important in criminal proceedings, and the necessary conditions for this.

Materials and Methods

At all stages of the preparation of this paper, a complex of general scientific and special methods of scientific knowledge was used. The starting point for their application was the recognition of the fact that the solution to the issue of using the polygraph in forensic psychological examination is inextricably linked with the interpretation of the possibilities of using this technical tool in other social spheres (service, labour and family relations). Taking this into account, a systemic-and-structural method was applied, according to which criminal proceedings were considered as one of the types of social activity that is under the influence of other types of social activities. In particular, this concerns the use of technical means to study the inner world of a person, determine their individual psychological characteristics, which are taken into consideration when establishing certain legal relations with a person and observing this person's rights.

Application of dialectical and historical methods allowed to determine the tendency in the evolution of academic views on the possibilities of using a polygraph during operative and searching activities, pre-trial investigation and judicial proceedings. In the process of preparing this paper, the method of logical-and-semantic analysis was also used to clarify the origin of the concept of "polygraph". It was important to realise that achieving the goal of the paper requires the use of the comparative legal analysis method. It was applied for the analysis of the legal regulation of the use of the polygraph in the countries of the European Union, as well as the decisions of the European Court of Human Rights (ECtHR) and national courts of Ukraine. The comparative legal analysis method was also used to determine the status of a forensic expert psychologist in criminal proceedings based on the analysis of various regulatory legal acts.

At all stages of the preparation of this paper, methods of formal logic (analysis, synthesis, induction, deduction, abstraction) were used, in particular when processing regulatory legal acts, academic publications, studying court decisions in cases where the polygraph was used. These methods were also used for determination of the subject matter of forensic psychological examination and the expert's assessment of the results of the polygraph interview in the course of its conduct, forming conclusions, and determining directions for further research into the issues of the use of the polygraph in criminal proceedings.

When preparing this paper, the provisions of criminal procedural legislation of Ukraine were analysed, which are related to the expert's opinion and status of an expert in criminal proceedings according to clause 11, part 2 of article 65, articles 101, 102, 356 of the Criminal Procedural Code of Ukraine (Criminal Procedure Code of Ukraine, 2022), the provisions of the Law of Ukraine No. 4038-XII (1994), Order of the Ministry of Justice of Ukraine No. 1350/5 (2015), as well as instructions on the use of the polygraph in the activities of individual ministries and agencies of Ukraine.

Thus, the authors searched and analysed the regulatory framework for the use of polygraphs in forensic psychological examination and academic studies on this issue. The search was carried out using the following keywords: psychophysiological examination, criminal proceedings, evidence, polygraph, forensic examination, false testimony, individual psychological characteristics, physiological reactions, methods of psychological research. Based on the analysis of the collected information, conclusions were formulated and prospects for further research were determined.

Results and Discussion

With the advent of the computer polygraph, Criminalistics professionals in Ukraine had high hopes for the possibility of revealing the circumstances of a crime that are deliberately concealed by a person during preliminary questioning and interrogations. The point was to expose the falsity of testimony and obtain relevant evidence using this technical tool. To a large extent, such expectations were due to the promotion of the polygraph as a lie detector. The experience of using this technical tool in other countries, where it began to be used in the fight against crime much earlier, had a significant impact on the ideas of Ukrainian academics and practitioners. But this experience was not unambiguous, different countries had their own history of using the polygraph by law enforcement agencies and its assessment by the court, which was due to socio-cultural particularities of each country.

Thus, in the European Union there are countries (Federal Republic of Germany, France, Italy) in which

there is a complete ban on the use of the polygraph due to the influence on its results of a number of factors that are not subject to control by the examiner (unreliability of the results). In other countries (Great Britain, Poland) the use of the polygraph is allowed, but only in certain areas and with reservations (Minka, 2023). This technical tool of psychophysiological control is also used on other continents. In particular, in the USA, Japan, Canada, Israel, South Korea, Turkey, evidence obtained using a polygraph can be presented in court. For example, Japan is recognised as one of the countries with a high prevalence of polygraph use in criminal proceedings regarding serious crimes. However, the high validity of the results of the polygraph interview and dependence of these results on the level of qualification of the expert are taken into account. Therefore, training of the experts is carried out exclusively in a state institution, which is the National Research Institute of Police Sciences. Candidates must have a higher education with a degree of not lower than a bachelor's degree and specialisation in psychology or behavioural sciences (Zubovskyi, 2017). The experience regarding history, current state and prospects of the use of the polygraph in judicial proceedings of Ukraine's closest western neighbour – Poland is interesting. For a considerable time, the Polish Criminal Procedure Code (entered into force in 1997) effectively prohibited the use of technical means aimed at checking the psychophysiological reactions of the interrogated person. However, in 2003, the Code was supplemented with a separate article (192 a/2), where it was stated that if the person being examined gives consent, the expert is permitted to use technical tools designed to monitor the individual's involuntary physiological responses (Law of Poland No. 89, Item 555, 1997). This ended the debate about the lack of a clear legal basis for the use of polygraph examinations in criminal proceedings in Poland (Kohutych, 2011).

As noted by T. Minka (2023), the ECtHR has defined its position to the use of the polygraph in criminal proceedings in several of its decisions in individual cases. In particular, as the author noted, the applicants challenged the use of the polygraph in criminal proceedings, arguing that it violated his rights to private life and a fair trial. The ECtHR emphasised that the use of the polygraph must comply with the principles of necessity and proportionality, and the results of the polygraph cannot be the only evidence in a criminal case and should be used only as an additional and auxiliary tool. The use of the polygraph is possible only with the voluntary consent of the person questioned, it should not intrude on the person's private life and encroach on his other rights and freedoms defined in the European Convention on Human Rights. Thus, the criteria for the use of the polygraph in criminal proceedings should be not only the technological capabilities of this tool (often considered as an overwhelming argument), but also legal and ethical factors. In this regard, it should be emphasised that the ECtHR does not assess the evidentiary value of the results of the use of the polygraph, it considers only those aspects of its use that are related to the observance of human rights, as defined in the European Convention on Human Rights. It seems that the requirements of the ECtHR should also be taken into account when deciding on the use of the polygraph by defence and security agencies, in particular in the process of recruitment, internal investigations, counterintelligence activities, and criminal proceedings (Butenko, 2022; Widacki, 2023).

In the course of academic discussions, where the methodology of polygraph interviewing was assessed in terms of compliance with the requirements of appropriateness, reliability and admissibility of evidence, it was stated that the use of the polygraph in this aspect is possible only in the form of forensic psychological examination. At the same time, it so happened that the use of the polygraph in the psychological examination led to the forming of a separate type of psychological expertise, which began to be called psychological examination with the use of the polygraph. The expression "to pass a polygraph test" became popular among participants in criminal proceedings. But in fact, this is a psychophysiological examination of a certain person to establish their individual psychological characteristics that affect the truthfulness or falsity of their testimony regarding the circumstances related to the crime (verification of truthfulness).

In this regard, it should be noted that a number of research methods may be used during psychological examination of the mental activity of a certain person, which could influence their behaviour during the criminal offense commission, formation of corresponding images and their reconstruction during the pre-trial investigation and trial. Usually, psychological issues that have legal significance must be resolved during the pre-trial investigation, what imposes a corresponding obligation on the prosecution. But the defence may also initiate a forensic psychological examination when it believes that in this way it can obtain data for protection the rights and legitimate interests of the suspect. Thus, the expertise has an extremely wide range of applications, since any type of human activity is accompanied by specific psychological processes (Types of forensic psychological examinations, 2025). It is worth noting that one of the tasks of forensic expert psychologists is to check the fundamental ability of the person under examination to correctly perceive the circumstances that are important for the criminal proceedings, and the ability to provide appropriate testimony about them, taking into account their age and individual psychological characteristics. However, the competence of experts in no way includes assessing the truthfulness or falsity of the testimonies given by the persons under examination during the pre-trial investigation – this is the exclusive competence of the pre-trial investigation body, and ultimately the court.

To understand the essence of forensic psychological examination and determine its capabilities, it is important to consider the methods of expert examination of such a complex phenomenon as human psychics. O. Vavryniv (2023) distinguished methods of psychological and socio-psychological research at two levels – theoretical and empirical. The methodology of psychological examination is a set of methods and techniques, as well as the forms and methods of their application, with the help of which psychological phenomena and processes are explored. Generalised data on the methods applied by psychologists in individual methodologies include: psychophysiological methods (diagnosis of pulse, blood pressure, galvanic skin reactions, etc.); content analysis (diagnosis based on texts and oral messages); projective methods (research through reactions to unstructured objects or situations); questionnaires with different statements and answers; objective testing with a single correct answer (intelligence or achievement tests); standardised observation; analysis of the products of the subject's activity; psychological interview (Psychodiagnostic Methods, 2023).

The methods of conducting forensic examinations (except for forensic medical and forensic psychiatric) are subject to certification and state registration by the Ministry of Justice of Ukraine in accordance with the established procedure (Resolution of the Cabinet of Ministers of Ukraine No. 595-p, 2008). Forensic psychological examination applies methodology that includes a set of methods since it examines rather complex mechanism of the behaviour of a certain person associated with the commission of a criminal offense. In each specific case, the expert independently chooses one or another method of psychological examination depending on the issues that are set for the forensic expert to resolve. According to paragraph 1.4 of the Instructions on the assignment and conduct of forensic examinations and expert research, determining the method of conducting the examination (choice of certain methods, methodology of examination) is within the competence of the expert (Order of the Ministry of Justice of Ukraine No. 1350/5, 1998). In this regard, it is necessary to realise that the party to the criminal proceedings has no right to force the expert to choose certain examination methods or to be guided by certain special literature. Otherwise, this would be a gross violation of the prohibition on entrusting anyone with the conduct of a forensic examination (Law of Ukraine No. 4038-XII, 1994). The party to the criminal proceedings may only initiate the interrogation of the expert in court, where, after taking the oath, the expert may be asked questions about the chosen methodology of the examination, provide justification for choice of the methodology and explanation of the conclusion provided (Part 7 of Article 101, Part 3 of Article 356 of the Criminal Procedure Code of Ukraine, 2022).

Based on the abovementioned facts, the popularisation of psychological examination with emphasis on the use of a polygraph is not always justified. American psychologist W. Iacono (2001), known for the academic research on the neurocognitive and mental health of adolescents, noted that there is no specific physiological reaction associated with lying. Therefore, it is impossible to ask a person to answer relevant questions about the alleged crime (for example, "Did you hit John?"), record the reactions of the nervous system and ensure the determination of truthfulness. Combination of control and comparative questions does not ensure adequate psychological control of emotional impact too. Bar community of Singapore (James-Civetta, 2019) and British Columbia (Provincial Court of British Columbia, 2016) are of similar opinion and provide their clients with recommendations on behaviour during psychological testing with the use of a polygraph.

When deciding on the appropriateness of conducting a psychological examination using a polygraph, it is worth considering that it is incorrect to single out a separate type of psychological examination based on the use of a technical tool (polygraph). The emphasis is placed only on psychophysiological diagnostic methods. It should also be taken into consideration that psychophysiology is a new scientific field that arose at the junction of psychology and physiology and tries to establish the laws of how physiological processes generate mental phenomena and vice versa. But this task has not yet been finally solved, although it is placed in one of the first places in modern science (Klymenko, 2021; Degtyarenko & Kovylina, 2022; Kolyada, 2022).

When making a decision on the use of a polygraph to establish the individual psychological characteristics of a certain participant in criminal proceedings, which could significantly affect their perception of certain circumstances and their reconstruction, it is necessary to take into account problematic issues of a technological, legal and ethical nature. The problematic feature of the technological aspect is that the polygraph does not register the truthfulness or falsity of testimony, but the physiological reactions of the examined person to certain stimuli in the course of the examination (they may be related to the event under investigation or be extraneous). The legal aspect is the presence in national legislation of clear provisions regarding the subject of a polygraph study, its procedure (methodology) and assessment criteria. Ethically, the use of a polygraph implies the inadmissibility of forced or covert application, which involves explaining the rights of the person and the procedure for obtaining written voluntary consent. This is a basic principle of legal proceedings – the right of a person not to testify against themselves (the right to silence). There is a reason to assume that the promoted "effectiveness" of the polygraph in exposing and proving guilt in criminal proceedings is not so much related to obtaining evidence with its help, but rather due to the psychological impact of using a "lie detector".

The resolution of the investigator (prosecutor) or the order of the defence to conduct a forensic

psychological examination with the use of a polygraph contains not only the questions (tasks), but also the requirements (instructions) on the means of their solution, which is a violation of the legislation regulating forensic expert activities. Since as of 2025 there are no methodologies for using a polygraph in psychological examinations that have passed state certification in Ukraine, the expert is granted the right to conduct an interview with the use of a computer polygraph in the framework of existing approved and certified methodologies. The purpose of such an interview is to obtain orienting information regarding: the degree of probability of the information reported by the interviewee; the completeness of the information provided by the interviewee; the source of the information received by the interviewee; the interviewee's ideas about a certain event; other orienting information necessary for constructing clues for the investigation of certain events.

The idea of considering a polygraph as a technical means by which the truth or falsity of the testimony given by a person during a pre-trial investigation or trial is erroneous. Its use by forensic psychologists allows only to detect the physiological reactions of the person under examination to questions related to certain circumstances. These reactions may to some extent indicate the person's awareness or lack of awareness of them. That is, the use of a polygraph in the framework of forensic psychological examination can provide the expert with only certain guidelines for answering the question of whether the person under examination has individual psychological characteristics that could significantly affect the nature of their testimony in the case. In this regard, the person is excluded from asking two types of questions that are typical of Russian practice and are used mostly by operational officers during interviews: questions related to situations when a person (suspect, witness or victim) hides their awareness of the circumstances of the crime under investigation: are there psychophysiological reactions detected during the polygraph examination that indicate that the person has information about the details of what happened? If so, what information could they have? Under what circumstances could the person have received this information? Could it have been received at the time of the incident? Questions related to situations when a person demonstrates cooperation with the investigative authorities and gives testimony regarding the circumstances of the case, but there are doubts about their reliability: are the psychophysiological reactions of the person identified during the examination with the use of the polygraph consistent with their testimony about the circumstances of... (specify the characteristics of the crime), namely, that... (specify which testimony requires verification (Forensic Psychological Expertise, 2020)).

Assessing the results of a psychophysiological examination by a forensic psychologist is influenced by two groups of factors. The first group – polygraphs only record the physiological activity of the person being examined and changes in its parameters, as a reaction to the expert's questions or other stimuli. That is, the polygraph does not register lies, but only excitement, which with a certain degree of probability may indicate a lie being reported. But the physiological reactions cannot accurately determine the cause of this excitement. Such reasons may be physical or psychological exhaustion, irritation due to family or work troubles, fear of negative consequences of the examination, the presence of negative associations and "myths" about the polygraph, deliberate opposition to the examination, etc. For instance, the specialist polygraphist of "PrivatBank" O.H. Zlatina-Kotkova (2018) noted the negative attitude of the staff towards the polygraph examination for the above reasons, which significantly affects the results of such examinations. External stimuli can also have a significant negative impact on the results (noise outside the window, sounds of footsteps in the corridor, gender and appearance of people present in the room, etc.). Research by E. Elaad (2016) demonstrated that even when using the Guilty Knowledge Test, which is considered more scientifically sound than traditional control questioning, there remains a high probability of false positive or false negative results, especially in real criminal cases. In addition, S.M. Kassin *et al.* (2010) emphasised that the use of techniques involving physiological readings or psychological pressure creates a risk of false confessions and distorted testimony, which is unacceptable in a fair trial.

The second group of factors that can cause errors in the assessment of the results of a polygraph examination are: the level of training of the expert, which is associated with their professional education and mastery of the method of using polygraph equipment (holding higher psychological education at the level of not lower than a specialist, certification of a forensic expert in the specialty "Psychology" and entry into the State Register of Certified Forensic Experts, completion of training in mastering the polygraph of at least 400 hours of classroom lessons); the bias of the expert (since polygraph indicators can be interpreted quite broadly, in cases where the expert has a bias towards the person being examined, there is a risk of an erroneous conclusion).

Thus, unprepared, thoughtless, and illiterate use of a polygraph to examine a certain person can lead to a number of problems related to the evaluation of test results, including the legality of using this method. As a rule, the prosecution initiates the conduct of a forensic psychological examination, implying the use of a polygraph by an expert, to verify the truthfulness of the testimony given by a certain person, which is unacceptable. It is necessary to consider that the forensic expert independently chooses the methodology of the examination to answer the questions posed. Therefore, the investigator (prosecutor) must first consult with the forensic psychologist regarding the content of the

questions and the possibility of answering them with the use of a polygraph. It is necessary to remember that when conducting an interview with the use of a polygraph, the expert can only obtain orienting information, which is not evidence and can only be used to construct investigative clues.

Based on the possibility of obtaining only orienting information when conducting this type of psychological examination, it is necessary to consider the expediency of its conduct taking into account the procedural status of the person under examination. Thus, when deciding on assignment forensic psychological examination of the suspect, it is necessary to take into account that the suspect has the right to provide explanations, testimony regarding the suspicion against them or remain silent, or refuse to testify and answer questions at any moment (Clauses 4, 5 of Part 3 of Article 42 of the Criminal Procedure Code of Ukraine, 2022). Such rights of the suspect give them the opportunity to manipulate the psychological examination with the use of a polygraph during its conduct on completely legal grounds according to the scheme "consent-refusal-consent-refusal" with reference to plausible reasons. Conducting a psychological examination of witnesses and victims with the use of a polygraph in the context of their responsibility for providing knowingly false testimony (Article 384 of the Criminal Procedure Code of Ukraine, 2022) is also problematic. Given that the credibility of a person's testimony can be assessed exclusively by the court, conducting such an examination often seems inappropriate. For instance, in the ruling of the Case No. 194/342/22 of Terniv City Court of Dnipropetrovsk Oblast (2023), which refused to satisfy the prosecutor's request to conduct a psychological examination with the use of a polygraph, among other reasons, the court considered the appointment of a psychological examination using a polygraph to be unjustified in this case, reasoning that determining the truthfulness or falsity of witness and victim testimony involves ethical and legal considerations rather than measurable physiological indicators. A polygraph can objectively register only bodily functions and emotional responses to specific stimuli, but it cannot capture or evaluate abstract concepts such as honesty or deception (Kabanets, 2023). It appears that the above judicial assessment of the results of a psychological examination with the use of a polygraph is fully consistent with the decisions of the ECtHR regarding the principles of ethics and the presumption of innocence. Thus, the statement about the evidentiary significance of the results of interviews of participants in criminal proceedings with the use of a polygraph, their outstanding role in the detection and investigation of crimes does not correspond to the basic principles in criminal proceedings. The above provisions are key to understanding the problem of psychological examination using the polygraph as a means of proof.

Conclusions

Summarising the above, it can be stated that forensic psychological examination is a complex psychological examination which applies a fairly wide range of methods, one of which may be the polygraph. The decision on the use of a polygraph to establish the individual psychological characteristics of a certain participant in criminal proceedings is made by an expert, taking into consideration technological, legal and ethical aspects. The technological aspect is that the polygraph does not register the truthfulness or falsity of testimony but records physiological reactions of the person under examination to certain stimuli, which must be assessed. The legal aspect is the presence in national legislation of clear provisions regarding the subject of a polygraph examination, the procedure for its conduct (methodology) and assessment criteria. Ethically, the use of a polygraph implies the inadmissibility of forced or covert application, which involves explaining the rights of the person and the procedure for obtaining written voluntary consent (basic principle of legal proceedings – the right of a person not to testify against themselves).

The expert chooses the research methodology independently, guided in each individual case by the nature of the questions posed and the criteria of a technological, legal and ethical nature. The questions posed to the expert may only concern the individual psychological characteristics of suspects (accused), witnesses and victims, related to their behaviour and ability to correctly perceive certain circumstances and provide relevant testimony regarding these circumstances. It is unacceptable to use a polygraph forcibly or covertly, to exert psychological pressure on a person with an emphasis on the "accuracy and infallibility of a lie detector". It is mandatory to obtain the person's written consent to undergo psychophysiological testing with the use of a polygraph, which must be accompanied by an explanation of the right to remain silent and the filling in of an appropriate protocol.

It is fundamentally important that the party to the criminal proceedings, who initiates the forensic psychological examination determines only the objective of the examination (i.e., the person) and the list of questions (tasks) to be addressed by such an examination, taking into account the capabilities of this examination to solve them. But the initiator of the examination does not have the right to determine the methodology for the expert examination as this fall under the exclusive competence of the forensic psychologist. When solving the questions posed regarding the individual psychological characteristics, the expert may conduct an interview with application of a polygraph, which is the use of psychophysiological diagnostic methods. But the goal in this case was to obtain orienting information for resolving the issues raised by the expert. Such orienting information can be used by the initiator of

the forensic psychological examination only to construct clues that must be verified by procedural means. Therefore, information obtained with the use of a polygraph about the person under examination cannot be considered as an assessment of the statements given by them during the pre-trial investigation from the point of view of their truthfulness or falsity, since it is the exclusive competence of the court. This paper does not claim to solve all the problematic issues of conducting forensic psychological examinations in criminal proceedings but invites to their further study. In particular, the problem of the quality of interviews with the use of a polygraph in human resources management practices in defence, security, and law enforcement agencies deserves additional attention.

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Психологічна експертиза із використанням поліграфа як засіб доказування

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Анотація. Зростаючий міжнародний інтерес до поліграфа, зумовлений як попитом правоохоронних органів, так і комерційними стимулами, призвів до перебільшеного сприйняття його доказової цінності в судочинстві. Метою цієї роботи було визначення на основі аналізу нормативно-правових актів, наукових публікацій, національної судової практики та рішень Європейського суду з прав людини, критеріїв використання поліграфа в доказуванні як одного з методів судово-психологічної експертизи. У дослідженні було застосовано низку загальнонаукових та правових методів дослідження, зокрема: системно-структурний метод для аналізу сфери кримінального судочинства та практики використання поліграфа; історичний та діалектичний методи для вивчення еволюції академічних підходів до застосування поліграфа; логіко-семантичний метод для уточнення ключових понять; та порівняльно-правовий метод для аналізу національного законодавства, рішень Європейського суду з прав людини та судової практики. Дослідження призвело до таких висновків: судово-психологічна експертиза – це комплексне психологічне дослідження для виявлення індивідуально-психологічних характеристик учасника кримінального провадження із застосуванням широкого спектру методів, одним з яких може бути поліграф; Рішення про використання поліграфа приймає експерт, враховуючи технологічні, правові та етичні аспекти; технологічний аспект полягає в тому, що поліграф фіксує лише фізіологічні реакції особи, що обстежується, на певні подразники, які має оцінити експерт; юридичний аспект – наявність у національному законодавстві чітких положень щодо предмета обстеження на поліграфі, порядку його проведення (методики) та критеріїв оцінки; етичний аспект – неприпустимість примусового або прихованого використання поліграфа, що передбачає роз'яснення прав особи та порядку отримання письмової добровільної згоди відповідно до основного принципу судочинства – права особи не свідчити проти себе. Сформульовані положення щодо використання поліграфа орієнтовані на практичне використання учасниками кримінального провадження

Ключові слова: кримінальне провадження; сліди психологічного походження; фізіологічні процеси; експертне дослідження; джерело доказів; поліграми

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The *sui generis* concept for digital assets: Ways to overcome legal conflicts and build an effective regulatory regime in Ukraine

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Abstract. This study aimed to develop a comprehensive model for reforming Ukrainian legislation on digital assets. The research methodology was based on doctrinal analysis and the formal legal method. These methods were applied to examine sources including the national legislation of Ukraine, key regulatory and strategic documents of leading international jurisdictions, as well as analytical reports produced by international organisations. The main results confirmed the existence of a profound conceptual crisis in Ukraine, caused by the inconsistency between the category of a "digital thing" and the intangible nature of digital assets. It has been established that this legal fiction leads to systemic legislative contradictions, the invalidity of the relevant law, and the practical impossibility of applying traditional property-law (vindication, negation) and procedural (arrest, foreclosure, inheritance) mechanisms for the protection of rights. This situation creates a legal vacuum and generates risks for users, particularly against the background of low levels of digital financial literacy among adults. A three-level model for reforming the legal regulation of digital assets was proposed. At the doctrinal level, a revision of fundamental civil-law categories was envisaged in order to distinguish digital assets as an independent type of intangible goods that are not subject to traditional property-law structures. At the substantive level, a rethinking of the content of special legislation was proposed through a transition to a functional classification of digital assets. At the procedural level, the development of special mechanisms for the investigation, arrest, foreclosure, transfer, and inheritance of digital assets was proposed, taking into account their intangible and distributed nature. It was concluded that the proposed comprehensive reform is a necessary condition for ensuring legal certainty, protecting rights, stimulating innovation, and supporting the European integration of Ukraine in the digital economy. The practical significance of the proposed model lies in creating prerequisites for legal certainty in the digital assets market, reducing regulatory and procedural risks for participants, and enhancing the protection of users and creditors

Keywords: blockchain; cryptocurrency; enforcement proceedings; possession; smart contracts

Introduction

The relevance of this study is determined by the fact that the legal regulation of digital assets represents one of the most dynamic segments of modern law. Conducting this research was particularly urgent as of November 2025, as Ukraine is at a crucial stage of European integration, which requires the immediate harmonisation of national legislation with European standards. While leading jurisdictions (the USA and the EU) are actively moving away from attempts to adapt existing legal categories towards the development of autonomous (*sui generis*) concepts, the current Ukrainian approach demonstrates its incapacity, thereby creating risks for financial stability and the investment climate. At the same time, in Ukraine, the regulatory framework in this area remains at the formative stage: the approach has not yet been established, and procedural mechanisms for protecting the rights of participants have not been unified. The key problem is that the Ukrainian legal system governing digital objects is in a state of deep conceptual crisis. The legislative attempt to subordinate

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these new, intangible phenomena to the traditional property-law category of "digital things" (Article 179-1 of the Civil Code of Ukraine, 2004) is not merely a theoretical error, but the root cause of systemic legislative contradictions, a legal vacuum (in particular, the invalidity of the relevant law), and practical failures within the judicial and law enforcement systems.

The problem of the legal qualification of digital assets constitutes a global challenge that is actively discussed in the scientific literature. This issue is particularly acute in Ukrainian legal doctrine, as it lacks a unified approach to determining the legal nature of these objects, and researchers demonstrate radically divergent positions regarding the introduced category of "digital things". On the one hand, a number of scholars justify the expediency of a property-law approach. K. Nekit (2022), in the study of the essence of virtual assets, argued in favour of recognising them as a type of "digital things". The author concluded that the characteristics of cryptocurrencies (in particular, exhaustibility, the impossibility of unlimited replication in contrast to information, and alienability) bring them closer to objects of the material world, albeit without a material substrate. O. Tanasyuk (2025), analysing Article 179-1 of the Civil Code of Ukraine in the context of tort obligations, likewise proceeded from the legitimacy of this construction. Defining the features of a digital thing as an intangible property good to which a property regime applies and in relation to which absolute rights arise through exclusive control, the author confirmed that obligations to compensate for damage may arise in connection with threats directed at a digital thing, for example during a cyberattack. On the other hand, this approach directly contradicts the conclusions of scholars who defend the intangible nature of these assets. L. Maksymiv (2025), in the study of intangible goods, proposed classifying virtual assets (including cryptocurrency) as property intangible goods that form part of property alongside property and corporate rights, thereby categorically denying their material nature. This doctrinal contradiction generates significant legal uncertainty and terminological confusion within legislation, as emphasised by Ye. Savchenko (2024). The author analysed the relationship between the definitions of "digital things", "digital assets", and "virtual assets" and concluded that there is no clear legislative distinction between them, proposing a hierarchy in which "digital things" (a legal category) and "digital assets" (an economic category) function as generic concepts. The need to overcome this terminological confusion and to develop a functional classification for the formation of differentiated regulation was also emphasised by S. Aksiukov (2024), who analysed various draft laws and highlighted the absence of a unified legal approach in Ukraine.

The lack of doctrinal unity complicates the resolution of practical tasks, particularly in the fields of taxation and law enforcement. V. Savenkova & B. Vykhrystenko (2025) pointed to fundamental problems of regulation and taxation arising from the wide variety of virtual assets (for example, decentralised Bitcoin versus secured stablecoins) and the impossibility of applying existing control methods to peer-to-peer transactions, concluding that special regulation is required. I. Guleykov (2025), in the conducted study, also characterised digital assets as "atypical objects" of civil relations, the specificity of which is determined by their innovative nature and the absence of adequate regulation. M. Pohrebniak (2025) summarised these challenges by analysing the overall transformation of civil law under the influence of artificial intelligence and digitalisation. The author substantiated the urgent need to harmonise Ukrainian legislation, including the regulation of "digital things", with European standards in order to ensure a balance between innovation and the protection of rights.

Researchers also noted deficiencies in national regulation. V. Hrudnytskyi (2023) observed that the legal regulation of the circulation of virtual assets in Ukraine remains at an early stage and requires further improvement, in particular through clarification of the conceptual framework, identification of the characteristics of different types of assets, and delimitation of the powers of regulatory authorities. P. Duravkin (2024), analysing the circulation of cryptocurrencies in the context of taxation, points to their nature as intangible goods and objects of civil-law relations, emphasising the urgency of establishing appropriate regulatory regulation. At the same time, international standards, particularly those developed by the Financial Action Task Force, require states to implement effective mechanisms for the licensing or registration of virtual asset service providers and the application of anti-money laundering and counter-terrorist financing (AML/CFT) measures. This creates additional challenges for national regulators, as noted by L. De Koker *et al*. (2022), who analysed the jurisdictional problems associated with the supervision of foreign virtual asset service providers. N. Schwarz *et al*. (2021), in their work prepared for the International Monetary Fund, also emphasised the vulnerability of virtual assets to criminal use and the necessity of implementing a robust AML/CFT framework based on Financial Action Task Force standards.

Despite the substantial number of international and Ukrainian studies examining the legal nature of digital assets and the problems of their regulation, the issue of the absence of a comprehensive and systemic model for reforming Ukrainian legislation remains unresolved. Existing studies predominantly either identify a crisis and terminological confusion or propose fragmentary solutions addressing individual aspects, such as taxation. In light of this gap, the present study aimed to develop a comprehensive, multi-level model for reforming Ukrainian legislation on digital assets.

To achieve this objective, the following tasks were set: to conduct a critical analysis of current Ukrainian legislation and law enforcement practice; and to develop and substantiate a strategic roadmap for legislative and institutional reform.

Materials and Methods

The research was theoretical-legal and comparative-legal in nature. Achievement of the stated goal was ensured through the consistent application of specific methods of legal science to relevant primary sources, in particular regulatory legal acts and official documents of Ukraine, the USA, and the EU, as well as analytical reports produced by international organisations and research centres as of 2025. To diagnose the conceptual crisis of the Ukrainian legal framework, doctrinal analysis and the formal legal method were employed. These methods were used to conduct a detailed examination of the provisions of the Civil Code of Ukraine (2004), in particular Articles 177, 179-1, 387, and 391, which regulate the objects of civil rights and methods of their protection. Relevant provisions of procedural legislation were also analysed, including the Criminal Procedure Code of Ukraine (2012) (Chapter 17), the Civil Procedure Code of Ukraine (2004), and the Law of Ukraine No. 1404-VIII (2016). The status of the Law of Ukraine No. 2074-IX (2021) and the reasons for its invalidity were examined, in particular in connection with the Law of Ukraine No. 4017-IX (2023). In addition, in order to understand the technological context of new phenomena – decentralised autonomous organisations (DAO), decentralised finance protocols (DeFi), and smart contracts – publicly available reference sources (web glossaries and technical descriptions) were analysed, as well as the Law of Ukraine No. 3425-XII (1993) in relation to inheritance issues.

To develop reform proposals and substantiate them, the comparative legal method and qualitative content analysis of international sources were applied. US strategic documents were examined, in particular Executive Order of the President of the United States No. 14178 (2025) and the report of the US Department of the Treasury (2025), in order to identify US approaches to the classification of digital assets, regulatory priorities, and inter-agency coordination. The EU approach was also analysed through a detailed examination of the structure and key provisions of the EU Regulation on Markets in Crypto-Assets (MiCA), based on the analytical paper by I. Angeloni & C. Tille (2025). To assess the global context of the use of digital assets, associated risks, and levels of user awareness, secondary data analysis and qualitative content analysis of analytical reports produced by international organisations and research companies were employed. In particular, data from the Organisation for Economic Co-operation and Development report (2025) on levels of digital financial literacy and risk awareness among crypto-asset owners were analysed. To assess market size, trends in cryptocurrency adoption and use, including illicit use, reports by Chainalysis (2025), a16zcrypto (2025), Fidelity Digital Assets (2025), EY (2025), and the Cybercrime Trends (2025) were examined. At the final stage, legal synthesis and modelling methods were applied to formulate specific legislative proposals and recommendations.

Results

Critical diagnosis of systemic failures: Conceptual crisis of digital asset regulation in Ukrainian law

Analysis of current Ukrainian legislation and law enforcement practice in the field of digital assets reveals a systemic crisis originating from a fundamental conceptual error – namely, the attempt to subordinate new, intangible digital phenomena to the traditional property-law paradigm. The introduction of the construct of a "digital thing" in Article 179-1 of the Civil Code of Ukraine (2004) represents not merely an inappropriate terminological choice, but the root cause of a chain reaction of legal conflicts, a legislative vacuum, and the ineffectiveness of mechanisms for the protection of rights in this sphere. This approach may be regarded as an example of the "inertia of legal tradition", whereby the deep roots of Ukrainian civil doctrine in the Romano-Germanic concept of res (thing) led to the selection of the path of least resistance – the creation of a legal fiction – instead of the more complex but necessary task of developing a new, adequate legal category based on first principles. The consequence of this choice has been not only doctrinal uncertainty, but also the practical paralysis of law enforcement, which calls into question the very possibility of effective legal regulation of the digital economy in Ukraine and stands in marked contrast to the more comprehensive approaches being developed in other leading jurisdictions.

A significant deficiency of the "digital things" construct lies in its ontological incompatibility with the nature of digital assets such as cryptocurrencies, tokens, or NFTs. Classical property law, rooted in Roman law, is based on the concept of a thing as a material, physically tangible object of the external world over which physical domination (possession) may be exercised. It is precisely this possibility of physical control that underpins the entire system of property rights (ownership, possession, easements, and related institutions) and the methods of protection derived from it. The institutions of vindication (reclaiming a thing from unlawful possession), the negative claim (removal of obstacles to use), and acquisitive prescription all implicitly presuppose the existence of an individually defined, physically existing object that can be localised in space, identified, and physically returned, or in respect of which obstacles to use can be removed. This constitutes an axiom for traditional objects of civil rights.

Digital assets, by contrast, are inherently intangible goods. They exist as records in a distributed digital register (blockchain) and lack any physical form or spatial localisation. The legal relationship between a person and a digital asset is determined not by physical possession, but by cryptographic control – namely, possession of a closed (private) key that provides the technical capacity to execute transactions involving the corresponding record in the register (Huang, 2021). This form of control is functional rather than physical. It represents the right of access to and disposal of a digital record, rather than dominion over a material substrate. Attempts to apply the category of a "things" to such an object inevitably result in logical and practical contradictions. As demonstrated in the previous study forming the basis of this work, this incompatibility renders traditional property-law methods of protection functionally inefficient and ineffective in the field of digital assets (Shuliaka, 2025). This Ukrainian qualification stands in sharp contrast to approaches adopted in other jurisdictions. In particular, in the United States, the comprehensive approach articulated in the report of the US Department of the Treasury (2025), prepared in implementation of Executive Order of the President of the United States No. 14178 (2025), examines digital assets through the prism of their functions within financial markets, banking, and payment systems, as well as the risks of illicit financing and the implications for the international competitiveness of the US dollar. The US administration emphasises the need to develop a "durable framework" that takes into account the diversity of digital assets, their specific functions, and the risks associated with them, rather than reducing them to a single simplified category. Such a simplified approach also disregards the actual scale of use, associated risks, and the level of public understanding of digital assets, as evidenced by international data (Table 1).

Table 1. Comparative dynamics of the development of digital asset markets (2022-2025)

Indicator	Ukraine	USA	EU
Market capitalisation of resident digital assets (2025)	USD 1.3 billion	USD 1.15 trillion	USD 0.85 trillion
Cryptocurrency capitalisation growth 2022-2025	60%	48%	42%
Share of population owning crypto assets	13.5%	18.2%	10.9%
DeFi's share in crypto capitalisation	12%	21%	17%
Digital asset transaction volume (2024)	USD 60 billion	USD 2.4 trillion	USD 1.6 trillion
Number of active Web3/DeFi/NFT companies	240	9,800	6,300
Institutional investments in crypto assets (2025)	USD 0.12 billion	USD 310 billion	USD 240 billion
Level of state regulation (score 0-5)	1.5 (fragmentary)	4.5 (complex, developing)	4 (harmonised MiCA)
Crypto fraud rate (per 100,000 users)	6.3	2.8	3.5
Availability of a mechanism for the seizure/ confiscation of digital assets (legally)	Missing/inactive	Partially/developing	Partially/developing

Source: compiled by the author based on analysis of US Department of the Treasury (2025), a16zcrypto (2025), Organisation for Economic Co-operation and Development (2025), Fidelity Digital Assets (2025), EY (2025)

The practical impossibility of applying classic property-law claims becomes evident when considering a claim for recovery (Article 387 of the Civil Code of Ukraine, 2004), which presupposes that an owner reclaims an individually defined thing from another person's unlawful possession. In the case of the theft of cryptocurrency, for example Bitcoin or Ethereum – assets characterised by significant market capitalisation, high volatility, and growing integration into financial markets – and its transfer to an anonymous wallet controlled by the attacker, the application of recovery encounters a number of obstacles (Fidelity Digital Assets, 2025). Most cryptocurrencies constitute generic rather than individually defined objects, as one Bitcoin is functionally identical to another within the protocol, which already complicates the application of a claim designed for unique things. Even if it is technically possible to trace specific Unspent Transaction Outputs within the Bitcoin blockchain, their legal qualification as "individually identifiable things" remains conceptually unfounded. Moreover, the concept of ownership in the physical sense is inapplicable to cryptocurrency. The wallet holder does not physically possess the cryptocurrency, but merely controls access to the corresponding record in the blockchain through a private key. Likewise, an attacker who has obtained control of the key or executed an unauthorised transfer does not physically possess the cryptocurrency, but only exercises cryptographic control over a new record in the distributed ledger. The identification of an "illegal possessor" is often impossible due to the pseudonymous or anonymous nature of blockchain transactions. This problem is recognised as a key challenge at the international level. The report of the US Department of the Treasury (2025) highlights the risks associated with anonymity and the use of digital assets in illegal activities, particularly money laundering and terrorist financing. Even where it is technically possible to trace the movement of assets to a specific wallet using blockchain analytics tools, establishing the identity of the person controlling that wallet is, in practice, extremely difficult without additional investigative measures, which are

often cross-border in nature and complicated by the absence of cooperation with unregulated exchanges (Cybercrime Trends, 2025). Consequently, bringing a vindication claim against an unknown person who does not possess the object in the traditional, physical sense becomes both legally and practically impossible.

Similar conceptual difficulties arise in relation to the negative claim (Article 391 of the Civil Code of Ukraine, 2004), which is intended to eliminate obstacles to the owner's exercise of the right to use and dispose of property. In the case of a non-fungible token (NFT) certifying the uniqueness of a particular digital object, such as a work of digital art, unauthorised use of that work by a third party – for example, copying or displaying it without the consent of the NFT owner, thereby undermining the exclusivity of the token – raises serious doubts as to the applicability of a negative claim. This type of claim inherently presupposes the existence of a physical thing and physical obstacles to its use or disposal. Since neither the NFT nor the associated digital object constitutes a physical thing, and the infringement occurs within the digital environment – more closely related to intellectual property rights, contractual rights, or specific rights arising from a smart contract – the application of a negative claim appears artificial and conceptually unjustified. This detailed analysis is corroborated by the findings of a previous study (Shuliaka, 2025), which demonstrated that the fundamental incompatibility between the intangible, cryptographically controlled nature of digital assets and the physical assumptions underlying property law renders its traditional instruments unsuitable for protecting rights in this domain. This situation generates significant risks for users, as also reflected in data published by the Organisation for Economic Co-operation and Development (2025), which indicate a low level of digital financial literacy among crypto-asset owners. In 2023, only 29% of adults across 39 countries reached the minimum target level of digital financial literacy, and among crypto-asset owners only 55% understood that such assets do not constitute legal tender within their jurisdiction. The absence of effective legal protection mechanisms in Ukraine, combined with this low level of awareness, substantially increases users' vulnerability to fraud and financial loss.

This doctrinal failure in substantive law – namely, the definition of an object in the Civil Code of Ukraine (2004) – creates a critical procedural problem that effectively paralyses law enforcement. An incorrect understanding of the nature of an object makes it impossible to develop effective rules for its handling and protection within procedural legislation, including the Criminal Procedure Code of Ukraine (2012), the Civil Procedure Code of Ukraine (2004), and the Law of Ukraine No. 1404-VIII (2016), as well as subsequent specialised acts. This also applies to tax legislation governing the taxation of transactions involving digital assets and to special financial monitoring acts aimed at preventing the laundering of proceeds derived from digital assets. Procedural rules governing the search, arrest, confiscation, or seizure of property have traditionally been designed with physical objects in mind – movable and immovable property, funds held in bank accounts, or securities – namely, objects that possess a physical form, a clearly identifiable geographical location, or a registered owner and a centralised intermediary (such as a bank or depository) through which coercive measures may be applied.

The rules governing the seizure of property in criminal proceedings (Chapter 17 of the Criminal Procedure Code of Ukraine, 2012) have proven to be entirely unsuitable for digital assets. These rules are ineffective because it is both legally and practically impossible to seize cryptocurrency stored on an unidentified hardware wallet or on a wallet controlled by a person located outside the jurisdiction of Ukraine. The physical seizure of a storage medium (a computer or flash drive) does not ensure access to the assets in the absence of a private key. Moreover, it is technically impossible for state authorities to block or freeze a record in a decentralised ledger such as Bitcoin or Ethereum. In practice, the only viable means of establishing control over digital assets is either to obtain the private key – for example, through its voluntary disclosure by suspects or its forcible seizure during a search – or to compel the owner to transfer the assets to a wallet controlled by the state. However, existing procedural legislation does not provide for such specific mechanisms, nor does it establish appropriate standards of proof or safeguards for the protection of individual rights when such measures are applied. Judicial practice concerning the seizure of cryptocurrencies, analysed in a previous study (Shuliaka, 2025), clearly illustrates this problem: courts either refuse to order seizure due to the unclear legal status of the object, or apply analogies with uncertificated securities or property rights, which is legally questionable and fails to resolve the issue of actual control. By contrast, the approach of the United States, although still evolving, already emphasises the need to enhance instruments for combating the illicit use of digital assets, including expanded powers to trace transactions, cooperation with private-sector actors such as exchanges, and the confiscation of assets obtained through criminal activity (US Department of the Treasury, 2025). This comparison underscores the urgent necessity of modernising Ukrainian procedural law.

This conceptual problem generates systemic procedural obstacles that extend beyond criminal law and significantly complicate law enforcement in civil proceedings. Comparable difficulties arise when attempts are made to apply existing procedural mechanisms to digital assets. In particular, the division of cryptocurrency assets upon divorce becomes problematic when one spouse conceals access to private keys or

employs anonymisation tools. The inclusion of NFTs in the estate and their transfer to heirs are likewise complicated by the absence of technical and legal mechanisms enabling notaries to identify, value, and ensure the transfer of cryptographic control. The enforcement of a debtor's digital assets in enforcement or bankruptcy proceedings also becomes virtually impossible due to their decentralised storage and the possibility of rapid cross-border transfer beyond the effective control of state authorities. The absence of clear procedural instruments, resulting from an incorrect substantive legal framework based on the concept of a "digital things", in practice amounts to a denial of access to justice for a significant category of disputes involving digital assets. This situation not only undermines confidence in the legal system, but also stimulates shadow trading and complicates the protection of the rights of bona fide market participants. This state of affairs contrasts with the approach adopted in the European Union, where the MiCA Regulation (Angeloni & Tille, 2025), although not resolving all procedural issues, establishes a comprehensive regulatory framework that recognises different types of crypto-assets (ARTs, EMTs, and Utility Tokens) and sets requirements for their issuers and service providers. Such classification of assets and regulation of market actors constitutes a necessary prerequisite for the subsequent development of effective procedural mechanisms at the national level of EU Member States. A comparison of key aspects of the regulatory approaches adopted by Ukraine, the United States, and the European Union clearly demonstrates differences in conceptual frameworks, legislative status, regulatory priorities, and institutional capacity (Table 2).

Table 2. Comparison of key aspects of regulatory approaches to digital assets (as of Q4 2025)

Aspect	Ukraine	USA	EU (MiCA Regulation)
Basic Act/Strategy	Law of Ukraine No. 2074-IX (not in force)	EO 14178 + draft acts (GENIUS, CLARITY); Department of the Treasury Report (2025)	Regulation (EU) 2023/1114 (MiCA)
Main regulators	Ministry of Digital Affairs/National Bank of Ukraine/National Securities and Stock Market Commission (project)	Securities and Exchange Commission, Commodity Futures Trading Commission, Financial Crimes Enforcement Network, Office of the Comptroller of the Currency, Department of the Treasury, Federal Reserve System (fragmented)	European Banking Authority and European Securities and Markets Authority (main); national regulators
Approach to asset classification	"secured/unsecured" (not valid)	Functional (security/commodity/ payment instrument); discussion ongoing	Functional: ARTs, EMTs, Utility Tokens, other crypto assets
Regulation of stablecoins	Unregulated	Allowed under GENIUS Act; high regulatory priority	Strict regulation of ARTs and EMTs (reserves, capital, authorisation)
DeFi/DAO Regulation	Missing	Under study; Financial Crimes Enforcement Network/Securities and Exchange Commission pilot principles; regulation announced	Largely outside MiCA; regulation expected
Tax regime (Reporting)	Fragmentary/ incoherent	Internal Revenue Service: reporting under the Crypto-Asset Reporting Framework rules from 2025	Crypto-Asset Reporting Framework implemented
Approach to innovation	Missing	The «responsible innovation» approach	Proportionality of regulation + possibility of national «sandboxes»
Central bank digital currency (CBDC)	E-hryvnia pilot (without legal basis)	Under investigation; EO 14178 raises concerns	Digital Euro in the preparation/ piloting phase
Institutional coordination of regulators	None / Low	Presidential Working Group; Interagency Coordination	Coordinated network of regulators (European Banking Authority, European Securities and Markets Authority, national authorities)
Regulatory Efficiency Index (score 0-10)	3.1	8.4	8.1

Source: compiled by the author based on analysis of US Department of the Treasury (2025), I. Angeloni & C. Tille (2025)

The invalidity of the Law of Ukraine No. 2074-IX (2021) – adopted in 2021, but the entry into force of which depends on the adoption of amendments to a number of legislative acts in connection with the entry into force of the Law of Ukraine No. 4017-IX (2023) – cannot be regarded merely as a technical delay. Rather, it represents a manifestation of a deeper problem, namely institutional inconsistency and conceptual uncertainty in state policy in the field of the digital economy. The absence of appropriate tax regulation and the delay in adopting the relevant legislative act indicate either a lack of political will or the absence of a strategic

consensus among public authorities regarding the prioritisation of the digital economy: whether it should be treated primarily as an additional source of fiscal revenue or as an innovative sector requiring state support and a favourable regulatory environment for development. This uncertainty is further exacerbated by the fact that the Law of Ukraine No. 2074-IX itself, although representing a certain legislative advance compared to Article 179-1 of the Civil Code of Ukraine (2004), still contains significant conceptual shortcomings. In particular, its classification of virtual assets into "secured" and "unsecured" categories is overly simplistic, does not correspond to the functional approach adopted in the European Union under the MiCA framework (Angeloni & Tille, 2025), and fails to reflect the economic realities of different types of tokens. In addition, the ongoing debate in the United States concerning the classification of digital assets as securities, commodities, or other categories, as well as the distribution of regulatory powers between the Securities and Exchange Commission and the Commodity Futures Trading Commission, illustrates the complexity of this issue even within a developed jurisdiction (US Department of the Treasury, 2025). Ukrainian regulatory stagnation in this sphere is therefore a direct consequence of an initial methodological error – namely, an attempt to regulate a fundamentally new phenomenon without an adequate doctrinal foundation, effective international coordination, or a coherent strategic vision.

Moreover, the current Ukrainian legal system, built upon the archaic concept of a "things" as the object of legal relations, proves to be conceptually ill-suited to contemporary technological realities that extend beyond mainstream cryptocurrencies and NFTs. This includes such phenomena as DAO, DeFi, and self-executing smart contracts. These innovations necessitate a reassessment not only of the concept of a "things", but also of the foundational categories of traditional law, including legal personality, ownership, control, jurisdiction, and liability. DAOs, which operate on the basis of software code and are collectively governed by token holders without centralised management, do not fit within existing organisational or legal forms. DeFi protocols, which enable lending, exchange, insurance, and other financial operations directly between users without banks or exchanges, call into question the effectiveness of traditional financial regulation based on the licensing of intermediaries. Smart contracts, which automatically execute contractual terms upon the occurrence of predefined conditions, raise complex issues regarding their legal force, the possibility of modification or termination, the interpretation of contractual terms, and liability for errors in code or external manipulation, such as attacks on data oracles. Legislation grounded in the legal fiction of "things", centralised entities, and territorial attachment is, a priori, incapable of providing effective regulation for decentralised, autonomous, and globally distributed systems. This problem is also recognised in the United States, where official reports emphasise the need to adapt regulatory frameworks to innovations in payment systems and to address the growing risks associated with DeFi, including the vulnerability of smart contracts and the absence of clear consumer protection mechanisms (US Department of the Treasury, 2025). The widening gap between technological development and legal regulation in Ukraine renders existing legal norms increasingly ineffective and demonstrates the inherent limitations of national law within a global digital environment. The lack of progress not only hinders the development of the digital economy, but also generates significant risks for financial stability and consumer protection, as emphasised by both the Organisation for Economic Co-operation and Development (2025) and US regulatory authorities. Addressing these challenges requires an immediate transition to fundamentally new regulatory approaches based on recognition of the unique (*sui generis*) nature of digital assets, functional classification, technological neutrality, and international harmonisation.

Strategic map of legislative and institutional reform: Building a *sui generis* regime for digital assets

The systemic failures in the Ukrainian legal framework concerning digital assets identified in the preceding analysis demonstrate that further attempts to adapt such assets to the existing property-law paradigm are both doctrinally unfounded and functionally infeasible. A fundamental revision of regulatory approaches is therefore required, involving a comprehensive, multi-level reform encompassing the foundational doctrinal principles of civil law, specific substantive legal norms, and relevant procedural mechanisms. This reform should be grounded in recognition of the unique, *sui generis* nature of digital assets as an independent category of objects of civil rights. At the same time, it must be strategically aligned with key international regulatory trends, particularly the EU legal framework, in order to ensure legal certainty, stimulate innovation, protect the rights of market participants, and support Ukraine's European integration. Below is a detailed strategic map of such reform, including specific legislative proposals and justifications for their necessity.

The primary task is to eliminate the root cause of the conceptual crisis – the erroneous legal fiction of a "digital thing". This necessitates substantial amendments to the Civil Code of Ukraine (2004). It is proposed to repeal Article 179-1 of the Civil Code of Ukraine in its entirety. This measure would remove a non-functioning and doctrinally unsound construct that generates systemic contradictions and impedes effective legal regulation. The elimination of this provision would harmonise the legal framework and create the conditions for a logically coherent and functional regulatory model. Furthermore, Article 177 of the Civil

Code of Ukraine ("Objects of Civil Rights") should be amended by supplementing the list of objects of civil rights with a new, independent category – "digital assets". This amendment would consolidate their special legal status at the level of the general provisions of civil law, clearly distinguishing them from things, property rights, results of intellectual activity, and other traditional categories. In addition, a new article should be introduced (for example, Article 177-1 of the Civil Code of Ukraine), providing a general legal definition of a digital asset and outlining its key ontological characteristics. It is proposed to define a digital asset as "an intangible good that exists and circulates exclusively within a digital environment based on distributed ledger technology or similar technology, certifies the property or non-property rights of its holder, possesses value, can be individually identified and controlled through cryptographic or other technical means, and whose legal regime, including the features of the emergence, exercise, and termination of rights thereto, is determined by law". This doctrinal reform is of fundamental importance for the further development of legal regulation. It formally recognises the unique (*sui generis*) intangible nature of digital assets and clearly differentiates them from tangible things. It identifies cryptographic or technical control as a key characteristic, functioning as the digital analogue of ownership. Moreover, it establishes the principle of special regulation by referring the detailed legal regime of different types of digital assets to separate legislation. This approach severs the conceptual link with traditional property law and creates a solid civil-law foundation for the development of a modern, flexible, and functional regulatory framework. Such a solution corresponds to the internal logic of civil law development in relation to the emergence of new categories of goods.

The next step involves revising the Law of Ukraine No. 2074-IX and related legislation on the basis of a new *sui generis* doctrinal framework and with strategic orientation towards the EU Regulation on Markets in Crypto-Assets (MiCA) (Angeloni & Tille, 2025). The current Ukrainian classification of virtual assets into "secured" and "unsecured" categories requires revision, as it is overly simplistic and does not correspond to international regulatory approaches. Instead, it is proposed to adopt a functional classification modelled on the MiCA Regulation, which distinguishes the following principal categories: Asset-Referenced Tokens (ARTs), E-Money Tokens (EMTs), Utility Tokens, and Other Crypto-Assets. Such a transition introduces a risk-based regulatory approach, under which more stringent requirements apply to stablecoins (ARTs and EMTs), given their higher potential risks to financial stability. Full harmonisation with MiCA constitutes a necessary precondition for integrating the Ukrainian digital asset market into the EU internal market and ensuring the ability of Ukrainian companies to operate within the European Union. The adoption of European definitions would enhance legal certainty for Ukrainian businesses, investors, and consumers. At the same time, Ukraine should treat MiCA as a minimum regulatory standard. As a political compromise, MiCA deliberately excludes certain emerging areas, such as decentralised finance (DeFi) and specific categories of NFTs, and therefore operates within a framework of incomplete and fragmented regulation. Given Ukraine's well-developed IT sector, regulatory policy should not be limited to this minimum (EY, 2025). Accordingly, a two-pronged strategy is proposed. The first component involves the full and rapid implementation of the MiCA framework with respect to the core categories of crypto-assets and related services, ensuring maximum harmonisation with EU law. The second component entails the parallel development of a national "innovative" regulatory regime addressing emerging areas such as DeFi, DAO, and NFTs. This may be achieved through the introduction of a soft, adaptive regulatory regime, drawing on the experience of other innovation-oriented jurisdictions. Such a dual approach would position Ukraine as a proactive regulatory actor and a potential regional leader in the field of digital regulation, capable of attracting investment into innovative sectors.

The subsequent step concerns the reform of procedural law in order to establish effective instruments for protection and enforcement. It is necessary to introduce specific, targeted amendments to procedural legislation to ensure that substantive reforms are practically operable. In particular, a new dedicated chapter or set of provisions should be introduced into the Criminal Procedure Code of Ukraine (2012) (for example, "Measures to Ensure Criminal Proceedings Concerning Digital Assets"). This chapter should establish clear procedures for identification and tracing, define legal standards for the admissibility of blockchain analytics data as evidence, and regulate interaction with crypto-asset service providers for the purpose of obtaining information on account holders. These measures are consistent with the efforts undertaken in the United States to strengthen tools for combating the illicit use of digital assets (US Department of the Treasury, 2025). A clear legal definition of the seizure of a digital asset should be established, conceptualising it as the acquisition of effective control by a law enforcement authority. This may include a court order mandating the forced transfer of assets to a state-controlled wallet, the seizure and secure storage of private keys, or the freezing and confiscation of assets held on centralised platforms. Clear rules must also be established for the valuation and storage of seized digital assets in order to prevent their loss or depreciation. An analogous legal mechanism should be introduced into the Law of Ukraine No. 1404-VIII (2016) to enable the enforcement of digital assets on the basis of court decisions in civil, commercial, and administrative proceedings.

This should include procedures for identifying a debtor's digital assets, imposing seizure, and effecting their forced transfer or sale. In addition, special rules governing the inheritance of digital assets should be incorporated into the Civil Code of Ukraine (2004) and the Law of Ukraine No. 3425-XII (1993). These rules should define the procedure for including digital assets in an estate, establish methodologies for their identification and valuation by a notary, and provide secure mechanisms for transferring control to heirs. These procedural reforms constitute a necessary condition for the effective functioning of the entire regulatory system. In their absence, substantive legal norms will remain largely declarative and incapable of ensuring real protection of rights in the digital assets sphere.

The successful implementation of legislative reforms also requires the development of adequate institutional capacity. It is necessary to clearly delineate and define the powers of national regulators – the National Bank of Ukraine and the National Securities and Stock Market Commission – in accordance with the MiCA classification (Angeloni & Tille, 2025), while ensuring that they are provided with sufficient resources and expertise to exercise effective supervision. Law enforcement agencies, the judiciary, notaries, and enforcement officers require specialised training in blockchain technology, investigative techniques, and the application of new procedural rules. The experience of the United States, which places particular emphasis on inter-agency coordination among regulators and law enforcement bodies, is especially relevant for Ukraine. Given the inherently cross-border nature of the digital asset market, strengthening international cooperation in the areas of information exchange, mutual legal assistance, and joint enforcement constitutes a necessary precondition for the effectiveness of national regulation (Cybercrime Trends, 2025; Organisation for Economic Co-operation and Development, 2025). This also entails Ukraine's active participation in international forums and initiatives aimed at developing global regulatory standards. The proposed roadmap constitutes a comprehensive strategy for reforming the legal framework governing digital assets. It is based on recognition of their unique (*sui generis*) nature, harmonisation with international standards, particularly MiCA, and the establishment of effective procedural and institutional mechanisms. The implementation of this strategy will facilitate overcoming the existing conceptual crisis and will contribute to the creation of a robust legal foundation for the sustainable development of the digital economy.

Discussion

The results of this study revealed a profound conceptual crisis in the Ukrainian legal regulation of digital assets, arising from attempts to apply to them the inappropriate category of a "digital thing". This approach has resulted in systemic legislative conflicts, a legal vacuum (in particular due to the invalidity of the Law of Ukraine No. 2074-IX, 2021), and the paralysis of law enforcement mechanisms, thereby making effective protection of the rights of market participants impossible. In response to this crisis, a comprehensive three-level reform model was developed, based on recognition of the *sui generis* nature of digital assets, harmonisation with the EU MiCA Regulation (Angeloni & Tille, 2025), and the creation of adequate procedural instruments. These conclusions were both confirmed and further developed through comparison with contemporary scholarly research in this field.

The central proposal of the study – the introduction of a *sui generis* concept for digital assets – corresponds to a global trend towards identifying appropriate legal regimes for new and atypical objects. V. Dmitrishin (2023), analysing recent developments in Ukrainian copyright law, noted the expansion of the application of special (*sui generis*) rights as a means of identifying legal phenomena that do not fit within traditional legal categories. O. Doroshenko & L. Tarasenko (2023), in examining the legal regime applicable to non-original objects generated by computer programs, likewise substantiated the feasibility of applying *sui generis* rights in order to ensure legal certainty. This demonstrates that the *sui generis* approach is already gaining recognition within Ukrainian intellectual property law as a mechanism for regulating new digital phenomena. The model proposed in this study extends this logic to the broader category of digital assets, which is consistent with international experience. In particular, *sui generis* approaches have been employed to protect databases, as analysed by E. Derclaye & M. Husovec (2022), and have been proposed for the protection of communal intellectual property, as examined by T. Simatupang (2022) & H. Haryono (2022). These studies confirmed that the creation of a special legal regime is both justified and necessary where traditional legal categories, such as property law or classical intellectual property law, prove inadequate.

The problems of legal qualification of digital assets identified in Ukrainian legislation, notably the fiction of "things", are also the subject of extensive international scholarly debate. S. Tsukan (2023), analysing the concept and nature of virtual assets, pointed to the absence of unified definitions and clear classification as a major obstacle to effective legal regulation. V. Havva & M. Haponiuk (2023), in their study of digital financial assets, likewise identified terminological confusion within the national legal framework, including the use of such terms as "cryptocurrency", "digital assets", "crypto-assets", and "virtual assets", and proposed their own classification, attributing payment tokens and security tokens to financial assets, while excluding utility tokens. This supports the conclusion reached in

this study regarding the necessity of transitioning to a functional classification based on the MiCA model, which offers a more differentiated approach than those currently employed in Ukraine. S. Hrytsai (2023), analysing draft laws proposing the introduction of the concepts of "digital thing" and "digital content", identified elements of legal tautology and the declarative nature of such amendments, which is likewise consistent with the critical assessment of Article 179-1 of the Civil Code of Ukraine (2004) presented in this work.

The legislative conflicts and legal vacuums identified in Ukrainian regulation represent a manifestation of a broader problem of systemic inconsistency within the legal system when introducing new norms. As noted by A. Chubai & O. Yukhimyuk (2021), legal conflicts arise as a result of intellectual errors and violations of the rules of legal drafting, thereby undermining the integrity of the legal system and necessitating their resolution in practice. D.I. Statkevich (2021), in analysing substantive legal conflicts, pointed to the potential use of digital technologies as instruments for overcoming such conflicts, which is particularly noteworthy in the context of regulating digital technologies themselves. The invalidity of the Law of Ukraine No. 2074-IX "On Virtual Assets" (2021) and the absence of comprehensive tax regulation, identified in this study, are also corroborated by other scholarly findings. V. Chyzhykov (2024) emphasised the existence of significant gaps in the regulation of accounting and taxation of virtual assets in Ukraine, despite the formal adoption of a specialised law, and highlighted the need for continuous updating of the regulatory framework. The proposal advanced in this study to harmonise Ukrainian legislation with the EU MiCA Regulation (Angeloni & Tille, 2025) is consistent with Ukraine's broader European integration trajectory and prevailing international trends. A. Nanavov & M. Blyznyuk (2025), in their comparative analysis of cryptocurrency regulation in the EU and Ukraine, explicitly identified the need for harmonisation with MiCA as a prerequisite for integration into the global financial system. In earlier work, A. Nanavov & M. Blyzniuk (2024) also stressed the importance of alignment with international standards for attracting investment, while noting that regulatory development in Ukraine remains at an initial stage. At the same time, T. Van der Lindenb & T. Shirazi (2023), analysing MiCA itself, expressed a degree of scepticism regarding its capacity to substantially accelerate the adoption of crypto-assets within the EU financial sector, due to the persistence of regulatory uncertainty in certain areas. This observation reinforces the relevance of the approach proposed in this study, namely the development of a national "innovation regime" alongside the implementation of MiCA. G. Soana (2024), in a critical assessment of European anti-money laundering regulation of crypto-assets, likewise argued that a simple replication of intermediary-based regulatory models may prove inadequate for decentralised systems, thereby necessitating the development of new, architecturally oriented regulatory solutions. This supports the conclusion of this study regarding the need to establish specialised procedural rules adapted to the technological characteristics of blockchain-based systems.

Procedural challenges associated with the seizure, confiscation, and enforcement of digital assets are also widely discussed in international scholarship. Issues of private international law and conflict of laws, examined by C. Wendehorst (2023) and A. Briggs (2024), underscore the complexity of cross-border enforcement of digital assets and the consequent need for enhanced international cooperation. The importance of developing global standards and strengthening regulatory requirements for crypto-asset service providers is likewise emphasised by P. Bains *et al*. (2022) in the International Monetary Fund's analysis of unbacked crypto-assets. Research by A. Copestake *et al*. (2023) demonstrates that crypto-asset markets are sensitive to regulatory interventions, such as bans or announcements concerning central bank digital currencies, thereby illustrating the significant impact of legal policy choices on market dynamics. Although the study by B. Kang *et al*. (2024) concerns video generation and physical laws, it nonetheless illustrates a broader methodological challenge: the difficulty of adapting existing models – in their case, artificial intelligence systems – to fundamentally new constraints. By analogy, this highlights the limitations of mechanically applying traditional legal concepts to novel digital realities, indicating that simple scaling or extension of established frameworks does not necessarily lead to an adequate understanding of underlying structural patterns. Accordingly, the findings of this study, which identify a deep conceptual crisis in the Ukrainian regulation of digital assets and propose a comprehensive reform based on a *sui generis* approach, harmonisation with MiCA, and the development of specialised procedural norms, are both confirmed and further elaborated in contemporary national and international academic discourse. The proposed model not only addresses the identified conflicts and regulatory gaps, but also aligns with global trends in the search for adequate legal regimes for innovative digital phenomena, thereby creating the prerequisites for legal certainty, effective protection of rights, and the sustainable development of Ukraine's digital economy within the European context.

Conclusions

The study found that the Ukrainian legal system regulating digital assets is in a state of conceptual crisis caused by attempts to apply the archaic property-law category of a "digital thing" to these phenomena. This fundamental error was identified as the root cause of systemic legislative contradictions, including conflicting definitions and the invalidity of sector-specific legislation, as well

as the practical incapacity of law enforcement mechanisms, as evidenced by inconsistent judicial practice concerning the seizure of cryptocurrencies. It was determined that this situation creates a significant legal vacuum, inhibits the innovative development of the digital economy, and deprives citizens and businesses of effective instruments for the protection of rights in this sphere. A qualitative indicator of this crisis is the inherent impossibility of applying classical property-law claims, such as vindication and negation, to intangible, cryptographically controlled digital assets. The quantitative dimension of the problem lies in the potential risks faced by a substantial segment of the population, given the high level of crypto-asset adoption in Ukraine combined with low levels of digital financial literacy, as documented in international studies. This state of legal uncertainty not only obstructs the lawful circulation of digital assets, but also creates favourable conditions for shadow transactions and fraud, thereby undermining trust in public institutions. The absence of effective mechanisms for the seizure and confiscation of digital assets in criminal proceedings further complicates efforts to combat money laundering and the financing of illegal activities, posing a challenge to national security. In contrast to Ukraine, leading jurisdictions such as the United States and the European Union are actively developing comprehensive regulatory frameworks, highlighting the lag of the domestic legislator in responding to technological change. The results obtained demonstrate that a fragmented approach and attempts to adapt new phenomena to the existing legal system through the fiction of a "digital thing" have proven ineffective. It is confirmed that the continued use of this construct would only deepen legal dysfunction and create additional obstacles to European integration processes, particularly in the context of harmonisation with European standards. Accordingly, the study substantiates the urgent need to transition to a fundamentally new regulatory paradigm based on recognition of the unique (*sui generis*) nature of digital assets.

In response to the objectives set out in the introduction, the study developed a comprehensive three-level model for reforming Ukrainian legislation. At the doctrinal level, it is recommended to abandon the fiction of a "digital thing" and to consolidate "digital assets" as an independent category of intangible goods within Ukrainian legislation, defined through cryptographic control and governed by the principle of special regulation. At the substantive level, it is proposed to fundamentally revise special legislation by introducing a functional, risk-oriented classification and regulatory approach, using European standards as a minimum benchmark and supplementing them with a national innovation regime for emerging areas such as DeFi, DAO, and NFTs. At the procedural level, the necessity of developing and implementing special rules on seizure, enforcement, and inheritance was emphasised, aimed at establishing clear and effective procedures for the identification, tracing, seizure (understood as the establishment of control), recovery, and transfer of digital assets. The limitations of this study stem from its predominantly theoretical nature, based on the analysis of legislation and legal doctrine. It did not include an empirical examination of judicial practice or surveys of market participants. Priority directions for further research include an in-depth analysis of tax aspects and the development of a balanced taxation model, an empirical assessment of the impact of prospective reforms on market functioning and consumer protection, as well as the study of mechanisms for international cooperation in the field of law enforcement.

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Концепція *sui generis* для цифрових активів: шляхи подолання правових колізій та розбудова ефективного регуляторного режиму в Україні

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Анотація. Дослідження мало на меті розробити комплексну модель реформування українського законодавства щодо цифрових активів. Методологія дослідження ґрунтувалася на застосуванні доктринального аналізу та формально-юридичного методу. Ці методи були використані для вивчення джерел, що включало національне законодавство України, ключові нормативні та стратегічні документи провідних міжнародних юрисдикцій, а також аналітичні звіти міжнародних організацій. Основні результати підтвердили наявність глибокої концептуальної кризи в Україні, спричиненої невідповідністю категорії "цифрової речі" нематеріальній природі цифрових активів. Встановлено, що ця фікція призводить до системних законодавчих суперечностей, нечинності профільного закону та практичної неможливості застосування традиційних речово-правових (віндикаційного, негаторного) та процесуальних (арешт, звернення стягнення, спадкування) механізмів захисту прав, створюючи правовий вакуум та ризики для користувачів, особливо на тлі низької цифрової фінансової грамотності дорослих. Запропоновано трирівневу модель реформування правового регулювання цифрових активів. На доктринальному рівні – передбачено перегляд базових цивілістичних категорій з метою виокремлення цифрових активів як самостійного виду нематеріальних благ, що не підпорядковуються традиційним речово-правовим конструкціям. На матеріально-правовому рівні – запропоновано переосмислення змісту спеціального законодавства шляхом переходу до функціональної класифікації цифрових активів. На процесуальному рівні – запропоновано розроблення спеціальних механізмів для розслідування, арешту, звернення стягнення, передачі та спадкування цифрових активів із урахуванням їх нематеріальної та розподіленої природи. Зроблено висновок, що запропонована комплексна реформа є необхідною умовою для забезпечення правової визначеності, захисту прав, стимулювання інновацій та євроінтеграції України у сфері цифрової економіки. Практичне значення запропонованої моделі полягає у створенні передумов для правової визначеності на ринку цифрових активів, зниженні регуляторних та процесуальних ризиків для учасників, підвищенні захищеності користувачів і кредиторів

Ключові слова: блокчейн; криптовалюта; виконавче провадження; володіння; смарт-контракти

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Some aspects of improvement of understanding combat immunity under Ukrainian criminal legislation

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Abstract. The full-scale invasion of russian troops caused the immergence in Ukrainian criminal legislation of new rules, aimed at raising the effectiveness of combating this military aggression. Among these rules one of the key ones is the article 43.1 of the Criminal Code of Ukraine, regulating the combat immunity. The research paper's objective was the development of some suggestions concerning interpretation of combat immunity and the improvement of its regulation under Ukrainian criminal legislation. While conducting this research the authors used in particular the following methods: gnoseological, systemic-structural, dialectical, logic-semantic and comparative-legal. Some proposals to improve regulatory framework of circumstances excluding criminal illegality of action stipulated by the Criminal Code of Ukraine were elaborated, as well as interpretation of its some attributes. The suggestion was to exclude the definitions of "ammunitions" and "explosive materials" from the text of the Criminal Code of Ukraine, because under their content they are covered by the understanding of concepts "weapon" and "armament". It was found that when repelling and deterring armed aggression of the russian federation or aggression of another country, it is permissible to use not only armed force, but also any other force capable of striking the enemy, and it is important that such use complies with the rules of international humanitarian law. They emphasised that actions of military personnel or civilians who used poison or other items or weapons prohibited by international humanitarian law to repel and deter the armed aggression of the russian federation, despite the fact that their actions were aimed at countering the occupiers, are subject to criminal liability under Criminal Code of Ukraine. The authors suggested to seek ways of legal possibility to use stricter, except treacherous ones, means and methods of conducting war against armies of those countries, whose armed forces do not absolutely respect rules of international humanitarian law during warfare. The practical value of this work lies in the fact that its results can be used in further research on combat immunity in criminal law, as well as in the application of certain provisions of the Criminal Code of Ukraine in the practical activities of law enforcement agencies

Keywords: laws and customs of war; means of warfare; weapon; armament; circumstances, excluding criminal unlawfulness of action

Introduction

The importance of the chosen research topic lies in the fact that after 24 February 2022, the Criminal Code of Ukraine (2001) was supplemented with several provisions aimed at improving criminal law enforcement against the russian federation's invasion of Ukraine. In order to be effective, these legal provisions require a

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thorough interpretation and, if necessary, the development of proposals for their improvement. In the work by N. Antonyuk (2022) it was pointed out that in the context of the ongoing conflict, with russia possessing significant military potential, an effective propaganda apparatus and international influence, Ukraine must adapt its criminal law policy in response to the aggression. This situation requires a reassessment of the public danger posed by various acts, taking into account the conditions imposed by martial law.

One of the new rules was the appearance among the circumstances excluding criminal illegality of an act of the circumstance regulated by Art. 43.1 of the Criminal Code of Ukraine (2001). This circumstance is one of the manifestations of broader concept of "combat immunity" giving legal possibility to cause harm to armed aggressor without threat of appearing of criminal liability for repelling and deterring such aggressor's acts. Criminal law plays a key role in ensuring justice. It is no coincidence that criminal punishment is often determined by the principle of justice, especially in the sense of retribution. In this context, a society outraged by unprovoked and brutal attacks by an adversary demands that the authorities use the most severe means of influence available under criminal law (Yakoviyk *et al*., 2024). Acting precisely within the framework of combat immunity, it is possible to inflict serious damage on the aggressor without being subject to criminal liability under either national or international law. Accordingly, the question arises as to the correct interpretation of all the characteristics of the aforementioned circumstance, which excludes the criminal illegality of the act, as well as the development of proposals for improving the criminal law provision that provides for it.

The issue of combat immunity in the criminal-legal context is a complex intersection between international humanitarian law (IHL), criminal law and human rights law. Its features were analysed by international courts (the International Criminal Court and tribunals), international organisations (the International Committee of the Red Cross), national courts and authoritative scholars who create the theoretical basis of this legal institution. At the global level, the following fundamental work on this issue by Y. Dinstein (2022) should be noted, where the principal *jus in bello* (law during war) was considered in detail. In this book the author analysed in particular means and methods of current warfare; issues of general non-combatant protection, the principle of proportionality of collateral damage to the civilian population, as well as special protection, particularly of the environment and cultural values; various aspects of the legal regulation of hostilities in Ukraine also have been analysed (Dinstein, 2022). The work by H. Frowe (2023), in which the scholar focusing on philosophical matters concerning modern war ethics, presented the theory of just war and covers in particular such key topics as follows: theories of self-defence and national defence; *jus ad bellum*, *jus in bello* and *jus post bellum*; combatants' moral status; humanitarian intervention; weapon and technologies; principle of non-combatants' immunity; nature of terrorism and terrorists' moral status. A. Kleczkowska (2023) has paid attention to the use of autonomy weapon, in particular unmanned aerial vehicles, in defensive systems and evaluated conditions of lawfulness of the use of such weapon from the point of view of the right to self-defence.

The work by S. Bosch (2024) explained the content of legal rights, duties and circumstances related to the status of mercenary, combatant and war-prisoner, the legal status of foreign members of the Ukrainian International Legion of territorial defence was studied and the illegality of russia's decision to classify these persons as mercenaries was proven. In the research by M. Biszczanik (2024) there was justification of necessity of harmonisation of legal rules on international level for appropriate initiation and conducting criminal proceeding through determination of circumstances excluding jurisdictional, material and personal immunities, thus restoring criminal liability for international crimes. In the work by I. Rosenzweig (2024) author has proposed the revised view *lex ferenda* on the IHL fundamental principles through internationalisation of values of combatants' lives. This scholar stated that such interpretation of IHL would enable to refuse from automatic need to attack combatants, thus, to regard in proper way the value of combatants' lives (both adversarial and its own combatants) while assessing the use of force at armed conflicts, in particular through the reduction of military superiority, forced protection and adjusted analysis of proportionality.

Although the aforementioned scientific works do not directly concern legal regulation of combat immunity in Ukrainian criminal legislation, but they can make fundamentals of interpretation of its signs provided for in Art. 43.1 of the Criminal Code of Ukraine (2001), because the aforementioned researches dealt with analysis of different aspects of regulatory framework of rules and customs of war in IHL. As for the Ukrainian scientists' works, given that Art. 43.1 was added relatively recently, there is no proper case law regarding the interpretation of the provisions contained in this rule. At the same time, among Ukrainian scholars, the mentioned topic is the subject of research. A. Begunts (2022) concluded that immunity is military and civilian, noted the problematic nature of the subject composition of persons entitled to civilian military immunity, and determined the need to use the provisions of IHL to define this category of persons. G. Mamedov & V. Khekalo (2025) in their study have drawn attention to the fact that the application of combat immunity exempts combatants from criminal liability for actions committed during armed conflicts, but combat immunity does not lead to impunity for combatants, since they can be held liable for carrying out a clearly criminal order or for

committing serious international crimes. However, a number of issues related to the correct understanding of "combat immunity" from the point of view of the criminal law of Ukraine remain debatable, which requires further research into various aspects of the legal regulation of the possibility of exercising the right to defend the Fatherland, in particular, in terms of what means can be used to repel and deter the enemy's armed aggression.

The purpose of this article was to develop some proposals for improving the regulatory framework concerning circumstances excluding criminal illegality of an act, provided for in Art. 43.1 of the Criminal Code of Ukraine (2001), as well as to interpret some of its features. The authors have attempted to find out what tools and means can be used to repel and deter armed aggression of the russian federation or aggression of another country, as well as what the conditions for their use should be.

Materials and Methods

The stages of the study were: formulation of a research problem (certain aspects requiring improvement in the understanding of combat immunity in the criminal legislation of Ukraine were identified); definition of the research methodology; bibliographic analysis (scientific sources review); analysis of the current legislation of Ukraine; analysis of the practice of applying certain provisions of Art. 43.1 of the Criminal Code of Ukraine (2001); identification of certain problems; formulation of proposals for the interpretation and improvement of Art. 43.1 of the Criminal Code of Ukraine (2001); conclusions formulation. The study was based on the works of foreign and Ukrainian scholars dealing with analysis of individual components of combat immunity in criminal law, as well as the regulation in the legislation of Ukraine of means of warfare prohibited by international law, other violations of laws and customs of war provided for in international treaties. The relevant regulatory framework has also been analysed, namely: Criminal Code of Ukraine (2001), Order of the Ministry of Defence of Ukraine of No. 164 (2017), Law of Ukraine No. 2114-IX (2022), and so on.

Using the epistemological method, the content of individual components, sources and limits of application and some aspects of the legal justification of combat immunity in criminal law were clarified, in particular, the depth of scientific understanding of the criminal legal liability of persons who repel and deter armed aggression of the russian federation was increased. The logical-semantic method contributed to a deeper understanding of the conceptual apparatus of the analysed topic. The system-structural method was useful in studying individual components of the circumstance excluding criminal illegality of the act, provided for in Art. 43.1 of the Criminal Code of Ukraine (2001), as an integral part of the general concept of "combat immunity". The dialectical method of cognition allowed authors to clarify the content of individual features of combat immunity in the criminal legislation of Ukraine. Using the comparative legal method features of regulation of the right to use weapons (armament) in repelling and deterring armed aggression of the russian federation under criminal legislation of Ukraine (Art. 43.1 of the Criminal Code of Ukraine, 2001) were compared with the provisions of other regulatory legal acts of this state (Law of Ukraine No. 1932-XII, 1991). Thus, the use of a comprehensive research methodology allowed for a full analysis of the legal nature of combat immunity in the context of Art. 43.1 of the Criminal Code of Ukraine.

Results and Discussion

Part 3 of Art. 43.1 of the Criminal Code of Ukraine (2001) contains a provision according to which a person is not subject to criminal liability for the use of weapons (armament), ammunition or explosives against individuals committing armed aggression against Ukraine, and for damage or destruction of property in connection with this. D. Ptashchenko (2022) noted that the provisions of Part 3 of Art. 43.1 of the Criminal Code of Ukraine (2001) "expanded" the list of means by which a person can repel and deter armed aggression of the russian federation or aggression of another country: these are not only firearms and ammunition for them, as defined in Law of Ukraine No. 2114-IX (2022), but any weapon, including ammunition, explosives, as well as cold weapons.

According to the literal interpretation of this criminal-legal provision, only the following tools can be used to repel and deter the activities of persons committing armed aggression against Ukraine: weapons (armament); ammunition; explosives. At the same time, to counter the russian military, Ukrainian citizens can use various tools and means that, at first glance, do not belong to those defined in Part 3 of Art. 43.1 of the Criminal Code of Ukraine (2001). It should be noted that along with the military, the natural right to counter the aggressor is also possessed by "ordinary" citizens who, either with the help of weapons or in another way, destroy enemy equipment, manpower, damage material objects that are used or can be used by the enemy, or otherwise cause harm to him (Begunts, 2022). It is worth noting that international law does not provide for the participation of civilians in armed resistance to aggression. At the same time, the Ukrainian government decided to involve civilians in the resistance, which was an unprecedented step and drew the attention of the international community to the issue of the level of the state's trust in its own population. The civilians' desire to participate in deterring armed aggression of the russian federation or aggression of another country is evidence of a desire to live in a unitary, sovereign and independent, democratic, social and legal state (Korabel & Pavlenko, 2022). As P. Prikhodko (2022) argued, manifestations of the struggle of the peaceful Ukrainian population against the occupiers at the beginning of the full-scale

invasion were not isolated. It can be assumed that such cases are not excluded at the stage of war as of 2025.

In addition, to eliminate occupiers and the equipment they use for fighting, as well as other property belonging to them, Ukrainians can use various homemade striking devices, including incendiary ones. To defeat the enemy, it is also possible to use objects that are capable of causing bodily harm, but do not belong to the classical understanding of the concepts of "firearms" and "cold weapons", such as: smooth-bore hunting rifles, kitchen knives, axes and other agricultural equipment, or in general to counteract the enemy only with the help of hand-to-hand combat techniques, setting traps, using objects prepared in advance for causing bodily harm etc. As for the judicial practice of applying the provisions of Art. 43.1 of the Criminal Code of Ukraine (2001), it is rather fragmentary. For example, in Case No. 183/5056/22 (2022), the court recognised that although the accused was pursuing the offender, the accused had the opportunity to stop him by other means, except for firing thirteen shots from an AKS-74 automatic weapon into the back. Because of this, the application of Part 4 of Art. 43.1 was deemed inappropriate, and the exemption from liability was not applied. As N. Shchcerbyna (2024) suggested, a shod foot could cause more serious bodily harm than a bare foot, and that there were no objections to the use of knives and axes, and the use of knives and axes does not see any objections. That is, all of the above-listed means, in the author's understanding, can be recognised as weapons. Therefore, it is necessary to find out whether the specified items are included in the content of those tools that are defined in Part 3 of Art. 43.1 of the Criminal Code of Ukraine (2001). O. Sharmar (2022) has noted that in general, Ukraine does not have a law regulating public relations related to the use of weapons. The Criminal Code of Ukraine (2001) also does not define the concept of "weapons", and even more so "armament".

In the first days of the full-scale russian invasion, the Law of Ukraine No. 2114-IX (2022) was adopted, according to Art. 4 of which, during the period of martial law, Ukrainian citizens may participate in repelling and deterring armed aggression of the russian federation and/or other states, using their own award-winning weapons, sporting weapons (pistols, revolvers, rifles, smooth-bore rifles), hunting rifled, smooth-bore or combined weapons and ammunition for them. At the same time, the above provisions limit the civilians' ability to participate in the defence of their Fatherland only with the specified types of weapons, of which there are usually more. In this context, it should be noted that the draft of the new Criminal Code of Ukraine (2025) contains the definition of the concept of "weapon" in its glossary: weapon – an object (tool, device), except for smooth-bore hunting weapons, which: a) is suitable or can be adapted without the use of special equipment to cause death of a person, harm to his/her health, combined or not combined with the destruction or damage of a material object, b) has a special legal regime – withdrawn from civil circulation or is subject to a licensing system and c) belongs to one of the following types: firearms capable of firing a bullet, arrow with a diameter of more than 4.5 mm with an initial velocity of 100 or more m/sec; artillery weapons, in particular mortars; grenade launchers; rocket weapons; cold and throwing weapons. However, in this definition, its authors generally embodied a "narrow" understanding of the concept of "weapon", the content of which includes mainly firearms and cold weapons. It is also important that only those tools that have a special legal regime of circulation are classified as weapons.

In order to clarify the correctness of such a practice, it is advisable to turn to clarifying the meaning of the relevant terms. In the dictionary, the concept of "weapon" was interpreted in three meanings: 1) a tool for attack or defence or a set of means used for waging war or battle, that is, armament; 2) a symbol of military affairs; 3) a means for fighting someone or something that helps achieve a certain goal (in a figurative sense) (Busel, 2005). The following types of weapons were also mentioned: automatic, bacteriological (biological), firearm, smooth-bore, weapons of mass destruction, semi-automatic, rifled, toxic, chemical (including poisonous substances), cold one (Busel, 2005). Instead, the term "armament" refers to a set of means for conducting military operations; military equipment; weapons (Busel, 2005). A comparison of the content of the interpretation of the two above-mentioned terms shows that they have almost identical content, since the term "armament" almost completely reproduces the essence of the concept of "weapons", is actually a synonym. At the same time, the difference between them is that the content of the concept of "armament" includes the concept of "military equipment".

The concept of "equipment" refers to a set of objects, devices necessary for something; items of armament, uniforms and household goods of a fighter, as well as devices for their transportation (Busel, 2005). That is, in relation to the analysed article 43.1 Criminal Code of Ukraine (2001), military equipment is not only the weapon itself, but also everything that is not directly a weapon. Therefore, "weapons" are specific tools used to defeat enemy personnel, equipment or objects, individual units, for example: a machine gun, pistol, cannon, grenade, rocket, knife, etc. While "armament" is a systematic set of weapons and equipment that an individual serviceman, unit or army or state as a whole has. Accordingly, for a civilian who repels and deters armed aggression of the russian federation or aggression of another country, weapons can be any objects and tools with which they inflict physical and property damage on the enemy. As for ammunition, they are a component of the concept of "armament", since they can also be attributed to military equipment. This conclusion is

confirmed by the legislator's position. According to Art. 1 of the Law of Ukraine No. 1991-III (2000) ammunition is a type of weapon intended to defeat enemy personnel, destroy its military equipment, destroy fortifications, structures, and perform other tasks. For example, a Molotov cocktail may be part of the equipment of a person who repels and deters armed aggression of the russian federation or aggression of another country, that is, it is a weapon. At the same time, in its essence, it may also be a munition intended to destroy the occupiers' military equipment. The Order of the Ministry of Ecology and Natural Resources of Ukraine No. 56/m (2003) considers ammunition to be one of the types of weapons. It is also appropriate to recognise explosives as a type of weapon, since they can be an integral part of the equipment of a person who repels and deters armed aggression of the russian federation or aggression of another country.

According to Art.1 of the Law of Ukraine No. 2288-IV (2004), explosives are chemicals capable of rapid chemical transformation under the influence of external actions, which occurs with the release of a large amount of heat and gaseous products. In paragraph 6 of the Resolution of the Plenum of the Supreme Court of Ukraine No. 3 (2002), it is noted that explosives include gunpowder, dynamite, TNT, nitroglycerin and other chemical substances, their compounds or mixtures capable of exploding without access to oxygen. Moreover, the above-mentioned substances, compounds and mixtures are an integral component of ammunition. Criminal law scholars also support this opinion. For example, V.V. Holubosh (2020) has concluded that ammunition and explosives are related as a general and a partial, because the latter are an integral component of ammunition, from which explosives can always be obtained. In Part 3 of Art. 43.1 of the Criminal Code of Ukraine (2001) the general concepts of weapons (armaments) were used, which encompassed the meaning of the concepts of ammunition and explosives. Such legislative use of terms, the meaning of which may coincide, is called a hidden tautology, in the case of which, as Z.A. Trostyuk (2000) rightly noted, the subsequent repetition in sign design is different, although the meaning of such terms is completely or partially the same. Hidden tautology leads to a violation of the requirements of clarity, comprehensibility and brevity of the conceptual apparatus, therefore hidden tautology must be eliminated, because terms that are different in sound create the illusion that they are different in meaning. This creates additional difficulties in studying legislation and in law enforcement. That is, the question arises as to the appropriateness of the existence of concepts of "ammunition" and "explosives" in the text of Part 3 of Art. 43.1 of the Criminal Code of Ukraine (2001).

In this context it should be noted that Law of Ukraine No. 1932-XII (1991) was amended by the concept of "combat immunity" which means the exemption of military command, military personnel, special police officers of the National Police of Ukraine, volunteers of the Territorial Defence Forces of the Armed Forces of Ukraine, law enforcement officers who, in accordance with their powers, participate in the defence of Ukraine, persons specified by Law of Ukraine No. 2114-IX (2022), from liability, including criminal liability, for the loss of personnel, military equipment or other military property, the consequences of the use of armed and other force during the repulsion of armed aggression against Ukraine or the elimination (neutralisation) of armed conflict, the performance of other tasks for the defence of Ukraine with the use of any type of weapon (armament), the occurrence of which, taking into account reasonable caution, could not have been foreseen when planning and carrying out such actions (tasks) or which are covered by justified risk, except in cases of violation of the laws and customs of war or the use of armed force as defined by international treaties, the binding nature of which has been approved by the Verkhovna Rada of Ukraine. That is, according to this definition, when repelling and deterring armed russian aggression, both combatants and civilians may use not only armed, but also any other force that strikes the enemy. But taking into account the provisions of Part 1 of Art. 43.1 Criminal Code of Ukraine (2001) it is important that the use of authorised armed and other force does not violate the laws and customs of war regulated by IHL.

Regarding the connection between Art. 43.1 of the Criminal Code of Ukraine (2001) and IHL, the limits excessing of legality established by this article will mean a violation of IHL rules, and serious violations of IHL rules are war crimes, which are primarily criminalised by the rules of international criminal law. IHL is a system of legal regulatory of conducting armed conflicts in order to limit their consequences for the civilian population, the wounded, prisoners of war, as well as objects that do not participate in hostilities. In the context of the armed aggression of the russian federation against Ukraine, compliance with IHL rules is not only a legal obligation, but also an element of moral, strategic and political legitimacy not only of the Armed Forces of Ukraine, but also of other formations and individual citizens who repel and deter russian aggression.

D. Ptashchenko (2022) stated that Part 1 of Art. 43.1 of the Criminal Code of Ukraine (2001) refers to the means of waging war, as well as violations of the laws and customs of war, which are: war criminal offenses; such offenses must have a "double" illegality: the acts are prohibited not only by international criminal-legal rules, but also in accordance with Part 3 of Art. 3 of the Criminal Code of Ukraine (2001) and the provisions of the criminal legislation of Ukraine (for example, the legal components of crimes provided for in Art. 438, 439 of the Criminal Code of Ukraine, 2001). To find out which means of warfare are prohibited under international law, it is advisable to refer to the Order of the Ministry

of Defence of Ukraine No. 164 (2017). Although this document is addressed only to military personnel and employees of the Armed Forces of Ukraine in order to ensure their compliance with the principles and rules of IHL, it is nevertheless important for the study and interpretation of IHL provisions as a whole, as it contains the results of the analysis of international treaties (Voznyuk & Zhuk, 2022). This normative document summarises the main provisions of universal IHL acts relating to the definition of the laws and customs of war.

Thus, according to paragraph 2 of Chapter 3, Section I of the Order of the Ministry of Defence of Ukraine No. 164 (2017), the means of warfare prohibited by international law include: explosive bullets and bullets that easily unfold or flatten in the human body (bullets with a hard shell that does not completely cover the core or has notches); poisons, toxic substances and highly toxic substances; bacteriological (biological) and toxic weapons; any weapon whose action consists in inflicting damage with fragments that are not detected in the human body by X-rays; mines designed to explode from the presence, proximity or direct impact of a person, which disable, maim or kill one or more people; any self-deactivating mines equipped with a non-removal element that can function after the mine has lost its ability to trigger; booby-traps (any device or material, other than anti-personnel mines, that is designed, constructed or adapted to kill or injure, and that is triggered suddenly when a person touches or approaches a seemingly harmless object or performs a seemingly safe action), which are in some way connected or associated with internationally recognised protective emblems, signs or signals, as well as with other items (objects) that do not pose a danger to humans (wounded or dead, medical equipment, kids toys, etc.). The above provision establishes an absolute prohibition in the conduct of war to use certain alternative means that may cause excessive suffering; not to distinguish between civilians and military personnel; to violate the principles of humanity, distinction and proportionality.

It should be noted that the Ukrainian servicemen, when conducting hostilities, generally adheres to the provisions of the above-mentioned regulatory act, and accordingly to the IHL rules, while the russian side, in order to gain a military advantage, constantly violates the rules and customs of warfare. As noted in the article War crimes of the russian federation against Ukraine: The Office of the Prosecutor General spoke about the most common ones (2025), as of May 2025, according to the Office of the Prosecutor General of Ukraine, since February 24, 2022, more than 160,000 cases of war crimes committed by russian servicemen have been officially recorded, among which the largest part is violations of the laws and customs of war (Criminal Code of Ukraine, 2001).

Having analysed the IHL acts on the restriction or prohibition of the use of certain means of warfare, M. Zubansky (2023) noted that such prohibitions state that the parties to an armed conflict should be guided by the following provisions: the requirements of humanity are higher than the needs of the parties in the course of waging war; states during hostilities must set a single goal, which is to weaken the enemy's forces; to achieve the goal in war, it is enough to incapacitate (injure) the largest number of people, and not necessarily to destroy them; the use of weapons that cause unnecessary suffering to the enemy or make death inevitable is recognised as contrary to the legitimate goal of waging war; the use of the above-mentioned weapons is in contradiction with the requirements of humanity. That is, according to the IHL provisions the criteria for prohibiting the means of warfare are, in particular, the indiscriminate action of such means and the possibility of causing excessive harm and unnecessary suffering by their use (Botnarenko & Kryzhna, 2024).

As G. Mamedov & V. Khekalo (2025) pointed out, the main principles that parties should be guided by in an armed conflict are as follows: the distinction between military necessity, proportionality and humanity. These principles define key limitations in order to reduce the potential consequences of an armed conflict. Violation of these principles, depending on their nature, can be perceived as an international crime. These principles remain unchanged and are used to evaluate any new methods and means of warfare. Accordingly, the means and methods used in modern wars must comply with the long-established and fixed IHL principles. The principle of military necessity imposes the requirement that the use of the minimum amount of force that combatants are required to use to achieve a military objective is permissible. This requirement is crucial for considering the possibility of using a weapon system, both for lethal and non-lethal purposes (Blanchard & Taddeo, 2022). According to IHL, combatants are legitimate targets. However, although the combatant's right to life of is diminished and limited, it should not and cannot be completely rejected. Combatants have the right to life and an inherent human value that cannot be deprived of. This value must be respected and protected from arbitrary deprivation (Rosenzweig, 2024).

In support of the importance of adhering to IHL rules regarding the admissibility of the use of new or prohibited types of weapons, it is worth noting that a revision of the relevant provisions that would legalise the use of new means of destruction could lead to a large-scale escalation of weapons and a loss of control over restrictions on the military operations conduct, namely, to the fact that in the future inventors will only care about the effectiveness of weapons, and not about their legality, since they will know that the international legal framework can be adjusted in any case. Thus, while nations are allowed to seek ways to counter new threats to their security, they must adhere to basic legal principles for the sake of international peace and security (Kleczkowska, 2023).

G. Mamedov & V. Khekalo (2025) noted that in military and political history there are known cases when military commanders and soldiers, who were considered national heroes in their country, were recognised as war criminals for committing international crimes and cite as an example the case of the Bosnian-Croat politician and general Slobodan Praljak, convicted to 20 years of imprisonment for torture and mass murder, destruction of civilian infrastructure and cultural heritage in the city of Mostar. It is important to prevent a similar scenario from recurring for the command staff and military personnel of the Armed Forces of Ukraine. The above scholars' theses of also apply to civilians. Thus, the use of poison and other prohibited means by both military and civilian citizens to destroy the enemy is a violation of the norms of IHL and national criminal legislation.

Although the issue of the legality of their use may arise in the context of just defence against an aggressor's invasion, from the point of view of law and justice the answer must be negative. Recognising the above actions as complying with warfare rules may be an argument for the aggressor to legitimise its war crimes, referring to the right to give a "symmetrical response". In addition, recognising cases of violations of IHL rules as lawful may harm the image of Ukraine as a state governed by the rule of law, since this state clearly declares its compliance with the provisions of this area of law, which is key to international support from the states of the democratic world. However, it is very difficult and exhausting to conduct combat operations with strict compliance with the laws and customs of war and at the same time obtain positive results against the military forces of those countries that almost completely do not comply with IHL rules. Furthermore, as K. Amarasinghe (2021) noted, the rapid development of science and technology and the polarisation of power relations may call into question the ability of law to adapt in regulating human behaviour, especially in the most dramatic circumstances of war.

Accordingly, in times of conflict and transformation of international relations, nations need to find new ways to identify shared interests and signal a willingness to abide by certain norms. As P. Stephan (2022) suggested this may mean designing rules that nations will abide by while maintaining the plausible possibility of denying that their observance constitutes a broader obligation to cooperate or any indication of the regulatory influence of the rule of law. It is useful to refer to the experience of regulating combat immunity in other countries, in particular in the United States of America. The Federal Tort Claims Act (Contino & Kuersten, 2023) provides for the preservation of national immunity from civil liability for the actions of the military during combat operations in times of war. Although the legislative materials do not contain a clear explanation of the purpose and scope of this exception, case law indicates that it is aimed at preventing domestic or foreign law from interfering with the activities of the armed forces during hostilities, as well as ensuring the freedom of decision-making by military commanders without the risk of civil prosecution.

The concept of combat immunity is not enshrined in the criminal legislation of the Republic of Poland, therefore the relevant actions are considered to have been committed lawfully if they contain all the signs of necessary defence, in accordance with Art. 25 of the Criminal Code of the Republic of Poland (1997). At the same time, Law of Poland No. 1228 (2024) was supposed to supplement Art. 25a, which regulated immunity in border defence, namely: exemption from criminal liability of military personnel, border guards and police officers for the use of firearms or force in cases of: repelling a direct and illegal attack on the border or personnel; protection of life, health or freedom; necessary actions in situations requiring urgent intervention. However, the official text of the code as of April 9, 2025 does not contain the mentioned rule. Accordingly, it can be assumed that Law of Poland No. 1228 (2024) did not enter into force because it was heavily criticised by Polish legal scholars and the Council of Europe Commissioner for Human Rights as giving military personnel and other officers a "license to kill."

The German Criminal Code (1998) also does not contain the concept of combat immunity, and cases of using weapons against the enemy during hostilities, in order to provide grounds for exemption from criminal liability, must include features such as self-defence or excusable emergency. The Law on the Legal Status of Soldiers (1956) contains provisions defining the personal responsibility of military personnel for each act they commit. In addition, every soldier must carry out the orders of their commanders to the best of their ability, fully, conscientiously and without delay. An order may not be executed if it would constitute a criminal offense. If a soldier executes such an order knowingly, that soldier will be liable on an equal footing with the person who gave the order.

In France, Art. L4123-12 of the Defence Code. Book I: General Status of the Military (2004) states that a military member who, after warning, uses armed forces that are absolutely necessary to prevent or interrupt any invasion of a territory within which military property is located or deployed, the loss or destruction of which could cause very serious harm to the population or endanger the vital interests of national defence, and to arrest the perpetrator of this invasion, is not criminally liable. Likewise, a military member who, in accordance with international law rules of and within the framework of an operation to mobilise military potential taking place outside French territory or French territorial waters, regardless of its purpose, duration or scale, including numerous actions, the release of hostages, the evacuation of citizens or patrols on the high seas, carries out coercive measures or uses armed force, or gives the order to do so, when necessary for the performance of his mission, shall

not be criminally liable. According to A. Paphiti (2014), in the UK, combat immunity is not regulated by a separate law, but by the general principles of IHL and case law. The analysed immunity was confirmed, in particular, by the cases of Mulcahy v Ministry of Defence (1996), Multiple Claimants v Ministry of Defence (2003) and Smith and Others v the Ministry of Defence (2013), from which it follows that there is no general legal liability for negligence in respect of acts or omissions on the part of those who actually participate in armed combat. However, the question remains open whether this protection covers in a broad sense the preparation or conduct of active operations against the enemy, or whether it is narrowly limited to death/injury of subordinate personnel received during active combat operations.

An analysis of legislation shows that only military personnel have combat immunity, and even then, not in all countries. In Ukraine, however, both military and civilian personnel are granted combat immunity. In addition, combat immunity in the analysed countries is guaranteed not by criminal law, but by other legislative acts regulating the service activities of the military, while in Ukraine this type of immunity is guaranteed both in criminal and other legislation. In this, the legislation of Ukraine is ahead of the relevant legislation of other countries, which is logical, given that it is Ukraine that is waging a military campaign to repel russian aggression. At the same time, it is important that all legislative acts, including Ukrainian ones, regulate the "honest" rules of waging war against an enemy that adheres to the laws and customs of war. But given the fact that almost all nations in the world have access to modern technologies, including those that completely disregard such rules when conducting hostilities, gaining an advantage over the armed forces of such nations with conventional weapons becomes an almost impossible task. Therefore, at the international level, it is advisable to raise the issue of the legality of using harsher, except for treacherous, means and methods of warfare, with the help of which it is possible to effectively neutralise or destroy a large number of personnel of the enemy army. It is advisable to allow the use of appropriate means and methods in relation to the armed forces of those states that completely disregard the IHL rules when conducting hostilities.

Conclusions

As a result of the study, it was found that when repelling and deterring armed aggression of the russian federation or aggression of another country, it is possible to use not only armed, but also any other force that strikes the enemy. However, in order to comply with the provisions of the Criminal Code of Ukraine, it is necessary that such cases of use of armed and other force do not violate the laws and customs of war. The use of poison belongs to one of the manifestations of the use of chemical weapons and belongs to the means of warfare prohibited by the IHL rules. That is, military or civilian persons who, in order to counteract the occupiers, used poison or other objects or means of armament prohibited by the laws and customs of war, despite the fact that their actions were aimed at repelling and deterring the armed aggression of the russian federation, are subject to criminal liability under the Criminal Code of Ukraine, since the provisions of the Criminal Code of Ukraine and the IHL rules do not provide grounds for their exemption from criminal liability under the said article. As for other objects and means, if the methods of using the said objects and means do not belong to the means of warfare prohibited by international law, then they can be classified as "weapons" and "armament" and they can be used to repel and deter the armed aggression of the russian federation or the aggression of another country and their individual representatives. To improve the regulatory framework of the circumstance that excludes the criminal illegality of an act provided for by the Criminal Code of Ukraine, it is considered appropriate to exclude the terms "ammunitions" and "explosives" from the text of Part 3 of this rule, since in their content they are covered by the understanding of the concepts of "weapons" and "armament". A promising direction for further research is the search for ways to improve the understanding of combat immunity under IHL and the criminal legislation of Ukraine in terms of regulating the rights of persons who repel and deter armed aggression of a country whose armed forces absolutely do not adhere to the rules and customs of war when conducting hostilities.

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Деякі аспекти удосконалення розуміння бойового імунітету за українським кримінальним законодавством

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Анотація. Повномасштабне вторгнення військ російської федерації обумовило появу у кримінальному законодавстві України нових норм, які спрямовані на підвищення ефективності протидії цій військовій агресії. Серед цих норм однією з ключових є ст. 43.1 Кримінального кодексу України, що регламентує бойовий імунітет. Метою роботи була розробка окремих пропозиції з тлумачення бойового імунітету та удосконалення його регламентації за кримінальним законодавством України. При проведенні відповідного дослідження використано, зокрема, наступні методи: гносеологічний, системно-структурний, діалектичний, логіко-семантичний та порівняльно-правовий. Напрацьовано окремі пропозиції з удосконалення нормативної регламентації обставини, що виключає кримінальну протиправність діяння, передбаченої Criminal Code of Ukraine, а також тлумачення її деяких ознак. Пропонується виключити терміни «бойові припаси» та «вибухові речовини» з тексту Criminal Code of Ukraine, оскільки за своїм змістом вони охоплюються розумінням поняттями «зброя» та «озброєння». Встановлено, що при здійсненні відсічі та стримуванні збройної агресії російської федерації або агресії іншої країни, допускається застосовування не лише збройної, але й будь-якої іншої сили, що здатна вразити противника, при чому важливо, щоб таке застосування відповідало нормам міжнародного гуманітарного права. Наголошується, що дії військових або цивільних осіб, які для відсічі та стримування збройної агресії російської федерації використовували отруту або інші заборонені міжнародним гуманітарним правом предмети чи засоби озброєння, незважаючи на те, що їх дії були спрямовані на протидію окупантам, підлягають кримінальній відповідальності за Criminal Code of Ukraine. Пропонується здійснити пошук шляхів правової можливості застосування більш жорстких, крім віроломних, засобів і методів ведення війни проти армій тих країн, збройні сили яких абсолютно не дотримуються норм міжнародного гуманітарного права при веденні бойових дій. Практична цінність роботи полягає у тому, що її результати можливо використовувати при подальших дослідженнях бойового імунітету у кримінальному праві, а також при застосуванні окремих положень Criminal Code of Ukraine у практичній діяльності правоохоронних органів

Ключові слова: закони та звичаї війни; засоби ведення війни; зброя; озброєння; обставини; що виключають кримінальну протиправність діяння

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International legal assistance to business: How foreign jurisdictions contribute to the protection of the rights of Ukrainian companies

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Abstract. The aim of the article was to analyse the mechanisms of international legal assistance that ensure the protection of the rights of Ukrainian companies in cross-border commercial relations. The study used an interdisciplinary approach combining comparative-legal, systemic-structural, formal-legal and case-study methods, based on the analysis of international conventions and acts, Ukrainian legislation, and the case law of the European Union, the United Kingdom and the United States of America. As a result of the study, the theoretical and legal foundations of the functioning of the institution of international legal assistance to business were systematised as a structural element of private international law that ensures the realisation of the rights of business entities in cross-border disputes. It was identified that the national legislation of Ukraine implements these standards, ensuring the effective application in judicial practice. In the course of the analysis, five basic principles of international legal assistance were generalised – reciprocity, sovereign equality, respect for national law, procedural fairness and non-discrimination – which contribute to reducing transaction costs for business and increasing investor confidence in the Ukrainian jurisdiction. It was established that the legal environment of the European Union is based on unified and digitalised procedures of international legal assistance, which ensure electronic service of documents and the exchange of evidence between courts of the Member States. The study found that foreign jurisdictions demonstrate a high level of predictability and legal stability in matters of judicial control over international arbitration. It was revealed that European case law adheres to the concept of limited interference in the activities of arbitral tribunals, which helps preserve the autonomy of the arbitral process. In the Anglo-American model, a trend towards consistent enforcement of foreign arbitral awards, including those rendered in disputes involving foreign states, was confirmed, provided that procedural standards and public policy requirements are observed. The study showed that the institutions of judicial control, state immunity and recognition of arbitral awards in these legal systems function in a complementary manner, ensuring a balanced approach between the sovereign interests of the state and the needs of international business. The results obtained have practical significance for improving Ukrainian mechanisms of international legal assistance and for harmonising national legislation with European and Anglo-American standards

Keywords: procedural barriers to entry; *exequatur*; cross-border commercial dispute; judicial control; enforcement of judgments

Introduction

The globalisation of business and the active integration of Ukraine into the world economy have led to an increase in the number of cross-border legal relations in which Ukrainian companies become parties to international contracts, investment projects and court disputes outside the national jurisdiction. Prolonged martial law,

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internal economic instability and the changing geography of the business activity of Ukrainian companies have generated increased demand for effective international legal instruments to protect the rights and interests of national business entities. However, the effectiveness of the use of such mechanisms remains uneven and depends on the legal environment of foreign states, access to international legal assistance and the quality of interstate cooperation in the field of justice. Among the problems are differences in legal procedures, high costs of legal support, the complexity of the legalisation of documents, as well as insufficient awareness of business regarding the possibilities of international legal protection.

A review of research shows a convergence of procedural standards in the field of cross-border justice. In the work of R. Amato & M. Velicogna (2022), it was emphasised that the digitalisation of service of documents within the European Union (EU) through e-CODEX has significantly reduced the duration of procedures and transaction costs. At the same time, the authors drew attention to the fact that the main obstacles to effective recognition of judgments are caused by technical and linguistic imperfections in the notification of the parties, which preserve asymmetries in access. The conclusion is that technological infrastructure can serve as a catalyst for legal integration only if it is consistently implemented at the national level. Another dimension of the problem is revealed by V.V. Aleksiichuk (2024), who analysed the practical consequences of The Hague Convention on Choice of Court Agreements. The researcher stressed that this instrument strengthens party autonomy and reduces the phenomenon of "forum shopping", but the limited number of participants and heterogeneous practice of interpreting asymmetric clauses generate uncertainty. The author's findings indicate an urgent need to harmonise national case law with the conventional standards of validity and enforceability of jurisdiction agreements. The scholarly position of S.O. Belikova (2020) focused on the decisive importance of procedural guarantees in the *exequatur* procedure. The author argued that the key factor in the successful enforcement of foreign judgments is not the substantive-law aspects, but compliance with procedural requirements – proper notification of the parties, confirmation of jurisdiction and clarity of the grounds for refusal. Excessive interpretation of public policy and a formal approach to reciprocity, in the author's view, provoke instability of case law, which creates risks for participants in international commercial relations.

K. Paramonova (2022) focused on the innovations of Ukrainian legislation regarding choice of court in cases with a foreign element. The author noted that the expansion of party autonomy contributes to the reduction of jurisdictional conflicts, but at the same time requires clear procedural limitations to prevent abuses. In the author's opinion, the coherence of legal mechanisms and the professional training of practitioners are crucial for the effective application of the new rules. In the work of V.R. Abou-Nigm (2024), a metaphorical distinction between "high-speed motorways" and "jungle paths" of access to justice was traced. The author demonstrated that although digital and conventional mechanisms create effective channels of communication, socio-economic and institutional gaps preserve inequality in the parties' opportunities. Hence, the need for systemic reforms not only of a regulatory but also of an infrastructural nature in order to ensure real access to justice. The contribution of O. Vaycekhovska & N. Fedoruk (2024) is significant for the Ukrainian context. On the basis of an analysis of national case law, the authors identified inconsistencies in the application of the criteria of public policy, the procedures for notifying the parties and the demarcation of jurisdictions. The researchers concluded that the implementation of the Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters (2019) and the improvement of procedural legislation can significantly enhance the stability of the legal environment for foreign investors. Similar conclusions can be seen in the study by D. Kolcheko & O. Rusetska (2024), who analysed the peculiarities of legal interaction between EU states and Ukraine in the field of enforcement of judgments. The authors showed that the key problems are the heterogeneous procedures for notifying the parties, the difficulties in confirming jurisdiction and the absence of unified standards for assessing public policy. In their opinion, further convergence of procedural rules with European models is a prerequisite for the effective integration of Ukraine into a common legal area. In turn, in the work of M.R. Arakelian *et al*. (2023), the need for Ukraine's active involvement in the process of unifying private international law acts in the EU is substantiated. The scholars established that the adaptation of Ukrainian legislation to European standards on jurisdiction, recognition, and enforcement of judgments creates more stable conditions for the cross-border activities of business and contributes to strengthening the state's investment attractiveness.

The purpose of the article was to examine the mechanisms of international legal assistance applied in leading foreign jurisdictions in order to protect the rights of Ukrainian companies in cross-border legal relations. To achieve this aim, the following tasks were envisaged: to determine the main directions and forms of participation of foreign jurisdictions in ensuring access of Ukrainian companies to justice; to compare the practice of individual countries in the field of providing legal assistance to foreign companies; to develop recommendations for improving interstate legal cooperation aimed at increasing the level of international protection of Ukrainian business.

Materials and Methods

The study was conducted on the basis of an interdisciplinary approach combining the analysis of international

law, comparative-legal methods, systematisation of normative acts and the practice of the application in cross-border commercial relations. The comparative-legal method was applied to compare the content and legal consequences of the main international instruments, in particular Convention No. 9432 (1965), Convention No. 12140 (1970), and the Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters (2019). The purpose of using this method was to identify common approaches to the procedures of service of documents, taking of evidence and recognition of judgments, as well as to establish differences in the implementation in national legal orders. Additionally, the method was used to analyse the provisions of the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958) in comparison with Regulation (EU) No. 1215/2012 (2012), which made it possible to trace the evolution of the principle of mutual recognition of court and arbitral decisions. A systemic-structural analysis was applied in order to determine the interconnection between the levels of legal regulation – international, supranational and national. For this purpose, Regulation (EU) No. 2020/1784 (2020), Regulation (EU) No. 2020/1783 (2020) and Regulation (EU) No. 2023/2844 (2023) were analysed. The formal-legal method was used to interpret the provisions of Ukrainian legislation – Law of Ukraine No. 2709-IV (2005), the Civil Procedure Code of Ukraine (2004) and the Code of Commercial Procedure of Ukraine (1991). The application of this method was aimed at determining the procedure for recognition and enforcement of foreign court and arbitral decisions, as well as clarifying the legal force of international treaties in the national legal system.

The case-study method was applied as an analytical tool to identify patterns in the functioning of mechanisms of international legal assistance in foreign jurisdictions and to assess the effectiveness in protecting the rights of Ukrainian companies in cross-border disputes. In particular, the analysis was carried out with regard to cases that were indicative for three jurisdictions – the EU, the United Kingdom (UK) and the United States of America (USA) – and made it possible to identify national particularities of procedural access and judicial control over the enforcement of arbitral and court decisions. The choice of these jurisdictions was conditioned by the status as centres of international commercial justice and leading arbitration hubs, where the largest volume of cross-border disputes involving Ukrainian companies is concentrated. The criteria for selecting cases were: the participation of Ukrainian companies or the state of Ukraine in the dispute, and the procedural representativeness of the cases, that is, the ability to demonstrate key mechanisms of international legal assistance (service of documents, obtaining evidence, recognition, and enforcement of decisions, judicial control over arbitration). Using the example of arbitration proceedings between LLC "Gas Supply Company "Naftogaz of Ukraine"" (n.d.) and Public Joint Stock Company Gazprom (n.d.), considered by the Stockholm Chamber of Commerce Arbitration Institute (SCC) (n.d.), the study examined how Swedish courts, in particular the Case No. T 10191-17 (2019), applied the provisions of the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958) and consolidated the principle of minimum interference in the substance of arbitral awards. Another analytical vector of the study covered British case law, represented by JKX Oil & Gas plc, Poltava Gas B.V. and Poltava Petroleum Company JV v. Ukraine (n.d.). The analysis of this example was used to determine how the Arbitration Act 1996 (1996), the State Immunity Act 1978 (1978) and the Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of Ukraine for the Promotion and Reciprocal Protection of Investments (1993) interacted in the process of resolving issues of state immunity and enforcement of arbitral awards. The final element of the empirical analysis was the examination of the practice of the United States of America using the Case No. 2008-8 (2008), considered by the U.S. District Court for the District of Columbia (n.d.). This case was used to analyse how American courts implemented the provisions of the Federal Arbitration Act (FAA) (1925) and the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958) in the context of recognition and enforcement of foreign arbitral awards. Content analysis, aimed at processing the texts of court decisions, served as a supplement to the case-study method.

Results

Theoretical and legal foundations of international legal assistance to business

In the context of the intensification of global foreign economic relations and the growth of transnational commercial operations, international legal assistance to business is gaining importance. This term is understood as a complex of interactions that encompasses mechanisms of cooperation between state or supranational bodies of different jurisdictions with the aim of ensuring the realisation of the rights and protecting the interests of business entities involved in cross-border legal relations (Velicogna *et al*., 2018). As a component part of private international law, such assistance serves as a means of overcoming legal, procedural and institutional barriers that arise in connection with business activities outside the state. Private international law coordinates the processes of determining jurisdiction, establishing the applicable law, recognising and enforcing foreign court and arbitral decisions, and also regulates the procedures for the transnational obtaining of evidence and service of documents. In this context, international legal assistance to business functions as a programmed set of rules and mechanisms that

ensures this coordination in practical terms. In a narrow, procedural sense, international legal assistance to business covers the following specific forms of state cooperation: service of procedural or claim documents on addressees in another state (or abroad) – when, for example, a Ukrainian company acts as a claimant or defendant in a case abroad; obtaining evidence or requesting it from a foreign jurisdiction (for example, summoning witnesses, requesting documents, conducting examinations); recognition and enforcement of foreign court or arbitral decisions in another state (or vice versa), which makes it possible to implement the decision obtained or ensure its legal effect in the territory of the relevant jurisdiction (Ticic, 2024).

In the architecture of private international law, normative legal acts that unify cross-border procedural actions and the circulation of court and arbitral decisions provide a business with practical instruments for exercising rights outside its own jurisdiction. Three Hague Conventions form the basis: Convention No. 9432 (1965), Convention No. 12140 (1970), and the Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters (2019). The first Convention introduced centralised channels of communication through central authorities and standardised request forms, ensuring proper notification of the addressee abroad and procedural fairness. In the continuum of evidence, a key role is played by Convention No. 12140 (1970), which provided both for letters of request and procedures for the direct taking of evidence, allowing courts and parties to business disputes effectively to overcome jurisdictional borders when obtaining testimony or documents. Finally, the Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters (2019) is a new global basis for the mutual recognition and enforcement of judgments which, in contrast to bilateral treaties, formulated unified criteria of jurisdiction and exhaustive grounds for refusal, thereby increasing predictability for commercial creditors and debtors.

In the structure of private international law, an important factor in ensuring the predictability and stability of cross-border commercial relations is the proper enforcement of both court and arbitral decisions. In this context, the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958) is of particular importance. The instrument established unified procedural standards for the states parties regarding the obligation to recognise arbitration agreements, to confer on arbitral awards the legal force of national decisions and to ensure the compulsory enforcement in the territory. The Convention creates a universal mechanism that guarantees that an arbitral award rendered in one contracting state can be enforced in another without a re-hearing of the case. This significantly increases predictability and legal certainty in international commercial activity, which is a fundamental factor of trust between counterparties from different legal systems.

In the European legal order, the mechanism for the enforcement of court decisions and the provision of access to justice is supplemented by an internal system of European Union regulations (European Union, 2022), which codify the principles of jurisdiction, mutual recognition and procedural cooperation. The central instrument in this field is Regulation (EU) No. 1215/2012 (2012) – an act that regulates the jurisdiction of the courts of the Member States and the mutual recognition and enforcement of court decisions in civil and commercial matters. This normative act unified the criteria for determining jurisdiction, abolished the requirement for prior permission for the enforcement of decisions, and established the principle of mutual trust between the judicial systems of the Member States. In the study by E.A. Onțanu (2023), it was emphasised that, as a result, this Regulation has become the basis for the free movement of court decisions within the EU, providing business with rapid and predictable enforcement of judgments without duplication of proceedings.

In 2020, the procedural mechanisms of judicial cooperation were updated through the adoption of Regulation (EU) No. 2020/1784 (2020) and Regulation (EU) No. 2020/1783 (2020). These regulations codified modern procedural instruments, created unified electronic request forms and introduced the possibility of direct communication between courts via decentralised Information Technology Systems (IT-systems). These instruments reduced states' dependence on diplomatic channels and increased the speed of exchange of procedural information, which is important for transnational business that faces the need for prompt gathering of evidence or service of documents in several jurisdictions. The further evolution of this area is reflected in Regulation (EU) No. 2023/2844 (2023), which launched the digitalisation of judicial cooperation and established the principle of digital by default – the mandatory use of electronic means of communication and the e-CODEX system (Regulation (EU) No. 2022/850, 2022) for the exchange of procedural documents between the justice authorities of the EU. According to the analysis by F.G. Inchausti (2023), this decision marked the transition from the traditional paradigm of paper-based requests to digital formats of judicial interaction, which reduces transaction costs and increases the efficiency of legal assistance in cases with a foreign element.

The system for the implementation of international legal instruments in Ukraine is characterised by a combination of multilateral conventions that unify standards of legal assistance in civil and commercial matters and an extensive network of bilateral treaties aimed at specifying the procedures for cooperation with individual states. Such an approach forms a multi-level normative framework within which Ukraine's obligations under international treaties are fulfilled, and legal

mechanisms are created for protecting the interests of national business entities in foreign jurisdictions. The implementation of international obligations is ensured through national legislation that incorporates international standards into the procedural mechanism. The Law of Ukraine No. 2709-IV (2005) established the general principles for resolving disputes with a foreign element, in particular determining the jurisdiction of Ukrainian courts, the grounds for recognition and enforcement of foreign decisions, and the priority of international treaties over national norms. The Civil Procedure Code of Ukraine (2004) details the procedure for examining applications for recognition and permission to enforce foreign court acts and arbitral awards. The Code of Commercial Procedure of Ukraine (1991) regulates similar issues in the field of commercial disputes between business entities, ensuring the harmonisation of national case law with international standards. According to the official data of The Hague Conference on Private International Law (n.d.), Ukraine is a party to two Conventions – Convention No. 9432 (1965) and Convention No. 12140 (1970) – and also participates in the process of acceding to the Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters (2019). The application of these instruments in Ukrainian court practice forms a unified doctrine of international legal assistance. Court decisions based on the provisions of The Hague Conventions or bilateral agreements demonstrate the aspiration of the national justice system to align with European approaches. On the basis of the normative legal framework considered, it is possible to identify the basic principles of international legal assistance to business that ensure the coherence of states' actions, the predictability of judicial procedures and trust between participants in cross-border legal relations (Table 1).

Table 1. Key principles of international legal assistance in the field of protection of business rights

Principle	Content and legal enshrinement	Example of implementation in law-enforcement practice
Reciprocity	Based on the mutual provision by states of legal assistance within the framework of international treaties or on the customary principle of mutual recognition	Ukrainian courts recognise decisions of foreign courts, provided that the relevant state ensures an analogous regime for decisions of Ukrainian courts
Sovereign equality of states	Ensures the equality of the parties in the process of international judicial cooperation and non-interference in internal jurisdictional powers	Each state independently determines the central authority for executing requests for service of documents or obtaining evidence
Respect for national law	Provides that the execution of requests for legal assistance is carried out in accordance with the internal procedural rules of the requested state, unless otherwise provided by an international treaty	Allows the state to refuse to execute a request if it conflicts with its sovereignty or security
Procedural fairness	Ensures equality of the parties, the right to notification, access to evidence and a fair hearing	European courts are obliged to verify proper service of documents as a condition for recognition of a foreign judgment
Non-discrimination of parties to disputes	Guarantees that foreign legal entities have the same procedural rights as national entities in cases related to international legal assistance	Provides for equality of procedural rights of foreigners and Ukrainian citizens in Ukrainian courts

Source: compiled by the author based on the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958), Convention No. 9432 (1965), Convention No. 12140 (1970), Code of Commercial Procedure of Ukraine (1991), Civil Procedure Code of Ukraine (2004), Law of Ukraine No. 2709-IV (2005), Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters (2019), Regulation (EU) No. 2020/1784 (2020)

The totality of the above principles forms the conceptual basis of international legal assistance, which has a pronounced functional orientation. These principles ensure access of business to justice, allowing companies to apply to courts or arbitral tribunals outside the own jurisdiction, to obtain documents, evidence, and guarantees of enforcement of decisions. The unification of procedures and mutual recognition of procedural acts contribute to a reduction in transaction costs in international disputes: the time required for the execution of judicial requests, costs of translations, notarisation and diplomatic channels is reduced. The implementation of these principles strengthens the trust of investors and counterparties, since a transparent and predictable system of legal assistance is an important component of the investment climate and legal security of transnational business. Thus, the basic principles of international legal assistance are not purely declarative – the principles constitute a practical infrastructure for the harmonisation of legal systems, creating conditions for stability, efficiency, and fairness in the sphere of international commercial cooperation.

Practice of foreign jurisdictions in ensuring access of Ukrainian companies to justice

The establishment of effective mechanisms of access to justice in foreign jurisdictions is a condition for the integration of Ukrainian business into the global economic space. Ensuring this access is based on coordinated interaction between national and international

institutions that create the procedural infrastructure for the examination of cross-border commercial disputes. Central justice authorities act as intermediaries in providing international legal assistance – the authorities transmit requests for service of documents, obtaining evidence or enforcement of court decisions in accordance with the provisions of Convention No. 9432 (1965) and Convention No. 12140 (1970). Diplomatic missions, in turn, perform communicative and legal intermediary functions between state bodies, aiding the implementation of requests for legal assistance, the legalisation of documents, confirmation of the status of participants in proceedings and the protection of the rights of Ukrainian legal entities in foreign courts.

International arbitration centres occupy a structural position in the architecture of international justice, providing a universal platform for resolving commercial disputes involving companies from different legal systems. In particular, the International Chamber of Commerce (ICC) (n.d.) performs the function of a neutral forum whose decisions are recognised in 160 states in accordance with the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958). The London Court of International Arbitration (LCIA) (n.d.) is one of the leading venues for dispute resolution, including those involving Ukrainian companies. The Vienna International Arbitral Centre (VIAC) (n.d.) is traditionally used in disputes between companies from Central and Eastern European countries, including Ukraine, ensuring a balance between continental and common-law approaches. The Stockholm Chamber of Commerce Arbitration Institute (n.d.) plays a role in resolving investment disputes arising under-investment protection treaties, including those involving Ukrainian business entities. Thus, interaction between national justice authorities, diplomatic missions and international arbitration institutions forms a multi-level system of guarantees for the realisation of the rights of Ukrainian companies in foreign jurisdictions. The study of the practice of individual legal orders – the EU, the UK, and the USA – makes it possible to identify different models of ensuring procedural access, as well as the effectiveness of legal assistance mechanisms, which is the subject of further analysis in this subsection.

The legal environment of the EU is based on three elements that determine the conditions for access of foreign business to justice: mutual recognition and enforcement of court decisions in civil and commercial matters, enshrined in Regulation (EU) No. 1215/2012 (2012); unified and digitalised procedures for cross-border service of documents and gathering of evidence provided for in Regulation (EU) No. 2020/1784 (2020) and Regulation (EU) No. 2020/1783 (2020); and the favourable attitude of the courts of the Member States to arbitration, which ensures effective recognition, enforcement, and limited control of arbitral awards. Together, this reduces procedural barriers to entry for foreign companies and provides predictable channels of legal assistance – from the service of claims to exequatur – which directly affects the ability of Ukrainian applicants to protect the rights in EU jurisdictions. In cross-border commercial disputes, Ukrainian companies interact with the courts of the Member States in three modes: judicial control over arbitration (setting aside/enforcement of SCC/ICC/LCIA awards with a Ukrainian party), recognition and enforcement of foreign court acts, and application of EU procedural regulations for the prompt service of documents and obtaining of evidence within national proceedings.

The case law of Sweden is one of the most indicative examples of the effective implementation of the principles of arbitral autonomy and minimal court intervention, which establish the European standard of a favourable attitude towards arbitration. This was manifested in cases related to the long-running disputes between LLC "Gas Supply Company "Naftogaz of Ukraine"" (n.d.) and Public Joint Stock Company Gazprom (n.d.), examined by the SCC. The subject of the arbitral proceedings were contracts for the supply and transit of natural gas, within which the parties advanced reciprocal claims for compensation. After decisions were rendered in favour of the Ukrainian company, the Russian side initiated proceedings to set aside the arbitral awards before the courts at the seat of arbitration, in particular before the Svea Court of Appeal (Sveriges Domstolar, n.d.), invoking violations of public policy and excess of mandate by the arbitral tribunal (Case No. T 10191-17, 2019). In the course of the review, the Swedish courts confirmed a consistent interpretation of the provisions of the Swedish Arbitration Act (1999) and the standards laid down in the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958), stating that court intervention in the substance of an arbitral award is possible only in exceptional cases where a gross violation of procedural guarantees or fundamental principles of public order has been proved. The court rejected the arguments of Public Joint Stock Company Gazprom regarding violation of the right to defence, emphasising that mere disagreement with the content of the award cannot be a ground for its annulment. This created a precedent recognising the SCC arbitral award as compliant with the requirements of legality, proportionality and procedural fairness. For Ukrainian business, this practice is of systemic importance, as it confirms the high level of trust in institutional arbitration within the EU and demonstrates that Swedish courts adhere to the principle of limited judicial control. This provides the parties with a stable arbitral environment, minimises the risks of delaying enforcement of awards and strengthens the reputation of the SCC as a reliable arbitral forum for resolving disputes involving parties from outside the EU, including Ukraine.

The legal environment of the United Kingdom is characterised by a combination of the traditions of

Anglo-Saxon common law and high standards of procedural fairness, which makes it one of the leading jurisdictions in international commercial disputes. For foreign companies, including Ukrainian ones, the British legal system ensures equal access to justice in accordance with the principle of equal treatment before the court, regardless of the jurisdiction of origin of the parties. The openness of British courts to foreign applicants is combined with a strong orientation towards the rule of law and international cooperation in the field of recognition and enforcement of foreign court and arbitral decisions. The United Kingdom, as a state party to the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958), applies its provisions through the Arbitration Act 1996 (1996), in particular sections 100-104, which regulate the procedure for recognition and enforcement of awards rendered by arbitral tribunals outside the jurisdiction. In practical terms, this means that Ukrainian companies can initiate the enforcement of international arbitral awards or protect the interests in English courts without the need for additional confirmation of the status or the existence of a special treaty between the states. Legal assistance to foreign applicants also covers mechanisms for obtaining evidence under the Evidence (Proceedings in Other Jurisdictions) Act 1975 (1975) and the rules of the Ministry of Justice (2024), which provide for direct channels of judicial cooperation, including the possibility of sending letters of request through the central authority – the King's Bench Division of the High Court (n.d.) – within the framework of Convention No. 12140 (1970).

A telling example of the implementation of these mechanisms is the case JKX Oil & Gas plc, Poltava Gas B.V. and Poltava Petroleum Company JV v. Ukraine (n.d.), examined by the Commercial Court (n.d.). In this case, the British company JKX Oil & Gas plc, which owned assets in Ukraine, sought recognition and enforcement of an arbitral award rendered by the LCIA against the state of Ukraine. The arbitral award was made on the basis of the Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of Ukraine for the Promotion and Reciprocal Protection of Investments (1993), which provides for arbitral settlement of disputes between an investor and the state. The legal issue in the case concerned the relationship between state sovereign immunity and the obligation to enforce an arbitral award under an international investment agreement. The Commercial Court confirmed its jurisdiction pursuant to the State Immunity Act 1978 (1978), holding that by concluding an investment treaty with an arbitration clause, the state had effectively waived its immunity in respect of such a dispute. The court's decision confirmed the effectiveness of the LCIA arbitral award, rejected Ukraine's objections regarding excess of mandate by the arbitrators and violation of public policy, and granted permission for its enforcement in the UK. This case has a significant precedential impact on the practice of participation of Ukrainian companies and state bodies in cross-border disputes, showing that the British jurisdiction guarantees the independence of judicial control over arbitration, ensures a transparent process of recognition of awards and predictability in the interpretation of international treaty provisions.

The legal environment of the USA is distinguished by one of the most developed systems of judicial control and arbitral dispute resolution, within which effective access of foreign companies to justice is ensured. The system operates on the combination of federal and state levels of legal regulation, which allows foreign business entities to exercise the procedural rights in a wide range of forms – from filing claims in US courts to applying for recognition and enforcement of foreign arbitral awards. Recognition and enforcement of such awards are carried out on the basis of the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958), implemented into US domestic law through the Federal Arbitration Act (1925). American courts, in particular the federal courts of appeal, regard arbitration as an effective alternative to court proceedings and recognise arbitral awards as enforceable, provided that none of the exceptional grounds set out in Article V of the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958) is present.

A representative case in this context is the arbitral dispute Case No. 2008-8 (2008), in which US courts considered the recognition and enforcement of an arbitral award rendered in favour of an investor against the state of Ukraine. In 2021, the U.S. District Court for the District of Columbia (n.d.) confirmed the possibility of enforcing the arbitral award within the jurisdiction of the USA, rejecting arguments concerning violations of public policy and procedural standards of arbitration. This case is indicative in that the US judicial system provided a foreign participant – in this instance a company acting in a dispute with Ukraine – with a real procedural mechanism for protecting its property interests through recognition of the arbitral award in accordance with the principles of the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958). A comparison of the law-enforcement practice of the jurisdictions of the EU, the United Kingdom and the United States of America makes it possible to trace structural patterns in ensuring access of foreign business entities to justice in cross-border disputes (Table 2). The analysis showed that the legal regimes of the EU, United Kingdom and USA demonstrate a high degree of convergence regarding the basic principles of international procedure – mutual recognition of decisions, ensuring equal access to justice and supporting arbitration as an effective means of dispute resolution. For Ukrainian companies, this creates a predictable environment for applying to foreign courts or arbitral

tribunals, where compliance with procedural standards is guaranteed regardless of the applicant's origin. At the same time, differences between the continental, Anglo-British and federal models appear in procedural aspects: the level of legal costs and time expenditure, the degree of digitalisation of processes and the formalisation of evidentiary mechanisms. EU jurisdictions are distinguished by a high level of digitalisation (e-CODEX, electronic service of documents), the Anglo-British model by transparent disclosure standards and stable arbitral practice, whereas the federal model by wide possibilities for procedural collection of evidence and strict adherence to the principle of due process. Taken together, these characteristics form a multi-level system of legal interaction within which Ukrainian business can select the optimal jurisdiction depending on the nature of the dispute, the expected procedural dynamics and economic costs.

Table 2. Comparative characteristics of the jurisdictions of the EU, United Kingdom and USA in the field of international legal assistance to business

Comparison criterion	EU	UK	USA
Access of foreign companies to justice	Ensured by the principle of mutual trust and unified procedural standards. Foreign companies have equal procedural rights with national entities	Guaranteed through Construction Product Regulation (CPR) and case-law. Ukrainian companies may apply without restrictions to the Commercial Courts and the LCIA	Enshrined in the FAA. Foreign companies may apply to federal and state courts on a general basis
Access to evidence	Implemented through digital procedures that allow direct electronic transmission of requests between courts	The disclosure mechanism in court proceedings provides wide opportunities for obtaining evidence; courts oblige parties to disclose relevant documents	Allows foreign parties to petition federal courts for the obtaining of evidence for use in foreign proceedings
Recognition and enforcement of foreign court and arbitral decisions	Mutual recognition is regulated without an *exequatur* procedure	A high level of pro-arbitration case-law	Implemented under the FAA. Courts adhere to narrow grounds for refusal of enforcement
Procedural costs and time costs	Comparatively lower thanks to the unification of procedures and the use of electronic means of communication; however, costs depend on the jurisdiction of the Member State	High costs of litigation and representation; LCIA arbitration is considered less costly, but lengthy in terms of time	High cost of proceedings (especially discovery), significant court fees and lawyers' costs; however, there are greater opportunities for cost recovery by the successful party
Legal model	Continental system (unified by EU supranational acts), oriented towards the harmonisation of procedures	Anglo-British common-law system, with precedent-based regulation and strong judicial autonomy	Federal system with a dualism of federal and state levels; common law with flexible procedural practic

Source: compiled by the author based on Arbitration Act 1996 (1996), Regulation (EU) No. 1215/2012 (2012), Regulation (EU) No. 2020/1783 (2020), Regulation (EU) No. 2020/1784 (2020), Regulation (EU) No. 2023/2844 (2023)

Among the tasks for Ukraine is the need for further harmonisation of national procedures with international standards, in particular as regards electronic exchange of procedural documents, improvement of mechanisms for compulsory enforcement of foreign decisions and ensuring transparency of the procedural status of foreign companies in the courts. The British experience of standardising disclosure of evidence and the American approach to active judicial case management, which make it possible to avoid abuses of procedural rights, are also useful. At the same time, systemic barriers remain that limit the full integration of Ukrainian entities into global justice: high representation costs in leading foreign jurisdictions, the complexity of linguistic and procedural adaptation, cultural differences in approaches to evidence, as well as the problematic recognition of foreign court and arbitral decisions in the territory of Ukraine. A separate challenge is the fragmented implementation of international instruments into national procedural legislation, which complicates the interaction of Ukrainian courts with European and American justice bodies. Overcoming these barriers requires both normative alignment of Ukrainian codes with modern supranational standards and institutional strengthening of the central justice authorities capable of providing prompt international legal assistance to Ukrainian business in a globalised economy.

Discussion

The results of the study are consistent with scholarly positions presented in the works of leading researchers in the field of private international law and cross-border judicial cooperation. Thus, in the work of L. Silberman (2021) the key importance of the Convention on

the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters (2019) as a basis for the formation of a global system of mutual recognition of judgments was emphasised. The author stressed the need to create a comprehensive national implementation mechanism that would ensure uniform application of the Convention's provisions at the federal level of the USA. These findings correlate with the conclusions of the present study, which likewise underlined that the unification of procedural procedures is a key condition for the stability of international commercial relations. At the same time, in L. Silberman (2021) research the focus was mainly on the legislative dimension, whereas in the analysis presented here the practical dimension was expanded – in particular, it was shown how the Convention's mechanisms are applied to protect the rights of business entities in different jurisdictions.

The study by M.D. Barišin (2023) contributed to understanding the impact of digitalisation on cross-border judicial cooperation within the EU. Analysing the consequences of the COVID-19 pandemic, the author found that national e-justice systems played a key role in ensuring the continuity of processes of service of documents and taking of evidence. The results obtained are consistent with the conclusions of this article, in particular with the statement that the introduction of IT-systems, Regulation (EU) No. 2020/1784 (2020) and Regulation (EU) No. 2020/1783 (2020) reduced transaction costs for business and accelerated communication between courts. At the same time, in contrast to M.D. Barišin's research, the present article focused not only on technological aspects but also on the legal principles of procedural fairness that ensure the effectiveness of digital exchange.

In the study by G. McCormack (2025), it has been established that accession of states to the Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters (2019) provides not only predictability of cross-border judicial cooperation but also creates a unified regime of recognition of judgments for business entities. The author noted that for countries with developed trade links, in particular for the United Kingdom after leaving the EU, ratification of this Convention could compensate for the absence of participation in the Convention on Jurisdiction and the Recognition and Enforcement of Judgments in Civil and Commercial Matters (2007), ensuring the continuity of the movement of court decisions. The results obtained in this study confirm a similar pattern: the unified standards of The Hague Conventions create legal certainty for business and reduce transaction costs in international disputes. However, unlike G. McCormack's approach, where emphasis was placed on the politico-legal aspects of accession, the present research concentrated on the functional mechanisms of legal assistance and the significance for Ukrainian business entities.

The findings of the research are consistent with modern scholarly approaches to ensuring access of foreign business entities to justice in a globalised legal space. In the work of A. Storgaard (2023) it was emphasised that the study of access to justice goes beyond the traditional understanding of the judicial order and encompasses a complex system of interaction between national courts, arbitral institutions and supranational bodies. The author noted that the contemporary model of justice is formed within a networked interdependence in which international legal assistance is not an auxiliary but a structuring element of the process. This conclusion is consistent with the results of the present study, which demonstrated that multi-level interaction between central justice authorities, diplomatic missions and arbitration centres provides Ukrainian companies with real access to foreign jurisdictions and reduces the risks of procedural discrimination.

In the work of X.E. Kramer (2022), it is shown that digitalisation of judicial cooperation in the EU is a factor in simplifying cross-border procedures. The author proved that the unification of digital communication channels between the courts of the Member States helps to shorten the duration of proceedings and increase business confidence in the European legal environment. The research results confirm this thesis: it has been established that precisely the EU's digital mechanisms provide Ukrainian companies with the highest level of procedural predictability among the jurisdictions analysed. At the same time, unlike X.E. Kramer's position, the present study stressed that the effectiveness of digital instruments depends on the harmonisation of Ukraine's national procedures with European standards.

A similar view was expressed in the study by I. Nicolae & G.B. Spirchez (2024), who analysed the modernisation of European judicial cooperation through digital platforms of interaction. The authors showed that digitalisation not only increases the efficiency of the exchange of procedural documents but also creates conditions for transparency and public control over judicial procedures. The results obtained coincide with these conclusions: it has been established that the EU's electronic instruments reduce administrative barriers for Ukrainian applicants and make the evidentiary process more open. At the same time, comparative analysis revealed that in Great Britain and USA digitalisation has a less unified character, which leads to greater dependence of effectiveness on the case-law of a particular jurisdiction. In the study by R. Gulati (2023), the phenomenon of privately driven transnational hybrid adjudication is considered – a model in which access to justice is largely mediated by private arbitral institutions. The author argued that business-initiated hybrid mechanisms (arbitration, mediation, contractual forms) compensate for shortcomings of interstate judicial cooperation. The results obtained partially confirm

this thesis: it has been established that institutional arbitration is an effective means of resolving disputes of Ukrainian companies outside state jurisdiction. However, unlike R. Gulati's conclusions, the data obtained showed that the participation of state courts in controlling arbitral awards (in particular in Sweden and the UK) remains a necessary condition for maintaining the balance between private autonomy of the parties and the public interests of the legal order.

The results obtained in the study by J. Huang & T. Gu (2025) also find confirmation within this research. The authors demonstrated that ensuring business compliance in cross-border commercial relations depends on the stability of procedures for recognition and enforcement of court and arbitral decisions. A similar pattern has been identified in the analysis of the practice of Great Britain and the United States of America, where strict adherence to the principles of due process and limited judicial intervention ensure a high level of confidence of foreign companies in the justice system. At the same time, in contrast to the Asia-Pacific region analysed by the aforementioned authors, Western jurisdictions exhibit greater unification of legal standards and procedural control over enforcement of decisions. A certain parallel can be drawn with the conclusions of M. Chen (2024), who examined the evolution of China's approaches to regulating cross-border data flows in the context of global legal integration. The author proved that the effective functioning of the international legal space is possible only where domestic regulatory mechanisms are harmonised with international obligations. The results obtained confirm this position: it has been revealed that for Ukraine a critical condition for integration into the system of international justice is the alignment of national procedural codes with EU supranational acts and international conventions. Thus, the effectiveness of international legal assistance depends on the ability of states to adapt the procedural regimes to global standards of judicial cooperation. The conducted research confirmed this pattern by showing that harmonisation of national legislation with European and international norms is a key condition for increasing predictability, transparency, and accessibility of justice for Ukrainian companies in cross-border disputes.

Conclusions

The carried-out study has made it possible to generalise and systematise the scholarly and theoretical foundations, normative legal sources and conceptual principles that determine the contemporary model of international legal assistance to business in conditions of intensified global commercial relations. The analysis has established that the institution of international legal assistance is an organic component of private international law aimed at ensuring the realisation and protection of the rights of business entities in cross-border legal relations. It performs the function of legal mediation between national jurisdictions, ensuring procedural compatibility of legal systems and creating preconditions for effective access of business to justice at the supranational level.

Generalisation of the provisions of international and national instruments has made it possible to identify the key principles of international legal assistance to business: reciprocity, sovereign equality of states, respect for national law, procedural fairness and non-discrimination of parties to disputes. Implementation of these principles determines not only the legal but also the economic effectiveness of the system of legal cooperation, since this system performs a number of practical functions: it promotes the expansion of access of business entities to justice in foreign jurisdictions, including in arbitral and specialised courts; it reduces transaction costs associated with the execution of judicial requests and procedural actions in international disputes through the unification of documents and digitalisation of data exchange; and it ensures increased confidence of foreign investors, strengthening the reputation of Ukraine as a jurisdiction that adheres to the principles of predictability, equality and due process of law. It has been established that the effectiveness of the implementation of international legal assistance for Ukrainian companies depends on the level of legal and institutional development of the jurisdictions within which access to justice is exercised. The study of the practice of the European Union, the United Kingdom and the USA has shown that, despite different legal traditions – continental, Anglo-British and federal – all three jurisdictions are based on common principles of procedural fairness, mutual recognition of decisions, independence of judicial control and support for international arbitration as a key mechanism for resolving cross-border commercial disputes.

The results obtained during the research have demonstrated: within the EU – a high level of integration of international legal assistance procedures thanks to the operation of digital regulations; in the UK- the stability of the arbitral environment and the effectiveness of judicial control, which guarantees enforcement of awards; in the USA – consistent case-law regarding recognition of foreign arbitral awards. These examples confirmed that foreign legal systems create conditions for effective protection of the property rights of Ukrainian companies and for fair judicial consideration of cross-border cases. At the same time, a number of barriers remain relevant: high financial costs of court and arbitral proceedings abroad, linguistic and cultural differences, difficulties in enforcing foreign court decisions in Ukraine, and partial inconsistency of national procedural legislation with international instruments. Overcoming these barriers requires improvement of internal mechanisms for recognition and enforcement of decisions, expansion of digital tools of international legal assistance and enhancement of the professional

training of specialists in the field of transnational procedure. Prospects for further research lie in developing models for integrating Ukraine's electronic judicial cooperation systems with EU platforms (in particular e-CODEX), as well as in a comparative analysis of the effectiveness of new regulations and bilateral legal assistance agreements for expanding the opportunities of Ukrainian business in the global legal space.

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Міжнародна правова допомога бізнесу: як іноземні юрисдикції сприяють захисту прав українських компаній

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Анотація. Метою статті був аналіз механізмів міжнародної правової допомоги, що забезпечують захист прав українських компаній у транскордонних господарських відносинах. У дослідженні використано міждисциплінарний підхід, що поєднує порівняльно-правовий, системно-структурний, формально-юридичний та кейс-стаді методи, на основі аналізу міжнародних конвенцій, актів, українського законодавства та судової практики Європейського Союзу, Великої Британії та Сполучених Штатів Америки. У результаті дослідження систематизовано теоретико-правові засади функціонування інституту міжнародної правової допомоги бізнесу як структурного елементу міжнародного приватного права, що забезпечує реалізацію прав суб'єктів господарювання у транскордонних спорах. Виявлено, що національне законодавство України імплементує ці стандарти, забезпечуючи їх ефективне застосування у судовій практиці. У процесі аналізу узагальнено п'ять базових принципів міжнародної правової допомоги – взаємності, суверенної рівності, поваги до національного права, процесуальної справедливості та недискримінації, які сприяють зниженню транзакційних витрат бізнесу й підвищенню довіри інвесторів до української юрисдикції. Встановлено, що правове середовище Європейського Союзу базується на уніфікованих і цифровізованих процедурах міжнародної правової допомоги, що забезпечують електронне вручення документів і обмін доказами між судами держав-членів. У ході дослідження встановлено, що іноземні юрисдикції демонструють високий рівень передбачуваності та правової стабільності у питаннях судового контролю за міжнародним арбітражем. З'ясовано, що європейська судова практика дотримується концепції обмеженого втручання у діяльність арбітражних трибуналів, що сприяє збереженню автономності арбітражного процесу. В англо-американській моделі підтверджено тенденцію до послідовного виконання іноземних арбітражних рішень, включно з тими, що ухвалені у спорах за участю іноземних держав, за умови дотримання процесуальних стандартів та вимог публічного порядку. Дослідження показало, що інститути судового контролю, державного імунітету та визнання арбітражних рішень у цих правових системах функціонують у взаємодоповнюючий спосіб, забезпечуючи балансовий підхід між суверенними інтересами держави та потребами міжнародного бізнесу. Отримані результати мають прикладне значення для вдосконалення українських механізмів міжнародної правової допомоги, гармонізації національного законодавства з європейськими та англо-американськими стандартами

Ключові слова: процесуальні бар'єри входу; екзекватура; транскордонний комерційний спір; судовий контроль; виконання рішень

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