

Recent Advancements in Forensic Expert Activity in the Context of Global Societal Digital Transformation

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The rapid digitization of society has fundamentally altered the nature of criminal activity, the sources of evidentiary information, and the operational context of forensic experts. Contemporary traditional approaches to recording, investigating, and assessing data have become inadequate for managing digital traces, extensive datasets, and their recent variations and forms. This requires the identification of traditional trends in the development of forensic expert activity and the re-evaluation of its normative, organizational, and methodological foundations. The Article Purpose is a comprehensive analysis of trends in the development of forensic expert activity within the context of global digitalization, as well as elucidation of the impact of contemporary digital technologies on the organizational, procedural, and methodological foundations of expert support to justice. The author employs the method of system analysis to identify general technological trends, the structural and functional method for assessing the impact of digitalization on the content and tasks of forensic expert activity. It has been proven that digital traces are being prioritized in expert research. Artificial intelligence, 3D technologies and simulation platforms significantly expand expert practice capabilities. A deficiency of methodological support is identified, attributable to the complexity of digital data and the emergence of their novel forms and variations. Essential changes in the training of specialized personnel are delineated, with particular emphasis on the implementation of automated testing and the advancement of digital competencies. The increasing significance of international cooperation within the context of the transnational

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character of digital challenges is underscored. Digitization constitutes a novel technological paradigm in forensic expert practice, necessitating the revision of methodologies, implementation of innovative technologies, enhancement of experts' digital competencies, and standardization of procedures for handling digital evidence. The sustainable development of forensic expert practice is unattainable without international integration, modernization of education, and enhancement of scientific and methodological support.

Keywords: *forensic expert activity; digitization; digital traces; artificial intelligence; 3D technologies; digital evidence; methodological support; international cooperation; training of forensic experts; forensic experts' advanced training.*

Research Problem Formulation

The global societal digital transformation has led to transformative changes in all key activity sectors of legal entities and natural persons and necessitated the appropriate response from state institutions to emerging challenges within the digital domain. Such processes are also occurring in the realm of justice, where traditional approaches to the collection, research, and evaluation of evidence are being constantly updated. In this context, expert support to justice in Ukraine is being imbued with a new essence and relevance, which is implemented through the transformation of it into a high-tech tool that plays a pivotal role in establishing objective facts and circumstances in criminal, administrative, civil, and economic proceedings, as well as in the processes of applying specific expertise outside the judiciary.

Emergence of novel categories of criminal offenses, on the one hand, and advancement of artificial intelligence (hereinafter referred to as AI) alongside diverse contemporary technologies, on the other hand, necessitate the refinement of approaches to the structuring of forensic expert activities. The available

methodological support has proven to be inadequate for working with digital traces, complex information systems, thereby requiring the introduction of new competencies, tools and technologies.

Digital environment development significantly outpaces adaptation of expert methodologies, statutory regulation and technical capabilities of conducting expert research. This poses risks to both the effectiveness of proof and the security of the rights and freedoms of participants to the proceedings (case). Therefore, there is a clear necessity to single out current trends in the development of forensic expert activity, in the formation of strategic pathways for modernization, and in the adherence of these processes to international standards and best practices.

The issues of incorporating high technologies into forensic expert practice, developing experts' digital competences, fostering international cooperation and standardizing approaches to work with digital evidence are of paramount importance. It is these aspects that determine the relevance of research and lay the groundwork for a comprehensive scientific analysis of trends in the development of forensic expert activity amidst the digital transformation.

Analysis of Essential Researches and Publications

Both researchers and practitioners place an emphasis on the problems of expert support to justice. Recently, the number of scientific papers on the adaptation of

modern technologies in forensic expert activity has also increased. These issues were studied in research papers by P. Giverts et al.¹, Ye. Demydova et al.², O. Zadnichenko et al.³, D. Kishko⁴, A. Kovalenko⁵, K. Latysh⁶, Yu. Nizovtsev et al.⁷, O. Posashkov⁸, O. Samoilenko⁹, R. Stepaniuk et al.¹⁰,

- 1 Гіверц П., Коломійцев О. Машинне навчання і можливість його застосування для криміналістичних досліджень вогнепальної зброї. *Теорія та практика судової експертизи і криміналістики*. 2024. Вип. 2 (35). С. 28–43. DOI: 10.32353/khrife.2.2024.03 (date accessed: 12.11.2025).
- 2 Shepitko V., Shepitko M., Latysh K., Kapustin M., Demidova E. Artificial intelligence in crime counteraction: From legal regulation to implementation. *Social & Legal Studios*. 2024. Vol. 7. No. 1. Pp. 135–144. DOI: 10.32518/sals1.2024.135 (date accessed: 10.11.2025).
- 3 Задніченко О. М., Пашинська І. В. Штучний інтелект в судово-експертній діяльності. *Судова експертиза: перспективи розвитку та окремі вектори змін* : мат-ли V Всеукр. форуму суд. експерт. (Львів, 06.06.2025). Одеса, 2025. С. 183–186. URL: https://ondise.minjust.gov.ua/wp-content/uploads/2025/08/forum_ondise_law__2025.pdf (date accessed: 12.11.2025).
- 4 Кішко Д. Цифровізація судово-експертної діяльності в умовах війни як шлях забезпечення безперервної роботи експертних установ. *Досвід і проблеми судово-експертної діяльності в умовах воєнного стану в Україні* : мат-ли всеукр. наук.-практ. конф. (Львів — Київ — Одеса; 28.09.2023). Львів, 2023. С. 15. URL: <http://ndekc.lviv.ua/pdf/a05122023.pdf> (date accessed: 12.11.2025).
- 5 Коваленко А. В. Перспективи запровадження 3D-технологій у судово-експертну діяльність. *Криміналістика та судова експертиза у XXI столітті* : мат-ли всеукр. наук.-практ. семінару (Київ, 30.05.2024). Київ, 2024. С. 89–91. URL: <http://repository.ukd.edu.ua/bitstream/handle/123456789/1684/3D%20expert.pdf?sequence=1&isAllowed=y> (date accessed: 12.11.2025).
- 6 Латиш К. В. Вплив технологій штучного інтелекту на судово-експертну діяльність: можливості та загрози. *Судово-експертна діяльність: збереження наукового та кадрового потенціалу в умовах воєнного стану* : мат-ли IV Всеукр. форуму суд. експерт. (Львів, 07.06.2024). Одеса, 2024. С. 216. URL: <http://ndekc.lviv.ua/pdf/law.pdf> (date accessed: 12.11.2025).
- 7 Нізовцев Ю., Парфіло О., Плахотнік О. Установлення особи, підозрюваної у скоєнні кіберзлочину з використанням WiFi-технологій. *Теорія та практика судової експертизи і криміналістики*. 2023. Вип. 4 (33). С. 23–38. DOI: 10.32353/khrife.4.2023.03 (date accessed: 12.11.2025).
- 8 Посашков О. О. До питання впровадження штучного інтелекту в судові експертизи під час досудового розслідування кримінальних правопорушень. *Вісник Кримінологічної асоціації України*. 2025. Т. 34. № 1. С. 728–735. DOI: 10.32631/vca.2025.1.58 (date accessed: 12.11.2025).
- 9 Самойленко О. А. Основи методики розслідування злочинів, вчинених у кіберпросторі : монографія / за заг. ред. А. Ф. Волобуєва. Одеса, 2020. 372 с. DOI: 10.32837/11300.13264 (date accessed: 12.11.2025).
- 10 Степанюк Р. Л., Колесник В. Г. Судова комп'ютерно-технічна експертиза: стан і перспективи розвитку. *Вісник Луганського державного університету внутрішніх справ ім. Е. О. Дідоренка*. 2023. Вип. 2 (102). С. 294. DOI: 10.33766/2524-0323.102.289-305 (date accessed: 12.11.2025).

S. Chorny et al.¹¹, V. Shepitko et al.¹², M. Shepitko et al.¹³, M. Shcherbakovskyi¹⁴, and others. Concurrently, notwithstanding the increasing scholarly interest in the technological transformation of forensic expert activity, the majority of studies have addressed only some aspects of this topic. Research typically concentrates either on the analysis of innovations within particular types of forensic science or on the application of specific technical tools or innovations during investigations; however, a comprehensive understanding of the impact resulting from the integration of contemporary digital technologies into forensic practice remains elusive.

Article Purpose

Comprehensively study current trends in the development of forensic expert activities against the backdrop of global digital transformation, elucidate the impact of digital technologies on organisational, methodological and regulatory and legal foundations of the functioning of expert support to justice in Ukraine.

Research Methods

System analysis method was applied to identify general technological trends. Structural-functional method was em-

ployed to assess the impact of digitalization on the content and tasks of forensic expert activity.

Main Content Presentation

Use of modern information and communication technologies, digital devices and tools, cloud services and large-scale databases profoundly reshapes criminal activity and other types of unlawful behaviour. There are new ways of committing illegal actions and, accordingly, traces resulting from such activities appear. The nature of evidentiary information in criminal, civil, economic and administrative proceedings and outside proceedings also undergoes changes.

Recently, forensic experts are increasingly faced with the need to investigate digital objects and traces resulting from their use. Furthermore, active dissemination of digital technologies and AI leads to the emergence of new forms and modifications of information (*deepfake* technologies, automated text generation, audio and video materials). With the development of digitization across all areas of human life, forensic experts are faced with the problems of investigating continuous sequential chain of blocks containing information according to certain rules. Thus, the cryptocurrency market is developing

- 11 Чорний С., Брендель О., Гратіашвілі Д. Автентифікація зображень на основі їх семантичної сегментації у нейронних мережах глибокого навчання з їх попереднім обробленням за методами фільтрації. *Теорія та практика судової експертизи і криміналістики*. 2022. Вип. 1 (26). С. 128. DOI: [10.32353/khrife.1.2022.08](https://doi.org/10.32353/khrife.1.2022.08) (date accessed: 10.11.2025).
- 12 Шепітько В. Ю., Авдеева Г. К., Коновалова В. О. та ін. Інноваційні методи, засоби та технології в криміналістиці та судовій експертизі : наук.-практ. посіб. / за ред. В. Ю. Шепітька. Харків, 2023. 116 с. URL: <http://surl.li/zhtvre> (date accessed: 12.11.2025).
- 13 Шепітько М., Латиш К. Використання штучного інтелекту в судово-експертній діяльності. *Теорія та практика судової експертизи і криміналістики*. 2024. Вип. 3 (36). С. 24–36. DOI: [10.32353/khrife.3.2024.03](https://doi.org/10.32353/khrife.3.2024.03) (date accessed: 12.11.2025).
- 14 Щербаківський М. Відкриті джерела кіберпростору як об'єкти судово-експертного дослідження. *Там само*. Вип. 2 (35). С. 10–27. DOI: [10.32353/khrife.2.2024.02](https://doi.org/10.32353/khrife.2.2024.02) (date accessed: 12.11.2025).

at a rapid pace all over the world. Consequently, we come across concepts such as *blockchain transactions*, *blockchain sites*, *blockchain cryptocurrency*, *blockchain ledger*, *blockchain wallet*, etc. Under such circumstances, forensic examination faces qualitatively new problems associated with the need to perform identification, diagnostic and situational tasks based on the results of modern technology application. The challenges of the war started by the aggressor country became especially relevant for solving the problematic issues of forensic examination in the field of blockchain. To wage a war against Ukraine, the enemy uses all the advantages that blockchain provides in cyberspace: decentralization and anonymity, speed and convenience. This applies, for example, to the creation of “cold wallets” for collecting money, to phishing sites, crypto pyramids, smart contracts and other fraudulent blockchain projects. To confront the enemy in cyberspace, forensic experts’ specific expertise is required.

Sources of evidentiary and indicative information are digital traces that can be created with the help of personal computers (PC) belonging to natural persons and legal entities, mobile devices, tablets, cameras and video cameras that are seized from participants in criminal proceedings, from servers and other information storage devices in organizations and institutions, from network services that set up voice and video calls between computers via the Internet (*ICQ*, *Skype*, *WhatsApp*, *Viber*, *Telegram*, etc.), from banking systems on corresponding digital media (*CD-disks*, *flash cards*, etc.), from video surveillance cameras of commercial and government institutions and other elec-

tronic computing devices¹⁵. Such traces contributed to the expansion of capabilities for establishing an evidentiary basis, to the transformation of approaches in the investigation of criminal offenses, to the execution of forensic expert activities, and to the adjudication of cases.

Since digital information is complex in nature, highly susceptible to alterations, may contain hidden data that are not available for immediate perception by a person who does not possess specific expertise, and can be easily modified or destroyed, it necessitates further research, specifically, with the use of specialized equipment and software. Therefore, the study of such objects has become an essential constituent of current forensic activities.

Examination of digital media is typical for various types of forensic examinations: computer forensics, electronic communications, video and audio recording, portrait, photographic, etc. However, with the development of information technology, profound shifts are occurring in the subject, object, tasks and methods of these expert examinations. Digital media today are not only physical objects containing files/records, but also complex information systems integrated into cloud platforms, virtual environments, hardware and software complexes. Traditional objects have been supplemented by log files and event logs, metadata, copies in cloud storage, messenger messages from encrypted channels, etc. In addition, even traditional forensic objects (e.g., photo, video, audio files) are being studied in evolving circumstances, as they can be easily altered with the help of modern digital processing tools, in particular AI. Synthesis and enhancement of speech, *deep-*

15 Колеснікова І. А. Цифрові сліди: поняття та їх значення при розслідуванні кримінальних правопорушень. *Юридичний електронний науковий журнал*. 2023. № 10. С. 472. DOI: 10.32782/2524-0374/2023-10/114 (date accessed: 12.11.2025).

fake and other manipulations with digital data complicate the performance of tasks addressed by forensic experts, requiring the development of new expert research methods as well as the acquisition of relevant competencies by a forensic expert.

As scientists and practitioners note, there is an acute shortage of scientific and methodological support during forensic examinations involving the study of electronic communications and digital data¹⁶. Particularly, it concerns problems related to the impossibility of creating specific methodologies for the authentication of digital video and audio recordings. This is due to their diversity and the lack of scientific publications on the characteristics of such video and audio recordings. Therefore, it is only possible to describe directions for detection of certain signs to solve the issue of digital records authentication¹⁷. Accordingly, the lack of methods (methodological guidelines) in the field of digital data examination requires targeted R&D, incorporation of international standards into forensic expert activity and novel approaches into expert practice, taking into account relevant real-world needs.

Scientific literature has consistently highlighted the substantial influence of technology on the advancement of forensic examination, both directly and indirectly, as numerous technological innovations originally developed for other fields subsequently emerged as essential instruments in forensic applications¹⁸. Thus, laser 3D scanning, originally developed for industrial applications, architecture, engineering, and medicine, is currently extensively employed to document and reconstruct crime scenes and other forensic investigation subjects. This is not only about the technical ability to visualize the trajectory of a bullet, the position of bodies and other objects in space, but also about the ability to provide a more convincing and understandable reconstruction of the scene for a court. This is critical when testimony is contradictory or fragmentary¹⁹.

Modern technologies are increasingly integrated into forensic expert activities. Specifically, the use of artificial intelligence by forensic experts from the Kyiv Research Institute of Forensic Expertise (hereinafter referred to as the *KRIFE*) during the conduct of forensic portrait

- 16 Іванович А., Сімакова-Єфремян Е., Півньов Є. Наукова діяльність у галузі судової експертизи — основа методології судово-експертних досліджень в умовах воєнного стану. *Теорія та практика судової експертизи і криміналістики*. 2023. Вип. 3 (32). С. 25. DOI: [10.32353/khrife.3.2023.02](https://doi.org/10.32353/khrife.3.2023.02) (date accessed: 10.11.2025); Галушневська К. О. Комп'ютерно-технічна експертиза: перспективи розвитку у сфері кіберзлочинів. *Актуальні проблеми кримінально-правового, кримінального процесуального та криміналістичного забезпечення протидії злочинності в сучасних умовах*: мат-ли Міжнар. наук.-практ. конф. (Дніпро, 20.12.2024). Дніпро, 2024. С. 64. URL: <https://surl.li/ievziq> (date accessed: 12.11.2025).
- 17 Брендель О. Дослідження автентичності цифрових відео- та звукозаписів. *Використання цифрових технологій у криміналістиці та судовій експертизі*: зб. мат-лів міжнар. наук.-практ. «кругл. столу» (Харків, 11.12.2023). Харків, 2024. С. 57–58. URL: <https://surl.li/rrlwve> (date accessed: 12.11.2025).
- 18 Arora A. Future of Forensic and Crime Scene Science Technologies. Chapter 18 / *Technology in Forensic Science: Sampling, Analysis, Data and Regulations*; Ed. D. Rawtani, Ch. M. Husain. Wiley : Hoboken, NJ, USA, 2020. Pp. 357–370. DOI: [10.1002/9783527827688.ch18](https://doi.org/10.1002/9783527827688.ch18) (date accessed: 12.11.2025).
- 19 Гусак А. П. Ефективність використання 3D-моделювання в балістиці для відновлення подій при використанні вогнепальної зброї. *Українська поліцейстика: теорія, законодавство, практика*. 2025. № 2 (14). С. 29. DOI: [10.32782/2709-9261-2025-2-14-6](https://doi.org/10.32782/2709-9261-2025-2-14-6) (date accessed: 08.11.2025).

examinations in the investigation of the shooting of a Ukrainian serviceman by Russian military personnel is widely recognised. As a result of this investigation, the identity of Oleksandr Matsievskiy, the deceased Hero of Ukraine, was confirmed. This represents one of the earliest instances of employing artificial intelligence to perform expert research in Ukraine. Forensic experts were faced with the task of identifying the dead Ukrainian soldier based on the images in the video and the photographs provided for comparison. KRIFE specialists obtained a video that was uploaded to the network on 6 March 2023. Experts compared this video with photographs of individuals supplied to investigators, who, according to law enforcement authorities, might have been recorded on the video. Among the challenges that forensic experts were required to address was the low quality of the examined video material and the inadequate (blurry) quality of the photographs provided for comparison, which received particular attention from the experts. Based on the research findings, KRIFE experts identified the Ukrainian serviceman in the video as Oleksandr Matsievskiy, a sniper of the 163rd Battalion of the 119th Territorial Defense Brigade (Chernihiv region). The use of AI in conjunction with other research methods has demonstrated how effective modern technologies are for personal identification²⁰. This case went beyond being just an important precedent in the practice of forensic examinations; it also served as a striking example of how con-

temporary technologies are transforming forensic expert activity, thereby creating new opportunities.

Incorporating AI into forensic expert activity is a promising avenue for enhancing the efficiency, accuracy and objectivity of expert research. At the same time, the introduction of such technologies poses significant obstacles—from technical to ethical and legal—that require comprehensive analysis and statutory regulation, professional training and interdisciplinary cooperation. Compilation of clear standards, creation of transparent accountability mechanisms, and implementation of systemic monitoring are necessary conditions for the safe and effective AI use in forensic expert activity, which will ultimately contribute to strengthening justice and trust in the judiciary²¹.

The practice of implementing AI prevails in other countries as well. In forensic examination, AI is predominately deployed to analyse large volumes of data, classify them into certain categories, create databases, and identify objects. As documented in the scholarly literature, various AI models are combined with phototechnical, microscopic methods and spectroscopy during the study of blood samples, fingerprints, petrol samples, soil and micro-objects. Additionally, in all cases, AI is used in tandem with traditional expert methods²². This is because the expert's opinion must be comprehensive, objective, well substantiated, and reliable: qualities that cannot be guaranteed solely through the application of AI algorithms

20 Shepitko V., Shepitko M., Latysh K., Kapustin M., & Demidova E. Op. cit. P. 141. DOI: 10.32518/sals1.2024.135 (date accessed: 10.11.2025).

21 Задніченко О. М., Пашинська І. В. Зазнач. твір. С. 185–186. URL: https://ondise.minjust.gov.ua/wp-content/uploads/2025/08/forum_ondise_law__2025.pdf (date accessed: 12.11.2025).

22 Javadova A. N. Using Artificial Intelligence in the Forensic Science for the Analysis of Micro-particles: A Systematic Review. *Futurity: Economics & Law*. 2024. Vol. 4. No. 2. Pp. 229–246. DOI: 10.57125/FEL.2024.06.25.13 (date accessed: 10.11.2025).

without human oversight. Moreover, notwithstanding the benefits of AI, its implementation is accompanied by challenges related to the opacity of intricate internal mechanisms. The lack of transparency further exacerbates the cybersecurity issue, as delegating critical decision-making to a system incapable of explaining its own logic is an obvious danger²³. Accordingly, it can be concluded that the use of AI in forensic expert activities is gradually shaping a new technological paradigm, while its further implementation is impossible without the development of standards that will ensure the reliability, reproducibility and admissibility of evidence sources in procedural activities.

From the perspective of A. Kovalenko, one of the areas of scientific and technological progress that may substantially enhance the forensic toolkit in the near future is 3D technology, which can be defined as a set of scientific and technical means for creating, editing, and using 3D models of certain objects. The first area of Ukrainian forensic activity where these technologies are deployed quite extensively and successfully is ballistic accounting (through the use of *BalScan* ballistic identification hardware and software systems). At the same time, positive outcomes from the deployment of these systems provide a basis for forecasting how these technologies will function in forensic trace evidence analyses. Direct objects of such research may be scanned digital 3D models of volumetric traces and probable trace-forming objects. *“Moreover, the use*

*of 3D technologies in forensic portrait examinations appears promising. Within the context of such an expert examination, a forensic specialist is capable of independently scaling a three-dimensional model of an individual’s face to the specified dimensions, orienting it to the appropriate angle, measuring the dimensional attributes of distinct features, performing comparative analyses, and effectively presenting findings based on the expert examination outcomes. Additional research is also needed into the possibility of using 3D technologies in forensic, engineering, military, and other types of expert examinations”*²⁴. That is, it can be argued that introduction of 3D technologies organically aligns with the global shift towards the digitalization of forensic expert activities.

A significant avenue for the advancement of forensic expert activity is the proactive fostering of international cooperation. In the present-day context, this holds strategic significance, as it facilitates not only the integration of advanced technologies and innovations and the implementation of leading international practices, but also the harmonization of approaches to the examination of digital evidence and the deployment of artificial intelligence, alongside the standardization of methodological frameworks.

Arts. 22–24 of the Law of Ukraine: *On Judicial Examination* stipulate various types of international cooperation: 1) conduct of a forensic examination on behalf of the relevant body or person of another state; 2) involvement of specialists from other states for joint forensic examina-

23 Посашков О. О. Знач. твір. С. 729. DOI: [10.32631/vca.2025.1.58](https://doi.org/10.32631/vca.2025.1.58) (date accessed: 12.11.2025); Capuano N., Fenza G., Loia V., Stanzione C. Explainable Artificial Intelligence in CyberSecurity: A Survey. *IEEE Access*. 2016. Vol. 4. No. 10. 26 p. DOI: [10.1109/ACCESS.2022.3204171](https://doi.org/10.1109/ACCESS.2022.3204171) (date accessed: 12.11.2025).

24 Коваленко А. В. Знач. твір. С. 91. URL: <http://repository.ukd.edu.ua/bitstream/handle/123456789/1684/3D%20expert.pdf?sequence=1&isAllowed=y> (date accessed: 12.11.2025).

tions; 3) international scientific cooperation²⁵. Thus, “*State specialized institutions performing forensic examinations enjoy the right to forge international academic partnerships with institutions of forensic examinations, criminalistics, etc., of other states, to hold joint scientific conferences, symposia, seminars, to exchange trainees, scientific information and printed editions, and to collaborate on joint publications in the field of forensic examination and criminalistics*”²⁶. For Ukraine, which is actively deepening its integration into the European Research Area, international cooperation is gaining significance in the context of forensic science development. Furthermore, given the cross-border nature of digital challenges, international cooperation is not only desirable, but critically necessary, as it enables the pooling of best practices and directing them towards solving global challenges.

Currently, the development of international cooperation in the field of forensic examination is inextricably linked to comprehensive globalization of human activities, rapid development of science and technology, means of communication, fostering of international scientific ties, creation of novel technologies and AI, constant and rapid migration of populations across various countries and regions, as well as to intensification of transnational organized crime and international terrorism resulting from these processes²⁷.

Researchers and practitioners recognize the critical significance of international cooperation in forensic expert activity. Thus, V. Shepitko surveyed forensic experts and identified the most promising areas of international cooperation in this area: ensuring software and hardware sustainability; conducting joint scientific research and panel forensic examinations with the participation of foreign experts; organizing collaborative scientific events on the problems of forensic examination; inviting foreign experts to conduct forensic examinations for the purpose of enhancing forensic analysis quality; preparing joint scientific editions²⁸. S. Yevdokimenko observes that the advancement of forensic expert activity in Ukraine is contingent upon the widespread involvement of forensic expert institutions in international organizations within the domain of forensic expert activity, as well as upon the access of Ukrainian experts to international standards and their capacity to implement them in practice. Members of international forensic organizations such as *ENFSI* benefit from streamlined access to these standards²⁹. P. Kipouras and I. Ovsianynkova are also convinced that it is impossible to ensure justice with high-quality expert examination without integration with the international community. Therefore, it is necessary to adopt the best foreign practices and use them to

25 Про судову експертизу : Закон України від 25.02.1994 р. № 4038-XII (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/4038-12#Text> (date accessed: 12.11.2025).

26 Там само.

27 Баулін О. В. Генеза і сучасний стан нормативно-правового регулювання міжнародного співробітництва України у галузі судової експертизи. *Криміналістика і судова експертиза*. 2023. Вип. 68. С. 30. DOI: [10.33994/kndise.2023.68.02](https://doi.org/10.33994/kndise.2023.68.02) (date accessed: 12.11.2025).

28 Шепітько В. Судова експертиза та судово-експертна діяльність: погляд крізь призму думок експертів. *Теорія та практика судової експертизи і криміналістики*. 2023. Вип. 1 (30). С. 20. DOI: [10.32353/khrife.1.2023.02](https://doi.org/10.32353/khrife.1.2023.02) (date accessed: 2.11.2025).

29 Євдокіменко С. В. Напрями міжнародного співробітництва у галузі судово-експертної діяльності. *Європейські перспективи*. 2024. № 1. С. 147. DOI: [10.32782/ep.2024.1.20](https://doi.org/10.32782/ep.2024.1.20) (date accessed: 12.11.2025).

boost the efficiency of forensic expert activity in our country³⁰.

The aforementioned positions align closely with contemporary trends in the advancement of forensic expert activities, as, amid rapid digitalization and the emergence of novel forms of criminality, an individual state cannot effectively address all challenges independently. The comprehensive advancement of forensic expert activities is unattainable without cooperation with international organizations and foreign expert institutions. Such collaboration is of paramount importance in the field of innovative technologies, where developments are unfolding at an accelerated rate. Therefore, international cooperation constitutes not only a mechanism for the exchange of expertise but also a prerequisite for sustainable, professional, and innovative development.

The conditions of digital transformation are re-shaping the requirements for forensic experts' professional competencies. This is why improving the advanced training and professional development of expert staff is an essential component for subsequent development of forensic expert activities. Forensic experts must both be well versed in novel research methods and be ready to adapt to emerging challenges. This requires, in particular, the development of the following basic competencies: understanding the principles of cybersecurity, digital ethics, and working

with large data sets; enhancing the capacity to critically evaluate obtained findings with the use of AI; increasing awareness of technical limitations and risks associated with the use of such tools.

According to V. Khrystyian, high-quality training of staff is one of crucial issues today, since the quality of their work, and therefore the quality of expert research, depends on the qualifications, professional level and competence, as well as on personal and moral-ethical qualities of forensic experts (objectivity, impartiality, strong analytical capabilities, attentiveness, perseverance). Among the primary measures to enhance the qualifications of expert practitioners, the author identifies systematic completion of internships and engagement of experts in research activities, additionally emphasizing the efficacy of conducting scientific and theoretical seminars and their significance in addressing contemporary issues in expert theory and practice. Based on his findings, the exchange of experience with international experts through participation in scientific events abroad, alongside ongoing self-directed learning to enhance the professional competencies of experts, constitutes an important factor³¹.

In 2025, the rules for training expert staff underwent significant revision: a new procedure for certifying forensic experts has been approved by the Central Expert Qualification Commission under the Ministry of Justice of Ukraine³². As set out in

30 Кіпоурас П., Овсянникова І. Судово-експертна діяльність в умовах глобалізації. *Теорія та практика судової експертизи і криміналістики*. 2021. Вип. 3 (25). С. 169–184. DOI: [10.32353/khrife.3.2021.12](https://doi.org/10.32353/khrife.3.2021.12) (date accessed: 10.11.2025).

31 Християн В. До питання підготовки судових експертів для роботи в підрозділах експертної служби МВС. *Теорія та практика судово-експертної діяльності* : мат-ли VIII Міжвідом. наук.-практ. конф. (Київ, 27.11.2019). Київ, 2019. С. 433–435. URI: <https://elar.navs.edu.ua/jspui/handle/123456789/15434> (date accessed: 12.11.2025).

32 Порядок проведення Центральною експертно-кваліфікаційною комісією при Міністерстві юстиції України атестації судових експертів : затв. наказ. Мініюсту України від 06.05.2025 р. № 1224/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/z0694-25#Text> (date accessed: 12.11.2025).

cl. 1 of Ch. 1 of Sec. II: *Attestation for the purpose of assigning the qualification of a forensic expert in the relevant expert specialty* of this document, “*Training of persons who aim to obtain a qualification as a forensic expert in the relevant expert specialty (hereinafter referred to as specialists) involves two stages:*

theoretical training;
internship.

Theoretical training of experts is conducted in accordance with the training program addressing theoretical, organizational, and procedural aspects of forensic examination by institutions that comply with the requirements set forth in paragraph 2 of this Chapter and are included in the list of institutions authorized to provide theoretical training for forensic experts pursuant to this Procedure <...>.

Internship of experts is carried out in conformity with internship programs in the relevant expert specialty”³³.

Simultaneously, it is stipulated that certification for the purpose of conferring the qualification of a forensic expert in the relevant specialty is conducted through a qualification examination utilizing an electronic system for automated testing. Automated testing encompasses three stages and is administered concurrently to all specialists participating in the qualifying examination; this process comprises the following:

- 1) test tasks for testing knowledge on theoretical, organizational and procedural issues of forensic examination;
- 2) test tasks for testing knowledge on issues within expert specialties;

- 3) a situational task (clauses 1, 9, 14, 18–20, Chap. 2: *Conferring the qualification of a forensic expert in the relevant expert specialty, Sec. II*)³⁴.

This approach enhances the transparency and objectivity of the procedure for conferring the qualification of a forensic expert, and also helps align the Ukrainian expert training model with international standards.

An important amendment to the legislation is the indefinite validity of the forensic expert qualification certificate (cl. 28, Chap. 2, Sec. II) and mandatory advanced training (cl. 1, Chap. 1, Sec. III: *Attestation for confirmation of forensic expert qualification in the relevant expert specialty*)³⁵. Thus, within three years from the date of the decision adopted by the Qualification Chamber of the Central Expert Qualification Commission to confer the qualification of a forensic expert in the relevant expert specialty, the expert must earn at least 2 ECTS credits (para. 1, cl. 3, Chap. 1, Sec. III)³⁶. The types of advanced training include: completion of training under the advanced training program; participation in conferences, seminars, workshops, trainings, webinars, master classes, etc., on issues of forensic expert activity; in scientific-pedagogical, other teaching, scientific and scientific-technical activities in the field of forensic examination³⁷. Introduction of a new procedure for certifying forensic experts presupposes a systematic update of approaches to training expert staff in Ukraine. However, the quality of such training is of paramount importance: the depth of presented content and the

33 Порядок проведення URL: <https://zakon.rada.gov.ua/laws/show/z0694-25#Text> (date accessed: 12.11.2025).

34 Там само.

35 Там само.

36 Там само.

37 Там само.

flexibility of acquired skills, the relevance of provided information and the need to consider challenges, etc. This necessitates a rethinking of educational standards and the sustainable and continuous professional development of forensic experts.

Updating teaching methods is also an urgent issue. Specifically, the use of modern technologies yields significant results not only during the conduct of forensic examinations, but also during training and advanced training of forensic experts. Among the most promising are forensic simulation platforms. They facilitate the reproduction of complex expert situations and the practice of running action algorithms without the risk of losing or damaging real objects (pieces of evidence).

For instance, VR is an environment created using computer technology that completely simulates reality and provides a high-fidelity reconstructed environment for learners. Specialised devices (VR headsets, glasses, controllers, etc.) are used to create a full sensory immersion that simulates clinical scenarios. In this context, augmented reality (AR) is essential, providing the overlay of digital information (3D models, images, videos) onto the physical world³⁸. Such technologies are currently deployed all over the world for the training of pilots, healthcare workers, for the study of foreign languages: they have proven themselves as an efficient tool for cultivating professional competences. As S. Ostapov notes, VR technologies in the training of forensic fire technicians (fire investigators) are a modern global trend and promising for Ukraine, as they allow

solving a number of problems related to the quality of training, availability of resources and adaptation to novel international standards. However, certain factors complicate their adoption in Ukrainian realities. *Firstly*, high cost of technology due to limited funding for state institutions and educational institutions. *Secondly*, a lack of proficiency among teachers and lack of specialists who will develop scenarios and adapt them to the real needs of forensic experts. *Thirdly*, inadequate standards for VR deployment in education, which complicates the process of integrating such technologies into educational programs. *Fourthly*, infrastructural challenges, since some educational institutions lack even the basic technical infrastructure for VR deployment: high-speed Internet or modern computers³⁹.

Under present circumstances, the issue of introducing VR technologies in the training of forensic experts is becoming particularly relevant. The increasing complexity of forensic examinations, the appearance of new types of traces, the need for prompt response to atypical situations in conditions of martial law and post-war reconstruction, necessitate in-depth practical skills from a forensic expert, which cannot be developed exclusively by traditional teaching methods. Furthermore, the significance is rooted in the fact that such technologies ensure effective acquisition of knowledge, repeated scenario simulation, formation of action algorithms and development of professional thinking, which is crucial in a field where the accuracy of decisions (in particular,

38 Лавринович О. А. Імерсивні технології у професійній підготовці фахівців. *Collection of Scientific Papers «ΛΟΓΟΣ»*. 2025. 4 Avr. P. 300. DOI: [10.36074/logos-04.04.2025.057](https://doi.org/10.36074/logos-04.04.2025.057) (date accessed: 10.11.2025).

39 Остапов С. Потенціал технологій віртуальної реальності у навчанні судових експертів-пожежотехніків в Україні. *Криміналістика і судова експертиза*. 2025. Вип. 70. С. 634. DOI: [10.33994/kndise.2025.70.48](https://doi.org/10.33994/kndise.2025.70.48) (date accessed: 12.11.2025).

those of a forensic expert) determines the establishment of important circumstances in a case or proceedings.

Conclusions

To conclude, global digital transformation of society has given rise to significant changes in the content, forms and methods of forensic expert activity. The emergence of digital traces, the development of AI, the spread of large data sets, cloud technologies, new means of communication and information manipulation tools have formed a new technological environment in which traditional approaches to conducting expert examinations no longer provide the appropriate level of credibility and efficiency. Under such circumstances, forensic expert activity faces qualitatively new tasks requiring the adaptation of methods, modernization of technical support, development of novel methodologies and introduction of innovative technologies.

Digital traces are now one of the principal sources of evidentiary information in criminal, civil, commercial and administrative proceedings. Investigating them necessitates specialised equipment, software, new methods and advanced digital proficiency on the part of forensic experts. At the same time, the development of AI has introduced a new set of possibilities alongside emerging difficulties: from automatic data analysis to the need to develop standards for verifying findings credibility, ensuring transparency of algorithms and human oversight.

In light of the findings, we can single out key trends in the development of forensic expert activity amid society digitalisation: 1) digitalisation of research objects (increase in the number of studies involving digital media, cloud services,

metadata and other digital traces of various origins); 2) incorporation of modern technologies into forensic expert activity (AI, 3D modelling, laser scanning); 3) establishment of more rigorous competence requirements for a forensic expert (understanding of the principles of cybersecurity, digital technologies, mastery of methods for analysing large data sets); 4) enhancement of the depth and quality of training for forensic experts, particularly by introducing new methods (VR/AR technologies, simulation platforms, interactive learning environment); 5) pressing need to update the methodological support for forensic examinations; 6) growing role and significance of international cooperation.

Тенденції розвитку судово-експертної діяльності в умовах глобальної цифрової трансформації суспільства

Наталія Ткаченко

Стрімка цифровізація суспільства змінила характер злочинності, джерел доказової інформації та умови діяльності судових експертів. Сьогодні традиційних підходів до фіксації, дослідження й оцінки даних уже недостатньо для роботи з цифровими слідами, великими масивами інформації і їх новітніми формами та модифікаціями. Це зумовлює потребу у визначенні сучасних тенденцій розвитку судово-експертної діяльності й оновленні її нормативних, організаційних і методичних засад. Метою праці є комплексне дослідження тенденцій розвитку судово-експертної діяльності в умовах глобальної цифровізації та з'ясування впливу сучасних цифрових технологій на організаційні, процесуальні й методологічні основи експертного забезпечення правосуддя. Застосовано метод системного аналізу для виявлення загальних технологічних тенденцій; структурно-

функціональний метод для визначення впливу цифровізації на зміст і завдання судово-експертної діяльності. Доведено, що цифрові сліди стають пріоритетним об'єктом експертних досліджень, а штучний інтелект, 3D-технології та симуляційні платформи значно розширюють можливості експертної практики. Виявлено дефіцит методичного забезпечення, зумовлений складністю цифрових даних і появою їх нових форм та модифікацій. Окреслено необхідні зміни в підготовці експертних кадрів, зокрема впровадження автоматизованого тестування та розвиток цифрових компетентностей. Підкреслено зростання значення міжнародної співпраці в умовах транснаціонального характеру цифрових викликів. Цифровізація формує нову технологічну парадигму судово-експертної діяльності, що потребує оновлення методик, упровадження інноваційних технологій, розбудови цифрових компетентностей експертів і стандартизації підходів до роботи з цифровими доказами. Сталий розвиток експертної практики є неможливим без міжнародної інтеграції, модернізації навчання та зміцнення науково-методичного забезпечення.

Ключові слова: судово-експертна діяльність; цифровізація; цифрові сліди; штучний інтелект; 3D-технології; цифрові докази; методичне забезпечення; міжнародна співпраця; підготовка судових експертів; підвищення кваліфікації судових експертів.

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The author declares no conflict of interest.

References

- Arora, A. (2020). Future of Forensic and Crime Scene Science Technologies. Chapter 18 / *Technology in Forensic Science: Sampling, Analysis, Data and Regulations* ; Ed. D. Rawtani, Ch. M. Husain. Wiley : Hoboken, NJ, USA. DOI: [10.1002/9783527827688.ch18](https://doi.org/10.1002/9783527827688.ch18).
- Baulin, O. V. (2023). Heneza i suchasnyi stan normatyvno-pravovoho rehuliuвання mizhnarodnoho spivrobotnytstva Ukrainy u haluzi sudovoi ekspertyzy [Genesis and current state of legal regulation of international cooperation of Ukraine in the field of forensic science]. *Kryminalistyka i sudova ekspertyza*. Vyp. 68. DOI: [10.33994/kndise.2023.68.02](https://doi.org/10.33994/kndise.2023.68.02) [in Ukrainian].
- Brendel, O. (2023). Doslidzhennia avtentychnosti tsyfrovyykh video- ta zvukozapysiv [Investigating authenticity in digital video and sound recordings]. *Vykorystannya tsyfrovyykh tekhnolohii u kryminalistytsi ta sudovii ekspertyzi* : zb. mat-liv mizhnar. nauk.-prakt. «kruhl. stolu» (Kharkiv, 11.12.2023). Kharkiv. URL: <https://surl.lu/rrlwve> [in Ukrainian].
- Capuano, N., Fenza, G., Loia, V., Stanzone, C. (2016). Explainable Artificial Intelligence in CyberSecurity: A Survey. *IEEE Access*. Vol. 4. No. 10. DOI: [10.1109/ACCESS.2022.3204171](https://doi.org/10.1109/ACCESS.2022.3204171).
- Chorny, S., Brendel, O., Gratiashvili, D. (2022). Authenticate images based on their semantic segmentation in deep learning neural networks with their

- pre-processing with use of filtering methods. *Theory and Practice of Forensic Science and Criminalistics*. Is. 1 (26). DOI: [10.32353/khrife.1.2022.08](https://doi.org/10.32353/khrife.1.2022.08).
- Giverts, P., Kolomiitsev, O. (2024). Machine Learning and Possibility of its Application for Forensic Researches on Firearms. *Theory and Practice of Forensic Science and Criminalistics*. Is. 2 (35). DOI: [10.32353/khrife.2.2024.03](https://doi.org/10.32353/khrife.2.2024.03).
- Halushnevska, K. O. (2024). Komp'uterno-tekhnichna ekspertyza: perspektyvy rozvytku u sferi kiberzlochyniv [Computer forensics: development prospects in the field of cybercrimes]. *Aktualni problemy kryminalno-pravovoho, kryminalnoho protsesualnoho ta kryminalistychnoho zabezpechennia protydii zlochynnosti v suchasnykh umovakh* : mat-ly Mizhnar. nauk.-prakt. konf. (Dnipro, 20.12.2024). Dnipro. URL: <https://surl.li/ievziq> [in Ukrainian].
- Husak, A. P. (2025). Efektyvnist vykorystannia 3D-modeliuvannia v balistytsi dlia vidnovlennia podii pry vykorystanni vohnepalnoi zbroi [Effectiveness of using 3d modelling in ballistics for reconstruction of firearms events]. *Ukrainska polityka: teoriia, zakonodavstvo, praktyka*. № 2 (14). DOI: [10.32782/2709-9261-2025-2-14-6](https://doi.org/10.32782/2709-9261-2025-2-14-6) [in Ukrainian].
- Ivanović, A., Simakova-Yefremian, E., Pivnov, Ye. (2023). Scientific Activity in the Field of Forensic Science is the Methodology Basis Forensic Researches Under Martial Law. *Theory and Practice of Forensic Science and Criminalistics*. Is. 3 (32). DOI: [10.32353/khrife.3.2023.02](https://doi.org/10.32353/khrife.3.2023.02).
- Javadova, A. N. (2024). Using Artificial Intelligence in the Forensic Science for the Analysis of Microparticles: A Systematic Review. *Futurity: Economics & Law*. Vol. 4. No. 2. DOI: [10.57125/FEL.2024.06.25.13](https://doi.org/10.57125/FEL.2024.06.25.13).
- Khrystyian, V. (2019). Do pytannia pidhotovky sudovykh ekspertiv dlia roboty v pidrozdilakh ekspertnoi sluzhby MVS [On the training of forensic experts for service within the units of the expert division of the Ministry of Internal Affairs]. *Teoriia ta praktyka sudovo-ekspertnoi diialnosti* : mat-ly VIII Mizhvidom. nauk.-prakt. konf. (Kyiv, 27.11.2019). Kyiv. URI: <https://elar.navs.edu.ua/jspui/handle/123456789/15434> [in Ukrainian].
- Kipouras, P., Ovsianykyva, I. (2021). Forensic science activity in globalization context. *Theory and Practice of Forensic Science and Criminalistics*. Is. 3 (25). DOI: [10.32353/khrife.3.2021.12](https://doi.org/10.32353/khrife.3.2021.12).
- Kishko, D. (2023). Tsyfrovizatsiia sudovo-ekspertnoi diialnosti v umovakh viiny yak shliakh zabezpechennia bezpererвної roboty ekspertnykh ustanov [Digital forensic operations as a means of ensuring the operational continuity within forensic institutions in wartime]. *Dosvid i problemy sudovo-ekspertnoi diialnosti v umovakh voiennoho stanu v Ukraini* : mat-ly vseukr. nauk.-prakt. konf. (Lviv — Kyiv — Odesa, 28.09.2023). Lviv. URL: <http://ndekc.lviv.ua/pdf/a05122023.pdf> [in Ukrainian].
- Kolesnikova, I. A. (2023). Tsyfrovii slidy: poniattia ta yikh znachennia pry rozsliduvanni kryminalnykh pravoporushen [Digital traces: concepts and their meaning in the investigation of criminal offenses]. *Yurydychnyi elektronnyi naukovyi zhurnal*. № 10. DOI: [10.32782/2524-0374/2023-10/114](https://doi.org/10.32782/2524-0374/2023-10/114) [in Ukrainian].
- Kovalenko, A. V. (2024). Perspektyvy zaprovadzhennia 3D-tekhnologii u sudovo-ekspertnu diialnist [Prospects for introducing 3D technologies in forensic activities]. *Kryminalistyka ta sudova ekspertyza u XXI stolitti* : mat-ly vseukr. nauk.-prakt. seminaru (Kyiv, 30.05.2024). Kyiv. URL: <http://repository.ukd.edu.ua/bitstream/handle/123456789/1684/3D%20expert.pdf?sequence=1&isAllowed=y> [in Ukrainian].
- Latysh, K. V. (2024). Vplyv tekhnologii shtuchnoho intelektu na sudovo-ekspertnu diialnist: mozhlyvosti ta zahrozy [Impact of artificial intelligence

- technologies on forensic activity: capabilities and threats]. *Sudovo-ekspertna diialnist: zberezhennia naukovoho ta kadrovoho potentsialu v umovakh voiennoho stanu* : mat-ly IV Vseukr. forumu sud. ekspert. (Lviv, 07.06.2024). Odesa. URL: <http://ndekc.lviv.ua/pdf/law.pdf> [in Ukrainian].
- Lavrynovych, O. A. (2025). Imersyvnii tekhnologii u profesiinii pidhotovtsi fakhivtsiv [Immersive technologies in the professional training of specialists]. *Collection of Scientific Papers «Λ'OHOMΣ»*. 4 Avr. DOI: [10.36074/logos-04.04.2025.057](https://doi.org/10.36074/logos-04.04.2025.057) [in Ukrainian].
- Nizovtsev, Yu., Parfyo, O., Plakhotnik, O. (2023). Identification of Person Suspected of Committing a Cybercrime Using Wi-Fi Technologies. *Theory and Practice of Forensic Science and Criminalistics*. Is. 4 (33). DOI: [10.32353/khrife.4.2023.03](https://doi.org/10.32353/khrife.4.2023.03).
- Ostapov, S. (2025). Potentsial tekhnologii virtualnoi realnosti u navchanni sudovykh ekspertiv-pozhezhotekhniv v Ukraini [Potential of Virtual Reality Technologies in the Training of Forensic Fire Scientists in Ukraine]. *Kryminalistyka i sudova ekspertyza*. Vyp. 70. DOI: [10.33994/kn-dise.2025.70.48](https://doi.org/10.33994/kn-dise.2025.70.48) [in Ukrainian].
- Posashkov, O. O. (2025). Do pyttannia vprovadzhennia shtuchnoho intelektu v sudovi ekspertyzy pid chas dosudovoho rozsliduvannia kryminalnykh pravoporushen [On the issue of implementing artificial intelligence in forensic examination during pre-trial investigation of criminal offences]. *Visnyk Kryminolohichnoi asotsiatsii Ukrainy*. T. 34. № 1. DOI: [10.32631/vca.2025.1.58](https://doi.org/10.32631/vca.2025.1.58) [in Ukrainian].
- Samoilenko, O. A. (2020). *Osnovy metodyky rozsliduvannia zlochyniv, vchynenykh u kiberprostorii* [Foundations of cybercrime investigation methodology] : monohrafiia / za zah. red. A. F. Volobueva. Odesa. DOI: [10.32837/11300.13264](https://doi.org/10.32837/11300.13264) [in Ukrainian].
- Shcherbakovskiy, M. (2024). Open Sources of Cyberspace as Objects of Forensic Research. *Theory and Practice of Forensic Science and Criminalistics*. Is. 2 (35). DOI: [10.32353/khrife.2.2024.02](https://doi.org/10.32353/khrife.2.2024.02).
- Shepitko, M., Latysh, K. (2024). Use of artificial intelligence in forensic science. *Theory and Practice of Forensic Science and Criminalistics*. Is. 3 (36). DOI: [10.32353/khrife.3.2024.03](https://doi.org/10.32353/khrife.3.2024.03).
- Shepitko, V. (2023). Forensic Science and Forensic Expert Activity: a View Through the Prism of Forensic Experts' Opinions. *Theory and Practice of Forensic Science and Criminalistics*. Is. 1 (30). DOI: [10.32353/khrife.1.2023.02](https://doi.org/10.32353/khrife.1.2023.02).
- Shepitko, V. Yu., Avdieieva, H. K., Konovalova, V. O. ta in. (2023). *Innovatsiini metody, zasoby ta tekhnologii v kryminalistyki ta sudovii ekspertyzi* [Innovative methods, tools and technologies in criminalistics and forensic examination] : nauk.-prakt. posib. / za red. V. Yu. Shepitka. Kharkiv. URL: <http://surl.li/zhtvre> [in Ukrainian].
- Shepitko, V., Shepitko, M., Latysh, K., Kapustin, M., & Demidova, E. (2024). Artificial intelligence in crime counteraction: From legal regulation to implementation. *Social & Legal Studios*. Vol. 7. No. 1. DOI: [10.32518/sals1.2024.135](https://doi.org/10.32518/sals1.2024.135).
- Stepaniuk, R. L., Kolesnyk, V. H. (2023). Sudova komp'uterno-tekhnichna ekspertyza: stan i perspektyvy rozvytku [Forensic computer and technical expertise: state and prospects of development]. *Visnyk Luhanskoho derzhavnogo universytetu vnutrishnikh sprav im. E. O. Didorenka*. Vyp. 2 (102). DOI: [10.33766/2524-0323.102.289-305](https://doi.org/10.33766/2524-0323.102.289-305) [in Ukrainian].
- Yevdokimenko, S. V. (2024). Napriamy miznarodnoho spivrobotnytstva u haluzi sudovo-ekspertnoi diialnosti [Areas of international cooperation in the field of forensic expert activities]. *Yevropeiski perspektyvy*. № 1. DOI: [10.32782/ep.2024.1.20](https://doi.org/10.32782/ep.2024.1.20) [in Ukrainian].
- Zadnichenko, O. M., Pashynska, I. V. (2025). Shtuchnyi intelekt v sudovo-ekspertnii diialnosti [Artificial intelligence in forensic expert activity]. *Sudova ekspertyza: per-*

spektyvy rozvytku ta okremi vektory zmin :
mat-ly V Vseukr. forumu sud. ekspert.
(Lviv, 06.06.2025). Odesa. URL: <https://>

[ondise.minjust.gov.ua/wp-content/up-
loads/2025/08/forum_ondise_law__2025.
pdf](https://ondise.minjust.gov.ua/wp-content/uploads/2025/08/forum_ondise_law__2025.pdf) [in Ukrainian].

Tkachenko, N. (2025). Recent Advancements in Forensic Expert Activity in the Context of Global Societal Digital Transformation. *Theory and Practice of Forensic Science and Criminalistics*. Issue 4 (41). Pp. 35–51. DOI: 10.32353/khrife.4.2025.03.