Challenges of Forensic Evidence in Cross-Border Proceedings: Standardisation and Reliability in International Cybercrime Cases

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Forensic evidence plays an essential role in cross-border proceedings, particularly in the context of international cybercrime, where its reliability and mutual recognition become increasingly important. However, differences in legal frameworks, forensic methodologies, and quality standards create challenges for the consistent evaluation and use of such evidence across jurisdictions. The aim of this article is to examine the key challenges related to the standardisation and reliability of forensic evidence in cross-border proceedings, with particular attention to international cybercrime. The study is based on the analysis of legal frameworks and legal doctrine, applying an analytical and systematic research approach.

Keywords: *forensic evidence; expert evidence; cross-border proceedings; standardisation; reliability of evidence; cybercrime.*

Проблемні аспекти користування судовими доказами в транскордонних провадженнях: стандартизація та надійність у міжнародних справах про кіберзлочини

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Судові докази відіграють важливу роль у транскордонних провадженнях, особливо в контексті міжнародної кіберзлочинності, де їхні надійність і взаємне визнання набувають особливого значення. Однак відмінності в правових системах, методологіях судової експертизи та стандартах якості становлять перешкоду для послідовного оцінювання подібних доказів і користування ними в різних юрисдикціях. Мета цієї статті — розглянути основні проблеми, пов'язані зі стандартизацією та надійністю судових доказів у транскордонних провадженнях, з особливим акцентом на міжнародній кіберзлочинності. Дослідження ґрунтується на аналізі нормативно-правового поля та правової доктрини із застосуванням аналітичного й систематичного підходів до дослідження.

Ключові слова: *криміналістичні докази; експертні докази; транскордонні судові процеси; стандартизація; надійність доказів; кіберзлочинність.*

Introduction

Forensic expertise is an essential instrument for the collection and evaluation of evidence in modern legal systems, the importance of which is particularly increasing in the context of cross-border cooperation and digital crime [1; 2]. Expert opinions are increasingly used in cases involving an international element, raising issues related to their mutual recognition and reliability [3].

The regulation of forensic expertise in cross-border proceedings is multi-layered, combining national legal frameworks and the influence of European Union law; however, this system is not fully harmonised [4; 5]. Differences in approaches to conducting forensic examinations, methodologies, and quality assurance create challenges for the consistent evaluation of evidence.

The aim of this article is to examine the key challenges related to the standardisation and reliability of forensic evidence in cross-border proceedings, with particular attention to digital crime. The study is based on the analysis of legal frameworks and legal doctrine, applying an analytical and systematic research approach [2; 6].

I The Multi-layered Regulation of Forensic Expertise in Cross-Border Proceedings

The regulation of forensic expertise in cross-border proceedings is multi-layered, combining national legal frameworks and the influence of European Union law. At the national level, the status of experts, qualification requirements, and the role of forensic expertise in the process of proof are determined, whereas at the EU level regulation is primarily manifested through the

principle of mutual recognition and mechanisms of judicial cooperation [1; 2].

However, this multi-layered system is not fully harmonised. As noted by J. D. Jackson and S. J. Summers, the use of cross-border evidence is based on an assumption of mutual trust, which in practice is not always sufficiently justified due to differing regulatory approaches [3]. Consequently, the regulation of forensic expertise operates in a fragmented manner, creating the preconditions for the challenges identified below.

II Challenges of Standardisation and Their Impact on Evidence Reliability

The most significant issue in cross-border proceedings concerns the challenges of standardisation in relation to the conduct of forensic expertise and quality assurance. Although technical standards such as ISO/IEC 17025 are used in international practice, their application is not uniform and does not cover all types of forensic examinations [4].

Scientific literature emphasises that the reliability of expert evidence is directly dependent on the scientific validity and reproducibility of the methodology applied [2]. Divergent methodologies may lead to situations in which the conclusions of an expert are questioned in another jurisdiction, thereby affecting the admissibility and evaluation of evidence.

Furthermore, inconsistent requirements regarding expert qualifications and professional oversight further complicate the application of uniform quality criteria. As noted by E. D. Shelton, insufficient control over expert competence may result in erroneous conclusions, which directly affect the quality of judicial decisions [5].

Thus, the challenges of standardisation not only hinder cross-border cooperation but also affect the reliability of forensic expertise as a form of evidence.

III Challenges Posed by Digital Crime for Forensic Evidence in Cross-Border Proceedings

The development of digital crime significantly intensifies the aforementioned challenges. The collection, preservation, and analysis of digital evidence require specific and standardised procedures; however, these procedures differ considerably across jurisdictions [6]. Recent studies emphasise that the development of digital forensics requires a flexible regulatory framework capable of adapting to the challenges posed by artificial intelligence and the increasing volume of data, while ensuring the verifiability of digital evidence and the fairness of proceedings [7].

As noted by E. Casey, even minor differences in methods of digital data acquisition may affect the authenticity and integrity of evidence [6]. This creates risks not only for the admissibility of evidence but also for mutual trust between law enforcement authorities. In the digital environment, these challenges become particularly significant, as evidence is often collected in one jurisdiction and used in another. Therefore, the standardisation of procedures in this field becomes a crucial prerequisite for effective international cooperation and the guarantee of a fair trial.

Conclusion

The regulation of forensic expertise in cross-border proceedings is characterised by fragmentation, resulting from differing national approaches to expert qualifications, methodologies, and quality assurance, as well as from incomplete harmonisation at the level of European Union law. This fragmentation affects the reliability of expert opinions and creates difficulties in their mutual recognition, as the methods and standards applied across jurisdictions are not uniformly comparable.

These challenges are particularly pronounced in the context of digital crime, where the collection and analysis of evidence rely on technologically specific procedures, the application of which varies significantly between countries. Consequently, the effective use of forensic expertise in cross-border proceedings is closely linked to the need for a more unified approach to quality criteria and methodology, which would enhance the reliability of evidence and facilitate its use in international judicial cooperation.

References

1. Tiesu ekspertu likums. Latvijas Vēstnesis, 2016. Nr. 41. URL: https://likumi.lv/ta/en/en/id/280576 (date accessed: 12.04.2026).
2. Faigman D. L., Kaye D. H., Saks M. J., Sanders J. Modern Scientific Evidence: The Law and Sci-

ence of Expert Testimony. St. Paul : West Academic Publishing, 2019.
3. Jackson J. D., Summers S. J. The Internationalisation of Criminal Evidence: Beyond the Common Law and Civil Law Traditions. Cambridge University Press, 2012.
4. ISO/IEC 17025:2017. General requirements for the competence of testing and calibration laboratories. Geneva: International Organization for Standardization, 2017.
5. Shelton E. D. Forensic Science Evidence and Miscarriages of Justice / *Advances in Forensic Human Identification*. Boca Raton : CRC Press, 2014. P. 409–426.
6. Casey E. Digital Evidence and Computer Crime: Forensic Science, Computers and the Internet. 3rd ed. Amsterdam : Academic Press, 2011.
7. Wickramasekara A., Breitinger F., Scanlon M. Exploring the Potential of Large Language Models for Improving Digital Forensic Investigation Efficiency. *Forensic Science International: Digital Investigation*. 2025. Vol. 52. Art. 301859. DOI: 10.1016/j.fsidi.2024.301859 (date accessed: 12.04.2026).