

Ministry of Justice of Ukraine

National Scientific Center
“Hon. Prof. M. S. Bokarius Forensic Science Institute”

Yaroslav Mudryi National Law University

DOI: 10.32353/khrife.1.2024

Theory and Practice **of Forensic Science and Criminalistics**

Research Paper Collection

Published Quarterly

Bilingual Edition

Founded in 2001

Issue 1 (34)

Kharkiv
NSC “Hon. Prof. M. S. Bokarius FSI”
2024

DOI: 10.32353/khrife.1.2024
UDC 343.98
T44

ISSN 1993-0917 (Print)
e-ISSN 2708-5171 (Online)

Included in the list of scientific editions of Ukraine where results of PhD and Doctoral dissertations can be published (Order No 886 of the Ministry of Education and Science of Ukraine dated on 02.07.2020).

Founders:

National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» of Ministry of Justice of Ukraine & Yaroslav Mudryi National Law University.

Recommended for publication by Academic Council of NSC «Hon. Prof. M. S. Bokarius FSI» (Minutes № 4 dated on 27.03.2024).

Theory and Practice of Forensic Science and Criminalistics :

T44 Research Paper Collection. — Kharkiv : NSC «Hon. Prof. M. S. Bokarius FSI», 2024. — Issue 1 (34). — 235, [1] p.

The thirty-fourth collection issue presents content on criminalistics, theory and methodology of forensic science, as well as information about scientific-practical conferences and educational projects and participation of the NSC staff in them.

Our authors are representatives of forensic science institutions, higher education institutions, law enforcement agencies from Ukraine and foreign countries.

The collection can be used by students and employees of higher education institutions, law enforcement agencies, legal experts, and researchers.

UDC 343.98

The editorial board uses double anonymized peer review.

Authors are responsible for the accuracy of the provided terms, facts, quotations, figures and surnames.

The authors declare that their opinions and views expressed in these articles are free of any impact of organizations where they work.

Distributed to scientific libraries and state forensic science institutes in Ukraine and internationally.

Full text electronic version is publicly available on the edition website at the following link:

<https://khrife-journal.org/index.php/journal>.



Research paper collection is indexed by Google Scholar, international online abstract and citation databases: *Academic Research Index (ResearchBib)*, *Bielefeld Academic Search Engine (BASE)*, *Central and Eastern European online library (CEEOL)*, *Directory of Open Access Journal (DOAJ)*, *Directory of Research Journals Indexing (DRJI)*, *ERIH PLUS*, *EuroPub*, *Index Copernicus International*, *MIAR*, *RefSeek*, *Ulrich's*, *WorldCat*, DOI® System. Full-text online versions of the collection are available on Internet on the platforms of the V. I. Vernadskyi National Library of Ukraine, libraries of forensic science institutions of Ministry of Justice of Ukraine, higher education institutions of Ministry of Internal Affairs of Ukraine, etc.

© National Scientific Center “Hon. Prof. M. S. Bokarius Forensic Science Institute”, 2024

© Yaroslav Mudryi National Law University, 2024

Contents

EDITOR-IN-CHIEF'S NOTE

Ella Simakova-Yefremian. Relevant Areas of Expert Research in Ukraine Under Martial Law	5
--	---

RESEARCH PAPERS

Nataliia Filipenko, Serhii Lukashevych, Olena Andrieieva, Aleksandar Ivanović. Application of Artificial Intelligence and Information and Communication Technologies: Socio-Ethical Problems (Review Article)	12
Serhii Tiulieniev. Prospects for Development of Forensic Methods for Investigation of Criminal Offenses Related to Raiding	42
Hendryk Malewski, Laimutis Kraujalis. Psychophysiological Research and its Place in the Lithuanian Scientific Discourse	58
Serghii Perepelytsia. Separate Aspects of Evidentiary Basis Formation during the Investigation of Facts Related to Collaborationism	76
Iryna Kuchynska. Analysis of Cannabis and its Products in the Context Forensic Science	92
Ivan Yatsenko. Research, Verification and Evaluation of Forensic Expert Conclusion: Forensic Veterinary Aspect	111

CASE NOTES

Görkem Ardacan Tan. Criminalistics and Crime Scene Investigation in Microgravity Space	132
Eluchka Kazarian. Initial Stage of Deliberate Murder Investigation Motivated by Racial, National or Religious Intolerance	146
Anatolii Starushkevych. Criminal Investigation Methods According to Hans Gross: Past and Present	163
Yevhen Pivnov. Survey as a Method of Scientific Cognition and Its Influence on the Formation of Forensic Road-Technical Examination Methodology	187
Viktoriya Slyusarenko, Oleksiy Khomutenko, Svitlana Tarasyutina. Conducting Forensic Multidisciplinary Examinations and Sets of Forensic Examinations Using Specific Expertise in Economics	209

SCIENTIFIC NEWS

All-Ukrainian Scientific and Practical Conference “30 Years of the Law of Ukraine ‘On Forensic Examination’: Current Status and Prospects for Improvement”	223
All-Ukrainian Educational Project “Unbreakable Legal Schools of Ukraine”	225
Forensic Psychological Examination as a Means of Protecting Minors Under Conditions of Martial Law	227
Scientific and Practical Conference “Transformation of Criminalistics Tasks in Conditions of Martial Law and European Integration Processes”	230
Scientific Achievements of Candidates for the Doctoral Degree in the Field of Law at NSC FSI	232

Theory and Practice of Forensic Science and Criminalistics

Editor-in-Chief

Prof. Ella Simakova-Yefremian, Doctor of Law,
National Scientific Center “Hon. Prof.
M. S. Bokarius Forensic Science Institute”
(Ukraine).

Co Editor-in-Chief

Prof. Valerii Shepitko, Doctor of Law, Yaroslav
Mudryi National Law University (Ukraine).

Executive Secretary

Prof. Oleh Uhrovetskyi, Doctor of Law, National
Scientific Center “Hon. Prof. M. S. Bokarius
Forensic Science Institute” (Ukraine).

Editorial Board

Olga Cataraga, Doctor of Law, Law Expertise
Department of Ministry of Justice of Republic
of Moldova (Moldova).

Prof. Aleksandar Ivanović, Doctor of Law, Forensic
Expert Center (Montenegro).

Gabrielė Juodkaitė-Granskienė, Doctor of Law,
Member of the Supreme Court of Lithuania
(Lithuania).

Prof. Vidmantas Egidijus Kurapka, Doctor of Law,
Mykolas Romeris University (Lithuania).

Prof. Hendryk Malevski, Doctor of Law, Mykolas
Romeris University (Lithuania).

Giedrius Mozuraitis, Doctor of Law, Forensic Science
Centre of Lithuania (Lithuania).

Nikolaos Tsiatis, PhD, National and Kapodistrian
University of Athens (Greece).

Patvakan Voskanian, PhD in Chemistry, National
Bureau of Expertises of the National Academy
of Sciences (Armenia).

Assoc. Prof. Dariusz Zuba, Doctor Habilitus of
Chemistry, Institute of Forensic Research
(Poland).

Advisory Board

Serhii Tiulieniev, PhD in Economics, National
Scientific Center “Hon. Prof. M. S. Bokarius
Forensic Science Institute” (Ukraine).

Larysa Derecha, PhD in Biology, National Scientific
Center “Hon. Prof. M. S. Bokarius Forensic
Science Institute” (Ukraine).

Prof. Oksana Kaplina, Doctor of Law, Yaroslav
Mudryi National Law University (Ukraine).

Prof. Ihor Krainov, Doctor of Technology, National
Scientific Center “Hon. Prof. M. S. Bokarius
Forensic Science Institute” (Ukraine).

Prof. Vasyl Olkhovsky, Doctor of Medicine, Kharkiv
National Medical University (Ukraine).

Prof. Iryna Petrova, Doctor of Law, National
Scientific Center “Hon. Prof. M. S. Bokarius
Forensic Science Institute” (Ukraine).

Prof. Evgen Popovich, Doctor of Law, National
Scientific Center “Hon. Prof. M. S. Bokarius
Forensic Science Institute” (Ukraine).

Prof. Volodymyr Semynozhenko, Doctor of
Mathematics and Physics, North-Eastern
Scientific Center of The National Academy of
Sciences of Ukraine (Ukraine).

Prof. Mykhailo Shcherbakovskyi, Doctor of Law,
Kharkiv National University of Internal Affairs
(Ukraine).

Prof. Viktor Shevchyuk, Doctor of Law, Yaroslav
Mudryi National Law University (Ukraine).

Prof. Hanna Spitsyna, Doctor of Law, National
Scientific Center “Hon. Prof. M. S. Bokarius
Forensic Science Institute” (Ukraine).

Prof. Volodymyr Zhuravel, Doctor of Law,
National Academy of Legal Sciences of Ukraine
(Ukraine).

Managing Editors

Anatoliy Tiapkin

Ihor Lushchuk

Tetiana Kipusheva

Inna Kopytina

Language Editors

Andriy Bublikov

Daryna Dukhnenko

Tetiana Droshchenko

Relevant Areas of Expert Research in Ukraine Under Martial Law

Ella Simakova-Yefremian *

* Doctor of Law, Professor, NSC «Hon. Prof. M. S. Bokarius FSI», Kharkiv, Ukraine, ORCID: <https://orcid.org/0000-0002-8246-7688>, e-mail: simakova@hniise.gov.ua

DOI: [10.32353/khrife.1.2024.01](https://doi.org/10.32353/khrife.1.2024.01) UDC [001.89:343.98] (477)

Received: 25.03.2024/ Accepted for Print: 27.03.2024 /

Available online: 29.03.2024



In today's world forensic expert activity is an essential component of ensuring justice in Ukraine through independent, qualified, and objective forensic examination, oriented towards maximizing the use of scientific and technological advancements. Due to the introduction of state-of-the-art technologies, research methods, and standards of conduct, forensic examination effectiveness in Ukraine has significantly increased in recent years, ensuring more precise and objective results and steady progress in this field throughout its development. At the same time, in the face of the new challenges posed by the full-scale military invasion and occupation of parts of our country's territory, expert research has gained special relevance and importance, as well as complexity.

Bombardment and artillery shelling of peaceful towns and villages by the ruscists, resulting in death and devastation, has led to an increase in the number of appeals to forensic science institutions of our state to document the consequences of the Russian Federation's invasion into Ukraine. Experts investigate destroyed infrastructure, residential buildings, and equipment in cities that will forever be in our history as witnesses to the horrific crimes of the Putin regime, genocide against the entire Ukrainian people. Participation of forensic experts in criminal proceedings for military crimes committed by the occupying forces is also crucial. Disastrous consequences of war are also

This article is translation of the original Ukrainian content, which source is available at the link: <https://khrife-journal.org/index.php/journal> (translated by Daryna Dukhnenko). The author acknowledges translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

documented in the work of experts in economics, commodity science, ecology, electrical engineering, psychology, and other specialists.

An example of expert research conducted by forensic experts from National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» (hereinafter referred to as NSC FSI), which is part of evidentiary basis for documenting the enemy's criminal actions, is examination aimed at determining the type of weapon used by war criminals who shot the writer Volodymyr Vakulenko and many other Ukrainians during the occupation of the city of Izyum and surrounding villages. Experts have determined that the weapons were manufactured by the aggressor country for the so-called LPR and DPR with deterioration in components quality.

NSC FSI experts also joined the selection of reference samples for further DNA analysis to identify persons found in mass gravesites and accelerate the search for missing persons.

Despite all the enemy's efforts to destabilize the situation in Ukraine, amid the horrors of war and the stress under which NSC FSI forensic experts are forced to live and work, the occupiers' military aggression only boosts our motivation to conduct research in a qualitative, timely, and conscientious manner.

Ukraine possesses significant potential for advancing forensic science. With favorable conditions and resources, it can achieve high-quality forensic examination and develop its own modern research methods and technologies, which it is keen to share with international colleagues. Ensuring the objectivity, reliability, and scientific integrity of forensic examinations is fundamental to justice and serves as a cornerstone for protecting citizens' rights in the modern world.

The *Theory and Practice of Forensic Science and Criminalistics* Research Paper Collection, published jointly by NSC «Hon. Prof. M. S. Bokarius FSI» and Yaroslav Mudryi National Law University since 2001, is a specialized scientific edition serving as a platform for sharing practical experience and scientific advancements among lawyers, criminalists, and forensic experts from Ukraine, Europe, and around the world. It is published quarterly in parallel editions in Ukrainian and English. It is indexed by international abstract and citation databases such as Academic Research Index (ResearchBib), Bielefeld Academic Search Engine (BASE), Central and Eastern European online library (CEEOL), Directory of Open Access Journals (DOAJ), Directory of Research Journals Indexing (DRJI), ERIH PLUS, EuroPub, Index Copernicus International, MIAR, RefSeek, Ulrich's, WorldCat, etc. In 2023, it was assigned the media identifier R-3002416.

The content in this issue is traditionally grouped into two main categories: *Research Papers* and *Case Notes*.

Issue 34 of the Collection begins with the review article *Application of Artificial Intelligence and Information and Communication Technologies: Socio-Ethical Problems* by Prof. **Nataliia Filipenko**, Doctor of Law, **Serhii Lukashevych**, and **Olena Andrieieva**, PhDs in Law, Docents (all three from Ukraine), and Prof. **Aleksandar Ivanović**, PhD in Law (Montenegro), emphasizing that existing ethical regulation of use of information and communication technologies and artificial intelligence is mostly limited to framework, declarative documents indicating only general approaches and the purpose of the interaction of humanity with artificial intelligence systems, a kind of warning about possible negative consequences of the use of technologies. Because of potential danger to civilization

of information and communication technologies and artificial intelligence, it is necessary to strictly license activities related to the production and operation of such systems. For this, at the legislative level, it is necessary to clearly define those responsible for occurrence of out-of-state situations, as well as to answer the question: “*Is the transition of artificial intelligence from the status of an object to the status of a subject of legal relations possible and legal?*”. All of the above indicates importance and significance of the chosen research goal and requires a socio-ethical understanding of the most pressing problems of applying the capabilities of artificial intelligence.

The following research paper by **Serhii Tiulieniev**, PhD in Economics (Ukraine), explores prospects for the development of forensic methods for investigation of criminal offenses related to raiding. According to performed research results, it was determined that in modern sense, a separate forensic investigation method (in a broad sense) should be understood as an integrated product of scientific knowledge in the field of law, formed on the basis of a generalization of investigative and judicial practice, which in its essence is a set of forensic recommendations, proven tactics methods of conducting investigative (search) and covert investigative (search) actions, methods and techniques of optimal and effective use of forensic techniques during pre-trial investigation developed in accordance with procedural requirements in order to optimize the model of conducting pre-trial investigation of a separate criminal offense, their groups, etc. Based on the generalization of certain elements of the criminal law and forensic characteristics of criminal offenses related to raiding, varieties of individual forensic methods of investigation have been determined, including interspecies, special, subspecies, species, etc.

Equally interesting is the research paper *Psychophysiological Research and its Place in the Lithuanian Scientific Discourse* by Lithuanian colleagues: Prof. **Hendryk Malewski**, Doctor of Law, and **Laimutis Kraujalis**. This article gives a brief overview of the development of psycho-physiological research using the polygraph. The main focus is on the legal regulation of these methods and the evaluation of the scientific discourse of Lithuanian specialists on the problems of psychophysiological research and the application of its methods in comparison with analogous processes in Poland. After the restoration of independence in 1990, the Lithuanian media interest in this issue prompted the law enforcement authorities and their specialists and scientists to look deeper into the possibility, reliability, permissibility and effectiveness of the use of these technical diagnostic tools in foreign countries, as well as into their compatibility with the Lithuanian law in the investigation of crimes. Some aspects of psychophysiological tests using the polygraph in Poland have been analysed for comparison purposes, which in the neighbouring country have attracted considerably more attention, both in the academic world as well as among lawyers and representatives of law enforcement agencies, etc.

The article *Separate Aspects of Evidentiary Basis Formation during the Investigation of Facts Related to Collaborationism* by **Serghii Perepelytsia**, PhD in Law, Docent (Ukraine), highlights that the formation of the evidentiary basis during pre-trial investigation of collaboration crimes depends on the availability of witness and eyewitness testimony, the identification of which is a leading task of the investigation involving the use of various measures (i.e., government and local self-government bodies obtain information about these people and suspects or temporarily access property

and documents as envisaged by law). The task of investigators in investigating this type of crime is: 1) to identify private individuals, representatives of volunteer movements, or community organizations who have documented crimes associated with collaboration activities; 2) to acquire information they have documented. Answers to questions arising during pre-trial investigation are contained in the expert conclusion (as a significant component of the evidentiary basis) because it is within the expert conclusion that a forensic expert provides information that he/she identified during the investigation and utilizes specific expertise that the investigator may not have possessed.

Another notable research paper in this Section is *Analysis of Cannabis and its Products in the Context Forensic Science* by **Iryna Kuchynska**, PhD in Pharmacy (Ukraine). Legalization of low-tetrahydrocannabinol-high-cannabidiol cannabis plants is gaining momentum due to growing demand for these products. In some countries, the testing of cannabis and products containing it is a legal requirement: cannabis is identified, the amount of tetrahydrocannabinol or cannabidiol and their precursor acids is assessed. Current research requires more sensitive and reliable analytical methods for accurate identification and quantification of cannabis components. Since the forensic expert must be well-versed in modern trends in the analysis of prohibited substances and use the latest data from the analytical and forensic literature in his work, such information will help them choose research methods, taking into account the actual resources and equipment of forensic laboratories.

One more significant research in this Collection is the research paper *Research, Verification and Evaluation of Forensic Expert Conclusion: Forensic Veterinary Aspect* by Prof. **Ivan Yatsenko**, Doctor of Veter-

inary Medicine (Ukraine). The author claims that during verification of forensic expert conclusion, it is necessary to assess its comprehensiveness, completeness and objectivity, as well as scientific validity, reliability, correctness, admissibility of using methods and techniques, means and methods of conducting expert research, as well as adequacy and relationship with other evidence collected within the framework of a criminal proceeding (case) with the aim of making a correct procedural decision (for evidence of factual data and circumstances proven by expert research). The criteria for completeness and reasonableness of the expert's conclusion are proposed, as well as the algorithm for evaluating such a conclusion by the investigator, prosecutor, defense attorney, investigative judge, and court. The application of a set of these criteria to the assessment of a forensic expert's opinion will guarantee the high reliability of the verification and assessment of such conclusion, as well as create reliable conditions for making procedural decisions in legal proceedings.

The Case Notes Section begins with the article *Criminalistics and Crime Scene Investigation in Microgravity Space* by **Görkem Ardacan Tan**, research student (Turkey). It provides insights into the challenges and considerations of criminalistics and crime scene investigation in extraterrestrial gravitational environments. Future space exploration may require the development of protocols for extraterrestrial crime scene investigations. Challenges in microgravity effects, confined space environments, forensic techniques, communication, coordination, and legal jurisdiction are highlighted in this brief. Future discussions and research will provide a basis for establishing protocols for extraterrestrial crime scene investigations to ensure effective and fair forensic practices. As space exploration advances, the development of space

law, technology, and international agreements is crucial to meeting the unique challenges of extraterrestrial crime scene investigations. This summary provides a basis for future discussions and research regarding the establishment of protocols to ensure effective and fair forensic practices off Earth.

The next article *Initial Stage of Deliberate Murder Investigation Motivated by Racial, National or Religious Intolerance* by **Eluchka Kazarian**, post-graduate student (Ukraine), brings to the forefront the importance of identifying typical investigative situations at the initial investigation stage, where specific investigative (detective) actions are taken to collect information, identify signs of a crime and develop investigative leads. At this investigation stage, forensic experts solve specific tasks, assess investigative situation, identify sources of information, determine investigation direction, plan interaction with operational agencies, and collect information about crime circumstances, the victim, and the suspect. The author notes the difficulty of determining the motive of intolerance at the initial stage and the possibility of changing criminal law qualification in the course of pre-trial investigation. Classification of investigative situations based on the sources of initiation of pre-trial investigation and information components serves as the basis for efficient investigation planning.

Another article in the Case Notes Section, authored by **Anatolii Starushkevych**, PhD in Law, Docent (Ukraine), on the topic *Criminal Investigation Methods according to Hans Gross: Past and Present*, explores the contribution made by H. Gross to establishing criminalistics as a science. Emphasis is placed on two methods he proposed for investigating crimes: setting a moment of firm conviction about case circumstances (the investigator's impartial attitude to the information received at the beginning

of an investigation) and graphic tables (visualization of relevant forensic information). It has been argued that the methods proposed by H. Gross are still relevant today due to the prospects of developing a modern applied scientific area (forensic technologies ensuring visualization in a criminal proceeding) and certain issues of unbiased analysis of relevant forensic information by investigators at the initial stage of investigating crimes.

The following research paper *Survey as a Method of Scientific Cognition and Its Influence on the Formation of Forensic Road-Technical Examination Methodology* by **Yevhen Pivnov**, postgraduate student (Ukraine), is dedicated to the topic of surveying as a method of scientific cognition, as well as its influence on developing the methodology of forensic road-technical examinations. It delves into the main terms (concepts) related to methodology of forensic examination and the survey's results of forensic experts. Based on the survey results of forensic experts, the main provisions of organizing forensic examinations in general and forensic road-technical examination in particular have been determined, which will be useful for developing general methodological principles of road-technical examinations. Due to the complexity and regulatory gaps in the provisions on complex expert examinations, changes to the regulatory legal acts have been proposed to establish the mechanism for formalizing the complex of examinations and comprehensive examination as different forms of integrating specific expertise. The author's definition of the concept of forensic science in criminal proceedings is provided, and proposals from forensic experts on improving the effectiveness of forensic activities are summarized.

The Case Notes Section concludes with the manuscript *Conducting Forensic Multidisciplinary Examinations and Sets*

of *Forensic Examinations using Specific Expertise in Economics* authored by **Viktoriya Slyusarenko**, PhD in Economics, Docent, **Oleksiy Khomutenko**, PhD in Economics, Senior Researcher, and **Svitlana Tarasyutina** (all three from Ukraine). The quality of forensic examination depends on a forensic expert's qualification and his/her in-depth and responsible research on objects, the investigation of which arose during pre-trial investigation or trial. Currently, expert methodologies for conducting forensic multidisciplinary economic examinations and sets of forensic examinations require improvement, especially in light of wartime conditions. Multidisciplinary examination reflects contemporary theoretical trends by integrating legal norms into practical application to address urgent tasks in pre-trial investigations and court proceedings. At the same time, multidisciplinary examination demonstrates high efficiency and broad possibilities through the combined and synthesized application of knowledge from diverse scientific fields and technical tools in addressing tasks assigned to a forensic expert. Multidisciplinary examination conclusions have a varied impact on the decisions made by the parties to the dispute. Therefore, improving the methodology of conducting forensic multidisciplinary examinations or sets of forensic examinations during the resolution of complex issues, which often arise in conditions of martial law, is relevant. This allows for the determination of unified approaches to addressing problematic aspects of such research.

The Scientific News Section highlights the participation of NSC FSI staff in scientific events of the 1st quarter of 2024: the All-Ukrainian Scientific and Practical Conference “30 Years of the Law of Ukraine “On Forensic Examination”: Current Status and

Prospects for Improvement” organized by our colleagues: Odesa Scientific Research Institute of Forensic Expertise; the thematic scientific and methodological seminar with practical cases on the topic “Disputes Regarding the Determination of Children’s Place of Residence and Parental Involvement in Their Upbringing During the State of War (Involvement of Specific Expertise and Judicial Practice)” hosted at the Kyiv Branch of National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» and the roundtable discussion “Improving the Mechanism of Conducting Forensic Psychological Examinations of Minors, Victims of Domestic Violence, Taking into Account the Victim-Oriented Approach” held by the State Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine; the All-Ukrainian Educational Project “Unbreakable Legal Schools of Ukraine” initiated by 13 legal schools and leading educational institutions of the country (including Yaroslav Mudryi National Law University and the Center for Criminalistic Innovations *IntelligenTtrident*); the Scientific and Practical Conference “Transformation of Criminalistics Tasks in Conditions of Martial Law and European Integration Processes” (dedicated to the memory of Violetta Omelianivna Konovalova, an Emeritus Professor of Yaroslav Mudryi National Law University, Academician of the National Academy of Legal Sciences of Ukraine, Doctor of Law, Professor, Honored Worker of Science and Technology of Ukraine) organized by the Department of Criminalistics at Yaroslav Mudryi National Law University.

The increased focus on educational efforts in defending 5 doctoral dissertations in the field of “Law” (specialty 081) since the beginning of the year, along with the granting of a license to NSC FSI for such defense with a licensed capacity of 40 indi-

viduals (including foreigners and stateless persons), have been separately noted.

The Editorial Board of the *Theory and Practice of Forensic Science and Criminalistics* Research Paper Collection is sincerely grateful to all the authors who provided materials for publication, as well as forensic experts who participated in its publication,

and invites scientists and practitioners to prepare articles for upcoming issues.

Together, only together, can we defeat the aggressor, rebuild our state, contribute to its prosperity in all spheres, and elevate the expert support of justice in Ukraine to a new level!

Together we will win! Glory to Ukraine!

Simakova-Yefremian, E. (2024). Relevant Areas of Expert Research in Ukraine Under Martial Law. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). P. 5—11. DOI: [10.32353/khrife.1.2024.01](https://doi.org/10.32353/khrife.1.2024.01).

Application of Artificial Intelligence and Information and Communication Technologies: Socio-Ethical Problems (Review Article)

Nataliia Filipenko * ^a, **Serhii Lukashevych** ** ^b, **Olena Andrieieva** *** ^c,
Aleksandar Ivanović **** ^d

* Doctor of Law, Professor, National Aerospace University H. E. Zhukovsky
«Kharkiv Aviation Institute» (KHAI), Kharkiv, Ukraine,

ORCID: <https://orcid.org/0000-0001-9469-3650>, e-mail: n.filipenko@khai.edu

** PhD in Law, Associate Professor, National Aerospace University H. E. Zhukovsky
«Kharkiv Aviation Institute» (KHAI), Kharkiv, Ukraine,

ORCID: <https://orcid.org/0000-0001-8386-6237>, e-mail: serhilukashevych@gmail.com

*** PhD in Law, Associate Professor, National Aerospace University H. E. Zhukovsky
«Kharkiv Aviation Institute» (KHAI), Kharkiv, Ukraine,

ORCID: <https://orcid.org/0000-0003-2731-9225>, e-mail: o.andrejeva@khai.edu

**** PhD in Law, Professor, Police Directorate of Montenegro, Podgorica, Montenegro,
e-mail: ialeksandar@t-com.me

^a Writing – original draft, Project administration, Supervision.

^b Writing – original draft, Formal analysis.

^c Writing – original draft, Project administration.

^d Project administration, Methodology.

DOI: [10.32353/khrife.1.2024.02](https://doi.org/10.32353/khrife.1.2024.02) UDC [004.383.8+004.9]:172+343.98

Received: 18.03.2024 / Reviewed: 20.03.2024 / Accepted for print: 27.03.2024 /

Available online: 29.03.2024



This article purpose is to reveal the essence of social and ethical requirements for the use of information and communication technologies and artificial intelligence in the life of a modern person, society and the state. General scientific and special scientific methods were used to achieve the goal. Peculiarity of analyzed topic implies mandatory consideration of rules and requirements already formulated by various social institutions and organizations in response to the challenges of digital reality. It is emphasized that existing ethical regulation of use of information and communication technologies and artificial intelligence is mostly limited to framework, declarative documents indicating only general approaches and the purpose of the interaction of humanity with artificial intelligence systems, a kind of warning about possible negative consequences of

the use of technologies. Despite significant overlaps in the proposed principles, the content of these norms remains almost undisclosed to this day. It was emphasized that use of artificial intelligence requires special legal regulation, as it concerns the life and health of people. Because of potential danger to civilization of information and communication technologies and artificial intelligence, it is necessary to strictly license activities related to the production and operation of such systems. For this, at the legislative level, it is necessary to clearly define those responsible for occurrence of out-of-state situations, as well as to answer the question: “Is the transition of artificial intelligence from the status of an object to the status of a subject of legal relations possible and legal?”. All of the above indicates importance and significance of the chosen research goal and requires a socio-ethical understanding of the most pressing problems of applying the capabilities of artificial intelligence.

Keywords: artificial intelligence; information and communication technologies; social challenges; ethical problems; field of information technologies.

Research Problem Formulation

Dynamic development of modern society radically changes the world around us, in particular, in the field of communication capabilities and the rapid introduction of artificial intelligence (hereinafter referred to as AI).

Digital revolution as a factor in the dynamic development of society contributed to the digital economy creation, formation of digital law foundations, new configuration of social relations through the use of the Internet, social networks and other information and communication

technologies (hereinafter referred to as ICT). As the researchers note, “modern digital technologies form a new mode of production, create prerequisites for the transition to a new formation, digitalization of public relations and the law itself regulating these relations”¹. V. Zhuravel, V. Shepitko and other Ukrainian scientists note that “digitalization is the latest reality of the advanced countries of Europe and the whole world, and therefore of Ukraine, which has chosen the European vector of development”².

Currently, AI is not just a technological trend, a buzzword or a temporary fad, it is

- 1 Petryshyn O. V., Hyliaka O. S. Human rights in the digital age: Challenges, threats and prospects. *Journal of the National Academy of Legal Sciences of Ukraine*. 2021. Vol. 28. No. 1. Pp. 15–23. DOI: [10.37635/jnalsu.28\(1\).2021.15-23](https://doi.org/10.37635/jnalsu.28(1).2021.15-23) (date accessed: 19.02.2024).
- 2 Журавель В. А., Шепітько В. Ю. Розвиток криміналістики та судової експертизи в Україні: наближення до єдиного європейського простору / Правова наука України: сучасний стан, виклики та перспективи розвитку : монографія. Харків, 2021. С. 651–669 ; Шевчук В. М. Європейський вектор розвитку сучасної криміналістики. Адаптація правової системи України до права Європейського Союзу: теоретичні та практичні аспекти : мат-ли Всеукр. наук.-практ. конф. з нагоди 20-ї річн. створ. Полтав. юрид. ін-ту НЮУ ім. Ярослава Мудрого (Полтава, 29.09.2022). Полтава, 2022. С. 320–323. URL: <http://pli.nlu.edu.ua/wp-content/uploads/2022/12/36ірінник-29.09.pdf> (date accessed: 11.02.2024).

a third, computing era based on innovation and advanced technology. We are at a stage of fundamental change unlike that experienced by generation of the first industrial revolution³.

Cloud infrastructure Gigacloud even notes that “artificial intelligence is one of the most popular terms in the world today. According to some forecasts, AI will bring \$15.7 trillion to the world economy by 2035”⁴.

The authors of the Collins dictionary named AI the word of the year and consider it the next great technological revolution.

As N. Filipenko and S. S. Lukashevych emphasize, “*artificial intelligence technologies increasingly affect various spheres of social life, determining not only the level of opportunities, but protection degree of social values*”⁵.

Thereby the issues of ICT and AI application should be considered through the prism of legal, ethical, security, humanistic goals and values of modern society. Any achievements in the field of AI make sense only if they meet the ideals of self-development, self-knowledge and, ultimately, prosperity of entire human civilization. Excessive delegation of authority from a person to AI systems,

on the contrary, can negatively affect existential foundations of human existence, especially acutely raise the question of the meaning of its existence and life purpose.

In recent decades, “advanced countries around the world are investing hundreds of billions of dollars in the development of AI technologies (machine learning, computer vision, natural language processing), the use of which in products and services (especially in the defense sector) is becoming one of the leading elements of success in international markets”⁶.

Socio-philosophical discussions on ethical standards of ICT and AI use have been going on for a long time, but the theoretical understanding of the changes occurring within its systems, the modern specialization of AI and the impact of the latest developments in this area on humans, society and all branches of social life are still significantly behind introduction of these technologies into modern life.

This problem is becoming so urgent that the Ministry of Digital Transformation of Ukraine has developed a Concept for the Development of Artificial Intelligence in Ukraine⁷ (hereinafter referred to as *AI Concept*) and plans to develop an Ethical

3 Вебб Е. Велика дев'ятка. Як ІТ-гіганти та їхні розумні машини можуть змінити людство / пер. з англ. І. Возняка. Харків, 2020. С. 9. URL: https://book-ye.com.ua/upload/iblock/8de/908f1e91_ee9d_11ea_813d_000c29ae1566_3c5783ac_ee9e_11ea_813d_000c29ae1566.pdf (date accessed: 19.02.2024).

4 Що таке штучний інтелект: історія, види та складові / Gigacloud. URL: <https://gigacloud.ua/blog/navchannja/scho-take-shtuchnij-intelekt-istorija-vidi-ta-skladovi> (date accessed: 15.02.2024).

5 Філіпенко Н. Є., Лукашевич С. Ю. Інформаційні методики дослідження кримінальних правопорушень, вчинених з використанням технологій штучного інтелекту. *Наукові перспективи*. 2023. № 11 (41). № 11(7). С. 1084—1095. DOI: 10.52058/2708-7530-2023-11(41)-1084-1095 (date accessed: 19.02.2024).

6 Можливості ШІ у правоохоронній системі міста. URL: <https://www.everest.ua/mozhlyvosti-shi-u-pravoohoronnij-systemi-mista/> (date accessed: 17.02.2024).

7 Концепція розвитку штучного інтелекту в Україні : схвал. розпорядж. КМУ від 02.12.2020 р. № 1556-р (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/1556-2020-p#Text> (date accessed: 01.02.2024).

Code for the Use of AI, taking into account European experience ⁸.

The document states that “main task of state policy in the field of legal regulation of the use of AI is to ensure the protection of the rights and freedoms of participants in relations in the field of AI, the development and use of AI technologies in compliance with ethical standards.

For achieving the goal of AI Concept, the following tasks should be ensured:

- “Implementation of the norms enshrined in Recommendations on Artificial Intelligence adopted in June 2019 by the Organization for Economic Cooperation and Development (OECD/LEGAL/0449) ⁹, subject to the ethical standards provided for in Recommendations CM/Rec(2020)1, approved on April 8 ¹⁰, 2020 by the Committee of Ministers of the Council of Europe for Member States on the impact of algorithmic systems on human rights, in legislation of Ukraine;
- consideration of the compliance issue of legislation of Ukraine with the

guidelines established by the Council of Europe on development and use of artificial intelligence technologies and its harmonization with the European one;

- *assessing possibility and determining the boundaries (ethical, legal) of the use of artificial intelligence systems for the purpose of providing professional legal assistance;*
- *ensuring functioning and activities of technical committees for standardization in accordance with the requirements of ДСТУ 1.14:2015 ¹¹ National Standardization. Procedures for the creation, operation and termination of the activities of technical committees for standardization in the field of artificial intelligence;*
- *ensuring interaction between the relevant Technical Committees of Ukraine and international subcommittees of standardization ISO/IEC JTC 1/SC 42 ¹² Artificial Intelligence on joint development of standards in the field of artificial intelligence;*

8 Повідомлення про проведення публічного громадського обговорення проєкту розпорядження Кабінету Міністрів України «Про схвалення Концепції розвитку штучного інтелекту в Україні» / Мінцифри України : офіц. сайт. URL: <https://thedigital.gov.ua/regulations/povidomlennya-pro-provedennya-publichnogogromadskogo-obgovorennya-proyektu-rozporyadzhennya-kabinetu-ministrivukrayini-pro-shvalennya-koncepciyi-rozvitku-shtuchno-go-intelektu-v-ukrayini> (date accessed: 01.02.2024).

9 Recommendation of the Council on Artificial Intelligence (OECD/LEGAL/0449). Adopted on: 22/05/2019. Amended on: 08/11/2023. OECD, 2024. 11 p. URL: <https://legalinstruments.oecd.org/en/instruments/oecd-legal-0449> (date accessed: 03.02.2024).— Прим. авт.

10 Рекомендація CM/Rec (2020) 1 Комітету Міністрів державам-членам щодо впливу алгоритмічних систем на права людини : прийнято Ком. Мін-в 08.04.2020 р. на 1373-му засід. заступ. мін-в. URL: <https://www.echr.com.ua/document/rekomendaciya-cm-rec-20201-vid-08-04-2020/> (date accessed: 10.02.2024).— Прим. авт.

11 ДСТУ 1.14:2015 Національна стандартизація. Процедури створення, діяльності та припинення діяльності технічних комітетів стандартизації : прийнято наказом ДП «УкрНДНЦ» від 31.12.2015 р. № 217 (зі змін. та допов.) [Чинний від 01.06.2016]. Київ, 2016. 46 с. URL: <https://dntb.gov.ua/wp-content/uploads/2021/02/%D0%94%D0%A1%D0%A2%D0%A3-1.14-2015.pdf> (date accessed: 19.02.2024).— Прим. авт.

12 ISO/IEC JTC 1/SC 42 Artificial Intelligence. URL: <https://www.iso.org/committee/6794475.html> (date accessed: 04.02.2024).— Прим. авт.

- support for initiatives to create organizational forms of cooperation between interested legal entities and individuals in the field of artificial intelligence;
- development of the Code of Ethics for Artificial Intelligence with the participation of a wide range of stakeholders;
- consideration of the need to regulate public relations in the field of artificial intelligence development at the legislative level”¹³.

Therefore, conclusion about legal, security and socio-ethical principles of procedure planning of development and implementation of ICT and AI in all fields of public life seems fair.

Analysis of Recent Researches and Publications

Some aspects of the problem under research were considered by: Yu. Baturin, K. Basin, P. Bilenchuk, A. Vengerov, V. Venediktov, M. Viekhov, O. Gavrilov, V. Golina, V. Golubev, O. Ivanenko, V. Zhuravel, M. Karchevsky, M. Kovalenko, V. Kolpakov, A. Komzyuk, O. Kokhanovska, V. Kuznetsov, M. Logvinenko, S. Lukashevich, T. Mikhailina, O. Mozhaev, M. Panov, V. Pyvovarov, M. Polieva, V. Severin, S. Semiletov, V. Sydorenko, K. Skoromnikov, F. Tarasenko, L. Tereshchenko, T. Tarakhonich, B. Ukraintsev, N. Filipenko, V. Frolov, V. Shevchuk, V. Shepitko, A. Chernykh, S. Chorny, S. Yasechko, etc. At the same time, many problematic issues of ICT and AI application remain debatable today and require additional coverage and development.

Development of philosophical, ethical, technical, legal, security, social and humanistic principles of interaction with AI aimed at effective and safe use of AI will help to eliminate these shortcomings. Such studies will make possible to formulate the content of the main requirements for developers and users of AI systems at any stage of its development and improvement, minimize possible negative consequences, determine the limits of the use of ICT and AI, intelligently and humanely realize their potential to solve the global problems of our civilization. Currently, much has already been done at the level of state structures, law enforcement agencies, scientific organizations, business and civil society to identify such principles, but their content is often not disclosed.

Consequently, research relevance is due to the need for a deeper and adequate reflection in legal, security and other documents that develop and approve the further development of social society of the realities of the impact of ICT and AI on society and humans, the need to identify the content of basic principles of human interaction with AI systems through the analysis of its most essential characteristics; identification of possible social, ethical consequences and prospects for human-AI interaction, safe and effective implementation of state functions.

Article Purpose

The aim of the article is to analyze the latest research of modern foreign and domestic scientists and determine the most optimal ways to use ICT and AI, identify and minimize its negative impact and develop established ethical standards for its application.

13 Концепція розвитку штучного інтелекту ... URL: <https://zakon.rada.gov.ua/laws/show/1556-2020-p#Text> (date accessed: 14.02.2024).

Research Methods

The theoretical and methodological basis of this research is general scientific and special scientific methods (dialectical, analytical abstraction, comparative, interpretation, as well as a systematic approach) that were used to reveal ethical norms of the introduction of ICT and AI in all fields of public life.

Main Content Presentation

Encyclopedia Britannica defines AI as «the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience. Since the development of the digital computer in the 1940s, it has been demonstrated that computers can be programmed to carry out very complex tasks — such as discovering proofs for mathematical theorems or playing chess — with great proficiency. Still, despite continuing advances in computer processing speed and memory capacity, there are as yet no programs that can match full human flexibility over wider domains or in tasks requiring much everyday knowledge. On the other hand, some programs have attained the performance levels of human experts and professionals in performing certain specific tasks, so that artificial intelligence in this limited sense is found in applications as

diverse as medical diagnosis, computer search engines, voice or handwriting recognition, and chatbots»¹⁴.

Collins English Dictionary interprets AI as «artificial intelligence is a type of computer technology which is concerned with making machines work in an intelligent way, similar to the way that the human mind works»¹⁵.

In turn, the *Oxford English Dictionary* considers AI as «the capacity of computers or other machines to exhibit or simulate intelligent behavior; the field of study concerned with this. In later use also: software used to perform tasks or produce output previously thought to require human intelligence, esp. by using machine learning to extrapolate from large collections of data. Also as a count noun: an instance of this type of software; a (notional) entity exhibiting such intelligence»¹⁶.

In other words, the development and use of ICT and AI opportunities are still in the field of constant discourse, which results are one of the most important subjects of discussion for scientists and practitioners around the world.

Most importantly, almost all scientists agree with the thesis that concept of artificial consciousness “implies availability of *an artificial conscience* [Here and further in the quotes we emphasize.— Authors.] as a mechanism for ensuring the ethics of AI decisions. This issue was positively perceived at the meeting of the Group of Governmental Experts on Lethal Autonomous Weapons Systems of the UN Office for Disarmament Affairs on June 27, 2022”¹⁷.

14 Copeland B. J. Artificial intelligence / *Encyclopædia Britannica*. URL: <https://www.britannica.com/technology/artificial-intelligence> (date accessed: 19.02.2024).

15 Artificial intelligence / *Collins English Dictionary*. URL: <https://www.collinsdictionary.com/dictionary/english/artificial-intelligence> (date accessed: 05.02.2024).

16 Artificial intelligence / *Oxford English Dictionary*. URL: <https://www.oed.com/viewdictionaryentry/Entry/271625> (date accessed: 05.02.2024).

17 Шевченко А. І., Барановський С. В., Білокобильський О. В., Бодяньський Є. В., Бомба А. Я. та ін. Стратегія розвитку штучного інтелекту в Україні : монографія / за заг. ред. А. І. Шевченка. Київ, 2023. С. 61. URL: https://jai.in.ua/archive/2023/ai_mono.pdf (date accessed: 07.02.2024).

However, we consider different approaches to understanding ICT and AI, given the current level of development of its systems. Since today the debate about the selective, universal, general in AI is exclusively in the field of forecasts and predictions, we conclude that it is necessary to use the most general classification of AI, which subdivides the many available types of AI into *strong AI* and *weak (narrow) AI*.

At the same time, strong AI is still a speculative topic, and the object of scientific knowledge, in our opinion, today can only be AI created by man to solve specific practical problems, that is, narrow AI.

In turn, «*weak artificial intelligence (AI) — also called narrow AI — is a type of artificial intelligence that is limited to a specific or narrow area. Weak AI simulates human cognition. It has the potential to benefit society by automating time-consuming tasks and by analyzing data in ways that humans sometimes can't. Weak AI can be contrasted to strong AI, a theoretical form of machine intelligence that is equal to human intelligence*»¹⁸; that means narrow AI can be characterized as a group of technologies or as a result of human application of scientific knowledge to solve various practical tasks. Most researchers emphasize the systemic nature of narrow AI. Today, AI is considered a fully or partially autonomous system that organizes itself, has the ability to think, learn, and make decisions independently. An artificial intelligence system is a software-hardware complex containing hardware and software. Hardware includes all physical parts of a computer or machine: the carrier of AI, that is, the electronic and mechanical parts that make up the system. Software contains programs used to control the machine.

Computer technology specialists often call these parts *hard* and *soft*. Thus, an artificial intelligent system is a computer capable of performing functions characteristic only of a person, it is a system, the elements of which are a hardware complex, software and data set.

Hardware system are physical devices ensuring operation of applications. Software is a set of computer code and connections between its components which functions thanks to hardware system. Data set contains input and output data and the latter are the result of input data processing and exist as a solution and action of the AI system.

AI systems are both applications running in virtual space (for example, an image or text recognition program) and hardware devices with software (for example, unmanned vehicle, robot cleaner). Let us emphasize once again that all modern AI systems and work with AI are examples of narrow AI.

Systemic nature of narrow AI is evidenced by the definition of the high-level expert group of the European Commission, which formulated the following definition of AI: “*Artificial intelligence (AI) systems are software (and possibly hardware) systems developed by humans having a complex goal, act in physical or digital dimension, collecting data about the environment, interpreting collected and structured or unstructured data in the form of reasoning based on previously obtained knowledge or the results of processing new information and capable of making a decision on the best course of action from the point of view of achieving the goal set by a person. Such artificial intelligence systems are able to follow the rules set by the developer,*

18 The Investopedia Team. Weak AI (Artificial Intelligence): Examples and Limitations / Investopedia. Jan 01, 2022. URL: [https://www.investopedia.com/terms/w/weak-ai.asp#:~:text=Key%20Takeaways,Weak%20artificial%20intelligence%20\(AI\)-also%20called%20narrow%20AI,is%20equal%20to%20human%20intelligence](https://www.investopedia.com/terms/w/weak-ai.asp#:~:text=Key%20Takeaways,Weak%20artificial%20intelligence%20(AI)-also%20called%20narrow%20AI,is%20equal%20to%20human%20intelligence) (date accessed: 09.02.2024).

*construct a digital model of a particular process or phenomenon, and can also change their own behavior, adapting it to environmental conditions that have changed as a result of previously perfect actions”*¹⁹. This definition can be found in a separate document prepared by the expert group and published under the *Defining AI: Core Capabilities and Disciplines* title.

This definition, in our opinion, can be called the most correct, since it notes the main properties and abilities of AI that distinguish it from any other objects and phenomena of social reality, thereby reflecting the deep essence of this phenomenon.

It should be noted that in the report of the ad hoc intergovernmental committee of experts on AI of the Council of Europe, this definition of AI is recognized as the most accurate²⁰. However, it cannot be considered final, since the technical sciences and AI technology in the modern world are in constant development.

There is often confusion in the conceptual apparatus due to the identification of AI with the methods, methods, algorithms, and mathematical models created to ensure its working functions. It is, in particular, about machine learning and artificial neural network. Machine learning (hereinafter referred to as machine learning) is a group of methods (learning with a teacher, learning without a teacher, learning with reinforcement) that provide data analysis by a program for decision-making. With the help of these methods, separate

intellectual tasks are solved — such as collecting and analyzing data, drawing conclusions, etc. An artificial neural network (hereinafter referred to as ANN) is «neural networks, also known as artificial neural networks (ANNs) or simulated neural networks (SNNs), are a subset of machine learning and are at the heart of deep learning algorithms. Their name and structure are inspired by the human brain, mimicking the way that biological neurons signal to one another. Artificial neural networks (ANNs) are comprised of a node layers, containing an input layer, one or more hidden layers, and an output layer. Each node, or artificial neuron, connects to another and has an associated weight and threshold. If the output of any individual node is above the specified threshold value, that node is activated, sending data to the next layer of the network. Otherwise, no data is passed along to the next layer of the network. Neural networks rely on training data to learn and improve their accuracy over time. However, once these learning algorithms are fine-tuned for accuracy, they are powerful tools in computer science and artificial intelligence, allowing us to classify and cluster data at a high velocity. Tasks in speech recognition or image recognition can take minutes versus hours when compared to the manual identification by human experts. One of the most well-known neural networks is Google’s search algorithm»²¹.

In other words, ANN is a mathematical model created for analyzing and processing data and making decisions on this basis in the case of using MN methods. The creators

19 Ethics Guidelines for Trustworthy AI. Independent High-Level Expert Group on Artificial Intelligence Set up by the European Commission. 8 April 2019. 41 p. URL: <https://www.aepd.es/sites/default/files/2019-12/ai-ethics-guidelines.pdf> (date accessed: 12.02.2024).

20 Ad Hoc Committee on Artificial Intelligence (CAHAI) Policy Development Group (CAHAI-PDG). Draft Questionnaire for the Multi-Stakeholder Consultation. CAHAI-PDG(2021)01. 19 p. URL: <https://rm.coe.int/cahai-pdg-2021-01-draft-questionnaire-on-feasibility-study-rev14012020/1680a11d31> (date accessed: 16.02.2024).

21 What is a neural network? / IBM. URL: <https://www.ibm.com/topics/neural-networks> (date accessed: 19.02.2024).

of ANNs were inspired by biological neural networks, so it is built from artificial neurons (processors), which make AI software “intelligent”, become methods and tools for achieving the desired result by AI systems. The essence of AI systems is fully expressed in the above definition.

As the researchers note, there are several types of AI:

- “ *purely reactive* (these machines have no memory or data to work with, specializing in only one area of activity. For example, in a chess game, the machine watches the moves and makes the best decision to win);
- *limited memory* (such systems collect previous data and continue to add it to their memory. Have enough memory or experience to make the right decisions, while their memory is minimal. For example, such a machine might suggest a restaurant based on a person’s location);
- *theory of mind* (this type of AI understands thoughts and emotions, and interacts socially);
- *self-conscious* (self-conscious machines are the future generation of new technologies. They will be intelligent, sensitive, conscious)”²².

Thus, the AI common in modern society exists in the form of its weak (or narrow) version, designed to perform specific, human tasks. It is noted for its systemic nature, which ensures the integrity of the interacting components represented by software and information software, as well as hardware devices. It is able to collect data, interpret them in the form of considerations, make decisions

based on available information base about the possible and best way to solve the task assigned to.

Let us consider the opinions of Ukrainian scientists about the concept of information and information technologies (hereinafter referred to as IT), where AI has become the most widespread.

Let us start with the *information* definition. As already noted by N. Filipenko and S. Lukashevich, «despite the rich practice of using information flows in the intellectual activity of a modern person and the extensive theoretical development of this scientific category, today there is no stable definition of the concept of «information». This is due, first of all, to the diversity of areas of application of information; secondly, to the multi-vector nature of information flows; thirdly, to the large number of operators exchanging (disseminating) information; fourthly, to the rapid development of modern communication links and technologies, etc. The essence of the category under consideration is also strongly influenced by the lack of a single unified scientific language (i.e., the concept is used within the science in which it is applied). Specialists are no longer satisfied with the old definition of information, they need more specific features. Moreover, there are many definitions of information, and each of them reflects either the specifics of the field of knowledge in which a particular definition is used, or the specifics of the professional activity of the person who gave or proposed the said definition, or simply his or her personal taste and terminological inclinations»²³.

They noted that «with regard to the scientific definition of this concept, we emphasize that information is the definition of content obtained from the external world

22 Що таке штучний інтелект ... URL: <https://gigacloud.ua/blog/navchannja/scho-take-shtuchnij-intelekt-istorija-vidi-ta-skladovi> (date accessed: 07.02.2024).

23 Filipenko N. Ye., Lukashevych S. Yu. Information Technologies in Law Enforcement, Security and Expert Activities. *Наука і техніка сьогодні*. 2023. No. 13 (27). Pp. 13—22. DOI: [10.52058/2786-6025-023-13\(27\)-13-21](https://doi.org/10.52058/2786-6025-023-13(27)-13-21) (date accessed: 08.02.2024).

in the process of our adaptation to it and the adaptation of our feelings to it. The process of obtaining and using information is the process of our adaptation to the contingencies of the external environment and our life activity in the external environment. The application of the general laws of the theory of philosophy allows us to understand the natural essence of information, so information will be understood as a certain characteristic of reflection due to the fact that reflection is a general property, an attribute of matter and is always characterized by organization. Having analyzed the above, we note that it is the category of reflection that is the key that allowed us to discover the nature of information. The specification of the content led to a simultaneous expansion of the scope of the concept of «information» and began to characterize not only the aspect of human communication, but also communication phenomena in technology, biological and other processes. We consider information to be a strategic product, it is the basis of management activities, reflects not only the conditions of existence, quality, patterns, features of the object, the functioning of the subject, but also the management system as a whole, with its elements in particular»²⁴.

According to Yu. Piliukov, «in the theory of exact sciences, in particular mathematics, there is a different approach to understanding the nature of information from the philosophical one. In cybernetics, information is understood as any set of signals, influences

or data that a system absorbs from the environment (input information), transmits to the environment (output information) or, ultimately, stores in itself (internal, intra-system information)»²⁵.

Ukrainian scientists, developing this statement, note that «in the theory of law, the study of legal phenomena is closely related to the development of a separate general scientific information approach, which has resulted in a new direction that combines the subject of forensic science with information processes»²⁶. At the same time, some scholars identify the concept of “information” with such concepts as “data”, “information”, “message”, “knowledge”, etc. Due to this, such concepts as “evidentiary”, “orientation”, “forensic”, “operational and investigative”²⁷, information, etc. have appeared and spread in the theory of legal sciences.

The impact of information and, ultimately, IT on civilization, as well as the impact of informatization processes on the socio-economic and political fields is considered quite positive, but the newest deviant manifestations are emerging (transforming) and interfering with sustainable life systems in the world every day. Some of them are positive, contribute to development of social relations in general and are the driving forces of progress in technology, economics and culture, even changing outdated schemes of morality and aesthetics. Instead, some of them generate negative changes, destroy established social relations with

24 Filipenko N. Ye., Lukashevych S. Yu. Op. cit. DOI: 10.52058/2786-6025-023-13(27)-13-21 (date accessed: 08.02.2024).

25 Пілюков Ю. О. Використання інформаційних систем в експертних підрозділах МВС України : дис. ... канд. юрид. наук. Київ, 2009. С. 190. URL: <http://dspace.wunu.edu.ua/handle/316497/45008> (date accessed: 09.02.2024).

26 Лукашевич В. Г. Криминалистическая теория общения: постановка проблемы, методика исследования, перспективы использования : монография. Киев, 1993. С. 84—90.

27 Салтевский М. В. Идентификация и информация. *Правоведение*. 1965. № 3. С. 84 ; Яременко В. В., Філіпенко Н. Є. Основи реалізації оперативно-розшукової інформації : наук.-практ. посіб. Київ, 2009. 216 с.

the onset of negative phenomena for societies²⁸.

Scientists identify the following main information threats of our time:

1. Spread of areas of specific expertise application in detection and investigation of crimes in the field of computer information and high technologies creates new risks associated with the possibility of cross-border circulation of information that is increasingly used for criminal geopolitical, military-political, terrorist, extremist and other illegal purposes to the detriment of international security and strategic stability.
2. Use expansion of information and psychological influence technologies by the special services of individual States to destabilize internal political and social situation in certain regions that threatens sovereignty and territorial integrity of States.
3. Intensification of information and psychological influence on Ukrainian society, especially young people, in order to impose a pro-Russian position and call for betrayal of Ukraine's national interests.
4. Strengthening influence of terrorist and extremist organizations, which in their practices actively use mechanisms of information influence on individual and public consciousness, actively recruit supporters and sympathizers through social networks to incite hatred on religious, racial, ethnic grounds.
5. Emergence of new and improvement of existing computer crimes, especially in economic and financial field.
6. Increase in the number of computer attacks on critical infrastructure and air transport facilities.
7. Insufficiency of scientific research aimed at creating promising high technologies, low level of introduction of domestic developments in the field of information security, etc.²⁹

The *AI Concept* emphasizes that *"use of artificial intelligence technologies in ensuring information security is one of the factors that will contribute to ensuring national interests. In particular, monitoring social networks and Internet resources of electronic media using artificial intelligence technologies makes it possible to identify systemic trends and problems, act proactively, and analyze the target audience"*³⁰. To achieve the goal of the *AI Concept* in this area, *"the following tasks should be performed:*

- *formation and use of information resource, ensuring high rates of its filling and specified quality criteria (availability, reliability, timeliness, completeness);*
- *creation of a protected national information space using artificial intelligence technologies;*
- *detection, prevention and neutralization of real and potential*

28 Арістова І. В., Баранов О. А., Дзьобань О. П. та ін. Юридична відповідальність за правопорушення в інформаційній сфері та основи інформаційної деліктології : монографія / за заг. ред. проф. К. І. Беякова. Київ, 2019. С. 108. URL: https://ippi.org.ua/sites/default/files/monografiya_ok_0_0.pdf (date accessed: 03.02.2024).

29 Філіпенко Н. Є., Снігерьев О. П., Бубліков А. В. Застосування спеціальних знань під час виявлення, профілактики й розслідування злочинів у сфері комп'ютерної інформації та високих технологій (оглядова стаття). *Теорія та практика судової експертизи і криміналістики*. 2020. Вип. 22. С. 162—178. DOI: 10.32353/khrife.2.2020.12 (date accessed: 03.02.2024).

30 Концепція розвитку штучного інтелекту ... URL: <https://zakon.rada.gov.ua/laws/show/1556-2020-p#Text> (date accessed: 14.02.2024).

threats of dissemination by the media of the cult of violence, cruelty, pornography, attempts to manipulate public consciousness, in particular, by disseminating inaccurate, incomplete or biased information”³¹.

Thereby safe and ethical use of information occupies one of the leading places in the modern development of world community.

In provisions of normative legal acts of Ukraine and research papers of foreign and Ukrainian authors, we find several almost identical terms: *information technologies* and *information and communication technologies*.

The current Law of Ukraine: *On the National Informatization Program*, where the term *information technology* is no longer used, contains a definition of the term *informatization*, understanding it as “*set of interrelated organizational, legal, political, socio-economic, scientific, technical, technological and production processes aimed at creating conditions for ensuring the development of the information society and the introduction of information, communication and digital technologies*”³².

According to Art. 1 of Law of Ukraine: *On the National Informatization Program* that has expired, “*information technology is a purposeful organized set of information processes using computer facilities that provide high speed data processing, fast*

information retrieval, data dispersal, access to information sources regardless of their location”³³.

According to the definition of H. Shvachych and V. Tolstoy, “*information technology is a data processing technology (information resource) consisting of a set of technological elements: collection, accumulation, search, processing, transmission of data to users based on modern technical means*”, and the term “*ICT <...> is often used as a synonym for <...> IT, although ICT is a more general term that emphasizes the role of unified technologies and the integration of telecommunications (telephone lines and wireless connections), computers, firmware, software, storage and audiovisual systems that allow users to create, access, store, transmit, and modify information. In other words, ICT consists of IT, as well as telecommunications, media broadcasting, all types of audio and video processing, transmission, network management and monitoring functions*”³⁴.

ICT is a general term that combines all technologies for the transfer of information. The concept of ICT is quite broad and variable. The most common is the interpretation of ICT as a rationally organized set of actions in information space for targeted production and dissemination of information to influence a specific audience: *communication technologies: planned impact on target groups*³⁵.

31 Концепція розвитку штучного інтелекту ... URL: <https://zakon.rada.gov.ua/laws/show/1556-2020-p#Text> (date accessed: 19.02.2024).

32 Про Національну програму інформатизації : Закон України від 01.12.2022 р. № 2807-IX. URL: <https://zakon.rada.gov.ua/laws/show/2807-20#n191> (date accessed: 06.02.2024).

33 Про Національну програму інформатизації : Закон України від 04.02.1998 р. № 74/98-BP (утрат. чин.). URL: <https://zakon.rada.gov.ua/laws/show/74/98-%D0%B2%D1%80#Text> (date accessed: 19.02.2024). Він поступився місцем Закону України від 01.12.2022 р. № 2807-IX «Про Національну програму інформатизації».

34 Швачич Г. Г., Толстой В. В., Петречук Л. М., Іващенко Ю. С., Гуляєва О. А., Соболенко О. В. Сучасні інформаційно-комунікаційні технології : навч. посіб. Дніпро, 2017. С. 5, 7. URL: https://nmetau.edu.ua/file/ikt_tutor.pdf (date accessed: 19.02.2024).

35 Reddick C. G. Handbook of Research on Strategies for Local E-Government Adoption and Implementation: Comparative Studies. IGI Global, 2009. 1106 p.

ICT is a set of technologies that ensure recording of information, its processing and exchange (transmission, dissemination, disclosure) and IT are methods and means of obtaining, transforming, transmitting, storing and using information³⁶.

Consequently, ICT can be defined as a set of actions related to the processing, storage and interpretation of information, as a result of which it is modified in accordance with the needs of a particular subject. In this form, data gets into public information flow, provoking a certain (mostly predicted and planned) reaction of influence audience. *"ICT is a set of methods, tools and techniques that are used to collect, process, store, disseminate information in the interests of its users"*³⁷.

The AI Concept states that field of AI is an area of activity in the field of IT ensuring creation, implementation and use of AI technologies³⁸.

According to Ukrainian scientists, *"AI is a function of artificial consciousness, represented by a system of algorithms created and controlled by it, which provides self-learning in accordance with available information, acquired knowledge, rules, laws of society and its experience, the creation of new knowledge on this basis to*

*fulfill human orders, as well as the ability to conduct self-diagnosis and substantiate decisions made by it"*³⁹.

AI is a *"metaphorical name of one of the priority scientific areas that has developed in the general complex of cybernetic research on the problems of modeling thinking processes, intensification of intellectual activity through the computerization of certain types of it. Therefore, acquiring an increasingly independent character in the process of accelerated development, it becomes the basis of high information technologies and systems, a powerful driver of the historical progress of mankind"*⁴⁰.

The main directions of legal regulation of safe functioning and development of IT are determined by the need to limit the use of information and electronic systems during genetic experiments, to determine the procedure for accessing and using electronic databases of confidential information and information related to development of bioelectronic and psychocomputer systems, as well as to develop procedures filing of lawsuits in case of violation of the balance of public and personal interests providing for resolution of conflict situations that arise in connection with functioning and

36 Климанська Л. Д. Комунікативні технології моделювання політичного простору в демократичному суспільстві. *Розвиток демократії та демократична освіта в Україні* : зб. мат-лів III міжнар. наук. конф. (Львів, 19–22.05.2005). Київ, 2006. URL: <https://scholar.google.com/scholar?cluster=17011766827876176489&hl=en&oi=scholar> (date accessed: 06.02.2024) ; Інформаційні й комунікаційні технології / UA5.org. URL: <https://www.ua5.org/svit/281-nformacijn-jj-komunkacijn-tekhnolog.htm> (date accessed: 06.02.2024).

37 Кочубей Л. Особливості сучасних інформаційно-комунікативних технологій в Україні. *Наукові записки Інституту політичних і етнонаціональних досліджень ім. І. Ф. Кураса НАН України*. 2017. Вип. 3 (89). С. 44–70. URL: https://ipend.gov.ua/wp-content/uploads/2018/07/kochubei_osoblyvosti.pdf (date accessed: 02.02.2024).

38 Концепція розвитку штучного інтелекту ... URL: <https://zakon.rada.gov.ua/laws/show/1556-2020-p#Text> (date accessed: 19.02.2024).

39 Шевченко А. І., Барановський С. В., Білокобильський О. В., Бодянский Є. В., Бомба А. Я. та ін. Зазнач. твір. С. 61. URL: https://jai.in.ua/archive/2023/ai_mono.pdf (date accessed: 11.02.2024).

40 Мороз О. Штучний інтелект / Філософський енциклопедичний словник // редкол.: В. І. Шинкарук (голова) та ін. Київ, 2002. С. 727. URL: https://shron1.chtyvo.org.ua/Shynkaruk_Volodymyr/Filosofskyi-entsyklopedychnyi-slovyk.pdf (date accessed: 20.02.2024).

development of information and electronic systems. Probably, this opinion should be taken into account when determining the grounds for criminalization of an act, in particular, assessing the risks that State should counter by developing an effective criminal law policy and using the capabilities of AI in the field of IT.

An important role is played by specific expertise application during detection, prevention and investigation of crimes in the field of computer information and high technologies. As stated in modern Ukrainian specialist studies on this issue, “specifics of identifying and researching forensically significant computer information are primarily related to the fact that this field of specific expertise contains quite diverse science-intensive areas such as electronics, electrical engineering, information systems and processes, radio engineering and communication, computing (in particular, programming) and automation. Crimes of considered categories are most often latent in nature, leave no visible traces and are difficult to disclose and collect evidentiary information due to the wide use of remote access tools, data protection, etc.”⁴¹.

Note that one of the most important procedural forms of application of special knowledge is expertise. The computer forensic science term (hereinafter referred to as CFS) has entered the modern circulation of forensic expert institutions of the Ministry of Justice of Ukraine. We believe that the current terminology is not final. The use of terms is directly or

indirectly related to the appearance of new or moral obsolescence of existing technical means, so in the future both the appearance of new types of CFS and a change in its very name are possible. However, regardless of the name, its high technocratic nature and the need for it both by law enforcement agencies and society in general remain unchanged. “*The main task of experts during computer forensic is to answer questions requiring specific expertise in the field of computer forensics: knowledge about methods of searching, securing and researching digital evidence for crimes, related to computer information (cybercrimes).*”

CFS makes possible to form a complete evidence base by solving most diagnostic and identification issues i.e., it solves tasks related to the search, detection, evaluation and analysis of information contained in a computer system. As a result of CFS carried out during investigation of crimes related to violations of information security in open computer networks, theft (destruction, modification) of information and violations of information security, information is formed about vulnerability of information processing processes in information systems. At the same time, information security specialists can use the results of CFS to improve modern means of information protection and ensure information security”⁴². Taking into account the achievements of foreign and domestic scientists⁴³ in this direction, modern level of development of science and technology and the practical experience

41 Філіпенко Н. Є., Снігерьев О. П., Бубликов А. В. Зазнач. твір. DOI: 10.32353/khrife.2.2020.12 (date accessed: 20.02.2024).

42 Ibid.

43 Можаяев О. О., Можаяев М. О., Логвиненко М. О., Чорний С. В. Автоматизована система накопичення емпіричних даних у сфері комп'ютерно-технічних експертиз. Актуальні питання протидії кіберзлочинності та торгівлі людьми : зб. мат-лів Всеукр. наук.-практ. конф. (Харків, 23.11.2018). Харків, 2018. С. 302—304. URL: https://univd.edu.ua/general/publishing/konf/23_11_2018/pdf/89.pdf (date accessed: 19.02.2024) ; Філіпенко Н. Є., Лукашевич С. Ю. Зазнач. твір. DOI: 10.52058/2708-7530-2023-11(41)-1084-1095 (date accessed: 21.02.2024).

of implementing CFS, the main objects of research of specialists in the field of CFS are integrated and embedded systems, open systems, communication systems, as well as multimedia information objects for the most part, the purpose of such research is to solve diagnostic and identification tasks during information system research, gain access to electronic equipment and information. Thus, special attention is paid to telecommunication services SMS, EMS, MMS during the research of mobile terminals, because they are able to provide information about persons involved in criminal acts (in particular, in mobile communication networks).

The AI Concept stipulates that “*main task in the field of cybersecurity during the implementation of the state policy for the development of the field of artificial intelligence is to protect communication, information and technological systems, information technologies, primarily those used by operators (suppliers) of key services (including critical infrastructure facilities) and are important for the continuity of the functioning of the State, society and the security of citizens*”⁴⁴.

Accordingly, “*comprehensive solution to cyber security issues requires the following tasks:*

- *improvement of legislation and creation of a modern regulatory framework for the implementation of the best world practices of artificial intelligence in the field of cybersecurity and cyber defense;*

- *development of innovative cybersecurity systems that widely use artificial intelligence technologies to automatically analyze and classify threats and automatically select a strategy for their containment and prevention;*
- *studying the issue of licensing foreign artificial intelligence developments in the field of cybersecurity, especially in the public sector;*
- *creation of national information systems, platforms and products in order to reduce the share of foreign software in the field of cybersecurity used by public administration bodies;*
- *update of state standards regarding information security, in particular state information resources, as well as the development of new national standards in the field of cyber security and cyber protection, in particular organizational and technical requirements related to security of applications, mobile devices, workstations, servers and networks, cloud computing models. Updating of standards and development of new ones should be carried out taking into account European and international standards, in particular standards: ISO 27001⁴⁵, ISO/IEC 27032^{46» 47}.*

Investigating the most relevant areas of application of ICT and AI, we found that in the process of designing, implementing and disseminating AI systems, a number of specific problems inevitably arise, which number is constantly increasing with

44 Концепція розвитку штучного інтелекту ... URL: <https://zakon.rada.gov.ua/laws/show/1556-2020-p#Text> (date accessed: 14.02.2024).

45 ISO/IEC 27001:2022 Information security, cybersecurity and privacy protection. Information security management systems. Requirements. URL: <https://www.iso.org/standard/27001> (date accessed: 19.02.2024).— Прим. авт.

46 ISO/IEC 27032:2023 Cybersecurity. Guidelines for Internet security. URL: <https://www.iso.org/ru/standard/76070.html> (date accessed: 11.02.2024).— Прим. авт.

47 Концепція розвитку штучного інтелекту ... URL: <https://zakon.rada.gov.ua/laws/show/1556-2020-p#Text> (date accessed: 19.02.2024).

development of application scope of AI systems.

Traditionally, these problems are called *ethical*, but, in our opinion, they go far beyond the actual ethical issues. The researchers rightly note that many problematic questions arise: “Will AI perceive morality and law and will it be guided by morality and law to make autonomous decisions?”, “What is the decision-making process for the AI system?”, “What are the moral and legal consequences of AI actions and decisions?”; “Can the AI system be held accountable for its actions?”. This is not a complete list of issues that arise in case of violation of the topic of legal and moral and ethical norms that should regulate issues related to the use of AI technologies⁴⁸.

We characterize them as socio-philosophical, since they cover a wide range of issues on the interaction between humans and AI in various fields of public life, violating, in addition to the actual ethical and moral problems, existential, axiological and others. In addition, their action worsens the condition and position of a person in the world. Consequently, they require understanding and permission both from ethical considerations and from the standpoint of social philosophy.

Thus, existential problem of human loss of the meaning of being can arise, for example, as a result of the introduction of ICT and AI into production. A person who

has lost his job due to his replacement by a robot often finds it difficult to find other forms of successful socialization, he feels useless, unclaimed by society and thinks about the purpose, value and meaning of his life. Axiological aspect of the impact of AI technologies on the worldview of modern man is due to the fact that society perceives AI as an absolute, unconditional value, displacing traditional values of human life on the sidelines of existence.

We should focus on a special class of problems caused by a certain novelty of the AI phenomenon, the lack of experience in its application in social practice and, as a result, the lack of human awareness of real and potential possibilities of using AI capabilities in the IT field.

Problems of applying AI capabilities in the field of IT have repeatedly become the subject of scientific discussion. According to its results, scientists have obtained important results and published reviews of the most important, in their opinion, issues.

Thus, J. Bossmann identified 9 main problems in the field of AI: unemployment, inequality, humanity, artificial stupidity, racist robots, security, evil gins, singularity and the rights of robots⁴⁹. M. Ryan and J. Antoniou and their co-authors are already talking about 17 challenges⁵⁰. T. Hagendorff in a fundamental study of various ethical guides⁵¹ identified problems of non-

48 Головка О. М., Боднар Є. Етико-правові проблеми використання роботів зі штучним інтелектом. *Вісник Національного технічного університету України «Київський політехнічний інститут»*. Політологія. Соціологія. Право. 2022. Вип. 3 (55). С. 93–97. DOI: 10.20535/2308-5053.2022.3(55).269563 (date accessed: 19.02.2024).

49 Bossmann J. Top 9 Ethical Issues in Artificial Intelligence / World Economic Forum. Oct 21, 2016. URL: <https://www.weforum.org/agenda/2016/10/top-10-ethical-issues-in-artificial-intelligence/> (date accessed: 14.02.2024).

50 Ryan M., Antoniou J., Brooks L., Jiya T., Macnish K. & Stahl B. Research and Practice of AI Ethics: a Case Study Approach Juxtaposing Academic Discourse with Organisational Reality. *Science and Engineering Ethics*. 2021. Vol. 27. Art. 16. DOI: 10.1007/s11948-021-00293-x (date accessed: 12.02.2024).

51 Hagendorff T. The Ethics of AI Ethics: An Evaluation of Guidelines. *Minds and Machines*. 2020. Vol. 30. Pp. 99–120. DOI: 10.1007/s11023-020-09517-8 (date accessed: 14.02.2024).

transparency, violation of confidentiality, discrimination, security threats, lack of accountability (responsibility).

In the report *Artificial Intelligence and Life in 2030: The One Hundred Year Study on Artificial Intelligence*⁵², among the urgent problems of the use of AI systems, the following are named: threat to the security and confidentiality of personal data, violation of criminal and civil liability, unemployment, certification.

The publication: *Ethically Aligned Design: a Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems*⁵³ states, in particular, “the use and impact of autonomous and intelligent systems (A/IS) become pervasive, we need to establish societal and policy guidelines in order for such systems to remain human-centric, serving humanity’s values and ethical principles. These systems have to behave in a way that is beneficial to people beyond reaching functional goals and addressing technical problems. This will allow for an elevated level of trust between people and technology that is needed for its fruitful, pervasive use in our daily lives.

To be able to contribute in a positive, non-dogmatic way, we, the techno-scientific communities, need to enhance our self-reflection, we need to have an open and honest debate around our imaginary, our sets of explicit or implicit values, our institutions, symbols and representations.

Eudaimonia, as elucidated by Aristotle, is a practice that defines human well-being as the highest virtue for a society. Translated roughly as «flourishing», the benefits of *eudaimonia*

begin by conscious contemplation, where ethical considerations help us define how we wish to live.

Whether our ethical practices are Western (Aristotelian, Kantian), Eastern (Shinto, Confucian), African (Ubuntu), or from a different tradition, by creating autonomous and intelligent systems that explicitly honor inalienable human rights and the beneficial values of their users, we can prioritize the increase of human well-being as our metric for progress in the algorithmic age. Measuring and honoring the potential of holistic economic prosperity should become more important than pursuing one-dimensional goals like productivity increase or GDP growth»⁵⁴.

This book states that «intelligent and autonomous technical systems are specifically designed to reduce human intervention in our day-to-day lives. In so doing, these new fields are raising concerns about their impact on individuals and societies. Current discussions include advocacy for the positive impact, as well as warnings, based on the potential harm to privacy, discrimination, loss of skills, economic impacts, security of critical infrastructure, and the long-term effects on social well-being. Because of their nature, the full benefit of these technologies will be attained only if they are aligned with our defined values and ethical principles. We must therefore establish frameworks to guide and inform dialogue and debate around the non-technical implications of these technologies... Autonomous systems designed to cause physical harm have additional ethical dimensions as

52 Stone P., Brooks R., Brynjolfsson E., Calo R., Etzioni O., Hager G. et al. *Artificial Intelligence and Life in 2030: The One Hundred Year Study on Artificial Intelligence* : Report of the 2015 Study Panel. Stanford University. Stanford, CA, Sept 2016. 52 p. DOI: [10.48550/arXiv.2211.06318](https://doi.org/10.48550/arXiv.2211.06318) (date accessed: 19.02.2024).

53 *Ethically Aligned Design: a Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems*. Version II. The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems. 266 p. URL: https://standards.ieee.org/wp-content/uploads/import/documents/other/ead_v2.pdf (date accessed: 13.02.2024).

54 Ibid.

compared to both traditional weapons and/or autonomous systems not designed to cause harm. These ethical dimensions include, at least, the following:

- Ensuring meaningful human control of weapons systems;
- Designing automated weapons with audit trails to help guarantee accountability and control;
- Including adaptive and learning systems that can explain their reasoning and decisions to human operators in a transparent and understandable way;
- Training responsible human operators of autonomous systems who are clearly identifiable;
- Achieving behavior of autonomous functions that is predictable to their operators;
- Ensuring that the creators of these technologies understanding the implications of their work;
- Developing professional ethical codes to appropriately address the development of autonomous systems intended to cause harm»⁵⁵.

Since daily use of IT in everyday life leads to significant changes in the material and spiritual world of a person, Ch. Reed⁵⁶ and M. U. Scherer⁵⁷ emphasize the problem of responsibility sharing in

the context of applying AI capabilities in the field of IT in smart cities. They write that AI systems should always be regulated, accountable and provided with mechanisms for compensating for accidents. This is precisely the type of regulation protecting human values and human life itself, sustainable development and environmental protection, compliance with requirements of social justice. These social values, in their opinion, should have an unconditional priority over economic values, considerations of profit and benefit.

Another equally striking example: R. Kurzweil⁵⁸ and B. Goertzel⁵⁹ believe that in a world of extremely intelligent machines, ICT and AI will directly affect well-being of people, therefore, they can both help and harm a person. Imagine that AI fails or falls into the hands of politically motivated terrorist groups or military organizations. With the help of AI, for example, they will spy, collect confidential information about organizations, politicians and individuals, which will cause significant damage to civilians and State institutions.

Unfortunately, it cannot be stated unequivocally that these fears are unjustified. The leading countries of the world are already using narrow AI for military purposes. We are talking, in particular, about unmanned aerial vehicles (drones) *Northrop Grumman X-47B*, which

55 Ethically Aligned Design URL: https://standards.ieee.org/wp-content/uploads/import/documents/other/ead_v2.pdf (date accessed: 17.02.2024).

56 Reed Ch. How should we regulate artificial intelligence? *Philosophical Transactions of the Royal Society A. Mathematical, Physical and Engineering Sciences*. 06 Aug 2018. Vol. 376. Is. 2128. P. 201. DOI: 10.1098/rsta.2017.0360 (date accessed: 19.02.2024).

57 Scherer M. U. Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies (May 30, 2015). *Harvard Journal of Law & Technology*. Spring 2016. Vol. 29. No. 2. 48 p. DOI: 10.2139/ssrn.2609777 (date accessed: 03.02.2024).

58 Kurzweil R. *The Age of Intelligent Machines*. Cambridge, MA : MIT Press, 1990. 565 p.

59 Goertzel B. Should Humanity Build a Global AI Nanny to Delay the Singularity Until it's Better Understood? *Journal of Consciousness Studies*. 2012. Vol. 19 (1–2). Pp. 96–111. URL: https://www.researchgate.net/publication/233497378_Should_Humanity_Build_a_Global_AI_Nanny_to_Delay_the_Singularity_Until_It's_Better_Understood (date accessed: 03.02.2024).

13 years ago were tested in the US Navy ⁶⁰. The management of this system, the choice of how to perform the task is completely entrusted not to a person, but to a narrow AI – a drone. Today, it is not yet known whether developers will develop such systems to the level of general intelligence. However, according to R. C. Arkin, the US military has already shown interest in producing intelligent systems designed to kill ⁶¹.

At the same time, there are ICTs that are already actively used in countering real terrorist threats.

As Ha. Spitsyna and N. Filipenko emphasize, *“the most dangerous and destructive consequences are determined by terrorist acts associated with the use of weapons, ammunition or explosives, because they create a real threat to people’s lives and health, cause the destruction of industrial, economic or defense facilities. <...> Complexity of the disclosure and investigation of the mentioned crimes is due to the following: the rapid appearance of the latest developments in the field of weapons; the weakness of the control system for the movement of weapons, ammunition and explosives along the demarcation line between the Armed Forces of Ukraine and armed terrorist groups; manifestations of corruption, shortcomings of organizational and economic activity in the Armed Forces of Ukraine; reduction of disciplinary requirements for military*

personnel; large gaps in the national-patriotic education of the population; the significant influence of the OUF on the socio-demographic structure of society (appearance of a large number of people who have been demobilized from ranks of the army and have combat experience and high military qualifications); an increase in stress and psychological burden on society, the emergence of panic moods caused by existence of negative military, economic and social factors; the activity of a large number of informal military-type associations; an increase in social tendencies towards the resolution of conflicts by force, the spread of manifestations of cruelty and violence; low coordination of actions of law enforcement agencies during anti-terrorist operations; the availability of a large database from the open arrays of the Internet on the creation and use of weapons and explosive devices; availability of so-called “dual-use” means that can be used as components to create homemade weapons or explosive devices; significant prevalence on the Internet of sites with overt extremist ideology, etc.” ⁶².

Unfortunately, critical infrastructure facilities are and will remain the most vulnerable to terrorist attacks. That is why, on February 17, 2017, the UN Security Council unanimously adopted Resolution No. 2341 on protection of critical infrastructure facilities and expanding the capabilities of states to prevent attacks on critical infrastructure facilities and

60 Navy’s Second Stealthy X-47B Drone Flies / Military.com. DefenseTech. 2011-11-28. URL: <https://web.archive.org/web/20210511114646/https://www.military.com/defensetech/2011/11/28/second-x-47b-uav-flies> (date accessed: 13.02.2024).

61 Arkin R. C. Governing Lethal Behavior: Embedding Ethics in a Hybrid Deliberative/Reactive Robot Architecture / Eds. P. Wang, B. Goertzel, S. Franklin // Artificial general intelligence, 2008: Proceedings of the first AGI conference. Washington DC : ISO Press, 2008. Pp. 51–62. URL: <https://sites.cc.gatech.edu/ai/robot-lab/online-publications/formalizationv35.pdf> (date accessed: 18.02.2024).

62 Спіцина Г. О., Філіпенко Н. Є. Терористична діяльність: кримінально-правова політика протидії. Кримінально-правові та кримінологічні засоби протидії злочинам проти громадської безпеки та публічного порядку : зб. тез доп. міжнар. наук.-практ. конф. до 25-річ. ХНУВС (Харків, 18.04.2019). Харків, 2019. С. 189. URL: https://univd.edu.ua/general-publishing/konf/18_04_2019/pdf/9.pdf (date accessed: 19.02.2024).

called on states to confront the danger of terrorist attacks on them. In sec. II: *Measures to combat and prevent terrorism* of the UN Global Counter-Terrorism Strategy, member states noted the need to “intensify all efforts to improve the security and protection of particularly vulnerable targets, such as infrastructure and public places, as well as in response to terrorist attacks and other disasters, in particular in the field of civil protection, recognizing that States may need assistance for this purpose”⁶³.

In this context, reliable short-term forecasts of non-state terrorism at the local level are key to the application of preventive measures. As scientists note, the study of armed conflicts and insurgents contributed to the development of prognostic models based on the theory⁶⁴ of the application of AI capabilities to predict the conflict on an accurate space temporal scale⁶⁵. However, this important information has not yet been included in terrorism research, which has largely focused on explanatory models using statistical approaches to capture and quantify the effects of the driving forces of terrorist attacks across space and time⁶⁶. Therefore, there is a need to develop an interpretable model for predicting

terrorist events on precise spatial and temporal scales which will contribute to implementation of effective measures, objective evaluation and sustainable development of relevant theories⁶⁷.

Dr. A. Python from Zhejiang University (China) and colleagues have found a way to improve the work of AI in this area. The scientists developed a framework “for predicting terrorist attacks around the world by first studying terrorist attacks that occurred during 2002-2016 (795 weeks) in 13 regions, including all subcontinental regions listed in the Global Terrorism Database (hereinafter referred to as GTD) and West Africa. For each region, predictive models have been built that allow identifying, evaluating and comparing the role of the main terrorist driving forces. Researchers have prepared a tree-like algorithm of interpreted machine learning with so-called gradient boosting. To cover all regions of the world that have experienced terrorist attacks for a long time, the authors divided the regions into cells, each of which covers an area of 50 × 50 km, and set a time parameter of 795 weeks. Then a tree-like machine learning algorithm began to work, analyzing the probability of terrorist attacks

63 The Protection of Critical Infrastructure Against Terrorist Attacks. Compendium of Good Practices. UN Office of Counter-Terrorism ; UN Security Council CTED ; Iterpol, 2022. 155 p. URL: https://www.un.org/counterterrorism/sites/www.un.org.counterterrorism/files/2225521_compendium_of_good_practice_web.pdf (date accessed: 19.02.2024).

64 Lim M. T., Metzler R., Bar-Yam Ya. Global Pattern Formation and Ethnic/Cultural Violence. *Science*. 2007. Vol. 317 (5844). Pp. 1540–1544. DOI: [10.1126/science.1142734](https://doi.org/10.1126/science.1142734) (date accessed: 02.02.2024) ; Zammit-Mangion A., Dewar M., Kadirkamanathan V., Sanguinetti G. Point process modelling of the Afghan War Diary. *Proceedings of the National Academy of Sciences*. 2012. Vol. 109. Is. 31. Pp. 12414–12419. DOI: [10.1073/pnas.1203177109](https://doi.org/10.1073/pnas.1203177109) (date accessed: 03.02.2024).

65 Hegre H., Karlsen J., Nygård H. M., Strand H., Urdal H. Predicting Armed Conflict, 2010–2050. *International Studies Quarterly*. 2013. Vol. 57 (2). P. 255. DOI: [10.1111/isqu.12007](https://doi.org/10.1111/isqu.12007) (date accessed: 03.02.2024).

66 Nemeth S. Ch., Mauslein J. A., Stapley C. The Primacy of the Local: Identifying Terrorist Hot Spots Using Geographic Information Systems. *The Journal of Politics*. Apr 2014. Pp. 304–317. DOI: [10.1017/S0022381613001333](https://doi.org/10.1017/S0022381613001333) (date accessed: 19.02.2024).

67 Python A., Bender A., Nandi A. K., Hancock P. A., Arambepola R., Brandsch J., Lucas T. C. D. Predicting non-state terrorism worldwide. *Science Advances*. 2021. Vol. 7. Is. 31. DOI: [10.1126/sciadv.abg4778](https://doi.org/10.1126/sciadv.abg4778) (date accessed: 19.02.2024).

(and countermeasures) in each cell every week around the world”⁶⁸.

According to scientists, AI has quite effectively predicted events in territories that have repeatedly suffered from attacks, but it is difficult for them to build forecasts for regions where there have been no terrorist attacks for a long time. This data imbalance reduces the accuracy of models, but it can be achieved by applying additional parameters.

These problems are particularly acute in the process of using relatively recently invented *Generative Pre-trained Transformer* chat (hereinafter referred to as GPT-4), based on AI. The GPT-4 with AI chatbot is a generative language model launched by the commercial company *Open AI* on March 14, 2023 to develop previously developed GPT chatbots. It is called generative because it is able to create new data, not just analyze existing data. GPT-4 chat not only recognizes patterns, but also uses them to create new data.

Modern chatbot composes poems and songs, prepares slides in a certain style, successfully interviews for a job at Google, writes marketing campaigns for a certain demographic group, comments on online games and creates high-resolution images, makes forecasts, financial analytics, generates the simplest code, communicates in many languages of the world. The products obtained by GPT-4 are almost indistinguishable from human-generated content, since this system uses all the information available on the Internet. Therefore, at first glance, GPT-4 looks like a full-fledged partner of a person in the creative work of creating innovative

products. The advantages of this new AI tool (compared to its predecessors) are obvious, but it is important to see and understand the downside of this phenomenon and the problems it creates.

As the researchers note, «one of the key concerns surrounding GPT-4 is the issue of bias. AI models like GPT-4 are trained on vast amounts of data, which means that they can inadvertently perpetuate biases present in the training data. This can result in biased outputs and reinforce existing societal prejudices. It is essential for developers and researchers to address this issue and ensure that GPT-4 is trained on diverse and unbiased data to mitigate potential harm.

Another ethical consideration is the potential misuse of GPT-4. With its advanced capabilities, GPT-4 could be used to spread misinformation, create deepfake content, or even manipulate public opinion. This raises concerns about the responsibility of individuals and organizations in using GPT-4 ethically and responsibly. It is crucial to establish guidelines and regulations to prevent misuse and promote ethical practices in the development and deployment of AI technologies.

Additionally, the impact of GPT-4 on the job market cannot be overlooked. As AI continues to advance, there is a legitimate concern about job displacement and the need for re-skilling the workforce. GPT-4's ability to generate human-like content raises questions about the future of content creators, writers, and journalists. It is crucial for society to anticipate these changes and proactively prepare for the integration of AI technologies into various industries»⁶⁹.

68 Комп'ютер проти тероризму: вчені навчили ШІ передбачати теракти по всьому світу / Фокус. 04.08.2021. URL: <https://focus.ua/uk/digital/489637-kompyuter-protiv-terrorizma-uchenye-nauchili-ii-predskazyvat-terakty-po-vseму-miru> (date accessed: 11.02.2024).

69 Exploring the Ethical Impact of GPT-4: The Future of AI [Electronic resource] / SINCODE. Oct 31, 2023. URL: <https://www.sincode.ai/blog/exploring-the-ethical-impact-of-gpt-4-the-future-of-ai#:~:text=With%20its%20advanced%20capabilities%2C%20GPT,GPT-4%20ethical%20and%20responsibly> (date accessed: 19.02.2024).

Similar concerns are expressed by other experts. For example, research *8 Ethical Considerations of Large Language Models (LLM) Like GPT-4* states ⁷⁰ that «as LLMs become more powerful, it is vital to consider the ethical implications of their use. From generating harmful content to disrupting privacy and spreading disinformation, the ethical concerns surrounding the usage of LLMs are complicated and multifold. Large Language Models have the potential to generate harmful content such as hate speech, extremist propaganda, racist or sexist language, and other forms of content that could cause harm to specific individuals or groups.

While LLMs are not inherently biased or harmful, the data they are trained on can reflect biases that already exist in society. This can, in turn, lead to severe societal issues such as incitement to violence or a rise in social unrest. For instance, Open Ai's Chat GPT model was recently found to be generating racially biased content despite the advancements made in its research and development... a major ethical concern related to Large Language Models is their tendency to hallucinate, i.e., to produce false or misleading information using their internal patterns and biases. While some degree of hallucination is inevitable in any language model, the extent to which it occurs can be problematic. This can be especially harmful as models are becoming increasingly convincing, and users without specific domain knowledge will begin to over-rely on them. It can have severe consequences for the accuracy and truthfulness of the information generated by these models. Therefore, it's essential to ensure that AI systems are trained on

accurate and contextually relevant datasets to reduce the incidence of hallucinations... Another serious ethical concern related to LLMs is their capability to create and disseminate disinformation. Moreover, bad actors can abuse this technology to carry out influence operations to achieve vested interests. This can produce realistic-looking content through articles, news stories, or social media posts, which can then be used to sway public opinion or spread deceptive information. These models can rival human propagandists in many domains making it hard to differentiate fact from fiction. This can impact electoral campaigns, influence policy, and mimic popular misconceptions, as evidenced by TruthfulQA. Developing fact-checking mechanisms and media literacy to counter this issue is crucial... Weapon proliferators can potentially use LLMs to gather and communicate information regarding conventional and unconventional weapons production. Compared to traditional search engines, complex language models can procure such sensitive information for research purposes in a much shorter time without compromising accuracy. Models like GPT-4 can pinpoint vulnerable targets and provide feedback on material acquisition strategies given by the user in the prompt. It is extremely important to understand the implications of this and put in security guardrails to promote the safe use of these technologies» ⁷¹.

Another significant ethical problem of using AI capabilities in the field of IT is the progression of people's dependence on such programs and the gradual delegation to them by humans of solving increasingly complex and important tasks ⁷². According

70 Sajid H. *8 Ethical Considerations of Large Language Models (LLM) Like GPT-4* / UNITE.AI. Apr 10, 2023. URL: <https://www.unite.ai/8-ethical-considerations-of-large-language-models-llm-like-gpt-4/> (date accessed: 06.02.2024).

71 Ibid.

72 Baird A., Maruping L. M. The Next Generation of Research on IS Use: A Theoretical Framework of Delegation to and from Agentic IS Artifacts. *MIS Quarterly*. 2021. Vol. 45. Is. 1b. Pp. 315—341. DOI: 10.25300/MISQ/2021/15882 (date accessed: 19.02.2024).

to the researchers, in developing countries where there is a lack of experts in certain fields of knowledge, *GPT-4* chat can replace them by generating the information needed by users. The widespread use of chatbots in education currently requires restructuring and adaptation of the educational process, the work of teachers, researchers and university management to the conditions of a rapidly changing digital environment. Similar technologies are also actively used by students to write scientific papers, which causes problems with plagiarism and academic integrity⁷³. In addition to the obvious problems, it is worth considering the risk of more global and long-term negative consequences. It is, for example, about the possible rejection of education seekers from in-depth study and critical analysis of various aspects of the subject they are studying, as a result of their use of the *GPT-4* chat giving quick result without real immersion and mastering new skills and acquiring new knowledge. Thus, S. O'Connor notes that this can lead to atrophy of critical thinking and creative potential, which are necessary for human development⁷⁴.

Availability of this technology to the mass consumer and developers through programming languages (for example, *Python*), cloud services (for example, *Amazon Web Services*, *Microsoft Azure*, *Google*) makes it possible to apply it as widely as, for example, *Excel* and *Access*

software. This ease and simplicity multiply the risk of harm to a person due to the use of information generated by this system which has nothing to do with the real solution of the tasks facing a person.

At the same time, the use of ICT and AI capabilities in education greatly facilitates its administration. For example, most AI technologies in the field of education are still used to check the attendance of classes and the fulfillment of tasks by students, assess and analyze answers in exams, and draw up personal training plans. *IBM* has developed a *Teacher Advisor* that helps third-grade (US) math teachers make personalized lesson plans⁷⁵. This system adapts learning materials for students in the same class but with different skill levels. In the future, *IBM* plans to increase the number of subjects and classes, management and conducting of classes with/in which it will contribute.

Duolingo, a language learning software company, uses AI to analyze user activity and assess their learning progress. This software creates personalized lesson plans and regularly tests new strategies to improve their effectiveness⁷⁶. *Duolingo* structures lesson plans so that each user can learn how to improve their own results and implement the most effective options for learning foreign languages.

In our opinion, the problems caused by application of AI capabilities in the field of IT require a socio-ethical understanding,

73 Stokel-Walker Ch. AI bot ChatGPT writes smart essays — should professors worry? *Nature*. 2022 Dec 9. DOI: [10.1038/d41586-022-04397-7](https://doi.org/10.1038/d41586-022-04397-7) (date accessed: 09.02.2024).

74 O'Connor S. Open artificial intelligence platforms in nursing education: Tools for academic progress or abuse? *Nurse Education in Practice*. 2023. Vol. 66. Art. 103537. DOI: [10.1016/j.nepr.2022.103537](https://doi.org/10.1016/j.nepr.2022.103537) (date accessed: 19.02.2024).

75 Harris E. A. Next Target for IBM's Watson? Third-Grade Math. *The New York Times*. Sept 27, 2016. URL: <http://www.nytimes.com/2016/09/28/nyregion/ibm-watson-common-core.html> (date accessed: 18.02.2024).

76 Guliani P. Duolingo Looks to Dominate the Mobile Education Market With New Flashcard App TinyCards / *Forbes*. July 22, 2016. URL: <http://www.forbes.com/sites/parulguliani/2016/07/22/duolingo-looks-to-dominate-the-mobile-education-market-with-new-flashcard-app/> (date accessed: 17.02.2024).

since their content corresponds to the main intention of socio-philosophical research. Social philosophy traditionally studies the universal, essential features of society, the most general laws of its dynamics, the deep causes of specific events and processes, and prospects for the development of society from the standpoint of integrity and systematicity. All this knowledge is necessary for her to clarify the place and role of a person who is the creator of values and norms necessary for the common existence of significant groups of people functioning of social institutions, existence of social reality in general.

These issues are and will remain the subject of consideration by philosophers. So, «three main themes that repeat across multiple papers concern, firstly, surveillance and algorithmic decision-making — its nature (Søe), harms (Brincker), acceleration (Vestergaard), normalization (Selinger and Rhee) — and possible rethought ownership (Schneider). Another reoccurring theme is the harm of the widespread myth or ideology of “technological determinism.” Namely, the notion that even though technology is made and implemented by human hands, we somehow are entirely incapable of shaping its developments and use. Several papers explicitly analyze and express concerns about this notion (see especially Vestergaard and Brincker), and others implicitly counter it by way of proposing new directions (see especially Alfano and Schneider). A last theme that repeats in these articles is the importance of public spaces, and the need for new ways of supporting the social and democratic fabric of society in the face of current trends of surveillance and misinformation (Søe, Vestergaard, Brincker, Alfano, and Schneider)»⁷⁷.

In other words, in the focus of socio-philosophical research, there is always

a person as the central element of the universe, creator and carrier of all the properties and qualities of the social, without which there is no point in talking about society. Thus, the problems arising while human interaction with AI systems should be added to the range of issues studied by social philosophy, since discussion and resolution of these issues concerns foundations of human existence in the world, its position in relation to the rest of the components of social reality, as well as the immediate and remote prospects for its development.

As noted in professional researches, «*philosophy of mind examines questions about mental states, cognition, and consciousness in humans, and these inquiries become even more intriguing when applied to AI. Philosophers ponder whether AI can genuinely possess conscious experiences or if it merely mimics human-like behavior without true subjective awareness. As AI increases its sophistication, these views become more relevant to our ethical responsibilities in creating and interacting with intelligent machines. One captivating thought experiment in this domain is the concept of the philosophical zombie — a hypothetical being that is physically identical to a conscious human but lacks subjective experience or consciousness. It is indistinguishable from a conscious person in behavior and responses, but has no inner experience. Philosophers use this experiment to consider whether AI could ever be functionally identical to conscious beings without necessarily having consciousness. Transparency and accountability are vital ethical concerns in AI. The “black-box” nature of some AI algorithms makes it challenging to understand the reasoning behind their decisions. The concept of accountability becomes more complex as AI systems become more autonomous and operate beyond human*

77 Pedersen E. O., Brincker M. Philosophy and Digitization: Dangers and Possibilities in the New Digital Worlds. SATS. Northern European Journal of Philosophy. July 8, 2021. DOI: 10.1515/sats-2021-0006 (date accessed: 05.02.2024).

oversight. Philosophers grapple with questions regarding the allocation of responsibility when AI makes mistakes or causes harm. They explore the role of human designers, the training data used to create AI models, and the transparency of decision-making processes as crucial factors in determining accountability»⁷⁸.

Thereby socio-philosophical research is also necessary to identify the complex nature of the problems of applying AI capabilities in the field of IT, to find solutions to these problems not only from the theoretical positions of ethics, axiology, philosophical anthropology and other branches of knowledge about man and society, but to understand integrity of human social life, implementation of humanistic ideals, activity nature, purposeful human function, its ability to transform nature and the resulting central position of man in social activity.

Conclusions

Summarizing the above, we note that a security threat or harm is a central, system-forming security, legal and socio-philosophical problem of the application of AI technology in the field of IT.

In the sources considered by us, researchers name the following most frequently discussed issues and problems of applying AI capabilities in the field of IT: violation of human autonomy, social injustice, violation of confidentiality, lack of responsibility, opacity, harm to humans.

Certainly, the proposed list of ICT and AI application problems is not exhaustive. The penetration of AI systems into all spheres of public life, the continuous improvement of technologies and the growth of their impact on human life and activity will eventually clarify and replenish this list. In addition, it is obvious that social problems can cause not only the use of AI capabilities in the field of IT: non-AI technologies are also quite capable of acting as a source of

these problems. However, use of AI can enhance the effect of other causes, as well as independently worsen human situation in the world.

All of the above necessitates a systematic, holistic, balanced study of the impact on society and humans of the use of AI capabilities in the field of IT by means and methods of humanistically oriented and socio-philosophical interpretation of human interaction with AI, which makes it possible to find solutions and ways to overcome existing and possible problems and obstacles in this area in the future.

Застосування штучного інтелекту й інформаційно-комунікаційних технологій: соціально-етичні проблеми (оглядова стаття)

**Наталія Філіпенко, Сергій Лукашевич,
Олена Андреева, Александар Іванович**

Метою статті є розкрити сутність соціальних та етичних вимог до застосування інформаційно-комунікаційних технологій і штучного інтелекту в житті сучасної людини, соціуму й держави. Для досягнення поставленої мети застосовано загальнонаукові та спеціальні наукові методи. Своєрідність аналізованої теми передбачає обов'язкове зваження на правила і вимоги, уже сформульовані різноманітними соціальними інституціями й організаціями у відповідь на виклики цифрової реальності. Наголошено, що наявне етичне регулювання застосування інформаційно-комунікаційних технологій і штучного інтелекту здебільшого обмежено рамковими, декларативними документами, які позначають лише загальні підходи та мету взаємодії людства із системами штучного інтелекту, своєрідне застереження про можливі негативні наслідки застосування технологій. Незважаючи на суттєві збіги в запропонованих принципах, зміст цих норм до сьогодні

⁷⁸ Pedersen E. O., Brincker M. Op. cit. DOI: 10.1515/sats-2021-0006 (date accessed: 22.02.2024).

залишається майже нерозкритим. Акцентовано, що використання штучного інтелекту потребує спеціального правового регулювання, оскільки йдеться про життя та здоров'я людей. Через потенційну небезпеку для цивілізації інформаційно-комунікаційних технологій і штучного інтелекту необхідно суворо ліцензувати діяльність, пов'язану з виробництвом і експлуатацією таких систем. Для цього на законодавчому рівні потрібно чітко визначити відповідальних за виникнення позаштатних ситуацій, а також відповісти на питання: «Чи можливий і чи правомірний перехід штучного інтелекту зі статусу об'єкта у статус суб'єкта правовідносин?». Усе згадане вище свідчить про важливість і значущість обраної мети дослідження та потребує соціально-етичного осмислення найбільш актуальних проблем застосування можливостей штучного інтелекту.

Ключові слова: штучний інтелект; інформаційно-комунікаційні технології; соціальні виклики; етичні проблеми; сфера інформаційних технологій.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the study design, data collection and analysis, decision to publish, or manuscript preparation.

Participants

Author contributed solely to the intellectual discussion underlying this document, case law research, writing and editing and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Authors declares no conflict of interest related to this topic, although Aleksandar Ivanović is member of Editorial Board of research paper collection; he was not involved in publishing decision, and this

article has undergone a full peer review and editing procedure.

References

- Ad Hoc Committee on Artificial Intelligence (CAHAI) Policy Development Group (CAHAI-PDG). Draft Questionnaire for the Multi-Stakeholder Consultation. CAHAI-PDG(2021)01. URL: <https://rm.coe.int/cahai-pdg-2021-01-draft-questionnaire-on-feasibility-study-rev14012020/1680a11d31>.
- Aristova, I. V., Baranov, O. A., Dzoban, O. P. et al. (2019). *Yurydychna vidpovidalnist za pravoporushennia v informatsiinii sferi ta osnovy informatsiinoi deliktologii* [Legal liability for offenses in the information sphere and the basics of information] : monohrafiia / za zah. red. prof. K. I. Bieliakova. Kyiv. URL: https://ippi.org.ua/sites/default/files/monografiya_ok_0_0.pdf [in Ukrainian].
- Arkin, R. C. (2008). *Governing Lethal Behavior: Embedding Ethics in a Hybrid Deliberative/Reactive Robot Architecture* / Eds. P. Wang, B. Goertzel, S. Franklin // Artificial general intelligence, 2008: Proceedings of the first AGI conference. Washington DC : ISO Press. URL: <https://sites.cc.gatech.edu/ai/robot-lab/online-publications/formalizationv35.pdf>.
- Artificial intelligence / *Collins English Dictionary*. URL: <https://www.collinsdictionary.com/dictionary/english/artificial-intelligence>.
- Artificial intelligence / *Oxford English Dictionary*. URL: <https://www.oed.com/viewdictionaryentry/Entry/271625>.
- Baird, A., Maruping, L. M. (2021). The Next Generation of Research on IS Use: A Theoretical Framework of Delegation to and from Agentic IS Artifacts. *MIS Quarterly*. Vol. 45. Is. 1b. DOI: 10.25300/MISQ/2021/15882.
- Bossmann, J. (2016). Top 9 Ethical Issues in Artificial Intelligence / *World Economic Forum*. URL: <https://www.weforum.org/agenda/2016/10/top-10-ethical-issues-in-artificial-intelligence>.
- Copeland, B. J. Artificial intelligence / *Encyclopædia Britannica*. URL: <https://www.britannica.com/technology/artificial-intelligence>.

- Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems*. Version II. The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems. URL: https://standards.ieee.org/wp-content/uploads/import/documents/other/ead_v2.pdf.
- Ethics Guidelines for Trustworthy AI* (2019). Independent High-Level Expert Group on Artificial Intelligence Set up by the European Commission. URL: <https://www.aepd.es/sites/default/files/2019-12/ai-ethics-guidelines.pdf>.
- Exploring the Ethical Impact of GPT-4: The Future of AI (2023) / SINCODE. URL: <https://www.sincode.ai/blog/exploring-the-ethical-impact-of-gpt-4-the-future-of-ai#:~:text=With%20its%20advanced%20capabilities%2C%20GPT,GPT-4%20ethically%20and%20responsibly>.
- Filipenko N. Ye., Snigerov O. P., Bublikov A. V. (2020). The use of special knowledge while identification, prevention and investigation of crimes in the field of computer-based information and high technologies (Review Article). *Theory and Practice of Forensic Science and Criminalistics*. 22nd Issue. DOI: 10.32353/khrife.2.2020.12.
- Filipenko, N. Ye., Lukashevych, S. Yu. (2023). Information Technologies in Law Enforcement, Security and Expert Activities. *Наука і техніка сьогодні*. No. 13 (27). DOI: 10.52058/2786-6025-023-13(27)-13-21.
- Filipenko, N. Ye., Lukashevych, S. Yu. (2023). Informatsiini metodyky doslidzhennia kryminalnykh pravoporushen, vchynenykh z vykorystanniam tekhnolohii shtuchnoho intelektu [Information methods for researching criminal offenses committed using artificial intelligence technologies]. *Naukovi perspektyvy*. № 11 (41). № 11(7). DOI: 10.52058/2708-7530-2023-11(41)-1084-1095 [in Ukrainian].
- Goertzel, B. (2012). Should Humanity Build a Global AI Nanny to Delay the Singularity Until it's Better Understood? *Journal of Consciousness Studies*. Vol. 19 (1–2). URL: https://www.researchgate.net/publication/233497378_Should_Humanity_Build_a_Global_AI_Nanny_to_Delay_the_Singularity_Until_It's_Better_Understood.
- Guliani, P. (2016). Duolingo Looks to Dominate the Mobile Education Market With New Flashcard App TinyCards / *Forbes*. URL: <http://www.forbes.com/sites/parulguliani/2016/07/22/duolingo-looks-to-dominate-the-mobile-education-market-with-new-flashcard-app>.
- Hagendorff, T. (2020). The Ethics of AI Ethics: An Evaluation of Guidelines. *Minds and Machines*. Vol. 30. DOI: 10.1007/s11023-020-09517-8.
- Harris, E. A. (2016). Next Target for IBM's Watson? Third-Grade Math. *The New York Times*. URL: <http://www.nytimes.com/2016/09/28/nyregion/ibm-watson-common-core.html>.
- Hegre, H., Karlsen, J., Nygård, H. M., Strand, H., Urdal, H. (2013). Predicting Armed Conflict, 2010–2050. *International Studies Quarterly*. Vol. 57 (2). DOI: 10.1111/isqu.12007.
- Holovko, O. M., Bodnar, Ye. (2022). Etyko-pravovi problemy vykorystannia robotiv zi shtuchnym intelektom [Ethical and legal problems of using robots with artificial intelligence]. *Visnyk Natsionalnoho tekhnichnoho universytetu Ukrainy «Kyivskyi politekhnichniyi instytut»*. Politolohiia. Sotsiolohiia. Pravo. Vyp. 3 (55). DOI: 10.20535/2308-5053.2022.3(55).269563 [in Ukrainian].
- Informatsiini y komunikatsiini tekhnolohii [Information and communication technologies] / UA5.org. URL: <https://www.ua5.org/svit/281-nformacijn-jj-komunkacijn-tekhнолог.htm> [in Ukrainian].
- ISO/IEC 27001:2022 *Information security, cybersecurity and privacy protection*. Information security management systems. Requirements. URL: <https://www.iso.org/standard/27001>.
- ISO/IEC JTC 1/SC 42 *Artificial Intelligence*. URL: <https://www.iso.org/committee/6794475.html>.
- ISO/IEC 27032:2023 *Cybersecurity*. Guidelines for Internet security. URL: <https://www.iso.org/ru/standard/76070.html>.
- Klymanska, L. D. (2006). Komunikatyvni tekhnolohii modeliuvannia politychnoho prostoru v demokratychnomu suspilstvi [Communicative technologies of modeling political space in a democratic society]. *Rozvytok demokratii ta demokratychna osvita v Ukraini* : zb. mat-liv III mizhnar. nauk.

- konf. (Lviv, 19–22.05.2005). Kyiv. URL: <https://scholar.google.com/scholar?cluster=17011766827876176489&hl=en&oi=scholar> [in Ukrainian].
- Kochubei, L. (2017). Osoblyvosti suchasnykh informatsiino-komunikatyvnykh tekhnolohii v Ukraini [Specifics of modern information and communication technologies in Ukraine]. *Naukovi zapysky Instytutu politychnykh i etnonatsionalnykh doslidzhen im. I. F. Kurasa NAN Ukrainy*. Vyp. 3 (89). URL: https://ipiend.gov.ua/wp-content/uploads/2018/07/kochubei_osoblyvosti.pdf [in Ukrainian].
- Kompiuter proty terorizmu: vcheni navchyly ShI peredbachaty terakty po vsomu svitu (2021) [Computer against terrorism: scientists have taught AI to predict terrorist attacks around the world] / *Fokus*. URL: <https://focus.ua/uk/digital/489637-kompyuter-protiv-terrorizma-uchenye-nauchili-ii-predskazyvat-terakty-po-vsemu-miru> [in Ukrainian].
- Kurzweil, R. (1990). *The Age of Intelligent Machines*. Cambridge, MA : MIT Press.
- Lim, M. T., Metzler, R., Bar-Yam, Ya. (2007). Global Pattern Formation and Ethnic/Cultural Violence. *Science*. Vol. 317 (5844). DOI: 10.1126/science.1142734.
- Lukashevich, V. G. (1993). *Kriminalisticheskaya teoriya obsheniya: postanovka problemy, metoda issledovaniya, perspektivy ispolzovaniya* [Forensic theory of communication: statement of the problem, research methodology, prospects for use] : monografiya. Kiev [in Russian].
- Moroz, O. (2002). Shtuchnyi intelekt / *Filosofskiy entsyklopedychniy slovnyk* [Artificial intelligence/Philosophical encyclopedic dictionary] // redkol.: V. I. Shynkaruk (holova) ta in. Kyiv. URL: https://shron1.chtyvo.org.ua/Shynkaruk_Volodymyr/Filosofskiy_entsyklopedychniy_slovnyk.pdf [in Ukrainian].
- Mozhaiev, O. O., Mozhaiev, M. O., Lohvynenko, M. O., Chornyi, S. V. (2018). Avtomatyzovana systema nakopychennia empyrychnykh danykh u sferi kompiuternotekhnichnykh ekspertyz [Automated system of accumulation of empirical data in the field of computer forensics]. *Aktualni pytannia protydii kiberzlochynnosti ta torhivli liudmy* : zb. mat-liv Vseukr. nauk.-prakt. konf. (Kharkiv, 23.11.2018). Kharkiv. URL: https://univd.edu.ua/general/publishing/konf/23_11_2018/pdf/89.pdf [in Ukrainian].
- Mozhlyvosti ShI u pravookhoronniy systemi mista [AI capabilities in the city law enforcement system]. URL: <https://www.everest.ua/mozhlyvosti-shi-u-pravookhoronnij-systemi-mista/> [in Ukrainian].
- Navy's Second Stealthy X-47B Drone Flies(2011) / *Military.com*. *DefenseTech*. URL: <https://web.archive.org/web/20210511114646/https://www.military.com/defensetech/2011/11/28/second-x-47b-uav-flies>.
- Nemeth, S. Ch., Mauslein, J. A., Stapley, C. (2014). The Primacy of the Local: Identifying Terrorist Hot Spots Using Geographic Information Systems. *The Journal of Politics*. DOI: 10.1017/S0022381613001333.
- O'Connor, S. (2023). Open artificial intelligence platforms in nursing education: Tools for academic progress or abuse? *Nurse Education in Practice*. Vol. 66. Art. 103537. DOI: 10.1016/j.nepr.2022.103537.
- Pedersen, E. O., Brincker, M. (2021). Philosophy and Digitization: Dangers and Possibilities in the New Digital Worlds. *SATS. Northern European Journal of Philosophy*. DOI: 10.1515/sats-2021-0006.
- Petryshyn, O. V., Hyliaka, O. S. (2021). Human rights in the digital age: Challenges, threats and prospects. *Journal of the National Academy of Legal Sciences of Ukraine*. Vol. 28. No. 1. DOI: 10.37635/jnalsu.28(1).2021.15-23.
- Piliukov, Yu. O. (2009). *Vykorystannia informatsiynykh system v ekspertnykh pidrozdilakh MVS Ukrainy* [Use of information systems in expert units of the Ministry of Internal Affairs of Ukraine] : dys. ... kand. yuryd. nauk. Kyiv. URL: <http://dspace.wunu.edu.ua/handle/316497/45008> [in Ukrainian].
- Povidomlennia pro provedennia publichnoho hromadskoho obhovorennia projektu rozporiadzhennia Kabinetu Ministriv Ukrainy «Pro skhvalennia Kontseptsii rozvytku shtuchnoho intelektu v Ukraini» [Notice of public discussion of the draft order of the Cabinet of Ministers of Ukraine:

- On Approval of the Concept for the Development of Artificial Intelligence in Ukraine] / Mintsyfry Ukrainy : ofits. sait. URL: <https://thedigital.gov.ua/regulations/povidomlennya-pro-provedennya-publichnohogromadskogo-obgovorennya-proyektu-rozporyadzhennya-kabinetu-ministrivukrayini-pro-shvalennya-koncepciyi-rozvitku-shtuchnogo-intelektu-v-ukrayini> [in Ukrainian].
- Python, A., Bender, A., Nandi, A. K., Hancock, P. A., Arambepola, R., Brandsch, J., Lucas, T. C. D. (2021). Predicting non-state terrorism worldwide. *Science Advances*. Vol. 7. Is. 31. DOI: [10.1126/sciadv.abg4778](https://doi.org/10.1126/sciadv.abg4778).
- Recommendation of the Council on Artificial Intelligence (OECD/LEGAL/0449). Adopted on: 22/05/2019. Amended on: 08/11/2023. OECD, 2024. URL: <https://legalinstruments.oecd.org/en/instruments/oecd-legal-0449>.
- Reddick, C. G. (2009). *Handbook of Research on Strategies for Local E-Government Adoption and Implementation: Comparative Studies*. IGI Global.
- Reed, Ch. (2018). How should we regulate artificial intelligence? *Philosophical Transactions of the Royal Society A. Mathematical, Physical and Engineering Sciences*. Vol. 376. Is. 2128. DOI: [10.1098/rsta.2017.0360](https://doi.org/10.1098/rsta.2017.0360).
- Ryan, M., Antoniou, J., Brooks, L., Jiya, T., Macnish, K. & Stahl, B. (2021). Research and Practice of AI Ethics: A Case Study Approach Juxtaposing Academic Discourse with Organisational Reality. *Science and Engineering Ethics*. Vol. 27. Art. 16. DOI: [10.1007/s11948-021-00293-x](https://doi.org/10.1007/s11948-021-00293-x).
- Sajid, H. (2023). 8 Ethical Considerations of Large Language Models (LLM) Like GPT-4 / UNITE.AI. URL: <https://www.unite.ai/8-ethical-considerations-of-large-language-models-llm-like-gpt-4>.
- Saltevs'kij, M. V. (1965). Identifikaciya i informaciya [Identification and information]. *Pravovedenie*. № 3 [in Russian].
- Scherer, M. U. (2016). Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies (May 30, 2015). *Harvard Journal of Law & Technology*. Vol. 29. No. 2. DOI: [10.2139/ssrn.2609777](https://doi.org/10.2139/ssrn.2609777).
- Shcho take shtuchnyi intelekt: istoriia, vydy ta skladovi [What is artificial intelligence: history, types and components] / *Gigacloud*. URL: <https://gigacloud.ua/blog/navchannja/scho-take-shtuchnij-intelekt-istorija-vidi-ta-skladovi> [in Ukrainian].
- Shevchenko, A. I., Baranovskiy, S. V., Bilokobyl'skiy, O. V., Bodianskiy, Ye. V., Bomba, A. Ya. ta in. (2023). *Strategiia rozvytku shtuchnoho intelektu v Ukraini* [Strategy for development of artificial intelligence in Ukraine] : monohrafiia / za zah. red. A. I. Shevchenka. Kyiv. URL: https://jai.in.ua/archive/2023/ai_mono.pdf [in Ukrainian].
- Shevchuk, V. M. (2022). Yevropeiskiy vektor rozvytku suchasnoi kryminalistyky [European vector of development of modern criminalistics]. *Adaptatsiia pravovoi systemy Ukrainy do prava Yevropeiskoho Soiuzu: teoretychni ta praktychni aspekty* : mat-ly Vseukr. nauk.-prakt. konf. z nahody 20-yi richn. stvor. Poltav. yuryd. in-tu NluU im. Yaroslava Mudroho (Poltava, 29.09.2022). Poltava. URL: <http://pli.nlu.edu.ua/wp-content/uploads/2022/12/Zbirnyk-29.09.pdf> [in Ukrainian].
- Shvachych, H. H., Tolstoy, V. V., Petrechuk, L. M., Ivashchenko, Yu. S., Huliaieva, O. A., Sobolenko, O. V. (2017). *Suchasni informatsiino-komunikatsiini tekhnologii* [Modern information and communication technologies] : navch. posib. Dnipro. URL: https://nmetau.edu.ua/file/ikt_tutor.pdf [in Ukrainian].
- Spitsyna, H. O., Filipenko, N. Ye. (2019). Terorystychna diialnist: kryminalno-pravova polityka protydii [Terrorist activity: criminal law policy of counteraction]. *Kryminalno-pravovi ta kryminolohichni zasoby protydii zlochynam proty hromadskoi bezpekky ta publichnoho poriadku* : zb. tez dop. mizhnar. nauk.-prakt. konf. do 25-rich. KhNUVS (Kharkiv, 18.04.2019). Kharkiv. URL: https://univd.edu.ua/general/publishing/konf/18_04_2019/pdf/9.pdf [in Ukrainian].
- Stokel-Walker, Ch. (2022). AI bot ChatGPT writes smart essays — should professors worry? *Nature*. DOI: [10.1038/d41586-022-04397-7](https://doi.org/10.1038/d41586-022-04397-7).
- Stone, P., Brooks, R., Brynjolfsson, E., Calo, R., Etzioni, O., Hager, G. et al. (2016). *Artificial Intelligence and Life in 2030: The One*

- Hundred Year Study on Artificial Intelligence : Report of the 2015 Study Panel.* Stanford University. Stanford, CA. DOI: 10.48550/arXiv.2211.06318.
- The Investopedia Team. Weak AI (Artificial Intelligence): Examples and Limitations (2022) / *Investopedia*. URL: [https://www.investopedia.com/terms/w/weak-ai.asp#:~:text=Key%20Takeaways-,Weak%20artificial%20intelligence%20\(AI\)-also%20called%20narrow%20AI-,is%20equal%20to%20human%20intelligence.](https://www.investopedia.com/terms/w/weak-ai.asp#:~:text=Key%20Takeaways-,Weak%20artificial%20intelligence%20(AI)-also%20called%20narrow%20AI-,is%20equal%20to%20human%20intelligence.)
- The Protection of Critical Infrastructure Against Terrorist Attacks* (2022). Compendium of Good Practices. UN Office of Counter-Terrorism ; UN Security Council CTED ; Interpol. URL: https://www.un.org/counterterrorism/sites/www.un.org.counterterrorism/files/2225521_compendium_of_good_practice_web.pdf.
- Veblen, E. (2020). *Velyka deviatka. Yak IT-hihanty ta yikhni rozumni mashyny mozhut zminyty liudstvo* [The Big Nine: How the Tech Titans and Their Thinking Machines Could Warp Humanity] / per. z anhl. I. Vozniaka. Kharkiv. URL: https://book-ye.com.ua/upload/iblock/8de/908f1e91_ee9d_11ea_813d_000c29ae1566_3c5783ac_ee9e_11ea_813d_000c29ae1566.pdf [in Ukrainian].
- What is a neural network? / IBM. URL: <https://www.ibm.com/topics/neural-networks>.
- Yaremchenko, V. V., Filipenko, N. Ye. (2009). *Osnovy realizatsii operativno-rozshukovoi informatsii* [Basics of implementation of investigative information] : nauk.-prakt. posib. Kyiv [in Ukrainian].
- Zammit-Mangion, A., Dewar, M., Kadirkamanathan, V., Sanguinetti, G. (2012). Point process modelling of the Afghan War Diary. *Proceedings of the National Academy of Sciences*. Vol. 109. Is. 31. DOI: 10.1073/pnas.1203177109.
- Zhuravel, V. A., Shepitko, V. Yu. (2021). Rozvytok kryminalistyky ta sudovoi ekspertyzy v Ukraini: nablyzhennia do yedynoho yevropeiskoho prostoru [Development of Criminalistics and Forensic Examination in Ukraine: Approaching the Single European Space] / *Pravova nauka Ukrainy: suchasnyi stan, vyklyky ta perspektyvy rozvytku* : monohrafiia. Kharkiv [in Ukrainian].
- Filipenko, N., Lukashevych, S., Andrieieva, O., Ivanović, A. (2024). Application of Artificial Intelligence and Information and Communication Technologies: Socio-Ethical Problems (Review Article). *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). P. 12—41. DOI: 10.32353/khrife.1.2024.02.

Prospects for Development of Forensic Methods for Investigation of Criminal Offenses Related to Raiding

Serhii Tiulieniev *

* PhD in Economics, NSC «Hon. Prof. M. S. Bokarius FSI», Kharkiv, Ukraine,
ORCID: <https://orcid.org/0000-0001-9685-1536>, e-mail: serhii.tiulieniev@ukr.net

DOI: [10.32353/khrife.1.2024.03](https://doi.org/10.32353/khrife.1.2024.03) UDC 343.98:343.74(477)

Received: 20.12.2023 / Reviewed: 03.01.2024 / Accepted for print: 27.03.2024 /

Available online: 29.03.2024



Formation and development of economic security of the State requires taking effective measures to counteract and minimize negative impact of criminal offenses that encroach on economic and social relations, legal activities of economic entities, rights of public administration employees, etc. Among the latter, those that demonstrate signs of raiding deserve close attention, i.e., related to the illegal takeover and seizure of property, assets of enterprises, institutions, organizations, corporate rights to them and other resources, encroachment on the rights of owners or authorized persons of entities management of various forms of ownership, etc. In this regard, the article purpose is defined as outlining prospects for construction of forensic methods of investigation of criminal offenses in which signs of raiding can be detected. In order to achieve the specified goal, a complex of general scientific, philosophical and special research methods was applied. According to performed research results, it was determined that in modern sense, a separate forensic investigation method (in a broad sense) should be understood as an integrated product of scientific knowledge in the field of law, formed on the basis of a generalization of investigative and judicial practice, which in its essence is a set of forensic recommendations, proven tactics methods of conducting investigative (search) and covert investigative (search) actions, methods and techniques of optimal and effective

This article is translation of the original Ukrainian content, which source is available at the link:
<https://khrife-journal.org/index.php/journal> (translated by Andriy Bublikov). The author acknowledges translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

use of forensic techniques during pre-trial investigation developed in accordance with procedural requirements in order to optimize the model of conducting pre-trial investigation of a separate criminal offense, their groups, etc. Based on the generalization of certain elements of the criminal law and forensic characteristics of criminal offenses related to raiding, varieties of individual forensic methods of investigation have been determined, including interspecies, special, subspecies, species, etc.

Keywords: criminal offense; separate forensic method of investigation; pre-trial investigation; raiding; entity; enterprise; land plot; unlawful absorption; delight.

Research Problem Formulation

Law enforcement activity related to pre-trial investigation of criminal offenses necessitates intensification of scientific researches to provide this activity with relevant scientifically based recommendations. Comprehensive recommendations are the basis not only for practical activities, but for scientific ones, as they can be presented in the form of separate forensic methods of investigation.

Developing issue of forensic methods for investigating crimes and criminal misdemeanors has been one of the most discussed topics in the scientific community for a long time. As stated in the legal literature: “forensic doctrine attempts to unify approaches to determining the

content and structure of individual forensic methods, however, their development, typification and implementation in practice remains an unsolved problem negatively affecting their effectiveness in the process of practical implementation”¹. In support of the stated thesis, we note that outlined issues have not yet found any logical solution. Some of their aspects are highlighted in the legal literature, but some proposals are not without signs of subjectivism that is not always consistent with the fundamental principles of forensic methods.

Our attention object are criminal offenses encroaching on legitimate activities of business entities, in particular, related to illegal takeover and seizure of property, assets and corporate rights of owners of enterprises, organizations,

1 Шевчук В. М. Структура окремої криміналістичної методики: сучасні наукові підходи та перспективи досліджень. *Вчені записки ТНУ імені В. І. Вернадського. Серія: Юридичні науки*. 2020. Т. 31 (70). № 4. С. 252. DOI: 10.32838/1606-3716/2020.4/41 (date accessed: 18.12.2023).

institutions, etc.² The latter is usually called raiding, which is understood as the seizure of property that occurs against the will of its owner and is combined with the use of means and methods of a criminal nature, in particular, acquisition of controlling stakes in ways that contradict legal procedures and the will of the management of the company being absorbed³. It should be emphasized that raiding usually has a valid or pretended legal basis and is carried out in compliance with, or with the imitation of compliance with, legal judicial and corporate procedures⁴. With this in mind, it is important to ensure not only their effective pre-trial investigation characterized by a number of difficulties, but proper countermeasure that should include measures to prevent this type of crime. Such areas of activity are relevant, because it is criminal offenses related to raiding that make it impossible for business entities to function negatively affecting market economy, opportunities to attract foreign investments, and also encroach on economic security as a component of national security of the

state, etc. At the same time, it should not be assumed that raiding as a phenomenon has a negative effect exclusively on the activities of participants in economic and social relations, because officials and persons whose professional activities are related to the provision of public services are often involved in implementation of criminal intent.

Exposing such raiding schemes, making them public, robs the authority of public officials and lowers the level of trust of civil society institutions in them and in general in the state, personified by State authorities⁵. Such facts have a negative impact on the Corruption Perception Index (hereinafter referred to as *CPI*) together with such factors as the lack of a professional public service in the state, the dependent functioning of the justice system, “traditional” nature of providing an undue advantage for concluding a contract or other personal reward, etc.⁶ Although in 2022 Ukraine scored 33 points out of a possible 100 according to the *CPI*, which is one point more than the previous year (in a ten-year perspective, this is 8 points), Ukraine still ranks 116th⁷

- 2 How many people were convicted of raiding in Kazakhstan / MIA “Kazinform”. 04.12.2020. URL: https://www.inform.kz/ru/skol-ko-chelovek-osudili-za-reyderstvo-v-kazahstane_a3726264 (date accessed: 18.12.2023) ; Рейдерство в Україні / Опендатабот. URL: <https://opendatabot.ua/open/raiders> (date accessed: 18.12.2023) ; OECD. G20/OECD Principles of Corporate Governance / OECDiLibrary. 2015. 60 p. DOI: [10.1787/9789264236882-en](https://doi.org/10.1787/9789264236882-en) (date accessed: 18.12.2023) ; Prinzel Yo. How Government Land Seizures Work for Landowners. Property rights and related impacts of government land seizure. 2023. Rev. by Boyle M. J / Investopedia. URL: <https://www.investopedia.com/financial-edge/1011/what-to-do-when-the-government-wants-your-land.aspx> (date accessed: 18.12.2023).
- 3 Кубарев І., Бархан С. Типові слідчі ситуації початкового етапу розслідування рейдерства. *Krakowskie Studia Małopolskie*. 2022. № 3 (35). С. 89.
- 4 Смітюх А. В. Рейдерство, поглинання та загарбання: співвідношення понять та класифікації. *Вісник господарського судочинства*. 2008. № 3. С. 98.
- 5 Рейдерство в Україні ... URL: <https://opendatabot.ua/open/raiders> (date accessed: 18.12.2023).
- 6 Индекс сприйняття корупції 2022 / Transparency International the Global Coalition Against Corruption. Transparency International Ukraine. 2022. 14 с. URL: https://cpi.ti-ukraine.org/stat-ic/download/2022_ukr_final.pdf (date accessed: 18.12.2023).
- 7 Маятник боротьби з корупцією в Україні: крок вперед після кроку назад / Ibid. URL: <https://cpi.ti-ukraine.org/> (date accessed: 18.12.2023).

among 180 countries. Undoubtedly, this affects the failure of national economic entities to receive foreign investments, which are necessary for the formation of a market economy, the development of modern entrepreneurship and the formation of production potential, despite the presence of advantages that Ukrainian entrepreneurs are able to offer. Therefore, the consequences of insufficient resistance to raiding, in particular by criminal procedural means, are not exclusively related to the infliction of various types of damage on business entities, their owners and other participants in economic and social relations, but are characterized by the scale of the interstate level, because they negatively affect the possibilities of concluding interstate economic agreements, prospects for Ukrainian accession to economic communities, etc.

The number of various criminal offenses committed by raiders forces scientists to classify their activities according to separate groups of offenses.

In some places, we can even talk about the existence of technologies of criminal activity, which actualizes the need to conduct comprehensive research in this area and to find scientific ways to solve

certain problems of investigative and judicial practice⁸.

Article Purpose

Outline development prospects of forensic methods of investigation of criminal offenses related to the illegal absorption and seizure of property, assets of enterprises, institutions, organizations, corporate rights to them, i.e., criminal offenses with raiding signs.

Research Methods

In order to achieve the specified goal, a complex of general scientific, philosophical and special research methods was applied, in particular: analysis, synthesis, system analysis, systemic-structural, forecasting, dialectical ones.

Methods of systemic analysis and system-structural helped in the study of investigative and judicial practice, generalization of theoretical developments of Ukrainian scientists in the field of criminal offenses investigated by us.

Such general scientific methods as analysis and synthesis contributed to determination of criminal offenses most

8 Best Practices in Investigating and Prosecuting Corruption. Using Financial Flow Tracking Techniques and Financial Intelligence: A Handbook. APEC Anticorruption and Transparency Working Group (ACTWG). September 2015. 196 p. URL: https://www.apec.org/docs/default-source/publications/2015/10/best-practices-in-investigating-and-prosecuting-corruption/apec-handbook-final-september-2015_ed2.pdf (date accessed: 18.12.2023) ; Savona E. U., Berlusconi G. (Eds.). Organized Crime Infiltration of Legitimate Businesses in Europe: A Pilot Project in Five European Countries. Final Report of Project ARIEL – Assessing the Risk of the Infiltration of Organized Crime in EU MSs Legitimate Economies: a Pilot Project in 5 EU Countries (www.ariel-project.eu). Trento : Transcrime — Università degli Studi di Trento. 2015. 135 p. URL: https://www.academia.edu/25765243/Organized_Crime_Infiltration_of_Legitimate_Businesses_in_Europe_A_Pilot_Project_in_Five_European_Countries (date accessed: 18.12.2023) ; Liekefett K. The Comeback of Hostile Takeovers / Harvard Law School Forum on Corporate Governance. Nov. 8, 2020. URL: <https://corpgov.law.harvard.edu/2020/11/08/the-comeback-of-hostile-takeovers/> (date accessed: 18.12.2023).

often committed by raiders collectively, and on the contrary, on the basis of the analysis of investigative situations, a conclusion was drawn about which signs of criminal offenses can be seen in the actions of raiders; their respective legal qualifications are offered.

Method of analysis of quantitative indicators and grouping is applied to the processing of statistical reports of Prosecutor General's Office of Ukraine, judicial practice (in particular, for the analysis of verdicts placed in the Unified State Register of Court Decisions).

The method of dialectics made it possible to formulate the author's definitions of some forensic categories, and forecasting to outline the prospects for the construction of separate forensic methods of investigation of criminal offenses related to raiding.

Analysis of Essential Researches and Publications

Such outstanding Ukrainian scientists as: V. Bakhin, V. Bernaz, A. Volobuiev, V. Halahan, V. Honcharenko, V. Zhuravel, A. Ishchenko, N. Klymenko, O. Kolesnychenko, V. Kolmakov, V. Konovalova, V. Kuzmichov, V. Lysychenko, V. Lysenko, V. Lukashevych, Ye. Lukianchykov, H. Matusovskyi,

O. Oderii, V. Ortynskyi, M. Salteviskyi, V. Tishchenko, L. Udalova, S. Cherniavskyi, Yu. Chornous, V. Shevchuk, V. Shepitko, B. Shchur et al.

L. Arkusha, V. Husieva, A. Zatopotskyi, V. Korzh, V. Lysenko, H. Nikitina-Dudikova, V. Pcholkin, O. Sainchyn, R. Stepaniuk, A. Shevchyshen, M. Shepitko et al. carried out thorough studies in the context of the construction of separate forensic methods.

At the same time, it should be emphasized that researchers have overlooked (despite their considerable relevance) certain forensic methods of investigation of criminal offenses related to the illegal absorption and seizure of property, corporate rights of owners of enterprises, organizations, institutions and other business entities, i.e. criminal offenses with signs raiding. Certain aspects of activities related to pre-trial investigation, proving and combating criminal offenses, which can be considered related to raiding according to certain characteristics, are highlighted in the works of domestic scientists (S. Andrusenko, L. Arkusha, O. Bandurka, S. Barhan, V. Berezniak, N. Hryshchenko⁹, S. Husarova, V. Husieva, S. Dovhun, R. Dudarets, I. Kubariev, V. Kikinchuk, O. Lukianikhina¹⁰, O. Podobnyi, Ye. Priakhin, M. Riabchenko, D. Sanakoiev, N. Tataryn, K. Fomichov, T. Khanov and co-author¹¹, M. Tsutskiridze,

9 Грищенко Н. М. Кримінальна відповідальність за протиправне заволодіння майном підприємства, установи, організації : дис. ... канд. юрид. наук. Дніпро, 2019. 216 с. URL: <https://dduvs.in.ua/wp-content/uploads/files/Structure/science/rada/d2/dissertations/4/1.pdf> (date accessed: 18.12.2023).

10 Лук'янихіна О. А. Рейдерство: причини та негативні наслідки для розвитку ринкового бізнес-середовища в Україні. *Сучасні проблеми правового, економічного та соціального розвитку держави* : тези доп. VII Міжнар. наук.-практ. конф. (Харків, 30.11.2018). Харків, 2018. С. 259—261. URL: http://univd.edu.ua/general/publishing/konf/30_11_2018/pdf/128.pdf (date accessed: 18.12.2023).

11 Ханов Т. А., Баширов А. В. Рейдерские захваты как социально-правовая и криминальная проблема в Республике Казахстан. *Актуальные проблемы современности*. 2020. № 2 (28). С. 22—26 (date accessed: 18.12.2023). URL: <https://aps.bolashaq.edu.kz/wp-content/uploads/2021/01/%D0%96%D1%83%D1%80%D0%BD%D0%B0%D0%BB-%D0%90%D0%9F%D0%A1-2-28-1.pdf> (date accessed: 18.12.2023).

H. Chyhryn, A. Shelekhov) and foreign ones (D. Weisburd with co-authors¹², R. H. Ward¹³, Th. S. Greenberg with co-authors¹⁴, D. L. Carter¹⁵, J. R. Macey¹⁶ at al.¹⁷). At the same time, only some of the works of the named scientists contain provisions on the types of methods or outlines of types of criminal offenses that can be considered related to raiding, and therefore are promising for determining their elements¹⁸ and specifics¹⁹, which indicates the need for more thorough research in this direction.

- 12 Weisburd D., Telep C. W., Hinkle J. C., Eck J. E. The Effects of Problem-Oriented Policing on Crime and Disorder. *Campbell Systematic reviews*. 2008. Vol. 4. Is. 1. Pp. 1—87. DOI: 10.4073/csr.2008.14 (date accessed: 18.12.2023).
- 13 Ward R. H. The Investigative Function — Criminal Investigation in the United States. Doct. dis. Berkeley, CA : University of California, 1971. 265 p.
- 14 Greenberg Th. S., Samuel L., Grant W., Gray L. Stolen Asset Recovery: A Good Practices Guide for Non-Conviction Based Asset Forfeiture. The World Bank, 2009. DOI: 10.1596/978-0-8213-7890-8 (date accessed: 18.12.2023).
- 15 Carter D. L. Law Enforcement Intelligence Operations. An Overview of Concepts, Issues and Terms. School of Criminal Justice Michigan State University, 1990. 434 p. URL: <https://www.ojp.gov/pdffiles1/Photocopy/134434NCJRS.pdf> (date accessed: 18.12.2023).
- 16 Macey J. R. Market for Corporate Control / Econlib. URL: <https://www.econlib.org/library/Enc/MarketforCorporateControl.html> (date accessed: 18.12.2023).
- 17 E. g., Forensic science and the criminal justice system: a blueprint for change. Publ. by the Auth. of the House of Lords, 2019. 66 p. URL: <https://publications.parliament.uk/pa/ld201719/ldselect/ldscitech/333/333.pdf> (date accessed: 18.12.2023) ; Rosett J. G. Do Union Wealth Concessions Explain Takeover Premiums? The Evidence on Contract Wages. *Journal of Financial Economics*. 1990. Vol. 27. Is. 1. Pp. 263—282. DOI: 10.1016/0304-405X(90)90029-Y (date accessed: 18.12.2023) ; Copley C. German industry body warns against takeover protection measures / Ed. by Goodman D. // Reuters. Oct. 17, 2016. URL: <https://www.reuters.com/article/idUSL8N1CN3HF/> (date accessed: 18.12.2023) ; Adverse Possession: Legal Definition and Requirements. By J. Frankenfield. Upd. Sept. 29, 2023. Rev. by Th. Brock. URL: <https://www.investopedia.com/terms/a/adverse-possession.asp> (date accessed: 18.12.2023) ; Khamitov B. N., Kemali Y. S., Rakhmetov S. M., Alibekova A. M. Retracted Article: International legal approaches in combatting raidership. *Security Journal*. 2022. Nov 17. 21 p. DOI: 10.1057/s41284-022-00362-1 (date accessed: 18.12.2023) ; Puziak M., Martyniuk M. Defensive strategies against hostile takeovers. The analysis of selected case studies. *Journal of International Studies*. 2012. Vol. 5. № 1. Pp. 60—69 (date accessed: 18.12.2023) ; Nipialidi O. Yu. On criminal schemes of raiding as a threat to the security of the business owner: Ukrainian realities and international practice. Irpin, 2019 ; Gaughan P. A. Mergers, acquisitions and corporate restructuring. Hoboken, 2018. 7th ed. 674 p. URL: <http://dspace.vnbrims.org:13000/jspui/bitstream/123456789/4962/1/Mergers%2C%20Acquisitions%2C%20and%20Corporate%20Restructurings.pdf> (date accessed: 18.12.2023) ; Liekefett K. Op. cit. URL: <https://corpgov.law.harvard.edu/2020/11/08/the-comeback-of-hostile-takeovers/> (date accessed: 18.12.2023).
- 18 Гусева В. О. Криміналістична класифікація кримінальних правопорушень, пов'язаних із рейдерством, елементи їх криміналістичних характеристик. *Вісник Луганського державного університету внутрішніх справ ім. Е. О. Дідоренка*. 2022. № 3 (99). С. 242—252. DOI: 10.33766/2524-0323.99.242-252 (date accessed: 18.12.2023).
- 19 Татарин Н. М., Пряхін Є. В. Методика розслідування самовільного зайняття земельної ділянки та самовільного будівництва : монографія. Львів, 2019. 192 с. URL: <http://surl.li/omigf> (date accessed: 15.09.2023) ; Березняк В. С. Криміналістична характеристика кримінальних правопорушень, пов'язаних із захопленням землі та об'єктів корпоративної власності. *Юридична наука*. 2020. № 9 (111). С. 128—134. DOI: 10.32844/2222-5374-2020-111-9.15 (date accessed: 18.12.2023) ; Кікінчук В. В., Гусева В. О. Особливості розслідування кримінальних правопорушень, пов'язаних з протиправним поглинанням та захопленням

Main Content Presentation

Forensic literature abounds with various definitions of the *forensic methods* term. There is no unity among scholars regarding the varieties of forensic methods and the classification criteria that can be applied to define these varieties, structural elements of the latter, etc.

V. Zhuravel notes terminology ambiguity used by scientists when researching the problems of constructing forensic methods: here there are *forensic methods of crime investigation*, *separate forensic methods*, and *forensic methodological recommendations*, but they all differ in semantic meaning²⁰. We make it our task to build separate forensic methods, because they embody a set of well-founded scientific and practical recommendations aimed at organizing an investigation and its immediate implementation²¹. Let us summarize the position of Academician V. Zhuravel²²: in the modern and broad

sense and in the ideal form, a separate forensic investigation method is an integrated product; it is a set of forensic recommendations tested by tactical methods of conducting investigative (search) and covert investigative (search) actions, methods and means of optimal and effective use of forensic techniques during pre-trial investigation, applied in accordance with procedural requirements and the optimal model of pre-trial investigation of a separate criminal offense (their groups). At the same time, in our opinion, it is inappropriate to consider forensic recommendations aimed at improving and optimizing the process of judicial review of criminal cases among components when formulating the definition of this concept. We share the position of scientists regarding separation of trial methods²³.

Activity of developing individual forensic methods of investigation is continuous, determined by peculiarities

підприємств, сільськогосподарських земель, порушенням прав їх законних власників (рейдерство) : наук.-метод. рек. Харків, 2020. 58 с. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/5f246ac8-784f-46b3-a205-36f18bdc478e/content> (date accessed: 15.09.2023) ; Гусева В. О. До питання визначення структури криміналістичної методики розслідування кримінальних правопорушень, пов'язаних з рейдерством. *Актуальність та особливості наукових досліджень в умовах воєнного стану* : зб. мат-лів III Міжнар. наук.-практ. інтернет-конф. з нагоди відзнач. Дня науки — 2023 в Україні (Київ, 23.05.2023). Київ, 2023. С. 59—62. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/5df7785a-79b8-4824-8857-3683272bd225/content> (date accessed: 18.12.2023).

20 Журавель В. Окрема криміналістична методика: поняття та сфера застосування. *Питання боротьби зі злочинністю*. 2011. № 2 (65). С. 203. URL: https://dspace.nlu.edu.ua/bitstream/123456789/7438/1/Zhuravel_202.pdf (date accessed: 18.12.2023).

21 Ibid.

22 Idem. Окремі методики в системі криміналістичних знань. *Науковий вісник Львівської комерційної академії. Серія: Юридична*. 2015. Вип. 1. С. 187—188. URL: http://nbuv.gov.ua/UJRN/nvfkau_2015_1_20 (date accessed: 18.12.2023).

23 Алексейчук В. І. Криміналістична методика судового розгляду в кримінальному провадженні (місце в системі криміналістики). *Право і суспільство*. 2016. № 6. С. 162—166. URL: http://pravoisuspilstvo.org.ua/archive/2016/6_2016/part_1/30.pdf (date accessed: 18.12.2023) ; Шур Б. В., Косаняк С. С. Проблеми побудови класифікації криміналістичних методик. *Вісник Львівського торговельно-економічного університету. Серія: Юридичні науки*. 2017. Вип. 5. С. 216—221. URL: http://nbuv.gov.ua/UJRN/nvfkau_2017_5_28 (date accessed: 18.12.2023) ; Шевчук В. М. Op. cit. С. 259. DOI: [10.32838/1606-3716/2020.4/41](https://doi.org/10.32838/1606-3716/2020.4/41) (date accessed: 18.12.2023).

of the regulatory and legal regulation of criminal procedural activity, corresponding trends that are formed in investigative and judicial practice, the development of science and technology, and the introduction of innovative technologies in the field of investigation of criminal offenses. In order for developed forensic recommendations to meet and contribute to satisfaction of the needs of law enforcement agencies, they must be constantly updated, in other words, brought “in line with current realities”²⁴.

Therefore, outlining construction prospects of forensic methods of investigating criminal offenses related to raiding requires a thorough analysis of criminal activity mechanism aimed at committing raiding actions, or its individual elements and this is impossible without generalization of legal literature, in particular theoretical scientific research, which became the subject of study of the outlined questions, and at the empirical level: generalization of investigative and judicial practice of investigating criminal offenses of this type. Criminal law and criminological characteristics of the crime and some information of a sociological and psychological nature are meaningful in the context of the construction of this type of methodology that has been repeatedly mentioned in legal literature²⁵.

First of all, we plan to determine specifics of the mechanism and criminal-legal characteristics of criminal offenses related to raiding on the basis of an analysis of the methods of committing criminal offenses related to raiding. First, we should note the complexity of the latter. Most often, they are fully structured and contain actions for preparation, direct implementation of criminal intent: method of commission (mostly the latter is determined by the disposition of corresponding article of Criminal Code of Ukraine) and actions for concealing the case of criminal offense.

Thus, at one time, M. Kamlyk, M. Pohoretskyi, V. Shelomentsev, on the basis of generalization of investigative and judicial practice, taking into account the provisions of criminal legislation, thoroughly approached generalization of totality of actions and schemes of raiding: in accordance with the provisions formulated by scientists, the raider capture of the subject under certain conditions, only criminal organizations are capable of doing business²⁶. In this regard, the actions of raiders who organized themselves with the aim of committing a serious or particularly serious crime will fall under the legal qualification of Art. 255: *Creation, management of a criminal*

24 Гусева В. О. Теоретичні основи методики розслідування злочинів проти авторитету органів державної влади у сфері правоохоронної діяльності : дис. ... д-ра юрид. наук. Харків, 2021. С. 94. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/5ea810ce-cc6f-4266-b94a-9756f3cc84af/content> (date accessed: 18.12.2023).

25 Колесниченко А. Н. Общие положения методики расследования отдельных видов преступлений : текст лекции. Харьков, 1976. С. 14 ; Малярова В. О. Криміналістична методика: питання співвідношення криміналістичної характеристики з іншими. *Науковий вісник Ужгородського національного університету. Серія: Право*. 2015. Вип. 35. Ч. I. Т. 3. С. 113. URL: <https://dspace.uzhnu.edu.ua/jspui/handle/lib/14912> (date accessed: 18.12.2023).

26 Камлик М. І., Погорецький М. А., Шеломенцев В. П. Рейдерство в Україні: сутність та засоби протидії. *Боротьба з організованою злочинністю і корупцією (теорія і практика)*. 2007. Вип. 17. С. 69—88. URL: http://nbuv.gov.ua/UJRN/boz_2007_17_6 (date accessed: 18.12.2023).

community or criminal organization, as well as participation in of Criminal Code of Ukraine ²⁷.

In the future, members of criminal organization usually take actions necessary to formulate a capture strategy, which most often consist of finding out information about the assets of the business entity, managers, financial statements, etc. If the actions of the raiders (criminal organization) are aimed at obtaining information that is a commercial or banking secret, they will also be qualified under Art. 231: *Illegal collection for the purpose of use or use of information constituting a commercial or banking secret* of this Code ²⁸, and the disclosure of the latter will be grounds for bringing perpetrators to justice also under Art. 232: *Disclosure of commercial, banking or professional secrets on capital markets and organized commodity markets* of the Criminal Code of Ukraine ²⁹.

Raiders are not limited to committing criminal offenses in the field of economic activity. Sometimes they resort to acts of a violent nature, including threats (intellectual and physical) that is the basis for qualifying the actions of criminals as a whole. As evidenced by the analysis of investigative and judicial practice, for criminal offenses related to raiding, it is typical to commit crimes that encroach on the life, health, will, honor and dignity of a person: among the latter, *Illegal deprivation of liberty or kidnapping of a person* (Article 146 of Criminal Code of Ukraine), *Forcible disappearance* (Article 146-1 of Criminal Code of Ukraine), *Intentional bodily harm of moderate severity* (Article 122 of Criminal

Code of Ukraine), *Threat to kill* (Article 129 of the Criminal Code of Ukraine) ³⁰.

Concurrently with criminal offenses investigated by us, the raiders commit “Stealing, misappropriating, extorting documents, stamps, seals, acquiring them through fraud or abuse of official position or damaging them” (Article 357 of Criminal Code of Ukraine), “Forgery of documents, seals, stamps and forms, sale or use of forged documents, seals, stamps” (Article 358 of Criminal Code of Ukraine) ³¹.

Raiders manage to commit other illegal actions. Thus, in investigative practice, there are cases when after the death of a single elderly person who owned a plot of land during her lifetime, criminals try to get this inheritance on the basis of, for example, recognition in court of the fact of living together as one family without registering marriage. In order to confirm the fact of running a joint economy (joint budget) and expenses (mutual rights and obligations), fraudsters submit forged documents to the court in the form of statements, certificates, etc.: they forge relevant documents on their own or by providing undue benefits to officials of state authorities or representatives of local self-government (they receive forged documents attesting to non-existent facts from them), and by providing material benefits to third parties, force them to give false testimony during judicial review of their applications. In case of a positive decision of the court regarding inheritance, in the future, such a dishonest person acquires the right of ownership of the object of inheritance (a land plot), which he can resell to a third party: “bona

27 Кримінальний кодекс України від 05.04.2001 р. № 2341-III (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/2341-14#Text> (date accessed: 18.12.2023).

28 Ibid.

29 Ibid.

30 Ibid.

31 Ibid.

fide purchaser”. In such cases, the actions of the raiders, aimed at seizing land plots usually for agricultural purposes, can be qualified as aiding in the falsification of official documents. At the same time (due to the presence of legal gaps), the latter will not bear responsibility for coercion (in any way) to provide false testimony to the court (another authorized body). As for the resale of the object for which the ownership right has been obtained, this, as it is rightly emphasized in the legal literature, “has signs of legalization of property obtained by criminal means, but this crime requires proof of the intention of the so-called “bona fide purchaser” to implement difficult in practice”³².

In addition, in the case of illegal takeover of business entities, criminals can use schemes that include: 1) blackmail, threats, use of physical influence measures (for the purpose of transferring the ownership of shares in the statutory funds of enterprises from one person to another); 2) providing material benefits or blackmailing managers of business entities (with the aim of forcing them to follow the raiders’ instructions regarding the financial and economic activities of such an entity); 3) establishing control over the company’s activities during the bankruptcy

procedure, buying up its debts; 4) capture of business entities through corporate conflicts by acquiring ownership of its corporate rights³³.

The above methods of committing illegal acts indicate that crimes in the field of economic activity (in particular, related to raiding) involve the commission of not simple single-component actions, but are related to the implementation of a set of illegal behavioral acts, each of which forms an independent component of a criminal offense. In the forensic literature, to indicate similar facts, the terminological construction: *criminal activity technology* is used³⁴, which additionally confirms: knowing the criminal event of criminal offenses related to raiding is a complex activity, and their proof involves the accumulation of various resources, the implementation of a set of investigators (detective) and covert investigative (research) actions, conducting tactical operations, involving carriers of specific expertise, etc. Such activity, of course, actualizes the need to build appropriate methods. Taking into account the outlined methods of committing crimes and the types of offenses committed by raiders, criminalized by the current legislation, as well as the criminal-legal criteria for

32 Ярош С. Проблема рейдерства та реформа державних реєстрів / Рада адвокатів Київської області : офіц. вебсайт [Електронний ресурс]. URL: <https://radako.com.ua/news/problema-reyderstva-ta-reforma-derzhavnih-reiestriv> (date accessed: 11.09.2023).

33 Камлик М. І., Погорецький М. А., Шеломенцев В. П. Оп. cit.

34 Смелік В. Б. Кореляційні зв'язки між окремими видами злочинів у сфері підприємництва (проблеми методики розслідування) : автореф. дис. ... канд. юрид. наук. Харків, 2006. 20 с. ; Аркуша Л. І. Основи виявлення та розслідування легалізації доходів, одержаних у результаті організованої злочинної діяльності : автореф. дис. ... д-ра юрид. наук. Одеса, 2011. С. 30. URL: <http://dspace.onua.edu.ua/bitstream/handle/11300/1476/%d0%90%d1%80%d0%ba%d1%83%d1%88%d0%b0.pdf?sequence=1&isAllowed=y> (date accessed: 11.09.2023) ; Степанюк Р. Л. Криміналістичне забезпечення розслідування злочинів, вчинених у бюджетній сфері України : монографія / за заг. ред. д-ра юрид. наук, проф. А. Ф. Волобуєва. Харків, 2012. С. 47 ; Пчеліна О. В. Поняття та характеристика злочинних технологій у сфері службової діяльності. Вісник Луганського державного університету внутрішніх справ імені Е. О. Дідоренка. 2018. № 2 (82). С. 292—293. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/88d0d842-d553-4077-a242-bf6b55ddd25b/content> (date accessed: 11.09.2023).

construction of methods of investigation of criminal offenses, we can summarize the following promising forensic methods of investigation of criminal offenses related to raiding:

- 1) interspace one (investigation of criminal offenses related to raiding, i.e. with illegal takeover and seizure of business entities, corporate rights to them or their assets, which commission is combined with the commission of criminal offenses in the field of official activity or those encroaching on life and health of a person, or related to encroachment on the will and honor of owners of business entities or persons authorized by, etc.);
- 2) special one (investigation of raiding-related criminal offenses committed in the sphere of economic activity);
- 3) depending on the stages of criminal proceedings (initial stage of investigation of criminal offenses related to raiding, investigation, trial, etc.);
- 4) depending on presentation (descriptive, formalized and mixed ones);
- 5) generic one (investigation of individual criminal offenses belonging to the group investigated by us);
- 6) subspecies (built on the basis of a separate article of Criminal Code of Ukraine, with additional highlighting of certain forensically significant features) etc.

Conclusions

In the modern sense, in a broad sense, *separate forensic investigation method* should be understood as an integrated product of scientific knowledge in the field of law, formed on the basis of generalization of investigative and judicial practice, which in its essence is represented by a set of forensic recommendations, proven tactical methods of investigative (detective) and undercover investigators (investigative)

actions, methods and techniques of optimal and effective use of forensic techniques during pre-trial investigation, developed in accordance with procedural requirements and with the aim of optimizing the model of pre-trial investigation of separate criminal offense, their groups, etc.

Group of criminal offenses related to raiding is numerous and their recognition by criminal procedural methods and the process of proof are complex, which is due to the relevant specifics of this type mechanism of crimes, as well as technologies of criminal activity, which are usually used by criminal organizations, groups of individuals or individuals subjects.

Based on generalization of certain elements of the criminal law and forensic characteristics of criminal offenses related to raiding, among the individual forensic methods of investigation of these criminal offenses, we consider it appropriate to single out the following:

- 1) interspace one (investigation of criminal offenses related to raiding, i.e. with illegal takeover and seizure of business entities, corporate rights to them or their assets, which commission is combined with the commission of criminal offenses in the field of official activity or those encroaching on life and health of a person, or related to encroachment on the will and honor of owners of business entities or persons authorized by, etc.);
- 2) special one (investigation of raiding-related criminal offenses committed in the sphere of economic activity);
- 3) depending on stages of criminal proceedings (initial stage of investigation of criminal offenses related to raiding, investigation, trial, etc.);
- 4) depending on presentation (descriptive, formalized and mixed ones);

- 5) generic one (investigation of individual criminal offenses belonging to the group investigated by us);
- 6) subspecies (built on the basis of a separate article of Criminal Code of Ukraine, with additional highlighting of certain forensically significant features) etc.

We have listed only some of the possible varieties of individual forensic methods of investigation, and therefore we believe that this issue requires further thorough research.

**Перспективи побудови
криміналістичних методик
розслідування кримінальних
правопорушень,
пов'язаних із рейдерством
Сергій Тюленєв**

Становлення та розвиток економічної безпеки держави потребує вжиття дієвих заходів із протидії та мінімізації негативного впливу кримінальних правопорушень, які посягають на господарські суспільні відносини, законну діяльність суб'єктів господарювання, права співробітників сфери публічного адміністрування тощо. Серед останніх на пильну увагу заслуговують ті, у яких убачаються ознаки рейдерства, тобто пов'язані з протиправним поглинанням і захопленням майна, активів підприємств, установ, організацій, корпоративних прав на них та інших ресурсів, посяганням на права власників або уповноважених осіб суб'єктів господарювання різної форми власності тощо. У зв'язку із цим мету статті визначено як окреслення перспектив побудови криміналістичних методик розслідування кримінальних правопорушень, у яких убачаються ознаки рейдерства. Задля досягнення означеної мети застосовано комплекс загальнонаукових, філософських і спеціальних

методів дослідження. За результатами проведеного дослідження визначено, що в сучасному розумінні під окремою криміналістичною методикою розслідування (у широкому сенсі) слід розуміти інтегрований продукт наукового знання в галузі права, сформований на підставі узагальнення слідчо-судової практики, що за своєю сутністю є сукупністю криміналістичних рекомендацій, апробованих тактичних прийомів проведення слідчих (розшукових) і негласних слідчих (розшукових) дій, способів і прийомів оптимального й ефективного застосування криміналістичної техніки під час проведення досудового розслідування, які розроблено відповідно до процесуальних вимог із метою оптимізувати модель здійснення досудового розслідування окремого кримінального правопорушення, їхніх груп тощо. На підставі узагальнення окремих елементів кримінально-правової та криміналістичної характеристик кримінальних правопорушень, пов'язаних із рейдерством, визначено різновиди окремих криміналістичних методик розслідування, серед яких міжвидові, спеціальні, підвидові, видові та ін.

Ключові слова: кримінальне правопорушення; окрема криміналістична методика розслідування; досудове розслідування; рейдерство; суб'єкт господарювання; підприємство; земельна ділянка; протиправне поглинання; захоплення.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the research design, data collection and analysis, decision to publish or manuscript preparation.

Participants

The author has contributed solely to intellectual discussion underlying this document, case law

research, writing and editing, and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

The author declares no conflict of interest related to this topic, although he is Advisory Board member of research paper collection; he was not involved in publishing decision and this article has undergone a full peer review and editing procedure.

References

- Aliexsieichuk, V. I. (2016). Kryminalistychna metodyka sudovoho rozghliadu v kryminalnomu provadzheni (mistse v systemi kryminalistyky) [Forensic method of trial in criminal proceedings (place in the system of criminalistics)]. *Pravo i suspilstvo*. № 6. URL: http://pravoisuspilstvo.org.ua/archive/2016/6_2016/part_1/30.pdf [in Ukrainian].
- Arkusha, L. I. (2011). *Osnovy vyivlennia ta rozsliduvannia lehalizatsii dokhodiv, oderzhanykh u rezultati orhanizovanoi zlochnnoi diialnosti* [Correlations between certain types of crimes in the field of entrepreneurship (problems of investigative methodology)] : avtoref. dys. ... d-ra yuryd. nauk. Odesa. URL: <http://dspace.onua.edu.ua/bitstream/handle/11300/1476/%d0%90%d1%80%d0%ba%d1%83%d1%88%d0%b0.pdf?sequence=1&isAllowed=y> [in Ukrainian].
- Berezniak, V. S. (2020). Kryminalistychna kharakterystyka kryminalnykh pravoporushen, pov'iazanykh iz zakhopleniam zemli ta ob'ektiv korporativnoi vlasnosti [Forensic characteristics of criminal offenses related to the seizure of land and objects of corporate property]. *Yurydychna nauka*. № 9 (111). DOI: [10.32844/2222-5374-2020-111-9.15](https://doi.org/10.32844/2222-5374-2020-111-9.15) [in Ukrainian].
- Best Practices in Investigating and Prosecuting Corruption*. Using Financial Flow Tracking Techniques and Financial Intelligence: A Handbook. APEC Anticorruption and Transparency Working Group (ACTWG) (2015). URL: https://www.apec.org/docs/default-source/publications/2015/10/best-practices-in-investigating-and-prosecuting-corruption/apec-handbook-final-september-2015_ed2.pdf.
- Carter, D. L. (1990). *Law Enforcement Intelligence Operations. An Overview of Concepts, Issues and Terms*. School of Criminal Justice Michigan State University. URL: <https://www.ojp.gov/pdffiles1/Photocopy/134434NCJRS.pdf>.
- Copley, C. (2016). *German industry body warns against takeover protection measures* / Ed. by Goodman D. // Reuters. Oct. 17, 2016. URL: <https://www.reuters.com/article/idUSL8N1CN3HF/>.
- Forensic science and the criminal justice system: a blueprint for change* (2019). Publ. by the Auth. of the House of Lords. URL: <https://publications.parliament.uk/pa/ld201719/ldselect/ldsctech/333/333.pdf>.
- Frankenfield, J. (2023). *Adverse Possession: Legal Definition and Requirements*. Rev. by Th. Brock. URL: <https://www.investopedia.com/terms/a/adverse-possession.asp>.
- Gaughan, P. A. (2018). *Mergers, acquisitions and corporate restructuring*. Hoboken. 7th ed. URL: <http://dspace.vnbrims.org:13000/jspui/bitstream/123456789/4962/1/Mergers%2C%20Acquisitions%2C%20and%20Corporate%20Restructurings.pdf>.
- Greenberg, Th. S., Samuel, L., Grant, W., Gray, L. (2009). *Stolen Asset Recovery: A Good Practices Guide for Non-Conviction Based Asset Forfeiture*. *The World Bank*. DOI: [10.1596/978-0-8213-7890-8](https://doi.org/10.1596/978-0-8213-7890-8).
- Hanov, T. A., Bashirov, A. V. (2020). Rejderskie zahvaty kak socialno-pravovaya i kriminalnaya problema v Respublike Kazakhstan [Raider raids as a socio-legal and criminal problem in the Republic of Kazakhstan]. *Aktualnye problemy sovremennosti*. № 2 (28). URL: <https://aps.bolashaq.edu.kz/wp-content/uploads/2021/01/%D0%96%D1%83%D1%80%D0%BD%D0%B0%D0%BB-%D0%90%D0%9F%D0%A1-2-28-1.pdf> [in Russian].
- How many people were convicted of raiding in Kazakhstan* (2020) / MIA "Kazinform". 04.12.2020. URL: https://www.inform.kz/ru/skol-ko-chelovek-osudili-za-reyderstvo-v-kazakhstan_a3726264.
- Hryshchenko, N. M. (2019). *Kryminalna vidpovidalnist za protypravne zavolodinnia*

- mainom pidpriemstva, ustanovy, orhanizatsii [Criminal liability for illegal possession of property of an enterprise, institution, or organization] : dys. ... kand. yuryd. nauk. Dnipro. URL: <https://dduvs.in.ua/wp-content/uploads/files/Structure/science/rada/d2/dissertations/4/1.pdf> [in Ukrainian].
- Husieva, V. O. (2021). *Teoretychni osnovy metodyky rozsliduvannia zlochyniv proty avtorytetu orhaniv derzhavnoi vlady u sferi pravookhoronnoi diialnosti* [Theoretical foundations of methodology of investigating crimes against authority of State authorities in the field of law enforcement] : dys. ... d-ra yuryd. nauk. Kharkiv. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/5ea810ce-cc6f-4266-b94a-9756f3cc84af/content> [in Ukrainian].
- Husieva, V. O. (2022). Kryminalistychna klasyfikatsiia kryminalnykh pravoporushen, poviazanykh iz reiderstvom, elementy yikh kryminalistychnykh kharakterystyk [Forensic classification of criminal offenses related to raiding, elements of their forensic characteristics]. *Visnyk Luhanskoho derzhavnoho universytetu vnutrishnikh sprav im. E. O. Didorenka*. № 3 (99). DOI: 10.33766/2524-0323.99.242-252 [in Ukrainian].
- Husieva, V. O. (2023). Do pytannia vyznachennia struktury kryminalistychnoi metodyky rozsliduvannia kryminalnykh pravoporushen, poviazanykh z reiderstvom [On the question of determining the structure of the forensic methodology of investigation of criminal offenses related to raiding]. *Aktualnist ta osoblyvosti naukovykh doslidzhen v umovakh voiennoho stanu* : zb. mat-liv III Mizhnar. nauk.-prakt. internet-konf. z nashod vidznach. Dnia nauky — 2023 v Ukraini (Kyiv, 23.05.2023). Kyiv. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/5df7785a-79b8-4824-8857-3683272bd225/content> [in Ukrainian].
- Indeks spryiniattia koruptsii 2022 (2022) [Corruption Perceptions Index 2022] / Transparency International the Global Coalition Against Corruption. Transparency International Ukraine. URL: https://cpi.ti-ukraine.org/static/download/2022_ukr_final.pdf [in Ukrainian].
- Kamlyk, M. I., Pohoretskyi, M. A., Shelomentsev, V. P. (2007). Reiderstvo v Ukraini: sutnist ta zasoby protydyi [Raiding in Ukraine: essence and countermeasures]. *Borotba z orhanizovanoi zlochynnistiu i koruptsiieiu (teoriia i praktyka)*. Vyp. 17. URL: http://nbuv.gov.ua/UJRN/boz_2007_17_6 [in Ukrainian].
- Khamitov, B. N., Kemali, Y. S., Rakhmetov, S. M., Alibekova, A. M. (2022). Retracted Article: International legal approaches in combatting raidership. *Security Journal*. Nov 17. DOI: 10.1057/s41284-022-00362-1.
- Kikinchuk, V. V., Husieva, V. O. (2020). *Osoblyvosti rozsliduvannia kryminalnykh pravoporushen, poviazanykh z protypravnym pohlynniam ta zakhoplenniam pidpriemstv, silskohospodarskykh zemel, porushenniam prav yikh zakonnykh vlasnykh (reiderstvo)* [Peculiarities of the investigation of criminal offenses related to illegal takeover and seizure of enterprises, agricultural lands, violation of the rights of their legal owners (raiding)] : nauk.-metod. rek. Kharkiv. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/5f246ac8-784f-46b3-a205-36f18bdc478e/content> [in Ukrainian].
- Kolesnychenko, A. N. (1976). *Obshchye polozheniia metodyky rassledovaniia otdelnykh vydiv prestuplenyi* [General provisions of the methodology for investigating certain types of crimes] : tekst lektsyy. Kharkov [in Ukrainian].
- Kubariev, I., Barkhan, S. (2022). Typovi slidchi sytuatsii pochatkovoho etapu rozsliduvannia reiderstva [Typical investigative situations of the initial stage of raiding investigation]. *Krakowskie Studia Malopolskie*. № 3 (35). [in Ukrainian].
- Liekefett, K. (2020). *The Comeback of Hostile Takeovers / Harvard Law School Forum on Corporate Governance*. Nov. 8, 2020. URL: <https://corpgov.law.harvard.edu/2020/11/08/the-comeback-of-hostile-takeovers/>.
- Lukianikhina, O. A. (2018). Reiderstvo: prychny ta nehatyvni naslidky dlia rozvytku rynkovoho biznes-seredovyshcha v Ukraini [Raiding: causes and negative consequences for the development of the market business environment in Ukraine].

- Suchasni problemy pravovoho, ekonomichnoho ta sotsialnoho rozvytku derzhavy : tezy dop. VII Mizhnar. nauk.-prakt. konf. (Kharkiv, 30.11.2018). Kharkiv. URL: http://univd.edu.ua/general/publishing/konf/30_11_2018/pdf/128.pdf [in Ukrainian].
- Macey, J. R. *Market for Corporate Control* / Econlib. URL: <https://www.econlib.org/library/Enc/MarketforCorporateControl.html>.
- Maiatnyk borotby z koruptsiieiu v Ukraini: krok vpered pislia kroku nazad [Pendulum of the fight against corruption in Ukraine: a step forward after a step back] / Transparency International the Global Coalition Against Corruption. Transparency International Ukraine. URL: <https://cpi.ti-ukraine.org/> [in Ukrainian].
- Maliarova, V. O. (2015). Kryminalistychna metodyka: pytannia spivvidnoshennia kryminalistychnoi kharakterystyky z in-shymy. *Naukovyi visnyk Uzhhorodskoho natsionalnoho universytetu. Seria: Pravo*. Vyp. 35. Ch. I. T. 3. URL: <https://dspace.uzhnu.edu.ua/jspui/handle/lib/14912> [in Ukrainian].
- Nipialidi, O. Yu. (2019). *On criminal schemes of raiding as a threat to the security of the business owner: Ukrainian realities and international practice*. Irpin.
- OECD. *G20/OECD Principles of Corporate Governance* (2015) / OECDiLibrary. DOI: [10.1787/9789264236882-en](https://doi.org/10.1787/9789264236882-en).
- Pchelina, O. V. (2018). Poniattia ta kharakterystyka zlochnynykh tekhnolohii u sferi sluzhbovoi diialnosti [Concept and characteristics of criminal technologies in the field of official activity]. *Visnyk Luhanskoho derzhavnogo universytetu vnutrishnikh sprav imeni E. O. Didorenka*. № 2 (82). URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/88d0d842-d553-4077-a242-bf6b55ddd25b/content> [in Ukrainian].
- Prinzel, Yo. (2023). *How Government Land Seizures Work for Landowners. Property rights and related impacts of government land seizure*. Rev. by Boyle M. J / Investopedia. URL: <https://www.investopedia.com/financial-edge/1011/what-to-do-when-the-government-wants-your-land.aspx>.
- Puziak, M., Martyniuk, M. (2012). Defensive strategies against hostile takeovers. The analysis of selected case studies. *Journal of International Studies*. Vol. 5. № 1. URL: https://www.jois.eu/files/PuziakV5_N1.pdf.
- Reiderstvo v Ukraini [Raiding in Ukraine] / Opendatabot. URL: <https://opendatabot.ua/open/raiders> [in Ukrainian].
- Rosett, J. G. (1990). Do Union Wealth Concessions Explain Takeover Premiums? The Evidence on Contract Wages. *Journal of Financial Economics*. Vol. 27. Is. 1. DOI: [10.1016/0304-405X\(90\)90029-Y](https://doi.org/10.1016/0304-405X(90)90029-Y).
- Savona, E. U., Berlusconi, G. (Eds.) (2015). *Organized Crime Infiltration of Legitimate Businesses in Europe: A Pilot Project in Five European Countries*. Final Report of Project ARIEL – Assessing the Risk of the Infiltration of Organized Crime in EU MSs Legitimate Economies: a Pilot Project in 5 EU Countries (www.ariel-project.eu). Trento : Transcrime — Università degli Studi di Trento. URL: https://www.academia.edu/25765243/Organized_Crime_Infiltration_of_Legitimate_Businesses_in_Europe_A_Pilot_Project_in_Five_European_Countries.
- Shchur, B. V., Kosaniak, S. S. (2017). Problemy pobudovy klasyfikatsii kryminalistychnykh metodyk [Issues of classification building of forensic methods]. *Visnyk Lvivskoho torhovelno-ekonomichnoho universytetu. Seria: Yurydychni nauky*. Vyp. 5. URL: http://nbuv.gov.ua/UJRN/nvklau_2017_5_28 [in Ukrainian].
- Shevchuk, V. M. (2020). Struktura okremoi kryminalistychnoi metodyky: suchasni naukovy pidkhody ta perspektyvy doslidzhen [The structure of a separate forensic methodology: modern scientific approaches and research perspectives]. *Vcheni zapysky TNU imeni V. I. Vernadskoho. Seria: Yurydychni nauky*. T. 31 (70). № 4. DOI: [10.32838/1606-3716/2020.4/41](https://doi.org/10.32838/1606-3716/2020.4/41) [in Ukrainian].
- Smelik, V. B. (2006). *Koreliatsiini zviazky mizh okremymi vydami zlochnyniv u sferi pidpriemnytstva (problemy metodyky rozsliduvannia)* [Correlations between certain types of crimes in the field of entrepreneurship (problems of investigative methodology)] : avtoref. dys. ... kand. yuryd. nauk. Kharkiv [in Ukrainian].

- Smitiukh, A. V. (2008). Reiderstvo, pohlynannia ta zaharbannia: spivvidnoshennia poniat ta klasyfikatsii [Raiding, absorbing and seizing: relation of concepts and classification]. *Visnyk hospodarskoho sudochynstva*. № 3. [in Ukrainian].
- Stepaniuk, R. L. (2012). *Kryminalistychne zabezpechennia rozsliduvannia zlochyniv, vchynenykh u biudzhethnii sferi Ukrainy* [Forensic investigation of crimes committed in the budgetary field of Ukraine] : monohrafiia / za zah. red. d-ra yuryd. nauk, prof. A. F. Volobuieva. Kharkiv [in Ukrainian].
- Tataryn, N. M., Priakhin, Ye. V. (2019). *Metodyka rozsliduvannia samovilnoho zainiattia zemelnoi dilianky ta samovilnoho budivnytstva* [Methods of investigation of unauthorized occupation of land and unauthorized construction] : monohrafiia. Lviv. URL: <http://surl.li/omigf> [in Ukrainian].
- Ward, R. H. (1971). *The Investigative Function — Criminal Investigation in the United States*. Doct. dis. Berkeley, CA : University of California.
- Weisburd, D., Telep, C. W., Hinkle, J. C., Eck, J. E. (2008). The Effects of Problem-Oriented Policing on Crime and Disorder. *Campbell Systematic reviews*. Vol. 4. Is. 1. DOI: 10.4073/csr.2008.14.
- Yarosh, S. *Problema reiderstva ta reforma derzhavnykh reiestriv* [Issue of raiding and the reform of state registers] / Rada advokativ Kyivskoi oblasti : ofits. vebсайт [Elektronnyi resurs]. URL: <https://radako.com.ua/news/problema-reyderstva-ta-reforma-derzhavnih-reiestriv> [in Ukrainian].
- Zhuravel, V. (2011). Okrema kryminalistychna metodyka: poniattia ta sfera zastosuvannia [Separate forensic methods: concept and scope of application]. *Pytannia borotby zi zlochynnistiu*. № 2 (65). URL: https://dspace.nlu.edu.ua/bitstream/123456789/7438/1/Zhuravel_202.pdf [in Ukrainian].
- Zhuravel, V. (2015). Okremi metodyky v systemi kryminalistychnykh znan [Separate methods in the system of forensic knowledge]. *Naukovi visnyk Lvivskoi komertsii noi akademii. Serii: Yurydychna*. Vyp. 1. URL: http://nbuv.gov.ua/UJRN/nvika_2015_1_20 [in Ukrainian].

Tiulieniev, S. (2024). Prospects for Development of Forensic Methods for Investigation of Criminal Offenses Related to Raiding. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). P. 42—57. DOI: 10.32353/khrife.1.2024.03.

Psychophysiological Research and its Place in the Lithuanian Scientific Discourse

Hendryk Malewski ^{* a}, Laimutis Kraujalis ^{** b}

* Doctor of Law, Professor, Mykolas Romeris University, Vilnius, Lietuva,
ORCID: <https://orcid.org/0000-0002-0124-2242>, e-mail: henryk.malewski@gmail.com

** Mykolas Romeris University, Vilnius, Lietuva,
ORCID: <https://orcid.org/0000-0002-3253-9938>, e-mail: laimis.vilnius@gmail.com

^a Writing – original draft, Methodology.

^b Writing – original draft.

DOI: [10.32353/khrife.1.2024.04](https://doi.org/10.32353/khrife.1.2024.04) UDC 343.98

Received: 14.03.2024 / Reviewed: 15.03.2024 / Accepted for print: 27.03.2024 /
Available online: 29.03.2024



This article gives a brief overview of the development of psychophysiological research using the polygraph. The main focus is on the legal regulation of these methods and the evaluation of the scientific discourse of Lithuanian specialists on the problems of psychophysiological research and the application of its methods in comparison with analogous processes in Poland. Already in the inter-war period, so-called lie detection attracted considerable interest, not only from the academic world, but also from law enforcement authorities. In interwar Lithuania, considerable attention was paid to the psychology of testimony and the problems of lie detection, including the application of instrumental methods of psychodiagnostics. V. Lazerson, J. Vabalas-Gudaitis, B. Kalvaitis and others have written about it. It should be noted that at that time there were quite heated debates about the permissibility and effectiveness of psychophysiological tests. During the Soviet era, the issue of psychophysiological (polygraph) examinations was not the subject of an official broad scientific discourse in the jurisdictional process, even though medical and psychological professionals cooperating with special services were interested in this issue. After the restoration of independence in 1990, the Lithuanian media interest in this issue prompted the law enforcement authorities and their specialists and scientists to look deeper into the possibility, reliability, permissibility and effectiveness of the use of these technical diagnostic tools in foreign countries, as well as into their compatibility with the Lithuanian law in the investigation of crimes. In this article, some aspects of psychophysiological tests

using the polygraph in Poland have been analysed for comparison purposes, which in the neighbouring country have attracted considerably more attention, both in the academic world as well as among lawyers and representatives of law enforcement agencies.

Keywords: psychophysiological research; polygraph; lie detector; variograph; polygraph examination; history of polygraph.

Research Problem Formulation

The problem of uncovering lies has always been a concern for people. People have sought to find out whether the person with whom they are communicating is telling the truth or lying. Without going back to a time when cruel methods of interrogation and torture could still be used to establish the truth in legal proceedings, we must note that from ancient times, ideas have emerged for the use of certain methodologies, techniques, tools and, later on, devices that could objectify the establishment of the truth in the investigation of criminal offenses. Every person, when lying, experiences certain emotions that can be noticed externally, such as a flushed face, increased breathing, etc. ¹ By observing a person's emotions, gesticulations, changes in facial expressions and physiological reactions, an attempt was made to identify certain signs that might give away a person

who is lying. Later, scientists from various fields (philosophers, physicians, psychologists, psychiatrists) and representatives of law enforcement agencies became interested in this problem and experimented and tried to develop certain devices that would make it easier to determine whether a person was telling the truth or lying. V. Lazerson, J. Vabalas-Gudaitis, B. Kalvaitis and others wrote about interviewing tactics and lie detection in interwar Lithuania ². The problem of lie detection has been and still is an issue of interest to lawyers, criminologists ³ and psychologists, including in contemporary Lithuania ⁴. Establishing the truth in criminal investigations has always been one of the most important objectives of criminal proceedings. H. Gross and E. Locard, the pioneers of scientific forensic science, emphasised the need to observe the interviewee's emotions when dealing with interrogation tactics, as this allowed assumptions to be made about the

-
- 1 Widacki J. Historia badań poligraficznych. Kraków, 2017. 197 p. URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/6a3d6335-9ad1-49d7-a577-52cd6a99f1e4/content> (date accessed: 24.07.2023) ; Reid J. E., Inbau F. E. Truth and Deception: The Polygraph (Lie-Detector Technique). Baltimore, 1977. 2nd ed. 447 p. ; Krapohl D., Shaw P. K. Fundamentals of Polygraph Practice. Academic Press; 2015. 1st ed. 348 p. ; Galianos J. Brief history of the polygraph. URL: http://home.total.net/~galcar/html/brief_history_of_the_polygraph.html (date accessed: 24.07.2023).
 - 2 Palskys E. Overview of the History of Lithuanian Criminalistics. Monographical study. Vilnius, 1995. Pp. 234—249.
 - 3 Асатрян Х. А., Христюк А. А. Психологические особенности подозреваемого и обвиняемого и их влияние на проведение психофизиологической экспертизы с использованием полиграфа. *Эксперт-криминалист*. 2011. № 1. С. 16—19.
 - 4 Justickis V., Valickas G. Procedural Justice in the Lithuanian Criminal Justice. Vilnius, 2006 ; Valickas G. Mėlą atpažinti galima ir iš akies vyzdžio pokyčių / Vilniaus universitetas. 23 Dec, 2019. URL: <https://naujienos.vu.lt/gintautas-valickas-mela-atpazinti-galima-ir-is-akies-vyzdzio-pokyciu/> (date accessed: 24.07.2023).

reliability of testimony ⁵. Another pioneer of forensic science, F. Galton, contributed to the study of this problem by describing the Word Association Test. R. Heindl and E. Seelig conducted their own research in the field of lie detection ⁶. At the beginning of the 20th century, the scientific revolution in medicine (physiology), psychology and various fields of engineering gave rise to new methodological, methodological and instrumental possibilities to observe and measure the manifestation of human emotions through certain physiological changes in the body (symptoms). The study of this issue has had several dimensions: scientific academic (as one of the important areas of human cognition), forensic legal (as a tool to help evaluate the testimony of the interviewee), and domestic applied (with the aim of determining whether a person is lying or telling the truth). Since the beginning of the „polygraph era“ ⁷, the use of this tool has had both credible supporters and fierce opponents.

Article Purpose

To compare the main mechanisms of legal regulation regarding the application of

various methods of psychophysiological research using the polygraph and to evaluate the scientific discourse of Lithuanian specialists on this issue in relation to similar processes in Poland.

Research Methods

At the theoretical level, the convergence from abstract to concrete, axiomatic, system-structural and other methods of scientific research were used.

Analysis of Essential Researches and Publications

After the restoration of independence in Lithuania in 1990, the public interest in the polygraph and its application was quite high, but the first major scientific work on the problems of polygraph use was the master's thesis of L. Kraujalis ⁸, whose supervisor was the co-author of this article. Later on, there were those who wanted to study the problem more or less in a complex way. Among the Lithuanian authors, A. Kovalenko and V. Saldžiūnas have a special place, having published several articles between 2007 and 2015 ⁹, most of

- 5 Locard E. *Dochodzenie przestępstw według metod naukowych*. Łódź, 1937. P. 84 ; Gross H. *Podręcznik dla sędziego śledczego jako system kryminalistyki*. Opracowanie i przekład J. Kasprzak, Warszawa, 2021. Pp. 144–154.
- 6 Heindl R. Ein Apparat, Lügen beim Verhör aufzudecken. *Archiv für Kriminologie*. 1927. Nr. 114 ; Seelig E. Die Registrierung unwillkürlicher Ausdrucksbewegungen als forensisch-psychodiagnostische Methode. *Zeitschrift für angewandte Psychologie*. 1927. No 28. S. 45–84 ; Seelig E. *Schuld, Lüge, Sexualität*. Stuttgart, 1955.
- 7 Kratka istorija poligrafa / Poligraf Centar. URL: <https://www.poligrafcentar.rs/poligraf/> (date accessed: 24.07.2023).
- 8 Kraujalis L. *Lie Detection Method: Theory and Practice*. Master Thesis. Vilnius, 1997.
- 9 Saldžiūnas V., Kovalenko A. The Event Knowledge Test. *European Polygraph*. 2008. Nr. 1 (3). Pp. 21–29. URL: https://www.academia.edu/107561272/The_Event_Knowledge_Test_EKT (date accessed: 24.07.2023) ; Ibidem. The Event Knowledge Test (EKT) in Polygraph Examination (in case murder). *Ibid*. Nr. 2 (4). Pp. 137–142. URL: https://www.academia.edu/104814924/The_event_knowledge_test_EKT_in_polygraph_examination_in_case_murder_Vitas_Sald%C5%BEi%C5%ABnas_Aleksandras_Kovalenko (date accessed: 24.07.2023) ; Ibidem. The Event Knowledge Test (EKT) in Polygraph Examination (common notice of tactics). *Ibid*. Nr. 3–4 (5–6). Pp. 209–220 ; Saldžiūnas V., Kovalenko A. Problems of Questions in Event

them in the journal *European Polygraph*, published by Andrzej Frycz Modrzewski Krakow University, whose founder and editor-in-chief was prof. J. Widacki. This also demonstrates not only the cooperation between Lithuanian and Polish scholars and specialists in this field, but also the conceptual proximity of the two countries in dealing with these issues.

In the forensic textbook published in 2013, we have a separate chapter „Psychophysiological investigation“¹⁰, and in the methodological tool published in 2014, we have a separate chapter „The use of a polygraph in the investigation of criminal offenses“¹¹. In 2022, G. Uchockytė prepared a master's thesis „Psychophysiological research using polygraph: theory, practice and legal regulation in Lithuania and abroad“ (thesis supervisor H. Malevski)¹², in which, among other

questions, she analysed the opinion of 200 respondents (including 100 representatives of various legal professions) about polygraph examinations. It is also worth mentioning that E. Palskys¹³ wrote about the historical application of psychophysiological methods in his scientific study. Even before the restoration of independence in Lithuania, the Department of Special Disciplines (Vilnius faculty of the Minsk Higher School of Militia) was discussing the acquisition of a polygraph and a complex (psychological, criminological and forensic aspects) research project for analysing and evaluating the meaningfulness and effectiveness of polygraph examinations.

In Lithuania's neighbouring countries, the issue of polygraphs has received considerably more attention. In Poland, for example, hundreds of scientific articles have

Knowledge Test. *Ibid.* 2009. Vol. 3. Nr. 2 (8). Pp. 145–152. URL: https://www.academia.edu/107561280/Problems_of_questions_in_event_knowledge_tests_Vitas_Sald%C5%BEi%C5%ABnas_Aleksandras_Kovalenko (date accessed: 24.07.2023) ; *Ibidem.* Field and Laboratory Polygraph Examinations. *Ibid.* 2010. Vol. 4. Nr. 4 (14). Pp. 213–228. URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/ab17de20-9cea-46de-be1e-4bd36abb85ab/content> (date accessed: 24.07.2023) ; *Ibidem.* a Little About Memory Traces. *Ibid.* 2011. Vol. 5. Nr. 1 (15). Pp. 11–25. URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/280f9f8f-6dce-4f23-b7bf-3e329fea3f3c/content> (date accessed: 24.07.2023) ; *Ibidem.* Alibi Check by Polygraph Examination. *Ibid.* 2012. Vol. 6. Nr. 2 (20). Pp. 117–127. URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/85cb8eca-9a73-4e62-b2aa-ce3f90858aac/content> (date accessed: 24.07.2023) ; *Ibidem.* Search for New Tests. *Ibid.* Nr. 4 (22). Pp. 241–247 ; *Ibidem.* Examination of Sexual Abuse Crimes. *Ibid.* 2013. Vol. 7. Nr. 3 (25). Pp. 127–136. URL: https://www.academia.edu/104814949/Examination_of_Sexual_Abuse_Crimes (date accessed: 24.07.2023) ; *Ibidem.* Field Examination: Certain Phenomena Related to Electrodermal Activity. *Ibid.* 2014. Vol. 8. Nr. 2 (28). Pp. 79–89 ; *Ibidem.* Selecting the Most Optimal Conditions for the Polygraph Examination. *Ibid.* 2015. Vol. 9. Nr. 2 (32). Pp. 69–84. URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/bba25ec4-f380-4b54-8b94-fee9b26bbbb/content> (date accessed: 24.07.2023).

10 Kurapka V. E. Criminalistics. Tactics and methodology. Tutorial / S. Matulienė (Editor in Chief). Vilnius, 2013. Pp. 1022–1046.

11 Criminalistics: Methodical handbook / J. Juškevičiūtė (Editor in Chief). Vilnius, 2014. Pp. 245–259.

12 Uchockytė G. Psychophysiological Examinations Using Polygraph: Theory, Practice and Legal Framework in Lithuania and Abroad : Master Paper. Vilnius, 2022. Pp. 53–59.

13 Palskys E. Op. cit.

been published over several decades¹⁴, at least seven monographs have been published¹⁵, many forensic textbooks have separate chapters or at least information on psychophysiological research and the use of the polygraph (wariograph), we have at least several hundred scientific articles in journals, the only scientific journal in Europe published in English is *European Polygraph*, whose editorial board included a representative of Lithuania, prof. G. Žukauskas. Psychophysiological research is carried out not only by Polish police departments and the Scientific Institute of the Polish Society of Forensic Scientists, as well as by some university forensic departments, but also by private experts. Other countries have very differ-

ent practices regarding the use of psychophysiological tests. Among the leaders in the use of psychophysiological testing is the USA, and active work in this area has been carried out in the Russian Federation in recent decades¹⁶. For example, in Ukraine, since the Soviet era, there has been a negative attitude towards the use of polygraphs, and it is only at the beginning of the 21st century that the situation started to change and researchers started to look into the issue of psychophysiological research¹⁷. Since 2016, a scientific journal «Судово-психологічна експертиза. Застосування поліграфа і спеціальних знань в юридичній практиці», and since 2018, the scientific journal of the Ukrainian College of Polygraphologists «Оцінка

-
- 14 Polska bibliografia kryminalistyczna. Warszawa, 2008. T. III (lata 1980–1989) / praca zbiorowa pod redakcją: B. Hołysta, T. Tomaszewskiego, E. Gruzy, M. Goca. Pp. 236–240. T. IV (lata 1990–2000) / praca zbiorowa pod redakcją: B. Hołysta, T. Tomaszewskiego, H. Kolečkiego, M. Goca. Pp. 294–298.
- 15 Jaworski R. Opinia z ekspertyzy poligraficznej jako dowód odciążający. Wrocław, 1999. 297 p. ; Idem. Situational Sequencing Tests in Polygraph Examination. Wrocław, 2006. 86 p. ; Idem. Multi-subject polygraph examination. Wrocław, 2008. 136 p. ; Konieczny J. Badania poligraficzne. Podręcznik dla zawodowców. Warszawa, 2009. 222 p. ; Gołaszewski M., Ibek A., Widacki M. Współczesne standardy badań poligraficznych / red. M. Gołaszewski. Warszawa, 2013. 132 p. ; Badania poligraficzne w Polsce / red. J. Widacki. Kraków, 2014. 310 p. URL: <https://core.ac.uk/download/pdf/214927459.pdf> (date accessed: 24.07.2023) ; Widacki J. Polygraph or Variograph? *Issues of Forensic Science*. 2016. No 1. Vol. 294. Pp. 88–92. DOI: 10.34836/pk.2016.294.5 (date accessed: 24.07.2023).
- 16 Варламов В. А. Детектор лжи. 2-е изд. Москва, 2004. 352 с. ; Комиссарова Я. В., Мягих Н. И., Пеленицын А. Б. Полиграф в России и США: проблемы применения. Москва, 2012. 222 с. ; Азарова Н. Ю. Полиграф: обзор современных методик США. Часть 1. Алгоритмы формирования стандартизированных тестов / под ред. В. В. Коровина. Москва, 2016. 198 с. ; Алексеев Л. Г., Потемкин Ф. В. Проблемы прикладной психофизиологии. Москва, 2017. 302 с. ; Комиссарова Я. В. Основы полиграфологии : учеб. для магистратуры. 2-е изд., перераб. и доп. Москва, 2022. 256 с.
- 17 Когутич І. Поліграф у Польщі та Україні: історія, сучасний стан і перспективи. Вроцлавсько-Львівський юридичний збірник / Wrocławsko-Lwowskie zeszyty prawnicze. 2011. № 2. Pp. 92–116. URL: http://repozytorium.uni.wroc.pl/Content/122657/PDF/07-Kogutic_I_Wariograf_w_Polsce_i_na_Ukrainie_historia_stan_obecny_i_perspektywy.pdf (date accessed: 24.07.2023) ; Морозов А. М., Морозова Т. Р. Некоторые аспекты современного состояния полиграфологии в Украине. *Експерт-криміналіст*. 2011. № 1. Pp. 14–16 ; Мотлях О. І. Поліграф: наукова природа походження, нормативно-правове регулювання та межі застосування : монографія. Київ, 2012. 394 с. ; Актуальні питання теорії та практики використання поліграфа : зб. ст. / за заг. ред. В. О. Шаповалова. Київ, 2016. 170 с.

достовірності: наукові дослідження та практика»¹⁸.

Main Content Presentation

The impact and significance of discoveries in the natural and technical sciences on the development of psychophysiological research

People have been interested in lie detection for a very long time (the first documented evidence of lie detection dating back more than 4,000 years in China)¹⁹, but in ancient and medieval times it was mostly confined to observing behaviour and facial expressions. A fundamental change occurs in the 19th century, when medicine (physiology), psychology and psychiatry start to develop rapidly²⁰. The rapid development of science, the application of new experimental methods, including in such sciences as medicine and psychology, allowed for a better understanding of the functioning of the human body, mindset, as well as the search for links between human emotions and the body's physiological reactions to certain stimuli. A wide range of diagnostic equipment is being developed, mostly for medical purposes. Law enforcement has seen here the possibility of addressing issues that are important to them through the use of certain devices that allow them to capture certain human emotions. It makes sense to use a rhetorical question

from J. Widacki's introduction to his book on the history of polygraph examinations, in which he writes: Why is a history of the instrumental development of lie detection necessary, and where does history end and the present begin? He attempts to answer these questions by showing in a coherent way the stages in the development of psychophysiological research and with a particularly strong emphasis on the significance of the achievements of various sciences for this issue²¹. One of the first major scientific articles on the development of lie detection was written by P. V. Trovillo and published in 1939²².

In 1846, the German physician and physiologist C. F. W. Ludwig invented what he called the „kymograph“, a device capable of simultaneously recording changes in arterial blood pressure and respiration in order to draw conclusions about the correlation between the external respiratory and circulatory systems²³.

The first scientific experiments to use technical means to determine whether a person is answering questions honestly or lying date back to the late 19th century. In 1878, the Italian physiologist A. Mosso begins to carry out studies using an instrument called the plethysmograph, which also examines the effects of these variables on cardiovascular and respiratory performance by investigating the emotions and fears of the subjects during the questioning. Experiments have shown that the

18 Оцінка достовірності: наукові дослідження та практика / Судово-психологічна експертиза. Застосування поліграфа і спеціальних знань в юридичній практиці. URL: <https://expertize-journal.org.ua/partneri-vidannya/1010-naukovij-zhurnal-go-kolegiya-poligrafologiv-ukrajini-otsinka-dostovirnosti-naukovi-doslidzhennya-ta-praktika> (date accessed: 24.07.2023).

19 Strong J. W. McCormich on Evidence. 4th ed. West Group, 1992. Pp. 97.

20 Widacki J. Historia URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/6a3d6335-9ad1-49d7-a577-52cd6a99f1e4/content> (date accessed: 24.07.2023).

21 Ibid.

22 Trovillo P. V. History of lie detection. *Journal of Criminal Law and Criminology*. 1939. Vol. 29 (6). Pp. 848–881 and Vol. 30 (1). Pp. 104–119. DOI: 10.2307/1136392 (date accessed: 24.07.2023).

23 Carl F. W. Ludwig / Britannica. URL: <https://www.britannica.com/biography/Carl-F-W-Ludwig> (date accessed: 05.11.2023).

human breathing pattern changes with exposure to certain stimuli and that this change in turn leads to changes in blood pressure and pulse. a significant invention was a diagnostic medical device developed in 1892, that was used in medical examinations because it had the ability to simultaneously capture the wavy traces of vascular impulses (radial, venous and arterial) with a metal pen on a rotating drum. Its inventor was the English surgeon J. Mackenzie.

In 1892, H. Münsterberg published the results of his research that some physiological changes in humans may be an expression of emotions related to lying²⁴. The first experiments were usually limited to recording one of the physiological changes listed above (respiration, blood pressure, skin electrical conductivity or muscle tension). Later, attempts were made to increase the responses of the analysed physiological mechanisms (parameters) to external stimuli, but these usually added very little „value“. It should be noted that a diagnostic instrument for measuring physiological reactions was used for this purpose in 1895, when the psychiatrist and criminologist Cesare Lombroso modified an existing device known as the „hydrosphygmograph“.

Although since J. A. „The Keeler Polygraph“, „The Truth Verifier“, „Stoelting Deceptograph“, etc. It was not until the turn of the 1990s that instrumental polygraphs were replaced by computerised polygraphs, which are still in use today. While the first polygraphs had one respiratory sensor, one skin electrical conductivity sensor and one blood flow sensor, the current latest modifications have two respiratory sensors, two skin electrical conductivity sensors, two blood flow sensors and one to four mus-

cle change sensors. According to a 2014 study, „A modern computerised polygraph not only records physiological responses in respiration, skin electrical conductivity and blood flow (4 to 8–9 channels), but also has effective interference detection technologies (motion sensors, computer algorithms). a modern polygraph has the ability to record the text of the questions asked and the answers given in a specialised program in the computer’s memory. They can make audio and video recordings along with the tests, record an audio version of the questions asked, and then provide an audio recording of the questions instead of the specialist’s voice. Modern polygraph software has the ability to record not only manually, but also automatically the starting and ending moments of the question and the moment of the subject’s answer“²⁵. L. Belevičius, one of the specialists in criminal procedure, described the polygraph as follows: „A modern polygraph is a complex of precise medical devices that record certain physiological processes in the body of the person under investigation (arterial blood pressure, sweat production, pulse rate, body temperature, breathing rate and depth, unconscious muscle contractions, head bio-currents etc.) that occur in the human body within seconds of answering the questions. Physiological processes are regulated by the autonomic nervous system, which governs physiological processes that are independent of human will. It has been established that there is a causal link between telling lies and physiological processes that are not under conscious control“²⁶.

To summarise, a polygraph is a compendium of diagnostic technical instruments that record and measure the

24 Hanausek T. *Zarys taktyki kriminalistycznej*. Warszawa, 1994. Pp. 168.

25 *Criminalistics: Methodical handbook* ...

26 Belevičius L. *Techninių priemonių naudojimo baudžiamajame procese teoriniai pagrindai ir reglamentavimas*. Daktaro disertacija. Vilnius, 2005. Pp. 59. URL: <https://vb.mruni.eu/object/elaba:1830246/MAIN> (date accessed: 28.05.2023).

psychophysiological changes (reactions) of the human body to certain verbal, visual or other stimuli.

Legal regulation of psychophysiological research and scientific discourse on the use of polygraph in Lithuania

After the restoration of independence in 1990, Lithuania witnessed major changes in all spheres of life, which had a clear vector of Western civilisation, and these processes could not but affect such an important area as public security and the fight against criminality. In the process of reforming law enforcement and justice institutions, the state had to look for new methods, ways and means of combating crime. One of these tools was the polygraph, often referred to in the media as 'lie detectors', which were to become (at least according to the prevailing public opinion) very effective tools for investigating crime. The issue of psychophysiological testing has been the subject of a very wide, including scientific, debate around the world. The possibility of using psychophysiological research to investigate criminal offenses has been, and continues to be, hotly debated. The interest in this issue generated by the Lithuanian media has prompted law enforcement authorities and researchers to look deeper into the possibility of using these technical tools, their reliability, permissibility and effectiveness in foreign countries, but also their compatibility with Lithuanian law in the investigation of crimes.

After some more behind-the-scenes discussions (as there were practically no scientific publications in Lithuania before the adoption of the law), the Law on the Use of the Polygraph of the Republic of Lithuania was adopted in 2000. In our opinion, the legislator did not sufficiently look into the essence of psychophysiological tests and their ability to verify certain information about a criminal event, its circumstances,

etc. For this reason, the law only regulated issues related to the verification of the loyalty of certain categories of persons, and it did not provide for the possibility of the use of the polygraph in criminal proceedings. This position of the legislator may have been linked to a desire to minimise potential criticism of the restriction and violation of human rights and freedoms, although in all countries where the polygraph is used there is a very important safeguard, namely the person's voluntary consent to take part in the investigation.

The Law on the Use of Polygraphs establishes the basic guidelines that must be followed when using this technical diagnostic device. Article 5 of the Law establishes the purpose of the polygraph and the cases in which it may be used. The purpose of the polygraph examination is therefore to verify the reliability of the persons covered by the law and of the information provided by them or collected by the relevant public authorities concerning those persons and their environment. a particularly important aspect is the cases in which the use of a polygraph is foreseen: when deciding on the issue or revocation of a permit to work or to have access to classified information, where there are grounds to believe that a person has concealed or misrepresented facts about his or her background or biography; in the course of counter-intelligence; and in the course of assessing the reliability of the covert participants of the criminal intelligence service and/or of the information they provided; assessing the credibility of officials carrying out the functions of ensuring the protection of protected persons, as well as assessing whether there are any reasons that could endanger the security of protected persons; investigating and preventing criminal offenses and other violations of the law, if such offenses and other violations are related to a breach of the established procedures for work, access

to classified information, or the use and storage of such information; when there are grounds to believe that a person is being subjected to unlawful influence having a bearing on the established procedure for access to, working with, or use and storage of classified information; when a person submits a request for a re-investigation ²⁷.

The Law on the Use of Polygraph of the Republic of Lithuania and its relationship with the provisions of the Criminal Procedure Code of the Republic of Lithuania ²⁸ have already been discussed on several occasions, but in this article, we would like to present our insights into the descriptions of the main concepts of the Law in Article 2, which, in our opinion, need to be adjusted. The law contains the following description of the device and polygraph examination: „1. **Polygraph** — a device with a certificate of the form prescribed by the Government of the Republic of Lithuania, that records respiratory, circulatory and other physiological changes occurring in a person's body during a polygraph examination, which are used as a basis for the assessment of the truthfulness of the statements of the person being examined by this device. 2. „**Polygraph examination**“ (hereinafter referred to as „the examination“) means a complex psychophysiological examination designed to assess the truthfulness of a person's claims by means of a polygraph“. In our opinion, the wording ‘assessment of the truthfulness of a person's statements’ is not correct, as this diagnostic tool only records changes in certain psychophysiological parameters (symptoms) of the human body, which

are triggered by certain external (verbal, visual or other) stimuli. From the point of view of forensic science, forensic expertise and legal doctrines, a specialist or expert using his or her special knowledge in the course of an investigation is obliged to establish certain objectively existing facts, and the „assessment of the correctness“ of these facts is the function of the procedural body (in the Lithuanian Criminal Procedural Code, which has been in operation since 2003, the assessment of evidence is the prerogative of the court, and in the vast majority of other countries, the function is also exercised by the public prosecutor and the investigating officers in the course of the investigation of criminal offenses). On 12 July 2002, a resolution on the approval of the rules for polygraph examinations was adopted ²⁹ (Resolution No. 1131 of the Government of the Republic of Lithuania). It should also be mentioned that the following terms are used in the literature: a psychophysiological examination is referred to as a ‘polygraph examination’. Article 2(2) of the Law on the Use of Polygraphs states that a polygraph examination is a complex psychophysiological examination designed to assess the truthfulness of a person's statements by means of a polygraph. We agree with the opinion of A. Kovalenko and L. Maslauskaitė that this provision in the law is misleading because the polygraph as a technical tool is only a component of the psychophysiological examination as a process, or one of the elements of the process, the significance of which in the process is that it captures the subject's physiological reactions.

27 Lietuvos Respublikos Poligrafo naudojimo įstatymas. 2000 m. rugpjūčio 29 d. Nr. VIII-1906. URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.107745/asr> (date accessed: 24.07.2023).

28 Lietuvos Respublikos Baudžiamojo proceso kodekso. 2002 m. kovo 14 d. Nr. IX-785. URL: <https://e-seimas.lrs.lt/rs/legalact/TAD/b3b97b11f31a11edb649a2a873fdbdfd> (date accessed: 24.07.2023).

29 Dėl tyrimo poligrafu taisyklių ir leidimo atlikti tyrimus poligrafu formos patvirtinimo : Lietuvos Respublikos Vyriausybės. 2002 m. liepos 12 d. Nr. 1131. URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.171266/asr> (date accessed: 24.07.2023).

The polygraph does not assess the truthfulness of the subject's statements but is carried out by a specialist who meets special requirements and who has a permit in the form prescribed by the Government of the Republic of Lithuania authorizing him/her to carry out polygraph examinations³⁰.

Government Resolution No. 1131 of July 12, 2002 „On Approval of the Rules for Polygraph Examination“ (08.07.2015)³¹ describes the requirements for the examination, the polygraph and the examination procedure, and lists the examination methodologies to be used. The aforementioned decree stipulates what the final conclusions of the examination may be and what information must be reflected in the examination report. It should be noted that the provisions of this decree are also applicable when the specialist carries out investigations not only in accordance with the Law on the Use of the Polygraph of the Republic of Lithuania, but also in accordance with the Code of Criminal Procedure of the Republic of Lithuania.

It should be noted that in addition to these two pieces of legislation governing polygraph examinations, it is likely that all polygraph examiners have relevant legislation. One of them is Order No. 1-55 of the Director of the State Security Department of the Republic of Lithuania of September 31, 2015 „On the Approval of the Description of the Procedure for Polygraph Examination by the State Security Department of the Republic of Lithuania“³².

Polygraph examinations in the police system are regulated by two orders — Order No 5-V-1116 of the Commissioner General of the Lithuanian Police of 7 December 2015 „On Approval of the Order of the Commissioner General of the Lithuanian Police of 4 September 2009 No 5-V-635 „On Approval of the Instruction on the Application of the Psychophysiological Examination to the Police Activities““ and Order No 5-V-635 of the Lithuanian Police Criminalistic Research Centre of 10 December 2015 No. 140-V-126 „On the approval of the description of the procedure for conducting a polygraph examination in order to find traces of a criminal offence and other objects of significance for pre-trial investigation, to determine the situation of the event and other circumstances relevant to the case“. It should be noted that the instruction approved by the Commissioner General of the Lithuanian Police essentially repeats the provisions of the Law on the Use of the Polygraph of the Republic of Lithuania and the Resolution of the Government of the Republic of Lithuania on the Approval of the Rules for Polygraph Examination. The description of the procedure of the Lithuanian Police Forensic Investigation Centre is more detailed and contains not only the regulation of the investigation procedure but also brief recommendations to the client of the investigation on how to properly prepare for the investigation.

Immediately after the adoption of the Law on the Use of the Polygraph of the Republic of Lithuania, several scientific

30 Kovalenko A., Maslauskaitė L. Psichofiziologinio tyrimo (tyrimo poligrafu) teisinis reglamentavimas Lietuvos Respublikoje: problemos ir sprendimai. *Kriminalistika ir teismo ekspertizė: mokslas, studijos, praktika*. Vilnius, 2007. Pp. 66–76.

31 Dėl tyrimo poligrafu URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.171266/asr> (date accessed: 24.07.2023).

32 Įsakymas Dėl Lietuvos Respublikos valstybės saugumo departamento tyrimo poligrafu tvarkos aprašo patvirtinimo : Lietuvos Respublikos valstybės saugumo departamento. 2015 m. liepos 31 d. Nr. 1-55. URL: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/bee6b5c03bad11e59cf1cfda-14b526c5?jfwid=9dzqnu8hm> (date accessed: 24.07.2023).

articles appeared ³³, which analyzed the theoretical aspects of the polygraph examination according to the Law on the Use of the Polygraph of the Republic of Lithuania.

Most publications by Lithuanian authors on polygraph issues appeared in 2007–2015, including abroad. A. Kovalenko and V. Saldžiūnas and their co-authors have been the most active. Only in the journal *European Polygraph* ³⁴ a dozen of articles have been printed. The articles by these authors in this journal were mainly focused on certain applied and methodological issues.

In the abstract, most law enforcement officials are positive about the possibility of using psychophysiological testing with the polygraph in criminal investigations, as it enhances their ability to determine the truth in cases. But when it comes to their direct use in the evidentiary process, opinions are strongly polarized. Representatives of criminal procedure science are critical of this method and not only argue their position on the basis of the provisions of the Law on the Use of Polygraphs of the Republic of Lithuania, but often emphasize the admissibility, reliability, ethicality and other aspects of the method. The article by

Gintaras Goda is often mentioned in such discussions. He stated that „In view of the purpose of special knowledge as an evidentiary tool in criminal proceedings, the results of a polygraph examination (interpretation of the data recorded by the device) cannot be considered a specialist's report (as well as an expert's report), as the nature and procedure of this examination are quite different from those of the usual specialist examinations in criminal proceedings. By drawing up a report, the specialist or expert answers the questions put to him or her and thus contributes to the establishment of the facts that form the subject matter of the evidence in a criminal case. Some important questions in a criminal case could not be answered at all without the use of specialized knowledge. For example, it is often difficult to identify the identity of the person behind blood or other human biological traces found at the scene of a crime without specialized knowledge. In contrast, polygraph examinations do not directly establish any new facts, and no further information is gained in the process“ ³⁵. In conclusion, the author says: „At present, polygraph examination is not possible in Lithuanian criminal proceedings

33 Kraujalis L. Tyrimas poligrafu. *Justitia*. 1999. Nr. 4. Pp. 26–27 ; Belevičius L. Techninių priemonių panaudojimo tiriant nusikaltimus teisinis reglamentavimas. *Jurisprudencija*. 2002. T. 29 (21).

34 Kovalenko A., Maslauskaitė L. Psichofiziologinio tyrimo ... ; Saldžiūnas V. EKT lub test wiedzy o zdarzeniu / Wykorzystanie wariografu (poligrafu) w badaniach kryminalistycznych oraz kadrowych. *Szczytno*, 2009. Pp. 21–23 ; Saldžiūnas V., Kovalenko A., Soshnikov A. Probability assessment of the value of psychophysiological stimuli. *European Polygraph*. 2009. Nr. 1 (7). Pp. 25–31. URL: https://www.academia.edu/104814942/Probability_assessment_of_the_value_of_psychophysiological_stimuli_Vitas_Sald%C5%BEi%C5%ABnas_Aleksandras_Kovalenko_Aleksandr_Soshnikov (date accessed: 24.07.2023) ; Saldžiūnas V., Kovalenko A., Gaidarov K. The Problems of Truth Perception During Psychophysiological Examination. *European Polygraph*. 2009. Vol. 3. Nr. 3–4 (9–10). Pp. 145–152. URL: https://www.academia.edu/107561274/The_problems_of_truth_perception_during_psychophysiological_examination_Vitas_Sald%C5%BEi%C5%ABnas_Aleksandras_Kovalenko_Kalin_Gaidarov (date accessed: 24.07.2023) ; Saldžiūnas V., Kovalenko A., Knyazev V. Tests with Numbers. *European Polygraph*. 2012. Vol. 6. Nr. 1 (19). Pp. 45–54. URL: https://www.academia.edu/104814945/Tests_with_numbers (date accessed: 24.07.2023).

35 Goda G. Poligrafas (melo detektorius) kaip įrodinėjimo priemonė baudžiamajame procese. *Teisė*. 2010. Nr. 76. Pp. 35–45. URL: <http://www.zurnalai.vu.lt/teise/article/download/226/176/> (date accessed: 24.07.2023).

because the law does not provide for such a method of proof. Such investigations could only be carried out by amending the Code of Criminal Procedure of the Republic of Lithuania (by expanding the list of acts of verification of testimony)³⁶ and the Law on the Use of Polygraph. However, it does not make sense to make such amendments to the law“. In our opinion, such a categorical scholastic approach to the possibility of using psychophysiological methods in the process of investigation of criminal offenses is the conceptual position of this author, which is not supported by his own empirical research or by a deeper analysis of the scientific doctrine and legislation in various countries. It should be noted that such a position has been taken by a number of advocates of criminal procedure, but among some representatives of Lithuanian criminal procedure science dealing with the use of technical means in criminal proceedings the polygraph is not categorically rejected³⁷. We can also point out that Lithuanian case law does not unequivocally reject the use of polygraphs in criminal proceedings.

Article 20 of the Code of Criminal Procedure of the Republic of Lithuania stipulates what data can be considered evidence in criminal proceedings³⁸. The Supreme Court of Lithuania, while examining criminal cases, clarified that: „Evidence in criminal proceedings is obtained according to the procedure established by law, verified by procedural steps provided for by the Code of Criminal Procedure of the Republic of Lithuania, examined at the tri-

al and recognised by the court, based on which the court draws conclusions regarding the presence or absence of a criminal act, the person who committed this act, the person's guilt or innocence and other circumstances that are important for the correct resolution of the case (Article 20 of the Code of Criminal Procedure of the Republic of Lithuania). The basic rules for evaluating evidence are determined by Part 5 of this Article, which states that judges evaluate evidence according to their inner conviction, based on a detailed and impartial examination of the circumstances of the case, in accordance with the law. Thus, the law provides for the exclusive competence of the court hearing the case to decide which of the data in the case have evidentiary value and whether they are sufficient to determine the presence of all the elements of a specific criminal act in a person's actions“ (Ruling of the Supreme Court of Lithuania No. 2K-20-697/2017)³⁹. The current Code of Criminal Procedure of Lithuania does not provide for a detailed list of actions that can be used to collect data about the person who committed the criminal act and the circumstances of the criminal act during the pre-trial investigation. According to court practice, there is no set list of evidence for the courts, on the basis of which it is mandatory to assess the question of a person's guilt or innocence. a direct requirement that the data be obtained legally and verified during the judicial examination is established. The court evaluates the data in the case based on its

36 Lietuvos Respublikos Baudžiamojo proceso kodekso. ... URL: <https://e-seimas.lrs.lt/rs/legalact/TAD/b3b97b11f31a11edb649a2a873fdbdfd> (date accessed: 24.07.2023).

37 Belevičius L. Reikalavimai techninių priemonių naudojimui baudžiamajame procese. Sąžiningas baudžiamasis procesas: probleminiai aspektai. Vilnius, 2009. Pp. 327–374.

38 Lietuvos Respublikos Baudžiamojo proceso kodekso ... URL: <https://e-seimas.lrs.lt/rs/legalact/TAD/b3b97b11f31a11edb649a2a873fdbdfd> (date accessed: 24.07.2023).

39 Lietuvos Aukščiausiasis Teismas. BYLA 2K-20-697/2017. URL: <https://eteismai.lt/byla/100804887914048/2K-20-697/2017> (date accessed: 24.07.2023).

internal conviction and examines the cases based on them.

The Supreme Court of Lithuania has clarified that: „A polygraph is a device that records the physiological changes of a person that occur in the person's body during the examination with this device and on which the evaluation of the statements of the person being examined with this device is based. The data obtained during the polygraph investigation do not meet the requirements for evidence established in Article 20 of the Code of Criminal Procedure of the Republic of Lithuania. However, the fact that a polygraph was used during the pre-trial investigation at the request of the person under investigation does not in itself provide grounds for claiming that the case involved substantial violations of the Code of Criminal Procedure (for example, cassation rulings in criminal cases No. 2K-31-511/2018, 2K-191-697/2018)“⁴⁰.

It is appropriate to give as an example the opinion of one of the practicing judges, the chairman of the Kaunas district court, A. Purvainis, about the polygraph: „So, it can be said that in judicial practice, in certain cases, the performance of a polygraph examination is determined by the court's duty to investigate all the evidence in detail and to take all measures provided for by law, but to remove any doubts or objections. The court must use all possible means to examine and verify the evidence, and if necessary, use the opportunity to conduct a polygraph examination. Of course, I will mention once again: The data obtained during this investigation do not determine

and cannot have a significant influence on the decisions made by the courts“⁴¹.

At this point, it should be noted that it is appropriate to get to know and evaluate the doctrines of neighbouring Poland's legal and forensic sciences, the problems of psychophysiological research using the polygraph and the practice of their application, as this would allow our scientists and specialists to avoid superficial conclusions. In Polish law, scientific doctrine and practice, we have seen a fairly complex process where there was a gradual transition from the absolute denial of the permissibility of the polygraph (variograph), through the permission to use it at the request of a person, if he could prove his innocence, to the recognition of the conclusions of the polygraph examination as an auxiliary tool in the investigation of criminal cases.

The survey of 200 respondents (among them 100 representatives of legal professions) about the use of the polygraph conducted by Master's student G. Uchockytė showed that their knowledge about psychophysiological tests using the polygraph is minimal and superficial. Respondent lawyers were asked whether polygraph examinations should be recognized as evidence in Lithuanian criminal proceedings. The answers were very evenly distributed⁴².

In conclusion, we can say that the application of psychophysiological tests using the polygraph is as passionate now as it was 50 or 100 years ago and has its supporters and opponents. Often, the choice of one or the other side is not based on rational scientific arguments, but on emotions and

40 Baudžiamojo proceso kodekso normų, reglamentuojančių specialiųjų žinių panaudojimą, taikymo teismų praktikoje apžvalga. No. AB-50-1. URL: <https://www.lat.lt/data/public/uploads/2019/06/ab-50-1.docx> (date accessed: 24.07.2023).

41 Purvainis A. Siekdamas teisingumo teismas gali pasitelkti net ir melo detektorių / 15min. 04.04.2022. URL: <https://www.15min.lt/naujiena/aktualu/nuomones/arunas-purvainis-siekdamas-teisingumo-teismas-gali-pasitelkti-net-ir-melo-detektoriu-18-1662492?copied> (date accessed: 24.07.2023).

42 Uchockytė G. Op. cit.

a subjective point of view. It follows from this that it is necessary to expand scientific research in this field and to raise the competence of lawyers because new technologies and new discoveries are strongly penetrating this field as well. In Lithuania, the time has come to prepare a complex monograph on the reliability, efficiency, ethics, and permissibility of psychophysiological research, which will become the scientific basis for improving the legal regulation of the application of these methods and the methodological basis for improving their application procedures.

Conclusions

The use of polygraphs for psychophysiological testing is a source of passion and has its supporters and opponents, both now and 50 or 100 years ago. In interwar Lithuania, considerable attention was paid to the psychology of testimony and the problems of diagnosing lies, including the use of instrumental methods of psychodiagnostics, as evidenced by the scientific articles written by the scientists and law enforcement representatives of the time.

The use of psychophysiological research in jurisdictional proceedings in Lithuania after the restoration of independence in 1990 has not yet received the due attention of scientists, because apart from several dozen scientific articles and several theses, there has been no broader discussion of this issue, although at this stage the Law on the Use of Polygraphs has been adopted, the positions of polygraphologists in the law enforcement institutions have been created, and we have the explanations of the Supreme Court of Lithuania.

In neighbouring countries, the problem of the application of psychophysiological research has a much longer history, both in academic discourse, legal regulation, and the practical application of these methods,

including in the interpretation and investigation of criminal offenses. In this area, we may be interested in the Polish experience, where there has been a gradual transition from the absolute denial of the admissibility of the use of the polygraph (wariograph), through the authorisation of its use at the request of a person if it could confirm his innocence, to the acceptance of the findings of the wariographic examination as an aid in the investigation of criminal offenses.

Психофізіологічні дослідження та їхнє місце в литовському науковому дискурсі

Гендрик Малевскі, Лаймутіс Крауяліс

Наведено стислий огляд розвитку психофізіологічних досліджень із застосуванням поліграфа. Увагу акцентовано на правовому регулюванні методів його використання та оцінюванні наукового дискурсу литовських спеціалістів із проблем психофізіологічного дослідження порівняно з аналогічними процесами в Польщі. У час між Першою та Другою світовими війнами так звана детекція брехні зацікавила не лише представників наукового світу, а й правоохоронних органів. У цей період у Литві значну увагу приділяли психології свідчень і проблемам виявлення брехні, зокрема застосуванню інструментальних методів психодіагностики, про що писали В. Лазерсон, Й. Вабалас-Гудайтіс, Б. Кальвайтіс та ін. Слід зазначити, що тоді точилися доволі гострі дискусії щодо допустимості й ефективності психофізіологічних тестів. За радянських часів питання психофізіологічних (поліграфних) досліджень не було предметом офіційного широкого наукового дискурсу в юрисдикційному процесі, хоча ними цікавилися медики та психологи, які співпрацювали зі спецслужбами. Після відновлення незалежності 1990 року інтерес литовських засобів масової інформації до цього питання спонукав фахівців пра-

воохоронних органів глибше вивчити можливість, надійність, допустимість та ефективність використання в інших країнах цих діагностичних технічних засобів, а також їхню відповідність литовському законодавству в розслідуванні злочинів. Проаналізовано також деякі аспекти психофізіологічних тестів із застосуванням поліграфа в Польщі, які там привернули значно більше уваги як науковців, так і юристів і представників правоохоронних органів.

Ключові слова: психофізіологічні дослідження; поліграф; детектор брехні; варіограф; перевірка на поліграфі; історія поліграфа.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the study design, data collection and analysis, decision to publish, or manuscript preparation.

Participants

Author contributed solely to the intellectual discussion underlying this document, case law research, writing and editing and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Authors declares no conflict of interest related to this topic, although Hendryk Malevski is member of Editorial Board of research paper collection; he was not involved in publishing decision, and this article has undergone a full peer review and editing procedure.

References

Aktualni pyttannia teorii ta praktyky vykorystannia polihrafa (2016) [Topical issues of the theory and practice of polygraph usage] : zbirka statei / za zah. red. V. O. Shapovalova. Kyiv [in Ukrainian].

Alekseev, L. G., Potemkin, F. V. (2017). *Problemy prikladnoy psihofiziologii* [Issues in Applied Psychophysiology]. Moskva [in Russian].

Asatryan, H. A., Hristyuk, A. A. (2011). Psihologicheskie osobennosti podozrevaemogo i obvinyaemogo i ih vliyanie na provedenie psihofiziologicheskoy ekspertizy s ispolzovaniem poligrafa [Psychological features of the suspect and the accused individual and their influence on the psychophysiological examination using polygraph]. *Ekspert-kriminalist*. № 1. [in Russian].

Azarova, N. Yu. (2016). *Poligraf: obzor sovremennykh metodik SSHA. Chast 1. Algoritmy formirovaniya standartizirovannykh testov* [Polygraph: a review of modern methods in the USA. Part 1. Algorithms of formation of standardized tests] / pod red. V. V. Korovina. Moskva [in Russian].

Badania poligraficzne w Polsce (2014) / red. J. Widacki. Kraków. URL: <https://core.ac.uk/download/pdf/214927459.pdf> [in Polish].

Belevičius, L. (2002). Techninių priemonių panaudojimo tiriant nusikaltimus teisinis reglamentavimas. *Jurisprudencija*. T. 29 (21) [in Lithuanian].

Belevičius, L. (2005). *Techninių priemonių naudojimo baudžiamajame procese teoriniai pagrindai ir reglamentavimas*. Daktaro disertacija. Vilnius. URL: <https://vb.mruni.eu/object/elaba:1830246/MAIN> [in Lithuanian].

Belevičius, L. (2009). *Reikalavimai techninių priemonių naudojimui baudžiamajame procese. Sąžiningas baudžiamasis procesas: probleminiai aspektai*. Vilnius [in Lithuanian].

Carl F. W. Ludwig / Britannica. URL: <https://www.britannica.com/biography/Carl-F-W-Ludwig>.

Criminalistics: Methodical handbook (2014) / J. Juškevičiūtė (Editor in Chief). Vilnius [in Lithuanian].

Galianos, J. *Brief history of the polygraph*. URL: http://home.total.net/~galcar/html/brief_history_of_the_polygraph.html.

Goda, G. (2010). Poligrafas (melo detektorius) kaip įrodinėjimo priemonė baudžiamajame procese. *Teisė*. Nr. 76. URL: <http://www.zurnalai.vu.lt/teise/article/download/226/176/> [in Lithuanian].

- Gołaszewski, M., Ibek, A., Widacki, M. (2013). *Współczesne standardy badań poligraficznych* / red. M. Gołaszewski. Warszawa [in Polish].
- Gross, H. (2021). *Podręcznik dla sędziego śledczego jako system kryminalistyki* / Opracowanie i przekład J. Kasprzak, Warszawa [in Polish].
- Hanausek, T. (1994). *Zarys taktyki kryminalistycznej*. Warszawa [in Polish].
- Heindl, R. (1927). Ein Apparat, Lügen beim Verhör aufzudecken. *Archiv für Kriminologie*. Nr. 114.
- Jaworski, R. (1999). *Opinia z ekspertyzy poligraficznej jako dowód odciażający*. Wrocław [in Polish].
- Jaworski, R. (2006). *Situational Sequencing Tests in Polygraph Examination*. Wrocław [in Polish].
- Jaworski, R. (2008). *Multi-subject polygraph examination*. Wrocław [in Polish].
- Justickis, V., Valickas, G. (2006). *Procedural Justice in the Lithuanian Criminal Justice*. Vilnius [in Lithuanian].
- Kohutych, I. (2011). Polihraf u Polshchi ta Ukraini:istoriia,suchasnyistaniperspektyvy [Polygraph in Poland and Ukraine: history, current status and prospects]. *Broslavskolivskyi yurydychnyi zbirnyk* / Wrocławskolwowskie zeszyty prawnicze. № 2. URL: http://repozytorium.uni.wroc.pl/Content/122657/PDF/07_Kogutic_I_Wariograf_w_Polsce_i_na_Ukrainie_historia_stan_obecny_i_perspektywy.pdf [in Ukrainian].
- Komissarova, Ya. V. (2022). *Osnovy poligrafologii* [Fundamentals of polygraphology] : ucheb. dlya magistratury. 2-e izd., pererab. i dop. Moskva [in Russian].
- Komissarova, Ya. V., Myagkih, N. I., Pelenitsyn, A. B. (2012). *Poligraf v Rossii i SShA: problemy primeneniya* [Polygraph in Russia and the USA: Challenges of Application]. Moskva [in Russian].
- Konieczny, J. (2009). *Badania poligraficzne. Podręcznik dla zawodowców*. Warszawa [in Polish].
- Kovalenko, A., Maslauskaitė, L. (2007). *Psichofiziologinio tyrimo (tyrimo poligrafu) teisinis reglamentavimas Lietuvos Respublikoje: teismos ir sprendimai. Kriminalistika ir teismo ekspertizė: mokslas, studijos, praktika*. Vilnius [in Lithuanian].
- Krapohl, D., Shaw, P. K. (2015). *Fundamentals of Polygraph Practice*. Academic Press. 1st ed.
- Kratka istorija poligrafa / Poligraf Centar. URL: <https://www.poligrafcentar.rs/poligraf/> [in Bosnian].
- Kraujalis, L. (1997). *Lie Detection Method: Theory and Practice*. Master Thesis. Vilnius [in Lithuanian].
- Kraujalis, L. (1999). Tyrimas poligrafu. *Justitia*. Nr. 4 [in Lithuanian].
- Kurapka, V. E. (2013). *Criminalistics. Tactics and methodology. Tutorial* / S. Matulienė (Editor in Chief). Vilnius [in Lithuanian].
- Locard, E. (1937). *Dochodzenie przestępstw według metod naukowych*. Łódź [in Polish].
- Morozov, A. M., Morozova, T. R. (2011). Nekotorye aspekty sovremennogo sostoyaniya poligrafologii v Ukraine [Some aspects of the current state of polygraphology in Ukraine]. *Ekspert-kriminalist*. № 1 [in Russian].
- Motliakh, O. I. (2012). *Polihraf: naukova pryroda pokhodzhennia, normatyvno-pravove rehuliuвання ta mezhi zastosuvannia* [Polygraph: scientific nature of the origin, normative-legal regulation and limits of its application] : monohrafiia. Kyiv [in Ukrainian].
- Otsinka dostovirnosti: naukovi doslidzhennia ta praktyka / Sudovo-psykholohichna ekspertyza. Zastosuvannia polihrafa i spetsialnykh znan v yurydychnii praktytsi. URL: <https://expertize-journal.org.ua/partneri-vidannya/1010-naukovyj-zhurnal-go-kolegiya-poligrafologiv-ukrajini-otsinka-dostovirnosti-naukovi-doslidzhennya-ta-praktika> [in Ukrainian].
- Palskys, E. (1995). *Overview of the History of Lithuanian Criminalistics*. Monographical study. Vilnius [in Lithuanian].
- Polska bibliografia kryminalistyczna* (2008). Warszawa. T. III (lata 1980–1989) / praca zbiorowa pod red.: B. Hołysta, T. Tomaszewskiego, E. Gruz, M. Goca [in Polish].
- Polska bibliografia kryminalistyczna* (2008). Warszawa. T. IV (lata 1990–2000) / praca zbiorowa pod red.: B. Hołysta, T. Tomaszewskiego, H. KołECKiego, M. Goca [in Polish].
- Purvainis, A. (2022). *Siekdamas teisingumo teismas gali pasitelkti net ir melo detektorių* / 15min. URL: <https://www.15min.lt/>

- nauijiena/aktualu/nuomones/arunas-purvainis-siekdamas-teisingumo-teismas-gali-pasitelkti-net-ir-melo-detektoriu-18-1662492?copied [in Lithuanian].
- Reid, J. E., Inbau, F. E. (1977). *Truth and Deception: The Polygraph (Lie-Detector Technique)*. Baltimore, 1977.
- Saldžiūnas, V. (2009). EKT lub test wiedzy o zdarzeniu / Wykorzystanie wariografu (poligrafu) w badaniach kryminalistycznych oraz kadrowych. *Szczytno* [in Polish].
- Saldžiūnas, V., Kovalenko, A. (2008). The Event Knowledge Test (EKT) in Polygraph Examination (in case murder). *European Polygraph*. Nr. 2 (4). URL: https://www.academia.edu/104814924/The_event_knowledge_test_EKT_in_polygraph_examination_in_case_murder_Vitas_Sald%C5%BEi%C5%ABnas_Aleksandras_Kovalenko.
- Saldžiūnas, V., Kovalenko, A. (2008). The Event Knowledge Test (EKT) in Polygraph Examination (common notice of tactics). *European Polygraph*. Nr. 3—4 (5—6).
- Saldžiūnas, V., Kovalenko, A. (2008). The Event Knowledge Test. *European Polygraph*. Nr. 1 (3). URL: https://www.academia.edu/107561272/The_Event_Knowledge_Test_EKT_.
- Saldžiūnas, V., Kovalenko, A. (2009). Problems of Questions in Event Knowledge Test. *European Polygraph*. Vol. 3 Nr. 2 (8). URL: https://www.academia.edu/107561280/Problems_of_questions_in_event_knowledge_tests_Vitas_Sald%C5%BEi%C5%ABnas_Aleksandras_Kovalenko.
- Saldžiūnas, V., Kovalenko, A. (2010). Field and Laboratory Polygraph Examinations. *European Polygraph*. Vol. 4. Nr. 4 (14). URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/ab17de20-9cea-46de-bele-4bd36abb85ab/content>.
- Saldžiūnas, V., Kovalenko, A. (2011). A Little About Memory Traces. *European Polygraph*. Vol. 5. Nr. 1 (15). URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/280f9f8f-6dce-4f23-b7bf-3e329fea3f3c/content>.
- Saldžiūnas, V., Kovalenko, A. (2012). Alibi Check by Polygraph Examination. *European Polygraph*. Vol. 6. Nr. 2 (20). URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/85cb8eca-9a73-4e62-b2aa-ce3f90858aac/content>.
- Saldžiūnas, V., Kovalenko, A. (2012). Search for New Tests. *European Polygraph*. Vol. 6. Nr. 4 (22).
- Saldžiūnas, V., Kovalenko, A. (2013). Examination of Sexual Abuse Crimes. *European Polygraph*. Vol. 7. Nr. 3 (25). URL: https://www.academia.edu/104814949/Examination_of_Sexual_Abuse_Crimes.
- Saldžiūnas, V., Kovalenko, A. (2014). Field Examination: Certain Phenomena Related to Electrodermal Activity. *European Polygraph*. Vol. 8. Nr. 2 (28).
- Saldžiūnas, V., Kovalenko, A. (2015). Selecting the Most Optimal Conditions for the Polygraph Examination. *European Polygraph*. Vol. 9. Nr. 2 (32). URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/bba25ec4-f380-4b54-8b94-feeeb9b26bbb/content>.
- Saldžiūnas, V., Kovalenko, A., Gaidarov, K. (2009). The Problems of Truth Perception During Psychophysiological Examination. *European Polygraph*. Vol. 3. Nr. 3—4 (9—10). URL: https://www.academia.edu/107561274/The_problems_of_truth_perception_during_psychophysiological_examination_Vitas_Sald%C5%BEi%C5%ABnas_Aleksandras_Kovalenko_Kalin_Gaidarov.
- Saldžiūnas, V., Kovalenko, A., Knyazev, V. (2012). Tests with Numbers. *European Polygraph*. Vol. 6. Nr. 1 (19). URL: https://www.academia.edu/104814945/Tests_with_numbers.
- Saldžiūnas, V., Kovalenko, A., Soshnikov, A. (2009). Probability assessment of the value of psychophysiological stimuli. *European Polygraph*. Nr. 1 (7). URL: https://www.academia.edu/104814942/Probability_assessment_of_the_value_of_psychophysiological_stimuli_Vitas_Sald%C5%BEi%C5%ABnas_Aleksandras_Kovalenko_Aleksandr_Soshnikov.
- Seelig, E. (1927). Die Registrierung unwillkürlicher Ausdrucksbewegungen als forensisch-psychodiagnostische Methode. *Zeitschrift für angewandte Psychologie*. No 28.
- Seelig, E. (1955). *Schuld, Lüge, Sexualität*. Stuttgart.

- Strong, J. W. (1992). *McCormich on Evidence*. 4th ed. West Group.
- Trovillo, P. V. (1939). History of lie detection. *Journal of Criminal Law and Criminology*. Vol. 29 (6) and Vol. 30 (1). DOI: [10.2307/1136392](https://doi.org/10.2307/1136392).
- Uchockytė, G. (2022). *Psychophysiological Examinations Using Polygraph: Theory, Practice and Legal Framework in Lithuania and Abroad* : Master Paper. Vilnius [in Lithuanian].
- Valickas, G. (2019). *Melą atpažinti galima ir iš akies vyzdžio pokyčių* / Vilniaus universitetas. URL: <https://naujienos.vu.lt/gintautas-valickas-mela-atpazinti-galima-ir-is-akies-vyzdzio-pokyciu/> [in Lithuanian].
- Varlamov, V. A. (2004). *Detektor lzhi* [Lie Detector]. 2-e izd. Moskva [in Russian].
- Widacki, J. (2016). Polygraph or Variograph? *Issues of Forensic Science*. No 1. Vol. 294. DOI: [10.34836/pk.2016.294.5](https://doi.org/10.34836/pk.2016.294.5).
- Widacki, J. (2017). *Historia badań poligraficznych*. Kraków. URL: <https://repozytorium.ka.edu.pl/server/api/core/bitstreams/6a3d6335-9ad1-49d7-a577-52cd6a99f1e4/content> [in Polish].

Malewski, H., Kraujalis, L. (2024). Psychophysiological Research and its Place in the Lithuanian Scientific Discourse. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). Pp. 58–75. DOI: [10.32353/khrife.1.2024.04](https://doi.org/10.32353/khrife.1.2024.04).

Separate Aspects of Evidentiary Basis Formation during the Investigation of Facts Related to Collaborationism

Serghii Perepelytsia *

* PhD in Law, Docent, doctoral student at NSC «Hon. Prof. M. S. Bokarius FSI», Kharkiv, Ukraine, ORCID: <https://orcid.org/0000-0002-0721-9609>, e-mail: 180.vk.2012@gmail.com

DOI: [10.32353/khrife.1.2024.05](https://doi.org/10.32353/khrife.1.2024.05) UDC [343.32:343.9](477)

Received: 18.03.2024 / Reviewed: 18.03.2024 / Accepted for print: 27.03.2024 / Available online: 29.03.2024



The Article Purpose is to outline separate aspects of forming the evidentiary basis during the investigation of facts related to collaborationism, identify challenges, and determine ways to address them. To fulfil this goal, general scientific and special scientific methods have been applied. It is emphasized that the formation of the evidentiary basis during pre-trial investigation of collaboration crimes depends on the availability of witness and eyewitness testimony, the identification of which is a leading task of the investigation involving the use of various measures (i.e., government and local self-government bodies obtain information about these people and suspects or temporarily access property and documents as envisaged by law). The paper stresses that the task of investigators in investigating this type of crime is to identify private individuals, representatives of volunteer movements, or community organizations who have documented crimes associated with collaborationist activities, and to acquire information they have documented. Answers to questions arising during pre-trial investigation are contained in the expert conclusion (as a significant component of the evidentiary basis) because it is within the expert conclusion that a forensic expert provides information that he/she identified during the investigation and utilizes specific expertise that the investigator may not have possessed.

This article is translation of the original Ukrainian content, which source is available at the link: <https://khrife-journal.org/index.php/journal> (translated by Daryna Dukhnenko). The authors acknowledge translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

Keywords: open sources; expert conclusion; evidence and proof; evidentiary basis; documents; pre-trial investigation; collaborationist activity; collaboration crime; mass media; evidence gathering; criminal proceeding; witness testimony; digital evidence.

Research Problem Formulation

In the modern world, collaborationism is studied not only by historians but also by legal scholars. This is due to the fact that collaborationism is recognized as a crime against the security and well-being of humanity and against peace overall. This crime falls under the jurisdiction of international law and the legislation of those countries where the principles of democracy and human rights are paramount. Studying collaborationism as a distinct phenomenon enables in-depth understanding of the nature of treasonous behavior and the consciousness of collaborators, as well as its consequences not only within the boundaries of a particular country but also for society as a whole. Researchers emphasize that *“understanding collaborationism in a broad context and its impact on international politics is an essential task of modern criminology and criminal law”*¹. We note that this task has not been overlooked by such branches of legal science as criminal procedure, criminalistics, forensic science, etc., as they face new complex challenges in investigating facts of collaborationist activity in the process of forming the evidentiary basis. In addition, a significant set of investigative (search) actions as well as procedural actions is required

to verify information regarding the commission of collaborationist activities. On the one hand, this is necessary to confirm or refute information about a person's involvement in this activity. On the other hand, if such confirmation is obtained, it is vital for forming a complete evidentiary basis by acquiring evidence of the committed crime. Introduction of a sufficient evidentiary basis during investigation of collaborationist activity largely depends on the timely conduct and proper documentation of certain investigative (search) actions, including: examination of documents and the scene; interrogation of suspects and witnesses; search; examination of computer data; and appointment of forensic examinations.

Analysis of Essential Researches and Publications

Issues of evidence collection at the pretrial stage of a criminal proceeding have been studied at various times by proceduralists, criminalists, forensic experts, and others. Their research findings are reflected in dissertations, monographs, research papers, manuals, and textbooks. Let's focus on those that have been published recently.

O. Kovalova's dissertation outlines a comprehensive study of theoretical and legal principles of informational support

1 Кішчак Б. І. Особливості доказування злочинів, пов'язаних з колабораційною діяльністю. Наукові записки Львівського університету бізнесу та права. Серія економічна. Серія юридична. 2023. Вип. 37. С. 58. DOI: 10.5281/zenodo.7934032 (date accessed: 16.01.2024).

for pre-trial investigation of criminal offenses in Ukraine. The dissertation *“specifies peculiarities of information usage in pre-trial investigation, including: 1) urgency: means of information support must be readily available to subjects of criminal proceedings for making urgent procedural decisions; 2) limitation data contained in information support tools must be accessible only to individuals whose procedural status presupposes it; 3) authenticity: data available in information support tools are personalized and relate to a specific event (or group of events or person/persons)”*².

V. Vapniarchuk proposes an improved classification of *“evidence gathering methods (forming evidentiary basis for the legal standpoint taken by a specific subject involved in proving a case) <...>: (1) methods used by subjects conducting a criminal proceeding and (2) methods used by subjects defending their own or interests that they represent on behalf of others in a criminal proceeding”*, such as examining *“the essence of individual evidence-gathering methods <...>, including obtaining and receiving, initiating investigative (search) actions, as well as conducting other actions by the defense party, victims <...>. These actions are capable of providing the court with proper and admissible evidence”*. What is more, V. Vapniarchuk considers the specifics of *“documenting the procedure for using all the studied evidence-gathering methods”*³.

S. Dankova, analyzing the structure of criminal procedural proof in a court proceeding at the first instance, notes that *“to ensure proving during pre-trial investigation stage, it is characteristic to engage in practical activities aimed at actively searching for factual data”*, and proposes to distinguish *“four elements in this structure: 1) formation of evidence; 2) examination of evidence; 3) evaluation of evidence; 4) use of evidence”*, and emphasizes that *“it is advisable to compile materials of a criminal proceeding (evidentiary basis) during a preliminary proceeding”*⁴.

A. Kovalenko identifies obtaining initial information about signs of criminal offenses from messages or publications in the media as the primary directions of interaction between pre-trial investigation bodies and mass media during the collection, examination, and utilization of evidence in a criminal proceeding⁵. The researcher notes that publications and reports in the media *“can be proper sources of initial information about signs of criminal offenses and grounds for initiating a pre-trial investigation”* and that *“evidentiary value can be attributed to information published by the media as a result of journalistic investigation of criminal offenses. In order to use such data, it is necessary to establish contact with authors of the content, editorial staff, participants and persons involved in the investigation*

- 2 Ковальова О. В. Теоретико-правові засади інформаційного забезпечення досудового розслідування кримінальних правопорушень : автореф. дис. ... д-ра юрид. наук. Кропивницький, 2023. С. 13–14. URL: https://dnuvs.ukr.education/wp-content/uploads/2023/05/referat_dyseratacyi_kovalovoyi_o_v_.pdf (date accessed: 16.01.2024).
- 3 Вапнярчук В. В. Щодо особливостей окремих способів збирання доказів у кримінальному провадженні. Науковий вісник Ужгородського національного університету. Серія право. 2022. Вип. 70. С. 405. DOI: [10.24144/2307-3322.2022.70.65](https://doi.org/10.24144/2307-3322.2022.70.65) (date accessed: 16.01.2024).
- 4 Данькова С. О. Структура кримінального процесуального доказування в судовому провадженні у першій інстанції. Електронне наукове видання «Аналітично-порівняльне правознавство». 2023. № 6. С. 628. DOI: [10.24144/2788-6018.2023.06.111](https://doi.org/10.24144/2788-6018.2023.06.111) (date accessed: 16.01.2024).
- 5 Коваленко А. В. Взаємодія органів досудового розслідування із засобами масової інформації під час збирання, дослідження та використання доказів у кримінальному провадженні. Криміналістичний вісник. 2022. Т. 38. № 2. С. 48, 50 і 54. DOI: [10.37025/1992-4437/2022-38-2-48](https://doi.org/10.37025/1992-4437/2022-38-2-48) (date accessed: 16.01.2024).

(organizational component of its use) and to obtain, verify and legitimize the information collected by journalists (procedural-tactical component)”⁶.

An in-depth analysis of the mentioned papers by researchers shows that they have overlooked a wide range of issues related to the evidentiary basis formation during pre-trial investigation of crimes associated with collaborationist activities.

Article Purpose

To outline separate aspects of developing evidentiary basis during collaborationist activities investigation, identify challenges, and determine ways to address them.

Research Methods

To fulfil the set goal, general scientific methods (dialectical, comparative, analysis, synthesis, induction, deduction) and special scientific methods (formal-logical, logical-legal, systemic-structural) have been applied, which contributed to a logical and consistent presentation of content, meaningful and reasoned scientific conclusions, and proposals.

Main Content Presentation

One of the main features of crimes involving collaborationist activities is that they are predominantly committed in the temporarily occupied territories of Ukraine, where law enforcement agencies lack

access. This situation renders it impossible to conduct all necessary investigative (search) actions, as well as procedural actions to establish the circumstances requiring proof in a criminal proceeding. At the same time, the prosecution must identify and implement the maximum possible measures to verify information regarding collaborationist activities. If these facts are confirmed, sufficient evidence must be provided regarding the commission of these crimes⁷.

Researchers claim that during the investigation of collaborationist activities (voluntary participation of our citizens in illegal armed or paramilitary units created in temporarily occupied territories, or in units of an aggressor country) or involvement of persons in terrorist groups or organizations, it is essential to conduct a series of "investigative (search) actions and operational measures: 1) scheduling and conducting interrogations of witnesses who may be aware of circumstances regarding the involvement of individuals in respective criminal associations; 2) reviewing information available on the Internet, including social media platforms accounts of individuals involved in illegal criminal associations [para. 2, Part 2, Article 237 of the Criminal Procedure Code of Ukraine⁸: hereinafter notes in square brackets are mine: S. Perepelytsia.]; 3) conducting covert investigative (search) actions, including collecting information from telecommunications [Article 263 of the Criminal Procedure Code of Ukraine⁹],

6 Коваленко А. В. Опр. cit. С. 48. DOI: 10.37025/1992-4437/2022-38-2-48 (date accessed: 16.01.2024).

7 Жидков В. Проблеми доказування злочинів про колабораційну діяльність: аналіз прокурора Офісу Генерального прокурора / Українська Гельсінська спілка з прав людини : офіц. сайт. 01.02.2023. URL: <https://www.helsinki.org.ua/articles/problemy-dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-analiz-prokurora-ofisu-heneralnoho-prokurora/> (date accessed: 16.01.2024).

8 Кримінальний процесуальний кодекс України від 13.04.2012 р. № 4651-VI (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).— Note by S. Perepelytsia.

9 Ibid.— Note by S. Perepelytsia.

in order to establish the intent of individuals to voluntarily commit a criminal offense and to confirm other circumstances of its commission.]; 4) temporary access to items and documents containing secrets protected by law [Art. 159, 162, 165 of the Criminal Procedure Code of Ukraine¹⁰], specifically to information held by telecommunications operators and providers, regarding the communication of the guilty party for the purpose of confirming his/her location, particularly in the temporarily occupied territories of Ukraine, as well as his/her connections with representatives of illegal armed or paramilitary units and/or armed units of the aggressor state.]; 5) <...> search [Art. 234 of the Criminal Procedure Code of Ukraine¹¹] at the place of residence of the individual in order to obtain evidence regarding a person's involvement in the aforementioned units, namely: identification and seizure of weapons; computer equipment and mobile devices containing information confirming ties of these individuals with members of such units; documents issued by representatives of the aforementioned illegal units, etc. <...> It is worth noting that due to the occupation of parts of Ukraine's regions, investigative authorities may lack the physical ability to conduct searches at the residences of certain individuals"¹².

In order to collect evidence and develop evidentiary basis during the pre-

trial investigation of crimes related to collaborationist activities, investigators conduct investigative actions, employing the following methods: "1) documenting and organizing available facts (actions, activities) of suspected individuals in the media, including Internet resources, local television, etc.; 2) collecting audio, photo, and video evidence from eyewitnesses (victims) among the residents of the occupied territories; 3) analysis of the terrorist country's media covering situation in the occupied territories; 4) originals/copies of administrative documents from local heads of a settlement, written statements, payroll information, etc.»¹³.

Let's emphasize that a fair share of collaboration crimes committed in the temporarily occupied territories of Ukraine, as well as the presence of suspects, eyewitnesses, and witnesses involved in collaborationist activities in these territories, along with the location of physical evidence and documents there, enable to utilize the full range of procedural tools during pre-trial investigation of these crimes.

In criminal proceedings for collaboration crimes during the pre-trial investigation stage, the circumstances that testify, in particular, to: the commission of collaborationist activities, appointments to positions in unlawfully established

10 Кримінальний процесуальний кодекс ... URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).— Note by S. Pereplytsia.

11 Ibid.— Note by S. Pereplytsia.

12 Мальгіна А. С. Використання методики розслідування участі у терористичній групі чи терористичній організації під час розслідування колабораційної діяльності. Актуальні питання кримінально-правової кваліфікації, документування та розслідування колабораціонізму : мат-ли Всеукр. наук.-практ. конф. (Одеса, 21.07.2022). Одеса, 2022. С. 63—64. URL: <https://dspace.oduvs.edu.ua/server/api/core/bitstreams/3ab2381e-e4e8-4932-b84f-d4e4a46cc720/content> (date accessed: 16.01.2024).

13 Вайда Т. С. Колабораційна діяльність в умовах війни: поняття, документування та кримінальна відповідальність за протиправні дії/діяльність. Актуальні питання кримінально-правової кваліфікації, документування та розслідування колабораціонізму : мат-ли Всеукр. наук.-практ. конф. (Одеса, 21.07.2022). Одеса, 2022. С. 16. URL: <https://dspace.oduvs.edu.ua/server/api/core/bitstreams/e5b44659-7bac-4fb9-87a6-0357b99358f6/content> (date accessed: 16.01.2024).

authorities in temporarily occupied territories, and denial of the facts of Russia's aggression and occupation of parts of Ukraine's territory, are subject to clarification and examination. Researchers emphasize that during the pre-trial investigation of crimes involving collaborationist activities, and considering the circumstances to be proved in criminal proceedings (Article 91 of the Criminal Procedure Code of Ukraine ¹⁴), it is important to take into account the following factors while evidentiary basis formation:

- the ability of information to change during its movement from the primary source to the public and law enforcement agencies;
- the possibility of slander from malicious individuals;
- direct physical or psychological coercion (force) that subsequently excludes criminal unlawfulness;
- the necessity to comply with a lawful order or instruction ¹⁵.

It is stressed that there are numerous when private individuals, representatives of volunteer movements, or community organizations document crimes associated with collaborationist activities, as they are able to. Investigators must identify such individuals, for example, by obtaining information

about them from government and local self-government bodies and acquiring documents confirming the facts of collaborationism. Investigators review the provided information sources and identify potential eyewitnesses and witnesses who need to be interrogated ¹⁶.

If, during a pre-trial investigation, information recorded by private individuals is not publicly available on the internet, these *“private persons should be instructed to provide relevant chronological documentation records, and they should be interrogated as witnesses regarding circumstances of discovering and preserving respective information”* ¹⁷. Such records of private individuals are documents (Article 99 of the Criminal Procedure Code of Ukraine ¹⁸) being *“relevant for assessing the admissibility and reliability of respective information stored by a volunteer from open sources as evidence”* ¹⁹. After verification by the investigator and direct review by the prosecutor, such information becomes proper and admissible evidence in court.

Note that the temporary occupation of certain Ukrainian territories has disrupted communication between close relatives who have found themselves on different sides of the contact line, thereby undermining the activities of government authorities, local self-government, law enforcement agencies, and courts. Consequently,

14 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).

15 Жидков В. Л., Жила О. Б. О.р. cit. URL: <https://www.helsinki.org.ua/articles/dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-problemni-pytannia-zakonu/> (date accessed: 16.01.2024).

16 Жидков В. О.р. cit. URL: <https://www.helsinki.org.ua/articles/problemy-dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-analiz-prokurora-ofisu-heneralnoho-prokurora/> (date accessed: 16.01.2024).

17 Пашковський М. І. Особливості використання OSINT при документуванні та розслідування колабораційної діяльності. *Актуальні питання кримінально-правової кваліфікації, документування та розслідування колабораціонізму*: мат-ли Всеукр. наук.-практ. конф. (Одеса, 21.07.2022). Одеса, 2022. С. 84–85. URL: <http://surl.li/saupi> (date accessed: 16.03.2024).

18 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.03.2024).

19 Пашковський М. І. О.р. cit. С. 85. URL: <http://surl.li/saupi> (date accessed: 16.03.2024).

cooperation between law enforcement agencies and private individuals, volunteer movements, and community organizations has been severely affected in the pre-trial investigation process of collaboration crimes. This cooperation is crucial for obtaining and verifying information about collaborationist activities, and it takes both procedural and extra-procedural forms of interaction.

Procedural forms of interaction include:

- obtaining from the prosecution party documents and information that may serve as evidence during investigative (search) actions (requesting: Article 93 of the Criminal Procedure Code of Ukraine ²⁰; temporarily accessing items and documents: Article 159 of the Criminal Procedure Code of Ukraine ²¹);
- interrogating representatives of state authorities and local self-government, volunteer movements, public organizations, and private individuals as witnesses;
- searches or identification presentation with the participation of subjects who possess information about the suspect's collaborationist activities.

This interaction is necessary for the prosecution party for:

- obtaining one's own findings during the pre-trial investigation of collaborationist activity;
- identifying the main source of evidence regarding an individual's

collaborationist activities within a particular territory;

- procedural documentation of collaborationist activities evidence;
- identification of eyewitnesses and witnesses of such activities and their interrogation ²².

In turn, components of *extra-procedural interaction* include communication and information exchange between the prosecution and representatives of government and local self-government bodies, volunteer movements, and community organizations, as well as media and private individuals regarding known circumstances of specific individuals' collaborationist activities, evidence of such activities, and prospects for pre-trial investigation. This takes place during joint working meetings, working group meetings, or other events.

Let's emphasize that covert investigative (search) actions serve as specific evidence of collaborationist activities, which, when combined with other evidence, help either confirm or refute their occurrence. However, for various reasons, covert investigative (search) actions cannot always be carried out during the pre-trial investigation of collaboration crimes. Under such circumstances, the prosecution may use information obtained in another criminal proceeding (Article 257 of the Criminal Procedure Code of Ukraine ²³).

This rule can help identify a broad spectrum of individuals involved in collaborationist activities, whose unlawful actions have been investigated in another criminal proceeding. Such materials can

20 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).

21 Ibid.

22 Жидков В. Л., Жила О. Б. Оп. cit. URL: <https://www.helsinki.org.ua/articles/dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-problemni-pytannia-zakonu/> (date accessed: 16.01.2024).

23 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).

be acquired through request or temporary access, provided that the prosecution party has temporary access to the items and documents (from the investigator or prosecutor who initiated these actions as part of another criminal proceeding). After obtaining such materials, the prosecution must coordinate their use with the investigating judge in the specific criminal proceeding²⁴.

American researches single out the following categories of open source information: common data and information, targeted commercial data, expert assessments, and “gray” literature²⁵.

In criminal proceedings related to collaborationist activities, emphasis should be placed on electronic (digital) evidence. According to Article 99 of the Criminal Procedure Code of Ukraine²⁶, digital data are considered as evidence in accordance with Article 84 of the Criminal Procedure Code of Ukraine²⁷. Furthermore, in criminal proceedings concerning collaboration crimes, digital evidence encompasses:

- photographic materials, audio and video recordings, computer data, and other media obtained from both closed and open networks (such as the internet, media, and social networks) and supported by witnesses;

- websites and pages on social networks illegally created by authorities in temporarily occupied territories; open Telegram channels; media operating in temporarily occupied territories of Ukraine and the aggressor country, covering the creation and activities of pseudo-government bodies;
- websites and pages on social networks of Ukrainian government and local self-government bodies, public figures, journalists, and lawyers; open Telegram channels; media outlets documenting and covering war crimes and crimes against the foundations of Ukraine’s national security, committed in the temporarily occupied territories of Ukraine, as well as events in these territories;
- photo, video, and audio files; various open and private messengers of witnesses²⁸.

Digital evidence can be recorded on such carriers:

- analog device, “*which properties are characterized by direct and usually relatively unaltered representation of information, such as in photo and video recordings*”²⁹;

24 Жидков В. Оп. cit. URL: <https://www.helsinki.org.ua/articles/problemy-dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-analiz-prokurora-ofisu-heneralnoho-prokurora/> (date accessed: 16.01.2024).

25 Best Jr. R. A., Cumming A. CRS Report for Congress. Open Source Intelligence (OSINT): Issues for Congress. Dec 5, 2007. 27 p. URL: <https://sgp.fas.org/crs/intel/RL34270.pdf> (date accessed: 16.01.2024) ; Виходець Ю. О., Тетерятник Г. К. Окремі питання використання OSINT при розслідуванні злочинів в умовах військової агресії рф. *Правові новели*. 2022. № 18. С. 70–76. DOI: 10.32847/ln.2022.18.10 (date accessed: 16.01.2024).

26 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).

27 Ibid.

28 Жидков В. Л., Жила О. Б. Оп. cit. URL: <https://www.helsinki.org.ua/articles/dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-problemni-pytannia-zakonu/> (date accessed: 16.01.2024).

29 Гуцалюк М. В., Гавловський В. Д., Хахановський В. Г. та ін. Використання електронних (цифрових) доказів у кримінальних провадженнях : метод. рек. / за заг. ред. О. В. Корнейка. Вид. 2-ге, допов. Київ, 2020. С. 40. URL: <https://elar.naiu.kiev.ua/server/api/core/bitstreams/8e9e5637-7b62-475c-8c41-9850e317bfc4/content> (date accessed: 16.01.2024).

- computer, “physical properties of which are not used for the direct representation of information, but for recording-reading discrete states of the electromagnetic field indirectly through an analog-to-digital converter”³⁰.

It is worth emphasizing that identification and review of web pages and websites, groups and channels in messengers, mass media, and social networks helps the prosecution obtain photo and video evidence of collaborative actions. These materials, along with witness testimonies, form the evidentiary basis in criminal proceedings involving collaboration crimes. However, it is crucial to note that information from open sources can be deleted or destroyed over time, at the same time Part 1 of Article 23 of the Criminal Procedure Code of Ukraine contains a requirement for direct examination of evidence by the court³¹. For example, a court adhering to the principle of direct examination of evidence during a trial may raise the issue of searching for the original source of information from which a copy of the information being

examined was made, which is impossible because it has been deleted³².

During the pre-trial investigation of collaboration crimes, the use of documents enables the investigator to obtain important evidence regarding the position held by the suspect and the activities carried out by him/her, which possess subjective and objective features of a committed crime. Researchers note that “under Article 111–1 of the Criminal Code of Ukraine³³, verdicts in criminal proceedings are to be based on witness testimonies and documents. However, documents cannot constitute hearsay testimonies, as this contradicts Article 97 of the Criminal Procedure Code of Ukraine and may cast doubt on the overall fairness of the trial and affect the assessment of compliance with Article 6 of the Convention for the Protection of Human Rights and Fundamental Freedoms³⁴ in the event of an appeal to the ECtHR [European Court of Human Rights: note by S. Perepelytsia]”³⁵. This indicates the need to identify the sources of evidence in criminal proceedings involving collaboration crimes.

Practitioners hold a similar opinion: they assert that verdicts should be based

30 Гуцалюк М. В., Гавловський В. Д., Хахановський В. Г. та ін. *Op. cit.* URL: <https://elar.naiu.kiev.ua/server/api/core/bitstreams/8e9e5637-7b62-475c-8c41-9850e317bfc4/content> (date accessed: 16.01.2024).

31 Кримінальний процесуальний кодекс ... URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).

32 Про організацію проведення слідчих дій зі збору та збереження цифрової інформації з відкритих джерел : лист-орієнтув. Офісу Генпрокурора від 28.08.2021 р. № 18/1-386вих-515окв-21.

33 Кримінальний кодекс України від 05.04.2001 р. № 2341-III (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/2341-14#Text> (date accessed: 16.01.2024). — *Note by S. Perepelytsia.*

34 Конвенція про захист прав людини і основоположних свобод (Європейська конвенція з прав людини) : від 04.11.1950 р.; ратифік. Законом України від 17.07.1997 р. № 475/97-ВР; чинна для України з 11.09.1997 р. (зі змін. та допов.). URL: https://zakon.rada.gov.ua/laws/show/995_004#Text (date accessed: 16.01.2024). — *Note by S. Perepelytsia.*

35 Гловук І. В. Питання доказування за ст. 111-1 КК України: аналіз вироків. *Актуальні питання кримінально-правової кваліфікації, документування та розслідування колабораціонізму* : мат-ли Всеукр. наук.-практ. конф. (Одеса, 21.07.2022). Одеса, 2022. С. 32. URL: <http://surl.li/sauqh> (date accessed: 16.01.2024).

on witness testimonies and documents³⁶ in criminal proceedings under Part 1 of Article 111–1 of the Criminal Code of Ukraine³⁷.

During the pre-trial investigation of collaboration crimes, the formation of the evidentiary basis is influenced by witness and eyewitness testimonies, which play a significant role. Therefore, clarifying these testimonies is a primary task for the investigation, requiring the application of various measures. As stated above, these measures, including requesting information in the manner envisaged in Art. 93 of the Criminal Procedure Code of Ukraine³⁸ and temporarily accessing the belongings and documents of workers who have left the temporarily occupied territories of Ukraine, as well as those who have remained in these territories, by state and local authorities, are crucial. Such information is vital for investigators. It allows them to interrogate persons who have left the temporarily occupied territories, thus obtaining testimony from direct eyewitnesses to collaborationist activities.

In addition, the investigator may obtain from government and local self-government bodies, as well as from centers for the provision of administrative services, information on internally displaced persons from certain temporarily occupied territories of Ukraine, who may be both eyewitnesses of collaborationist

activities and collaborators. Requesting information from government and local self-government bodies on the operation of crossing points along the contact line and filtration points will enable the investigator to compile a list of individuals who have left the temporarily occupied territories, including eyewitnesses and witnesses of collaborationist activities. Obtaining such information will also help clarify the (im) possibility of leaving the temporarily occupied territory of Ukraine for a person suspected of collaborating³⁹.

As set out in Part 11 of Article 615 of the Criminal Procedure Code of Ukraine (although other articles of the procedural law do not contain such a requirement), witness interrogations conducted in conditions of martial law are carried out using video recording equipment⁴⁰, since only in this format will these materials be considered as evidence by the court.

Persons who have been abroad or internally displaced have repeatedly refused to testify to the investigator, while at the same time informing by phone that they possess information about a collaboration crime in a specific criminal proceeding. In such circumstances, the information provided by this person must be formalized by the prosecution as an explanation obtained by the investigator or prosecutor from the participants in a criminal proceeding, as well as from other persons with their consent (Part 8 of

36 Мальгіна А. С. *Op. cit.* С. 62. URL: <https://dspace.oduvs.edu.ua/server/api/core/bitstreams/3ab2381e-e4e8-4932-b84f-d4e4a46cc720/content> (date accessed: 16.01.2024).

37 Кримінальний кодекс України URL: <https://zakon.rada.gov.ua/laws/show/2341-14#Text> (date accessed: 16.01.2024).

38 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.03.2024).

39 Жидков В. *Op. cit.* URL: <https://www.helsinki.org.ua/articles/problemy-dokazuvannia-zlochyniv-pro-kolaboratsiyu-diialnist-analiz-prokurora-ofisu-heneralnoho-prokurora/> (date accessed: 16.01.2024).

40 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).

Article 95 of the Criminal Procedure Code of Ukraine)⁴¹, and recorded in the format of “explanations by individuals”. The forms of recording explanations obtained by the prosecution from an individual residing abroad include:

- written explanations by the individual (similar to the written form of a witness interrogation record): should include the personal and contact details of a person; circumstances to be proved in this criminal proceeding; interrogation date, and the signature of a conducting person;
- report from the investigator to the head of the pre-trial investigation body or an official note to the head of the prosecutor’s office with a description of obtained information.

It is important to note that the information obtained by the prosecution through telephone communication cannot serve as an independent source of evidence. Furthermore, in the presence of other corroborating evidence, it can supplement the established factual circumstances of a collaboration crime. Such information should not be disregarded, as there may be opportunities in the future (for example, during the trial stage) to question those individuals who provided explanations to the prosecution over the phone. Therefore, their testimonies under such

conditions become relevant and admissible evidence⁴².

When developing the evidentiary basis during the pre-trial investigation of collaboration crimes, well-versed persons are not overlooked, which, according to the procedural law, include experts and specialists: “*Specialist in criminal proceedings shall be a person who has special knowledge and skills necessary to use technical or other devices, and who is able to consult during pre-trial investigation and judicial proceedings on issues which require special knowledge and skills*” (Part 1 of Article 71 of the Criminal Procedure Code of Ukraine)⁴³, and “*An expert in criminal proceedings shall be an individual who has scientific, technical or any other special expertise, is entitled to conduct expert examination under the Law of Ukraine “On Forensic Examination”⁴⁴ and who is assigned to examine objects, events and processes that contain information on circumstances under which a criminal offence was committed, and to provide an opinion on issues arising in the course of the criminal proceeding and relating to the scope of his/her expertise*” (Part 1 of Article 69 of the Criminal Procedure Code of Ukraine)⁴⁵.

Throughout pre-investigation of collaboration crimes, the investigator encounters questions that only a forensic expert can address after conducting a forensic examination. During pre-trial investigation of collaboration crimes, the following types of forensic examinations are most commonly appointed (in accordance

41 Ibid; Жидков В. Л., Жила О. Б. Оп. cit. URL: <https://www.helsinki.org.ua/articles/dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-problemni-pytannia-zakonu/> (date accessed: 16.01.2024).

42 Жидков В. Л., Жила О. Б. Оп. cit. URL: <https://www.helsinki.org.ua/articles/dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-problemni-pytannia-zakonu/> (date accessed: 16.01.2024).

43 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).

44 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: 16.01.2024).— Note by S. Perepelytsia.

45 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 16.01.2024).

with the Scientific and Methodological Recommendations on the Preparation and Appointment of Forensic Examinations and Expert Studies ⁴⁶, hereinafter referred to as *the Recommendations*):

- 1) semantic-textual analysis of written and oral speech (*"semantic-textual examination addresses tasks related to determining the content of concepts, lexical meanings of words or word combinations used in the texts provided for research or oral communications [based on their textual reproductions], their stylistic coloring, semantic load, the nature of information contained herein [whether such information may be considered offensive or contain a threat to a specific person/persons], etc.) that is resolving issues of linguistic nature not related to establishing factual data about the author"*: paragraph 2 of subclause 2.1.2 of clause 2.1 of Chapter 2 of Section I of the Recommendations);
- 2) linguistic analysis of oral speech (*"during identification and diagnostic studies of a person's oral speech, questions related to:*
 - *identification of a person based on linguistic features of oral speech;*
 - *determination of speech type [spontaneous, non-spontaneous speech, reading of text, etc.];*
 - *identification of signs of mimicry in speech, native language, etc."*: paragraphs 1–4 of subclause 2.2.1 of clause 2.2 of Chapter 2 of Section I of the Recommendations);
- 3) psychological analysis (*"the main task of psychological examination is to identify in the examined person:*
 - *individual psychological features, character traits, dominant personality*

traits; motivational factors of mental life and behavior;

- *emotional reactions and states;*
- *patterns of the course of mental processes, their developmental levels, and personal qualities"*: clause 6.4 of Section VI of the Recommendations);

- 4) handwriting analysis (*"identification of the author of a handwritten text, limited to the volume of manuscript records [literary and digital] and the signature. This examination addresses certain non-identification tasks [establishing the fact of executing a handwritten text under the influence of various interfering factors: natural: illness, chronic conditions, age-related changes; temporary external: unusual pen grip, unusual posture, visual impairment, etc.; temporary internal: alcohol intoxication, pharmacological, narcotic substances, etc.; artificial: distortion of handwriting by altered movements]; determination of the author's gender, as well as affiliation to a certain age group, etc."*: clause 1.1 of Chapter 1 of Section I of the Recommendations);
- 5) video and audio recording analysis (the main tasks of this examination are: "20.1.1. To determine technical specifications and technology of video and sound recording.
20.1.2. To identify individuals by voice physical parameters.
20.1.3. To identify persons by linguistic features of speech": subclauses 20.1.1–20.1.3 of clause 20.1 of Chapter 20 of Section I of the Recommendations);
- 6) portrait analysis (*"the main task of portrait examination is identification of an individual [corpse] based on a photograph [photo card, negative], and video*

46 Науково-методичні рекомендації з питань підготовки та призначення судових експертів та експертних досліджень : затв. наказом Мініюсту України від 08.10.1998 р. № 53/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 16.01.2024).

recording”: clause 18.1 of Chapter 18 of Section I of the Recommendations);

7) computer analysis (“*principal tasks of computer hardware and software expertise encompass:*

- *determining the operating status of computer-technical equipment;*
- *establishing circumstances involving the use of computer-technical means, information, and software;*
- *detecting information and software contained on computer media;*
- *determining compliance of software products with specific versions or requirements for their development”* (as specified in subclause 13.1 of Chapter 13 of Section II of the Recommendations)⁴⁷;

8) psycholinguistic multidisciplinary analysis (studies expert situations related to determining the semantic features of the text and psychological characteristics of participants’ speech behavior in communicative interaction to elucidate the specifics of the information orientation being conveyed; expert research involves using expertise from the fields of: linguistics: to analyze peculiarities of speech and semantic properties of texts; psychology: to identify peculiarities of participants’ behavior in the communicative process. This specific expertise enables in-depth examination of textual, video, and audio recordings from various aspects).

Conclusions

It has been proven that today it is not uncommon for private individuals, voluntary movements or public organizations to document crimes related to collaborationist activities. The investigators’

task is to identify private individuals, representatives of volunteer movements, or public organizations that have documented crimes associated with collaborationist activities and collect the information they have recorded. Additionally, they aim to uncover individuals suspected of collaboration, which involves obtaining information about them from government and local self-government bodies, as well as acquiring relevant documents to verify the facts of collaborationism. It should be emphasized that, for various reasons, it is not always possible to carry out covert investigative (search) actions during pre-trial investigation of collaboration crimes. Under such circumstances, the public prosecutor may utilize information obtained in another criminal proceeding (Article 257 of the Criminal Procedure Code of Ukraine).

It is pointed out that digital evidence holds a separate place in criminal proceedings involving collaboration crimes, which encompasses: photographic materials, audio and video recordings, computer data, and other media found in both closed and open networks (internet, media, social networks), as well as witness testimonies. Another component of the evidentiary basis comprises documents that enable investigators to acquire crucial evidence regarding the position held by the suspect and the activities they have undertaken, demonstrating both subjective and objective signs of the alleged crime.

When developing evidentiary basis during pre-trial investigation of collaboration crimes, witness testimonies become a pivotal component. Thus, ascertaining them is a leading task for the investigation, involving the application of various measures (such as obtaining information in the manner set out in

47 Науково-методичні рекомендації ... URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 16.01.2024).

Article 93 of the Criminal Procedure Code of Ukraine, or temporary accessing items and documents by government and local self-government bodies). In the course of pre-trial investigation of collaboration crimes, the investigator faces questions that only a forensic expert can answer after conducting a forensic examination: namely, the expert conclusion is a key component for forming evidentiary basis. It is the expert conclusion that contains information obtained by the forensic expert during the examination using specific expertise and about which the investigator was unaware.

Due to the fact that collaboration crimes predominantly take place in temporarily occupied territories, the process of gathering evidence and developing evidentiary basis is quite complex. Such difficulties may result in the loss of part of the evidence or insufficient evidence to establish the fact of committing a collaboration crime. The investigator should also consider other nuances of evidence gathering, as collaborators use closed communication channels to conceal their actions or employ other forms of cooperation with occupiers (financial or informational support).

Окремі аспекти формування доказової бази під час розслідування фактів колабораційної діяльності

Сергій Перепелиця

Мета статті — окреслити окремі аспекти формування доказової бази під час розслідування фактів колабораційної діяльності, виокремити проблемні питання й визначити шляхи їх подолання. Для досягнення поставленої мети застосовано загальнонаукові та спеціальні наукові методи. Зауважено, що формування доказової бази під час досудового розслідування колабораційних злочинів залежить від наявності показань свідків і очевидців,

з'ясування осіб яких є провідним завданням слідства та передбачає застосування різних заходів (наприклад, витребування відомостей про цих осіб і підозрюваних або тимчасового доступу до речей і документів від органів державної влади й місцевого самоврядування в передбаченому законодавством порядку). Акцентовано, що завданням слідчих у розслідуванні цього виду злочинів є виявити приватних осіб, представників волонтерських рухів або громадських організацій, які зафіксували злочини, пов'язані з колабораційною діяльністю, та отримати зафіксовану ними інформацію. Констатовано, що законодавством України обумовлено використання інформації, отриманої за іншим кримінальним провадженням. Іншою складовою доказової бази є документи, які дають слідчому важливі докази про посаду підозрюваного та здійснювану ним колабораційну діяльність. Висновок експерта (як вагома складова доказової бази) містить відповіді на запитання, які виникають у слідчого під час досудового розслідування, оскільки саме у ньому експерт наводить відомості, які він визначив під час проведення дослідження із застосуванням спеціальних знань і про які не знав слідчий.

Ключові слова: відкриті джерела; висновок експерта; докази й доказування; доказова база; документи; досудове розслідування; колабораційна діяльність; колабораційний злочин; засоби масової інформації; збирання доказів; кримінальне провадження; показання свідків; цифрові докази.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the study design, data collection and analysis, decision to publish, or manuscript preparation.

Participants

Author contributed solely to the intellectual discussion underlying this document, case law research, writing and editing and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Author declare no conflict of interest.

References

- Best, Jr. R. A., Cumming, A. (2007). CRS Report for Congress. Open Source Intelligence (OSINT): Issues for Congress. URL: <https://sgp.fas.org/crs/intel/RL34270.pdf>.
- Dankova, S. O. (2023). Struktura kryminalnoho protsesualnoho dokazuvannya v sudovomu provadzhenni u pershii instantsii [The structure of criminal procedural proving in court proceedings in the first instance]. *Elektronne naukovye vydannia «Analychno-porivnialne pravoznavstvo»*. № 6. DOI: 10.24144/2788-6018.2023.06.111 [in Ukrainian].
- Hloviuk, I. V. (2022). Pytannia dokazuvannya za st. 111-1 KK Ukrainy: analiz vyrokiv [Proving Issues under Article 111-1 of the Criminal Code of Ukraine: Analysis of Verdicts]. *Aktualni pytannia kryminalno-pravovoi kvalifikatsii, dokumentuvannya ta rozsliduvannya kolaboratsionizmu* : matly Vseukr. nauk.-prakt. konf. (Odesa, 21.07.2022). Odesa. URL: <http://surl.li/sauqh> [in Ukrainian].
- Hutsaliuk, M. V., Havlovskiy, V. D., Khakhanovskiy, V. H. ta in. (2020). Vykorystannia elektronnykh (tsyfrovyykh) dokaziv u kryminalnykh provadzhenniakh [The use of electronic (digital) evidence in criminal proceedings] : metod. rek. / za zah. red. O. V. Korneika. Vyd. 2-he, dopov. Kyiv. URL: <https://elar.naiu.kiev.ua/server/api/core/bitstreams/8e9e5637-7b62-475c-8c41-9850e317bfc4/content> [in Ukrainian].
- Kishchak, B. I. (2023). Osoblyvosti dokazuvannya zlochyniv, poviazanykh z kolaboratsiinoiu diialnistiu [Peculiarities of proving crimes related to collaboration]. *Naukovi zapysky Lvivskoho universytetu biznesu ta prava. Seriya ekonomichna. Seriya yurydychna*. 2023. Vyp. 37. DOI: 10.5281/zenodo.7934032 [in Ukrainian].
- Kovalenko, A. V. (2022). Vzaiemodiia orhaniv dosudovoho rozsliduvannya iz zasobamy masovoi informatsii pid chas zbyrannia, doslidzhennia ta vykorystannia dokaziv u kryminalnomu provadzhenni [Interaction of the pre-trial investigation bodies with the mass media during the collection, investigation and use of evidence in criminal proceedings]. *Kryminalistychnyi visnyk*. T. 38. № 2. DOI: 10.37025/1992-4437/2022-38-2-48 [in Ukrainian].
- Kovalova, O. V. (2023). *Teoretyko-pravovi zasady informatsiinoho zabezpechennia dosudovoho rozsliduvannya kryminalnykh pravoporushen* [Theoretical and legal principles of information providing pretrial investigation of criminal offenses] : avtoref. dys. ... d-ra yuryd. nauk. Kropyvnytskyi. URL: https://dnuvs.ukr.education/wp-content/uploads/2023/05/referat_dysertacziyi_kovalovoyi_o_v_.pdf [in Ukrainian].
- Malhina, A. S. (2022). Vykorystannia metodyky rozsliduvannya uchasti u terorystychnii hrupi chy terorystychnii orhanizatsii pid chas rozsliduvannya kolaboratsiinoi diialnosti [The use of investigation methodologies for determining involvement in a terrorist group or terrorist organization during the investigation of collaborationist activities]. *Aktualni pytannia kryminalno-pravovoi kvalifikatsii, dokumentuvannya ta rozsliduvannya kolaboratsionizmu* : matly Vseukr. nauk.-prakt. konf. (Odesa, 21.07.2022). Odesa. URL: <https://dspace.oduvs.edu.ua/server/api/core/bitstreams/3ab2381e-e4e8-4932-b84f-d4e4a46cc720/content> [in Ukrainian].
- Pashkovskiy, M. I. (2022). Osoblyvosti vykorystannia OSINT pry dokumentuvanni ta rozsliduvannya kolaboratsiinoi diialnosti [Peculiarities of using OSINT in documenting and investigating collaborationist activities]. *Aktualni pytannia kryminalno-pravovoi kvalifikatsii, dokumentuvannya ta rozsliduvannya kolaboratsionizmu* : matly Vseukr. nauk.-prakt. konf. (Odesa, 21.07.2022). Odesa. URL: <http://surl.li/saupi> [in Ukrainian].
- Vaida, T. S. (2022). Kolaboratsiina diialnist v umovakh viiny: poniattia, dokumentuvannya ta kryminalna

- vidpovidalnist za protypravni dii/diialnist [Collaborationism in wartime: concepts, documentation, and criminal liability for unlawful actions/activities]. *Aktualni pytannia kryminalno-pravovoi kvalifikatsii, dokumentuvannia ta rozsliduvannia kolaboratsionizmu* : mat-ly Vseukr. nauk.-prakt. konf. (Odesa, 21.07.2022). Odesa. URL: <https://dspace.oduvs.edu.ua/server/api/core/bitstreams/e5b44659-7bac-4fb9-87a6-0357b99358f6/content> [in Ukrainian].
- Vapniarchuk, V. V. (2022). Shchodo osoblyvosti okremykh sposobiv zbyrannia dokaziv u kryminalnomu provadzhenni [Regarding the peculiarities of certain methods of gathering evidence in criminal proceedings]. *Naukovyi visnyk Uzhhorodskoho natsionalnoho universytetu. Seriiia pravo*. Vyp. 70. DOI: 10.24144/2307-3322.2022.70.65 [in Ukrainian].
- Vykhodets, Yu. O., Teteriatnyk, H. K. (2022). Okremi pytannia vykorystannia OSINT pry rozsliduvanni zlochyniv v umovakh viiskovoi ahresii rf. *Pravovi novely*. № 18. DOI: 10.32847/ln.2022.18.10 [in Ukrainian].
- Zhydkov, V. (2023). Problemy dokazuvannia zlochyniv pro kolaboratsiinu diialist: analiz prokurora Ofisu Heneralnoho prokurora / Ukrainiska Helsinska spilka z prav liudyny : ofits. sait. URL: <https://www.helsinki.org.ua/articles/problemy-dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-analiz-prokurora-ofisu-heneralnoho-prokurora/> [in Ukrainian].
- Zhydkov, V. L., Zhyla, O. B. (2023). *Dokazuvannia zlochyniv pro kolaboratsiinu diialist: problemni pytannia zakonu* [Challenges in proving crimes related to collaborationism: analysis by the Prosecutor of the Office of the Prosecutor General] / Ukrainiska Helsinska spilka z prav liudyny : ofits. sait. URL: <https://www.helsinki.org.ua/articles/dokazuvannia-zlochyniv-pro-kolaboratsiynu-diialnist-problemni-pytannia-zakonu/> [in Ukrainian].
- Perepelytsia, S. (2024). Separate Aspects of Evidentiary Basis Formation During the Investigation of Facts Related to Collaborationism. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). Pp. 76—91. DOI: 10.32353/khrife.1.2024.05.

Analysis of Cannabis and its Products in the Context Forensic Science

Iryna Kuchynska *

* PHD in Pharmacy, Ukrainian Research Institute of Special Equipment and Forensic Science of the Security Service of Ukraine, Kyiv, Ukraine, ORCID: <https://orcid.org/0000-0002-0269-9463>, e-mail: irynakuchynska@ukr.net

DOI: [10.32353/khrife.1.2024.06](https://doi.org/10.32353/khrife.1.2024.06) UDC 543:343.98

Received: 20.12.2023 / Reviewed: 03.01.2024 / Accepted for print: 27.03.2024 / Available online: 29.03.2024



Legalization of low-tetrahydrocannabinol-high-cannabidiol cannabis plants is gaining momentum due to growing demand for these products. In some countries, the testing of cannabis and products containing it is a legal requirement: cannabis is identified, the amount of tetrahydrocannabinol or cannabidiol and their precursor acids is assessed. Current research requires more sensitive and reliable analytical methods for accurate identification and quantification of cannabis components. This article purpose is to review the latest advances in the scientific literature on the isolation and analysis of cannabis and cannabis-containing products in the context of forensic science. Research methods included analysis of information on this topic using search engines, including Google, Google Scholar, Web of Science, PubMed, and ScienceDirect. Search requests took into account scientific, analytical and statistical reports in the field of forensic research. Since the forensic expert must be well-versed in modern trends in the analysis of prohibited substances and use the latest data from the analytical and forensic literature in his work, such information will help them choose research methods, taking into account the actual resources and equipment of forensic laboratories. According to the article purpose, advantages and disadvantages of existing methods of extraction and analysis of objects containing cannabis for identification,

This article is translation of the original Ukrainian content, which source is available at the link: <https://khrife-journal.org/index.php/journal> (translated by Andriy Bublikov). The author acknowledges translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

quantification, profiling and age estimation of cannabis are considered.

Keywords: *cannabis; phytocannabinoids; extraction; identification; quantitative definition; gas chromatography; liquid chromatography; nuclear magnetic resonance method; methods of vibrational spectroscopy.*

Research Problem Formulation

Illegal circulation of narcotic drugs, psychotropic substances, their analogues and precursors is one of the leading social problems. Cannabis remains the most widely used illicit substance. Cultivation and production of hemp covers all regions of the world, the main emphasis is on achieving a high content of tetrahydrocannabinol (hereinafter referred to as *THC*) in plants. According to the report of the European Monitoring Centre for Drugs and Drug Addiction (*EMCDDA*) for 2023, in the countries of the European Union in 2021, the average THC content in herbal cannabis was 9.5 %, in cannabis resin – 20 %¹.

Cannabis regulation is increasingly confronted with new forms and ways of its use. Currently, cannabis products are represented by substances with a high THC content or contain cannabidiol (hereinafter referred to as *CBD*) against the background of low levels of THC in oils or tinctures. These products are used in food production (such as pastries, candies, chocolate, marmalade, potato chips, pies, soups, drinks of various colors and flavors), as well as in electronic cigarettes and

vaping liquids. Traditional cannabis resin is increasingly found in loose form, and there are known cases of cannabis resin being produced from plant material with a high CBD content.

The increase in the number of such materials and their various characteristics requires forensic experts to revise analysis methods in order to prevent unreliable results. In addition, forensic experts (in particular, in EU countries) often have to not only detect, but quantify low levels of THC, differentiate its isomers, in particular delta-9-tetrahydrocannabinol (hereinafter referred to as Δ^9 -*THC*) and delta-8-tetrahydrocannabinol (hereinafter referred to as Δ^8 -*THC*), as well as to identify other cannabinoids present. Solving such a large number of analytical problems requires reliable, reproducible and sensitive analytical methods. At the same time, the lack of reference materials for Δ^9 -*THC*, its isomers and other cannabinoids is hindering quality results of forensic laboratories.

Plants of the Cannabis genus contain approximately 500 compounds, of which more than 144 are classified as phytocannabinoids (natural cannabinoids), while others are represented by flavonoids,

1 European Drug Report 2023: Trends and Developments. Lisbon : EMCDDA, 2023. URL: https://www.emcdda.europa.eu/index_en (date accessed: 25.09.2023).

fatty acids, and phenols. Among the chemical components, the most famous in plants of the genus *Cannabis*, THC and CBD are distinguished. Due to complexity of terpenophenolic composition of plants and the investigated matrix, for example, products containing cannabis extracts, their analysis and quantification require the use of multi-step sample preparation protocols with subsequent validation of each new method that will be implemented in the laboratory.

This topic is relevant for Ukraine, as cannabis and products containing cannabis are actively promoted on the market of recreational products. The speed of spread of these substances (against the fact that their psychoactivity is not always known, insufficient research and lack of control) gives them the status of high social danger and requires further research, which is already being conducted in EU countries.

Article Purpose

Review of the latest advances of scientific literature on isolation and analysis of cannabis and cannabis-containing products in a forensic context. Since the forensic expert must be well-versed in modern trends in the analysis of prohibited substances and use the latest data from the analytical and forensic literature in his work, such information will help them choose research methods, taking into account the actual resources and equipment of forensic laboratories.

Research Methods

Research on information according to the topic in question was carried out by studying search engines, in particular *Google*, *Google Scholar*, *Web of Science*, *PubMed*, *ScienceDirect*. Search requests took into account scientific, analytical and statistical reports in the field of forensic research.

Analysis of Essential Researches and Publications

Analysis of the special scientific literature of recent years indicates an active interest in the analysis of the complex matrix of cannabis plants. Many studies are aimed at studying the processes of phytocannabinoid extraction for further analysis. A study by G. Micalizzi and colleagues of the properties of solvents (methanol, ethanol, acetone, hexane) demonstrated that ethanol exhibits the best extraction properties against cannabinoid acids in their decarboxylated forms; on the other hand, the use of hexane reduces the extraction results of cannabinoids ².

N. Christinat et al. studied the properties of a mixture of water and acetonitrile as extraction reagents for the determination of various types of cannabinoids in samples of hempseed oil, milk, various beverages and food³. In other similar studies, isopropanol was recognized as the most effective extractant (compared to methanol and acetonitrile) during the extraction

-
- 2 Micalizzi G., Vento F., Alibrando F., Donnarumma D., Dugo P., Mondello L. Cannabis Sativa L.: A comprehensive review on the analytical methodologies for cannabinoids and terpenes characterization. *Journal of Chromatography A*. 2021. Jan 25:1637:461864. DOI: [10.1016/j.chroma.2020.461864](https://doi.org/10.1016/j.chroma.2020.461864) (date accessed: 27.09.2023).
 - 3 Christinat N., Savoy M.-C., Mottier P. Development, Validation and Application of a LC-MS/MS Method for Quantification of 15 Cannabinoids in Food. *Food Chemistry*. 2020. Vol. 318. Art. 126469. DOI: [10.1016/j.foodchem.2020.126469](https://doi.org/10.1016/j.foodchem.2020.126469) (date accessed: 27.09.2023).

of the phytocannabinoid composition of hemp seeds ⁴.

V. Brighenti and colleagues compared extraction methods, their parameters and solvents, studying the composition of cannabinoids in cannabis flowers; dynamic maceration in ethanol at room temperature demonstrated the highest efficiency for the further study of the total amount of cannabinoids, as well as their neutral and acidic forms ⁵.

Investigating the effect of extraction conditions on the release of cannabinoids and cannabis flowers, E. M. Mudge et al demonstrated that ultrasonic extraction was more effective than shaking, but that enhanced sonication for 15 minutes caused some cannabinoid degradation ⁶.

The advantages of microwave extraction for decarboxylated forms of

cannabinoids were noted by D. de Vita and her colleagues ⁷.

L. J. Rovetto and N. V. Aieta developed a supercritical fluid extraction strategy with pulsating carbon dioxide and ethanol as co-solvents, which increased the extraction rate and total cannabinoid yield, reduced solvent consumption and analysis time; this method proved useful for extracting total THC or CBD in neutral and acidic forms ⁸.

M. A. ElSohly and C. Cuttler report a tendency to increase THC concentration in hemp plants from 10-14 % ⁹ to 20 % ¹⁰. Quantification of cannabis is usually performed using gas chromatography (GC) with a flame ionization detector (GC-FID), as noted in G. R. Borges et al ¹¹.

V. Cardenia and his colleagues compared the methods of GC-FID and

- 4 Chang Ch.-W., Tung Ch.-W., Tsai Ch.-Ch., Wu Yu-T., Hsu M.-Ch. Determination of Cannabinoids in Hemp Nut Products in Taiwan by HPLC-MS/MS Coupled with Chemometric Analysis: Quality Evaluation and a Pilot Human Study. *Drug Testing and Analysis*. 2017. No. 9. Pp. 888–897. DOI: [10.1002/dta.2062](https://doi.org/10.1002/dta.2062) (date accessed: 29.09.2023).
- 5 Brighenti V., Pellati F., Steinbach M., Maran D., Benvenuti S. Development of a New Extraction Technique and HPLC Method for the Analysis of Non-Psychoactive Cannabinoids in Fibre-Type Cannabis Sativa L. (Hemp). *Journal of Pharmaceutical and Biomedical Analysis*. 2017. Vol. 143. Pp. 228–236. DOI: [10.1016/j.jpba.2017.05.049](https://doi.org/10.1016/j.jpba.2017.05.049) (date accessed: 21.09.2023).
- 6 Mudge E. M., Murch S. J., Brown P. N. Leaner and Greener Analysis of Cannabinoids. *Analytical and Bioanalytical Chemistry*. 2017. Vol. 409. Pp. 3153–3163. DOI: [10.1007/s00216-017-0256-3](https://doi.org/10.1007/s00216-017-0256-3) (date accessed: 22.09.2023).
- 7 De Vita D., Madia V. N., Tudino V., Saccoliti F., De Leo A., Messori A., Roscilli P., Botto A., Pindinello I., Santilli G. et al. Comparison of Different Methods for the Extraction of Cannabinoids from Cannabis. *Natural Product Research*. 2019. Vol. 34 (20). Pp. 2952–2958. DOI: [10.1080/14786419.2019.1601194](https://doi.org/10.1080/14786419.2019.1601194) (date accessed: 23.09.2023).
- 8 Rovetto L. J., Aieta N. V. Supercritical Carbon Dioxide Extraction of Cannabinoids from Cannabis Sativa L. *The Journal of Supercritical Fluids*. 2017. Vol. 129. Pp. 16–27. DOI: [10.1016/j.supflu.2017.03.014](https://doi.org/10.1016/j.supflu.2017.03.014) (date accessed: 22.09.2023).
- 9 ElSohly M. A., Chandra S., Radwan M., Majumdar Ch. G., Church J. C. A Comprehensive Review of Cannabis Potency in the United States in the Last Decade. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*. 2021. Vol. 6. No. 6. Pp. 603–606. DOI: [10.1016/j.bpsc.2020.12.016](https://doi.org/10.1016/j.bpsc.2020.12.016) (date accessed: 22.09.2023).
- 10 Cuttler C., LaFrance E. M., Stueber A. Acute effects of high-potency cannabis flower and cannabis concentrates on everyday life memory and decision making. *Scientific Reports*. 2021. Vol. 11. No. 1. Art. 13784. DOI: [10.1038/s41598-021-93198-5](https://doi.org/10.1038/s41598-021-93198-5) (date accessed: 24.09.2023).
- 11 Borges G. R., Birk L., Scheid C., Morés L., Carasek E., Kitamura R. O. S., Roveri F. L. et al. Simple and Straightforward Analysis of Cannabinoids in Medicinal Products by Fast-GC-FID. *Forensic Toxicology*. 2020. Vol. 38. Pp. 531–535. DOI: [10.1007/s11419-020-00522-1](https://doi.org/10.1007/s11419-020-00522-1) (date accessed: 22.09.2023).

gas chromatography with a mass detector (hereinafter referred to as GC-MS), showed the interchangeability of detectors in the case of the study of cannabis and products containing it, and developed a GC-MS method for the quantitative determination of cannabinoids, approved for use in European countries, on a quadrupole GC-MS with electron impact ionization¹².

C. Citti and colleagues noted that the GC-MS method for quantification requires the use of expensive deuterated standards, which are not available for all cannabinoids¹³. L. A. Ciolino and her colleagues recommend using N,O-bis(trimethylsilyl)trifluoroacetamide for the derivatization process that occurs during the identification of phytocannabinoid acids¹⁴. G. R. Borges and his co-authors compared several chromatographic methods using Δ⁹-THC as an example and determined a significant amount of Δ⁸-THC and cannabitol (hereinafter referred to as CBN), which are known products of the breakdown of Δ⁹-THC and are present in

the GC chromatograms, in contrast to the results obtained by the methods of high-performance Liquid chromatography-mass spectrometry (hereinafter referred to as HPLC)¹⁵, nuclear magnetic resonance (hereinafter referred to as hereinafter referred to as) and thin-layer chromatography (hereinafter referred to as TLC). M. M. Delgado-Povedano, together with co-authors, described a method for research on extracts of plants of the genus Cannabis using quadrupole time-of-flight mass detectors in combination with GC for non-polar compounds or the method of liquid chromatography (hereinafter referred to as LC) for more polar cannabinoids and their acids¹⁶.

L. Calvi and colleagues evaluated the potential of HPLC with an Orbitrap detector for the study of cannabinoids in commercial cannabis extracts and investigated the degradation of these extracts under different storage conditions¹⁷.

N. Christinat et al. tested a variety of edible products sold in the EU for the presence and quantitative content of

- 12 Cardenia V., Toschi T. G., Scappini S., Rubino R. C., Rodriguez-Estrada M. T. Development and Validation of a Fast Gas Chromatography/Mass Spectrometry Method for the Determination of Cannabinoids in Cannabis Sativa L. *Journal of Food and Drug Analysis*. 2018. Vol. 26 (4). Pp. 1283–1292. DOI: [10.1016/j.jfda.2018.06.001](https://doi.org/10.1016/j.jfda.2018.06.001) (date accessed: 25.09.2023).
- 13 Citti C., Russo F., Sgrò S., Gallo A., Zanutto A., Forni F., Vandelli M. A., Laganà A., Montone C. M., Gigli G., Cannazza G. Pitfalls in the analysis of phytocannabinoids in cannabis inflorescence. *Analytical and Bioanalytical Chemistry*. 2020. Vol. 412. No. 17. Art. 4009–4022. DOI: [10.1007/s00216-020-02554-3](https://doi.org/10.1007/s00216-020-02554-3) (date accessed: 25.09.2023).
- 14 Ciolino L. A., Ranieri T. L., Taylor A. M. Commercial cannabis consumer products part 1: GC-MS qualitative analysis of cannabis cannabinoids. *Forensic Science International*. 2018. Vol. 289. Pp. 429–437. DOI: [10.1016/j.forsciint.2018.05.032](https://doi.org/10.1016/j.forsciint.2018.05.032) (date accessed: 24.09.2023).
- 15 Borges G. R., Birk L., Scheid C., Morés L., Carasek E., Kitamura R. O. S., Roveri F. L. et al. Op. cit. DOI: [10.1007/s11419-020-00522-1](https://doi.org/10.1007/s11419-020-00522-1) (date accessed: 28.09.2023).
- 16 Delgado-Povedano M. M., Sánchez-Carnerero Callado C., Priego-Capote F., Ferreiro-Vera C. Un-targeted Characterization of Extracts from Cannabis Sativa L. Cultivars by Gas and Liquid Chromatography Coupled to Mass Spectrometry in High Resolution Mode. *Talanta*. 2020. Vol. 208. Art. 120384. DOI: [10.1016/j.talanta.2019.120384](https://doi.org/10.1016/j.talanta.2019.120384) (date accessed: 27.09.2023).
- 17 Calvi L., Pentimalli D., Panseri S., Giupponi L., Gelmini F., Beretta G., Vitali D., Bruno M., Zilio E., Pavlovic R., Giorgi A. Comprehensive Quality Evaluation of Medical Cannabis Sativa L. Inflorescence and Macerated Oils Based on HS-SPME Coupled to GC-MS and LC-HRMS (q-ex-active Orbitrap) Approach. *Journal of Pharmaceutical and Biomedical Analysis*. 2018. Vol. 150. Pp. 208–219. DOI: [10.1016/j.jpba.2017.11.073](https://doi.org/10.1016/j.jpba.2017.11.073) (date accessed: 28.09.2023).

cannabinoids using ultra-efficient liquid chromatography with a hybrid triple quadrupole-linear ion trap. Studies have shown that the concentration of CBD in the milk of cows fed with hemp reaches 10 mg/kg. In their studies, the authors also noted the excess of permissible levels of toxicity and concentration of THC in some products containing cannabis extract¹⁸.

G. R. Borges and colleagues developed a fast (5 minutes) method of high-performance liquid chromatography in combination with a diode detector for the quantitative determination of THC without loss of resolution of the main cannabinoids¹⁹.

Application of liquid chromatography method with ultraviolet detection to classify cannabis samples in order to distinguish them into recreational and fibrous, was proposed by M. Mandrioli et al²⁰.

M. Deville and her colleagues noted the existence of a significant metabolic difference between plants grown indoors and outdoors: outdoor cultivars had significantly higher concentrations of THC, CBD, and CBN²¹.

G. Stefkov and his co-authors investigated phytocannabinoids from plants of the genus *Cannabis* using UV detection²². At the same time, a team of Italian researchers published a report on the difficulties of joint elution of cannabinoid peaks and their low sensitivity to UV radiation, which makes it difficult to quantify THC and CBD during one analytical cycle²³.

C. Duchateau and colleagues described the difficulties of identifying and distinguishing between legal and illegal (legal and illegal) cannabis inflorescences encountered by law enforcement agencies in the field (outside laboratories), and developed an innovative approach to the classification of cannabis samples (in accordance with European and Swiss laws) using stationary and portable near-infrared (hereinafter referred to as NIR) analyzers and chemometric methods for determining the concentration of THC on GC-FID²⁴.

C. Sánchez-Carnerero Callado and co-authors reported obtaining acceptable prognostic results in the estimation of

- 18 Christinat N., Savoy M.-C., Mottier P. Op. cit. DOI: [10.1016/j.foodchem.2020.126469](https://doi.org/10.1016/j.foodchem.2020.126469) (date accessed: 27.09.2023).
- 19 Borges G. R., Birk L., Scheid C., Morés L., Carasek E., Kitamura R. O. S., Roveri F. L. et al. Op. cit. DOI: [10.1007/s11419-020-00522-1](https://doi.org/10.1007/s11419-020-00522-1) (date accessed: 28.09.2023).
- 20 Mandrioli M., Tura M., Scotti S., Toschi T. G. Fast Detection of 10 Cannabinoids by RP-HPLC-UV Method in *Cannabis sativa* L. *Molecules*. 2019. Is. 24. No. 11. Art. 2113. DOI: [10.3390/molecules24112113](https://doi.org/10.3390/molecules24112113) (date accessed: 10.10.2023).
- 21 Deville M., Dubois N., Denooz R., Charlier C. Validation of an UHPLC/DAD Method for the Determination of Cannabinoids in Seized Materials: Analysis of 213 Samples Sold in Belgian CBD shops. *Forensic Science International*. 2020. Vol. 310. Art. 110234. DOI: [10.1016/j.forsciint.2020.110234](https://doi.org/10.1016/j.forsciint.2020.110234) (date accessed: 06.10.2023).
- 22 Stefkov G., Cvetkovikj Karanfilova I., Stoilkovska Gjorgievska V., Trajkovska A., Geskovski N., Karapandzova M., Kulevanova S. Analytical Techniques for Phytocannabinoid Profiling of Cannabis and Cannabis-Based Products — A Comprehensive Review. *Molecules*. 2022. Vol. 27. Is. 3. Art. 975. DOI: [10.3390/molecules27030975](https://doi.org/10.3390/molecules27030975) (date accessed: 11.10.2023).
- 23 Citti C., Russo F., Sgrò S., Gallo A., Zanotto A., Forni F., Vandelli M. A., Laganà A., Montone C. M., Gigli G., Cannazza G. Op. cit. DOI: [10.1007/s00216-020-02554-3](https://doi.org/10.1007/s00216-020-02554-3) (date accessed: 07.10.2023).
- 24 Duchateau C., Kauffmann J.-M., Canfyn M., Stévigny C., De Braekeleer K., Deconinck E. Discrimination of legal and illegal *Cannabis spp.* according to European legislation using near infrared spectroscopy and chemometrics. *Drug Testing and Analysis*. 2020. Vol. 12. No. 9. Pp. 1309–1319. DOI: [10.1002/dta.2865](https://doi.org/10.1002/dta.2865) (date accessed: 12.10.2023).

cannabinoid concentration using NIR and NIR with Fourier transformation and the use of mathematical and statistical models: in their opinion, this analytical method simplifies the estimation of the quantitative content of cannabinoids in plants of the genus *Cannabis* compared to traditional GC method ²⁵.

L. Sanchez and colleagues used Raman spectroscopy to investigate cannabis with high CBD content, achieving 100 % accuracy through the use of chemometric methods ²⁶.

J. A. de Leite and her colleagues noted difficulty of isolating cannabinoids from a complex plant matrix using the NMR method: they used preparative high-pressure liquid chromatography to isolate and purify the samples ²⁷.

C. Citti ²⁸, G. Stefkov ²⁹ and J. A. de Leite ³⁰ in their research papers described the use of the NMR method for qualitative and quantitative research of cannabis components.

Chemometric analysis for estimating the age of herbal cannabis was used by K. C. Mariotti and co-authors ³¹. G. R. Borges and his co-authors used chemometric methods to differentiate the fibrous and recreational types of cannabis ³². A. Slosse processed data during cannabis profiling using chemometric methods ³³.

Main Content Presentation

Development of analytical methods for the identification and quantification of cannabinoids in various matrices is a special

- 25 Sánchez-Carnerero Callado C., Núñez-Sánchez N., Casano S., Ferreiro-Vera C. The potential of near infrared spectroscopy to estimate the content of cannabinoids in *Cannabis sativa* L.: A comparative study. *Talanta*. 2018. Vol. 90. No. 1. Pp. 147–157. DOI: [10.1016/j.talanta.2018.07.085](https://doi.org/10.1016/j.talanta.2018.07.085) (date accessed: 11.10.2023).
- 26 Sanchez L., Filter C., Baltensperger D., Kurouski D. Confirmatory non-invasive and non-destructive differentiation between hemp and cannabis using a hand-held Raman spectrometer. *Royal Society of Chemistry Advances*. 2020. Vol. 10. Is. 6. Pp. 3212–3216. DOI: [10.1039/C9RA08225E](https://doi.org/10.1039/C9RA08225E) (date accessed: 11.10.2023).
- 27 De Leite J. A., de Oliveira M. V. L., Conti R., de S. Borges W., Rosa Th. R., Filgueiras P. R., Lacerda Jr. V., Romão W., Neto Á. C. Extraction and isolation of cannabinoids from marijuana seizures and characterization by 1H NMR allied to chemometric tools. *Science & Justice*. 2018. Vol. 58. Is. 5. Pp. 355–365. DOI: [10.1016/j.scijus.2018.06.005](https://doi.org/10.1016/j.scijus.2018.06.005) (date accessed: 01.10.2023).
- 28 Citti C., Russo F., Sgrò S., Gallo A., Zanutto A., Forni F., Vandelli M. A., Laganà A., Montone C. M., Gigli G., Cannazza G. Op. cit. DOI: [10.1007/s00216-020-02554-3](https://doi.org/10.1007/s00216-020-02554-3) (date accessed: 07.10.2023).
- 29 Stefkov G., Cvetkovikj Karanfilova I., Stoilkovska Gjorgievska V., Trajkovska A., Geskovski N., Karapandzova M., Kulevanova S. Op. cit. DOI: [10.3390/molecules27030975](https://doi.org/10.3390/molecules27030975) (date accessed: 11.10.2023).
- 30 De Leite J. A., de Oliveira M. V. L., Conti R., de S. Borges W., Rosa Th. R., Filgueiras P. R., Lacerda Jr. V., Romão W., Neto Á. C. Op. cit. DOI: [10.1016/j.scijus.2018.06.005](https://doi.org/10.1016/j.scijus.2018.06.005) (date accessed: 12.10.2023).
- 31 Mariotti K. C., Marcelo M. C. A., Ortiz R. S., Borille B. T., dos Reis M., Fett M. S., Ferrão M. F., Limberger R. P. Seized Cannabis Seeds Cultivated in Greenhouse: A Chemical Study by Gas Chromatography-Mass Spectrometry and Chemometric Analysis. *Science & Justice*. 2016. Vol. 56. Pp. 35–41. DOI: [10.1016/j.scijus.2015.09.002](https://doi.org/10.1016/j.scijus.2015.09.002) (date accessed: 10.10.2023).
- 32 Borges G. R., Birk L., Scheid C., Morés L., Carasek E., Kitamura R. O. S., Roveri F. L. et al. Op. cit. DOI: [10.1007/s11419-020-00522-1](https://doi.org/10.1007/s11419-020-00522-1) (date accessed: 28.09.2023).
- 33 Slosse A., Van Durme F., Samyn N., Mangelings D., Vander Heyden Yv. Gas Chromatographic Fingerprint Analysis for the Comparison of Seized Cannabis Samples. *Molecules*. 2021. Vol. 26. Is. 21. Art. 6643. DOI: [10.3390/molecules26216643](https://doi.org/10.3390/molecules26216643) (date accessed: 10.10.2023).

challenge. In nature, THC is found in plants of the genus *Cannabis*, it is considered the main psychoactive component of cannabis. The *tetrahydrocannabinol* term includes all stereochemical variants unless otherwise specified. For forensic investigations, the following components of cannabis are important: tetrahydrocannabinolic acid (hereinafter referred to as THCA), CBN, CBD, cannabigerol, cannabivarin, cannabichromene (hereinafter referred to as CBC).

THC, CBD and CBC are the main phytocannabinoid components of cannabis. In fresh biomass, approximately 95% of these components exist in the form of starting compounds: THCA, cannabidiolic acid (hereinafter referred to as CBDA) and cannabichromic acid. All of them are formed as a result of the enzymatic catalysis of cannabigerolic acid. The corresponding THC, CBD and CBC are formed by light and heat decarboxylation.

Decarboxylation rarely comes to an end, so both forms remain present in the matrix. CBN is a product of unnatural decomposition of THC, therefore, when processing cannabis and products containing it, it is necessary to take into account factors that affect the stability of cannabinoids and the consequences of sample storage conditions, laboratory analysis and interpretation of results (such as decarboxylation of THCA, oxidation of THC to CBN, CBD to THC isomers, isomerization of Δ^9 -THC in Δ^8 -THC).

Decarboxylation of THCA to form THC occurs during harvesting and drying of hemp, heating of the sample, for example, during smoking, under the influence of light, and during chemical research. Under similar conditions, THC can independently turn into CBN. Therefore, the correct

storage of samples and products containing hemp, as well as the choice of appropriate methods for their chemical analysis, are of crucial importance.

Important factor in determining total THC content is also the stability of cannabinoids in the studied object. Based on the THC and CBN content, the age of a particular cannabis sample can be determined, so comparative analysis is usually impractical three months after material extraction.

Cannabis resin is usually in the form of large, dense blocks; the degree of decarboxylation and degradation of cannabinoids, and therefore the profiles of cannabinoids, differ in different parts of such blocks due to different exposure to light and heat (cannabis resin is sensitive to heat and light during storage).

CBN and Δ^8 -THC have recently received increasing attention: Δ^8 -THC, which is a secondary component naturally occurring in the *Cannabis* plant, has been found as a major component in vaping liquids, chewing gum and tinctures.

In addition to Δ^8 -THC, THC isomers such as delta-6a- and delta-10a-tetrahydrocannabinol have been found in vaping liquids³⁴.

For routine analysis (identification and quantification) of cannabis samples and products containing it, it is important to use representative material. General aspects of representative sampling of narcotic substances for analysis are presented in the European Network of Forensic Institutes (ENFSI) Narcotics Working Group Guidelines on Sampling of Illicit Drugs for Quantitative Analysis.

It is important to maintain the best storage conditions for the herb, including a dark place at -20 °C, as THC at this stage

34 European Drug Report 2023 URL: https://www.emcdda.europa.eu/index_en (date accessed: 25.09.2023).

is still sensitive to air and UV (light) that can cause THC to oxidize to CBN. Fresh plant material should be stored in paper bags, as polymer packaging can cause decomposition and the appearance of mold due to the high moisture content.

Samples must be dried. There are different approaches to drying *Cannabis* plants, for example, at temperatures below 70 °C to constant weight and a moisture content of 8% to 13%³⁵, or at 40 °C in an oven for 12 hours³⁶. The dried material has a heterogeneous composition: it should be crushed. Grinding helps to release the oily resin containing cannabinoids, terpenes and other secondary plant metabolites, increases the surface area and increases the extraction efficiency³⁷.

Homogenization of plant cannabis is not required for qualitative chromatographic analysis when using plant parts with the highest THC levels. Drying cannabis resin is not necessary. However, due to the nature of the matrix, the grinding process is complicated, and freezing the samples can facilitate grinding with a mortar and pestle³⁸.

Objects in the form of food, beverages, or supplements require preparation

for a specific analytical method before analytical testing. For research on of liquid samples containing cannabinoids, they are mixed with a selected solvent, homogenized and (if necessary) decarboxylated³⁹. This method of sample preparation is simple and straightforward, but can lead to overloading of the analyzer and unreliable results.

The extraction procedure is an important step in the preparation of samples containing cannabis. Extraction of samples should be simple, selective and reproducible⁴⁰. Depending on the lipophilicity of the extracted cannabis components, solvents from polar to non-polar are used⁴¹. Non-polar solvents (hexane, petroleum ether) extract neutral cannabinoids well, but acidic cannabinoids (for example, THCA) poorly. Therefore, the extracts obtained in this way do not satisfy the requirements of quantitative THCA analysis the sum of THC and THCA. To extract acidic cannabinoids, polar solvents are used (isopropyl alcohol, ethanol, methanol, mixtures of methanol with chloroform and acetonitrile)⁴².

Common methods are liquid-liquid extraction, which is used to extract

- 35 Recommended methods for the identification and analysis of Cannabis and Cannabis products / United Nations Office on Drugs and Crime. March 2022. 82 p. URL: <https://www.unodc.org/unodc/en/scientists/recommended-methods-for-the-identification-and-analysis-of-cannabis-and-cannabis-products.html> (date accessed: 13.10.2023).
- 36 Slosse A., Van Durme F., Samyn N., Mangelings D., Vander Heyden Yv. Op. cit. DOI: 10.3390/molecules26216643 (date accessed: 10.10.2023).
- 37 Citti C., Russo F., Sgrò S., Gallo A., Zanutto A., Forni F., Vandelli M. A., Laganà A., Montone C. M., Gigli G., Cannazza G. Op. cit. DOI: 10.1007/s00216-020-02554-3 (date accessed: 12.10.2023).
- 38 Recommended methods for the identification and analysis URL: <https://www.unodc.org/unodc/en/scientists/recommended-methods-for-the-identification-and-analysis-of-cannabis-and-cannabis-products.html> (date accessed: 13.10.2023).
- 39 Borges G. R., Birk L., Scheid C., Morés L., Carasek E., Kitamura R. O. S., Roveri F. L. et al. Op. cit. DOI: 10.1007/s11419-020-00522-1 (date accessed: 13.10.2023).
- 40 Micalizzi G., Vento F., Alibrando F., Donnarumma D., Dugo P., Mondello L. Op. cit. DOI: 10.1016/j.chroma.2020.461864 (date accessed: 13.10.2023).
- 41 Rovetto L. J., Aieta N. V. Op. cit. DOI: 10.1016/j.supflu.2017.03.014 (date accessed: 13.10.2023).
- 42 Citti C., Russo F., Sgrò S., Gallo A., Zanutto A., Forni F., Vandelli M. A., Laganà A., Montone C. M., Gigli G., Cannazza G. Op. cit. DOI: 10.1007/s00216-020-02554-3 (date accessed: 13.10.2023).

bioactive substances from oils or other liquids containing CBD, and solid-liquid extraction, where an organic solvent is added to the plant material⁴³.

In addition to the solvent type, total cannabinoid yield is affected by the number of consecutive extractions, particle size, and temperature. Extraction at elevated temperatures causes the decarboxylation of cannabinoid acids to neutral compounds, which distorts the results for each cannabinoid present, so extraction methods using ultrasound, microwave radiation, pressurized liquid extraction and supercritical liquid extraction are recommended⁴⁴.

The choice of appropriate method for research on cannabis and products containing it depends on the goals of the analysis, the characteristics of the objects and the analytical requirements (qualitative and/or quantitative data, determination of low levels of Δ^9 -THC, differentiation of Δ^9 -THC isomers, detection of other cannabinoids present in the sample).

Thin-layer chromatography is often used for the initial qualitative screening of cannabinoids: it is a simple and affordable method for pre-screening for the presence of acidic and neutral cannabinoids.

GC is a rapid method with excellent resolution properties used for the analysis of cannabinoids in plant materials and biological matrices. However, due to the thermolability of acidic forms of phytocannabinoids, this method does not work for the identification of cannabinoid acids (THCA and CBDA), since their

decarboxylation occurs in the high-temperature injector of gas chromatograph.

In default of specific legal requirements, it is established practice to determine the total THC content, as this best reflects the pharmacological activity of the material, but even then, elevated temperatures may lead to THC decomposition (to CBN). For non-smoking products containing THC, THC and THCA should be identified and quantified separately. THC, like cannabis, unlike THCA, is subject to international control. Total THC findings are common practice when the material is intended for smoking, as this process converts THCA to THC. In test materials that are not heated during use, THC does not convert to THC (e.g. in foodstuffs) and should therefore be identified and described separately.

In order to preserve the acid structure and evaluate all cannabis components separately, derivatization is carried out before starting the research, which helps to obtain a more detailed profile of cannabinoids (although this procedure lengthens sample preparation and increases analysis cost). There can be difficulty in achieving complete derivatization, leading to inaccurate results due to the possibility of thermal degradation of cannabinoids in the injection port and column.

Despite the above issues, GC method remains useful for the analysis of cannabinoids. The most common detectors for GC analysis of cannabinoids are mass spectrometric (MS) and flame ionization (FID) detectors. The gold standard for identification is the GC-MS method, which

43 Deidda R., Dispas A., De Bleye Ch., Hubert Ph., Ziemons É. Critical review on recent trends in cannabinoid determination on cannabis herbal samples: From chromatographic to vibrational spectroscopic techniques. *Analytica Chimica Acta*. 2021. May 29:1209:339184. DOI: 10.1016/j.aca.2021.339184 (date accessed: 10.10.2023); Valizadehderakhshan M., Shahbazi A., Kazem-Rostami M., Todd M. S., Bhowmik A., Wang L. Extraction of Cannabinoids from *Cannabis sativa* L. (Hemp) — Review. *Agriculture*. 2021. Vol. 11. Is. 5. Art. 384. DOI: 10.3390/agriculture11050384 (date accessed: 11.10.2023).

44 Delgado-Povedano M. M., Sánchez-Carnerero Callado C., Priego-Capote F., Ferreira-Vera C. Op. cit. DOI: 10.1016/j.talanta.2019.120384 (date accessed: 09.10.2023).

uses electron ionization, which provides a high level of fragmentation of compounds together with the use of commercial and proprietary libraries for the qualification of cannabis products. There is no such possibility in GC-FID ⁴⁵, since the identification of substances depends on the retention time, and reference standards are used to identify components. At the same time, GC-FID offers a simple and relatively economical detection method with high resolution and a wider linear dynamic range, which ensures accurate quantification of cannabinoids ⁴⁶.

For accurate identification and quantification of the most common cannabinoids (Δ^9 -THC, Δ^8 -THC, CBD, CBC, cannabicyclol and their acid precursors that have the same molecular weight and identical mass fragments) during testing using mass spectrometric detectors, it is necessary to carefully choose an initial chromatographic separation method combined with sensitive detection methods.

Liquid chromatography (hereinafter referred to as LC) is an advanced method for separating complex cannabinoid samples. The main methods used for this are HPLC and ultra-efficient LC.

Advantages of LC compared to GC: reduced separation time and the ability to analyze all cannabinoids directly, including acid precursors, bypassing the derivatization process. The use of this method is not accompanied by heating of the samples, therefore decarboxylation of natural acids does not occur. This ensures the preservation of the authentic composition and allows detection of acids and their corresponding neutral forms, which contributes to a more complete profile ⁴⁷.

Diode array detectors and UV detectors are often used in conjunction with HPLC to quantify cannabinoids in complex extracts of Cannabis plants, simple and relatively inexpensive methods that provide accurate results. Diode array detectors have the advantage of simultaneously measuring a wide range of wavelengths (compared to UV scanning, which uses one fixed wavelength per cycle). Published HPLC analytical methods are fully ⁴⁸ or partially ⁴⁹ validated for various matrices ⁵⁰ and meet the requirements of the international standard ISO/IEC 17025 ⁵¹, that stipulates general requirements for testing and calibration laboratories. However, the authors note different values of detection

45 Slosse A., Van Durme F., Samyn N., Mangelings D., Vander Heyden Yv. Op. cit. DOI: [10.3390/molecules26216643](https://doi.org/10.3390/molecules26216643) (date accessed: 09.10.2023).

46 Stefkov G., Cvetkovikj Karanfilova I., Stoilkovska Gjorgievska V., Trajkovska A., Geskovski N., Karapandzova M., Kulevanova S. Op. cit. DOI: [10.3390/molecules27030975](https://doi.org/10.3390/molecules27030975) (date accessed: 12.10.2023).

47 Micalizzi G., Vento F., Alibrando F., Donnarumma D., Dugo P., Mondello L. Op. cit. DOI: [10.1016/j.chroma.2020.461864](https://doi.org/10.1016/j.chroma.2020.461864) (date accessed: 11.10.2023).

48 Mudge E. M., Murch S. J., Brown P. N. Op. cit. DOI: [10.1007/s00216-017-0256-3](https://doi.org/10.1007/s00216-017-0256-3) (date accessed: 13.10.2023).

49 Brighenti V., Pellati F., Steinbach M., Maran D., Benvenuti S. Op. cit. DOI: [10.1016/j.jpba.2017.05.049](https://doi.org/10.1016/j.jpba.2017.05.049) (date accessed: 13.10.2023).

50 Deville M., Dubois N., Denooz R., Charlier C. Op. cit. DOI: [10.1016/j.forsciint.2020.110234](https://doi.org/10.1016/j.forsciint.2020.110234) (date accessed: 13.10.2023).

51 ДСТУ EN ISO/IEC 17025:2019 Загальні вимоги до компетентності випробувальних та калібрувальних лабораторій (EN ISO/IEC 17025:2017, IDT; ISO/IEC 17025:2017, IDT) : затв. наказом ДП «УкрНДНЦ» від 23.12.2019 р. № 483 [Чинний з 01.01.2021]. URL: https://online.budstandart.com/ua/catalog/doc-page.html?id_doc=88724 (date accessed: 12.10.2023).

levels, quantification, linear range, and repeatability due to matrix, instrument, and detector design properties.

Lack of selectivity of diode-array detectors when analyzing complex matrices of cannabinoid extracts, where other cannabinoid-absorbing compounds at the detection wavelength may co-elute with the same retention time and distort analytical results, has prompted the scientific community to investigate more sensitive and specific MS detectors.

LC-MS is the preferred method for cannabinoid analysis using ionization modes (electrospray ionization or atmospheric pressure chemical ionization). Cannabinoids can be analyzed in any type of mass detector because they contain ionized hydroxyl and carboxyl groups. Most of these mass detectors and their combined systems have been successfully used to determine cannabinoids in cannabis plant material⁵².

A time-of-flight mass detector (alone or in combination with a quadrupole) is used to identify and quantify cannabinoid compounds in complex plant mixtures and matrices: such as food products containing cannabis (e.g. cannabis chocolate)⁵³.

Because the mass-to-charge ratio of cannabinoids and the nature of fragmentation are similar, experts use a dual approach to their quantification: chromatographic separation using a diode detector combined with quadrupole

quantitative analysis. Two separate LC-MS instruments can be used in research to effectively identify and quantify all cannabinoids in their extracts.

Triple quadrupole mass detector is particularly useful for the quantification of compounds with very low cannabinoid concentrations (e.g. hemp seed extracts and human body fluids) in positive ionization mode⁵⁴.

Ion trap mass detectors (such as the *Orbitrap*) are often combined with a quadrupole mass detector to form a *QTrap*. Detectors of this type perform multi-stage mass spectroscopic analysis with high resolution and selectivity. Orbitrap type mass detectors, as well as LC with triple quadrupole mass spectrometer (*LC-QqQ*), are used to study products with low cannabinoid content (food and beverages)⁵⁵.

In order to meet the high demand for the analysis of cannabis and products containing it, today special analytical tools are being developed to test such samples. For example, an HPLC analyzer from Shimazu is already available, designed exclusively for the quantification of cannabinoid content, which comes with a column, mobile phase and standard material and does not require laborious method development.

High-resolution mass spectrometry with direct real-time analysis (*DART-HRMS*) is used to screen products

52 Citti C., Russo F., Sgrò S., Gallo A., Zanutto A., Forni F., Vandelli M. A., Laganà A., Montone C. M., Gigli G., Cannazza G. Op. cit. DOI: [10.1007/s00216-020-02554-3](https://doi.org/10.1007/s00216-020-02554-3) (date accessed: 12.10.2023).

53 McRae G., Melanson J. E. Quantitative Determination and Validation of 17 Cannabinoids in Cannabis and Hemp Using Liquid Chromatography-Tandem Mass Spectrometry. *Analytical and Bioanalytical Chemistry*. 2020. Vol. 412. No. 27. Pp. 7381–7393. DOI: [10.1007/s00216-020-02862-8](https://doi.org/10.1007/s00216-020-02862-8) (date accessed: 12.10.2023).

54 Chang Ch.-W., Tung Ch.-W., Tsai Ch.-Ch., Wu Yu-T., Hsu M.-Ch. Op. cit. DOI: [10.1002/dta.2062](https://doi.org/10.1002/dta.2062) (date accessed: 29.09.2023).

55 Aizpurua-Olaizola O., Omar J., Navarro P., Olivares M., Etxebarria N., Usobiaga A. Identification and Quantification of Cannabinoids in *Cannabis Sativa* L. Plants by High Performance Liquid Chromatography-Mass Spectrometry. *Analytical and Bioanalytical Chemistry*. 2014. Vol. 406. Pp. 7549–7560. DOI: [10.1007/s00216-014-8177-x](https://doi.org/10.1007/s00216-014-8177-x) (date accessed: 11.10.2023).

containing cannabis (eg., leaves, stems, roots, powders, tinctures, capsules, and other plant products) for forensic purposes. This method makes it possible to quickly identify the required substance in complex matrices without pre-treatment of samples ⁵⁶.

The NMR method is a powerful tool for the analysis of chemical compounds, including cannabinoids. In forensic laboratories, the NMR method is used to identify and quantify cannabinoids in samples of narcotic drugs and psychotropic substances. NMR is based on the reaction of nuclei with a magnetic field and measures the emission of electromagnetic signals that provide information about the structure and amount of substances in the sample. Derivatization is a necessary step in the study of some samples to obtain reliable analysis results, especially for cannabidiol acids, which acquire a neutral form during decarboxylation. Direct measurement is possible for cannabis oils. One of the main advantages of the NMR method is that its use does not require the use of standard samples for calibration. This method makes it possible to quickly and reliably determine the composition of complex mixtures by measuring the interactions of nuclei with a magnetic field, which is especially important for the study of complex substances that contain many different compounds and in which it is difficult to determine the

standard concentrations of each individual component.

In recent years, methods of vibrational spectroscopy, in particular infrared and Raman, have been actively used to analyze cannabis. NIR method is considered the most common in the spectral range of infrared spectroscopy. The main advantages of these methods are ease of use, speed of measurements, as well as non-invasive and non-destructive analysis of plant material without the need for pre-treatment of the sample ⁵⁷.

The availability of portable devices makes it possible to conduct testing outside the laboratory ⁵⁸. Despite the mentioned advantages, it is worth noting the low sensitivity of this method compared to LC and GC. The interpretation of such spectra requires a multidimensional analysis of the obtained data due to a significant amount of information ⁵⁹. It is worth noting that the results of Raman spectroscopy can be affected by molecules that cause fluorescence (for example, chlorophyll) ⁶⁰.

Analytical methods provide a large and complex volume of data that requires multidimensional analysis to obtain the necessary information. These data can be processed to select optimal measurement procedures, explore patterns, or predict certain properties. Chemometrics methods are used to obtain the most valuable information. Recently, for processing complex matrices (as in the case of

56 Appley M. G., Chambers M. I., Musah R. A. Quantification of Hordenine in a Complex Plant Matrix by Direct Analysis in Real Time-High-Resolution Mass Spectrometry: Application to the "Plant of Concern" *Sceletium Tortuosum*. *Drug Testing and Analysis*. 2021. Vol. 14. Is. 4. Pp. 604–612. DOI: [10.1002/dta.3193](https://doi.org/10.1002/dta.3193) (date accessed: 07.10.2023).

57 Deidda R., Dispas A., De Bleye Ch., Hubert Ph., Ziemons É. Op. cit. DOI: [10.1016/j.aca.2021.339184](https://doi.org/10.1016/j.aca.2021.339184) (date accessed: 12.10.2023).

58 Sanchez L., Filter C., Baltensperger D., Kurouski D. Op. cit. DOI: [10.1039/C9RA08225E](https://doi.org/10.1039/C9RA08225E) (date accessed: 11.10.2023).

59 Citti C., Russo F., Sgrò S., Gallo A., Zanutto A., Forni F., Vandelli M. A., Laganà A., Montone C. M., Gigli G., Cannazza G. Op. cit. DOI: [10.1007/s00216-020-02554-3](https://doi.org/10.1007/s00216-020-02554-3) (date accessed: 12.10.2023).

60 Deidda R., Dispas A., De Bleye Ch., Hubert Ph., Ziemons É. Op. cit. DOI: [10.1016/j.aca.2021.339184](https://doi.org/10.1016/j.aca.2021.339184) (date accessed: 07.10.2023).

Cannabis), chemometric tools are used, which make it possible to obtain necessary information from sample data⁶¹.

Given that the results provided by forensic laboratories are part of law enforcement investigations and can be used as evidence in court, it is important to provide reliable and reproducible data. To confirm the technical competence of forensic laboratories, accredited ISO/IEC 17025 methods should be used. The main parameter is the measurement uncertainty, especially for the quantitative determination of $\Delta 9$ -THC and other prohibited cannabinoids to check their legality (0.08% is the maximum permissible rate of THC in vegetable raw materials in Ukraine). This parameter should be kept in mind as it reflects the variance of the results and has a significant impact on the interpretation of the results under applicable law. Without considering this parameter, there is a risk of misinterpretation and wrongful prosecution⁶².

Analytical standards are a cornerstone of quantitative cannabinoid analysis. Today, there are several manufacturers and distributors of single-component and multi-component analytical standards for cannabinoids: *Cayman*, *Cerilliant*, *Accu Standard*, *Merck*, *Restek* (USA), *LGC Standards*, *Reagecon Diagnostics* (EU). The most available is an analytical standard that contains 10 different cannabinoid compounds. However, in order to obtain a standard material, experts must pay

attention to the legislation that regulates the purchase and import of such materials.

Morphological and chemical analytical methods for the study of cannabis and products containing it are usually sufficient for its identification. However, in situations where the sample does not have distinct morphological characteristics of cannabis plant material or contains low levels of THC (for example, if it is highly fragmented material, young seedlings, seeds, roots or bare branches), the identification of cannabis based on DNA analysis is more efficient and effective for species-level identification⁶³.

Conclusions

Highly professional forensic examination of narcotic drugs, psychotropic substances and precursors plays an important role for judicial system in particular and society as a whole. Most current research focuses on the three or four major cannabinoids and their precursor acids. With the expansion of knowledge about other cannabinoids, the demand for their research as additives to many consumer goods is likely to increase, which necessitates the development of identification protocols and quantification methods.

There are at least 16 to 20 different cannabinoids that require immediate development of procedures for their extraction and analysis due to the fact that interest in them as products for consumption is growing day by day.

61 Duchateau C., Kauffmann J.-M., Canfyn M., Stévigny C., De Braekeleer K., Deconinck E. Op. cit. Pp. 1309—1319. DOI: [10.1002/dta.2865](https://doi.org/10.1002/dta.2865) (date accessed: 13.10.2023).

62 Sgrò S., Lavezzi B., Caprari C., Polito M., D'Elia M., Lago G., Furlan G., Girotti S., Ferri E. N. Delta9-THC Determination by the EU Official Method: Evaluation of Measurement Uncertainty and Compliance Assessment of Hemp Samples. *Analytical and Bioanalytical Chemistry*. 2021. Vol. 413. No. 13. Pp. 3399—3410. DOI: [10.1007/s00216-021-03283-x](https://doi.org/10.1007/s00216-021-03283-x) (date accessed: 13.10.2023).

63 CBOL Plant Working Group, Hollingsworth P. M., Forrest L. L., Little D. P. A DNA Barcode for Land Plants. *Proceedings of the National Academy of Sciences USA*. 2009. Vol. 106. Is. 31. Pp. 12794—12797. DOI: [10.1073/pnas.0905845106](https://doi.org/10.1073/pnas.0905845106) (date accessed: 10.10.2023).

The present review of cannabis-containing object analysis methods shows that for the correct separation and identification of phytocannabinoids from the plant matrix and/or matrix of edible or other cannabis-derived products, various chromatographic methods offer different possibilities in terms of detection limits, linearity, reproducibility, and specificity. They depend on particular device parameters (type of detector, availability of ionization, capabilities of data collection and analysis software). Therefore, in order to choose the most appropriate analytical method, it is important to apply a balanced approach, which should be based on the volume of analysis and analytical capabilities of a particular laboratory.

While developing analysis procedures, it is necessary to take into account the storage conditions and the influence of various factors on composition of cannabis containing objects, as well as on the analytical research standards. This is especially important because cannabinoids by their nature can decompose or turn one into the other under the influence of light, heat, or oxidation.

With development of cannabinoid extract analysis, it is important to harmonize standardized research methods that will contribute to harmonization of testing methods and harmonization of analytical results.

Chemometrics is becoming an important and powerful forensic tool, especially when it comes to cannabis profiling or while working with spectroscopic data, where multivariate data analysis is commonly used.

Despite the rather complex modern approaches to cannabis research procedures and products containing it, they may not be needed for routine research. The choice of method of and decision on the need to apply additional methods

remains at discretion of forensic expert and depends on availability of appropriate laboratory equipment and legal specifics.

This list of research methods for cannabis and cannabis containing products is not exhaustive. Within one article, it is impossible to cover all the analytical methods for research on plant material and products based on it used in forensic research: we have focused only on the leading ones.

Аналіз канабісу та його продуктів у контексті судової експертизи

Ірина Кучинська

Легалізація вирощування рослин роду Cannabis із низьким вмістом тетрагідро-роканабінолу й високим вмістом канабідіолу набирає обертів через зростання попиту на ці продукти. У деяких країнах тестування канабісу та продуктів, що його містять, є юридичною вимогою: канабіс ідентифікують, оцінюють кількість у ньому тетрагідро-роканабінолу або канабідіолу та їхніх кислот-попередників. Сучасні дослідження потребують більш чутливих і надійних аналітичних методів для точної ідентифікації та кількісного визначення компонентів канабісу. Мета цієї статті — огляд представлених у наукових джерелах останніх досягнень щодо виокремлення й аналізу канабісу та продуктів, які його містять, у контексті судової експертизи. Методи дослідження містили аналіз інформації із цієї тематики за допомогою пошукових систем, зокрема Google, Google Scholar, Web of Science, PubMed і ScienceDirect. Пошукові запити враховували наукові, аналітичні та статистичні звіти в галузі судово-експертних досліджень. Оскільки судовий експерт має добре орієнтуватися в сучасних тенденціях аналізу заборонених речовин і по-слуговуватися у своїй роботі останніми даними аналітичної та судово-криміналістичної літератури, така інформація

допоможе їм обирати методи проведення досліджень, зважаючи на фактичні ресурси й обладнання судово-криміналістичних лабораторій. Згідно з метою статті розглянуто переваги і недоліки наявних методів екстрагування й аналізу об'єктів, що містять канабіс, для ідентифікації, кількісного визначення, профілювання та оцінювання віку канабісу.

Ключові слова: канабіс; фітоканабіноїди; екстрагування; ідентифікація; кількісне визначення; газова хроматографія; рідинна хроматографія; метод ядерного магнітного резонансу; методи коливальної спектроскопії.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the research design, data collection and analysis, decision to publish or manuscript preparation.

Participants

Author has contributed solely to intellectual discussion underlying this document, case law research, writing and editing, and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Author declare no conflict of interest.

References

- Aizpurua-Olaizola, O., Omar, J., Navarro, P., Olivares, M., Etxebarria, N., Usobiaga, A. (2014). Identification and Quantification of Cannabinoids in Cannabis Sativa L. Plants by High Performance Liquid Chromatography-Mass Spectrometry. *Analytical and Bioanalytical Chemistry*. Vol. 406. DOI: [10.1007/s00216-014-8177-x](https://doi.org/10.1007/s00216-014-8177-x).
- Appley, M. G., Chambers, M. I., Musah, R. A. (2021). Quantification of Hordenine in a Complex Plant Matrix by Direct Analysis in Real Time-High-Resolution Mass Spectrometry: Application to the “Plant of Concern” *Sceletium Tortuosum*. *Drug Testing and Analysis*. Vol. 14. Is. 4. DOI: [10.1002/dta.3193](https://doi.org/10.1002/dta.3193).
- Borges, G. R., Birk, L., Scheid, C., Morés, L., Carasek, E., Kitamura, R. O. S., Roveri, F. L. et al. (2020). Simple and Straightforward Analysis of Cannabinoids in Medicinal Products by Fast-GC-FID. *Forensic Toxicology*. Vol. 38. DOI: [10.1007/s11419-020-00522-1](https://doi.org/10.1007/s11419-020-00522-1).
- Brighenti, V., Pellati, F., Steinbach, M., Maran, D., Benvenuti, S. (2017). Development of a New Extraction Technique and HPLC Method for the Analysis of Non-Psychoactive Cannabinoids in Fibre-Type Cannabis Sativa L. (Hemp). *Journal of Pharmaceutical and Biomedical Analysis*. Vol. 143. DOI: [10.1016/j.jpba.2017.05.049](https://doi.org/10.1016/j.jpba.2017.05.049).
- Calvi, L., Pentimalli, D., Panseri, S., Giupponi, L., Gelmini, F., Beretta, G., Vitali, D., Bruno, M., Zilio, E., Pavlovic, R., Giorgi, A. (2018). Comprehensive Quality Evaluation of Medical Cannabis Sativa L. Inflorescence and Macerated Oils Based on HS-SPME Coupled to GC-MS and LC-HRMS (q-exactive Orbitrap®) Approach. *Journal of Pharmaceutical and Biomedical Analysis*. Vol. 150. DOI: [10.1016/j.jpba.2017.11.073](https://doi.org/10.1016/j.jpba.2017.11.073).
- Cardenia, V., Toschi, T. G., Scappini, S., Rubino, R. C., Rodriguez-Estrada, M. T. (2018). Development and Validation of a Fast Gas Chromatography/Mass Spectrometry Method for the Determination of Cannabinoids in Cannabis Sativa L. *Journal of Food and Drug Analysis*. Vol. 26 (4). DOI: [10.1016/j.jfda.2018.06.001](https://doi.org/10.1016/j.jfda.2018.06.001).

- CBOL Plant Working Group, Hollingsworth, P. M., Forrest, L. L., Little, D. P. (2009). *A DNA Barcode for Land Plants. Proceedings of the National Academy of Sciences USA*. Vol. 106. Is. 31. DOI: [10.1073/pnas.0905845106](https://doi.org/10.1073/pnas.0905845106).
- Chang, Ch.-W., Tung, Ch.-W., Tsai, Ch.-Ch., Wu, Yu-T., Hsu, M.-Ch. (2017). Determination of Cannabinoids in Hemp Nut Products in Taiwan by HPLC-MS/MS Coupled with Chemometric Analysis: Quality Evaluation and a Pilot Human Study. *Drug Testing and Analysis*. No. 9. DOI: [10.1002/dta.2062](https://doi.org/10.1002/dta.2062).
- Christinat, N., Savoy, M.-C., Mottier, P. (2020). Development, Validation and Application of a LC-MS/MS Method for Quantification of 15 Cannabinoids in Food. *Food Chemistry*. Vol. 318. Art. 126469. DOI: [10.1016/j.foodchem.2020.126469](https://doi.org/10.1016/j.foodchem.2020.126469).
- Ciolino, L. A., Ranieri, T. L., Taylor, A. M. (2018). Commercial cannabis consumer products part 1: GC-MS qualitative analysis of cannabis cannabinoids. *Forensic Science International*. Vol. 289. DOI: [10.1016/j.forsciint.2018.05.032](https://doi.org/10.1016/j.forsciint.2018.05.032).
- Citti, C., Russo, F., Sgrò, S., Gallo, A., Zanotto, A., Forni, F., Vandelli, M. A., Laganà, A., Montone, C. M., Gigli, G., Cannazza, G. (2020). Pitfalls in the analysis of phytocannabinoids in cannabis inflorescence. *Analytical and Bioanalytical Chemistry*. Vol. 412. No. 17. Art. 4009–4022. DOI: [10.1007/s00216-020-02554-3](https://doi.org/10.1007/s00216-020-02554-3).
- Cuttler, C., LaFrance, E. M., Stueber, A. (2021). Acute effects of high-potency cannabis flower and cannabis concentrates on everyday life memory and decision making. *Scientific Reports*. Vol. 11. No. 1. Art. 13784. DOI: [10.1038/s41598-021-93198-5](https://doi.org/10.1038/s41598-021-93198-5).
- De Leite, J. A., de Oliveira, M. V. L., Conti, R., de S. Borges, W., Rosa, Th. R., Filgueiras, P. R., Lacerda, Jr. V., Romão, W., Neto, Á. C. (2018). Extraction and isolation of cannabinoids from marijuana seizures and characterization by ¹H NMR allied to chemometric tools. *Science & Justice*. Vol. 58. Is. 5. DOI: [10.1016/j.scijus.2018.06.005](https://doi.org/10.1016/j.scijus.2018.06.005).
- De Vita, D., Madia, V. N., Tudino, V., Saccoliti, F., De Leo, A., Messori, A., Roscilli, P., Botto, A., Pindinello, I., Santilli, G. et al. (2019). Comparison of Different Methods for the Extraction of Cannabinoids from Cannabis. *Natural Product Research*. Vol. 34 (20). DOI: [10.1080/14786419.2019.1601194](https://doi.org/10.1080/14786419.2019.1601194).
- Deidda, R., Dispas, A., De Bleye, Ch., Hubert, Ph., Ziemons, É. (2021). Critical review on recent trends in cannabinoid determination on cannabis herbal samples: From chromatographic to vibrational spectroscopic techniques. *Analytica Chimica Acta*. May 29:1209:339184. DOI: [10.1016/j.aca.2021.339184](https://doi.org/10.1016/j.aca.2021.339184).
- Delgado-Povedano, M. M., Sánchez-Carnerero Callado, C., Priego-Capote, F., Ferreira-Vera, C. (2020). Untargeted Characterization of Extracts from Cannabis Sativa L. Cultivars by Gas and Liquid Chromatography Coupled to Mass Spectrometry in High Resolution Mode. *Talanta*. Vol. 208. Art. 120384. DOI: [10.1016/j.talanta.2019.120384](https://doi.org/10.1016/j.talanta.2019.120384).
- Deville, M., Dubois, N., Denooz, R., Charlier, C. (2020). Validation of an UHPLC/DAD Method for the Determination of Cannabinoids in Seized Materials: Analysis of 213 Samples Sold in Belgian CBD shops. *Forensic Science International*. Vol. 310. Art. 110234. DOI: [10.1016/j.forsciint.2020.110234](https://doi.org/10.1016/j.forsciint.2020.110234).
- Duchateau, C., Kauffmann, J.-M., Canfyn, M., Stévigny, C., De Braekeleer, K., Deconinck, E. (2020). Discrimination of legal and illegal Cannabis spp.

- according to European legislation using near infrared spectroscopy and chemometrics. *Drug Testing and Analysis*. Vol. 12. No. 9. DOI: [10.1002/dta.2865](https://doi.org/10.1002/dta.2865).
- ElSohly, M. A., Chandra, S., Radwan, M., Majumdar, Ch. G., Church, J. C. (2021). A Comprehensive Review of Cannabis Potency in the United States in the Last Decade. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*. Vol. 6. No. 6. DOI: [10.1016/j.bpsc.2020.12.016](https://doi.org/10.1016/j.bpsc.2020.12.016).
- European Drug Report 2023: Trends and Developments (2023). Lisbon : EMCDDA. URL: https://www.emcdda.europa.eu/index_en.
- Mandrioli, M., Tura, M., Scotti, S., Toschi, T. G. (2019). Fast Detection of 10 Cannabinoids by RP-HPLC-UV Method in Cannabis sativa L. *Molecules*. Is. 24. No. 11. Art. 2113. DOI: [10.3390/molecules24112113](https://doi.org/10.3390/molecules24112113).
- Mariotti, K. C., Marcelo, M. C. A., Ortiz, R. S., Borille, B. T., dos Reis, M., Fett, M. S., Ferrão, M. F., Limberger, R. P. (2016). Seized Cannabis Seeds Cultivated in Greenhouse: A Chemical Study by Gas Chromatography-Mass Spectrometry and Chemometric Analysis. *Science & Justice*. Vol. 56. DOI: [10.1016/j.scijus.2015.09.002](https://doi.org/10.1016/j.scijus.2015.09.002).
- McRae, G., Melanson, J. E. (2020). Quantitative Determination and Validation of 17 Cannabinoids in Cannabis and Hemp Using Liquid Chromatography-Tandem Mass Spectrometry. *Analytical and Bioanalytical Chemistry*. Vol. 412. No. 27. DOI: [10.1007/s00216-020-02862-8](https://doi.org/10.1007/s00216-020-02862-8).
- Micalizzi, G., Vento, F., Alibrando, F., Donnarumma, D., Dugo, P., Mondello, L. (2021). Cannabis Sativa L.: A comprehensive review on the analytical methodologies for cannabinoids and terpenes characterization. *Journal of Chromatography A*. Jan 25:1637:461864. DOI: [10.1016/j.chroma.2020.461864](https://doi.org/10.1016/j.chroma.2020.461864).
- Mudge, E. M., Murch, S. J., Brown, P. N. (2017). Leaner and Greener Analysis of Cannabinoids. *Analytical and Bioanalytical Chemistry*. Vol. 409. DOI: [10.1007/s00216-017-0256-3](https://doi.org/10.1007/s00216-017-0256-3).
- Recommended methods for the identification and analysis of Cannabis and Cannabis products (2022) / United Nations Office on Drugs and Crime. March 2022. URL: <https://www.unodc.org/unodc/en/scientists/recommended-methods-for-the-identification-and-analysis-of-cannabis-and-cannabis-products.html>.
- Rovetto, L. J., Aieta, N. V. (2017). Supercritical Carbon Dioxide Extraction of Cannabinoids from Cannabis Sativa L. *The Journal of Supercritical Fluids*. Vol. 129. DOI: [10.1016/j.supflu.2017.03.014](https://doi.org/10.1016/j.supflu.2017.03.014).
- Sanchez, L., Filter, C., Baltensperger, D., Kurouski, D. (2020). Confirmatory non-invasive and non-destructive differentiation between hemp and cannabis using a hand-held Raman spectrometer. *Royal Society of Chemistry Advances*. Vol. 10. Is. 6. DOI: [10.1039/C9RA08225E](https://doi.org/10.1039/C9RA08225E).
- Sánchez-Carnerero Callado, C., Núñez-Sánchez, N., Casano, S., Ferreiro-Vera, C. (2018). The potential of near infrared spectroscopy to estimate the content of cannabinoids in Cannabis sativa L.: A comparative study. *Talanta*. Vol. 90. No. 1. DOI: [10.1016/j.talanta.2018.07.085](https://doi.org/10.1016/j.talanta.2018.07.085).
- Sgrò, S., Lavezzi, B., Caprari, C., Polito, M., D'Elia, M., Lago, G., Furlan, G., Girotti, S., Ferri, E. N. (2021). Delta9-THC Determination by the EU Official Method: Evaluation of Measurement Uncertainty and Compliance Assessment of Hemp Samples. *Analytical and Bioanalytical Chemistry*. Vol. 413. No. 13. DOI: [10.1007/s00216-021-03283-x](https://doi.org/10.1007/s00216-021-03283-x).

- Slosse, A., Van Durme, F., Samyn, N., Mangelings, D., Vander Heyden, Yv. (2021). Gas Chromatographic Fingerprint Analysis for the Comparison of Seized Cannabis Samples. *Molecules*. Vol. 26. Is. 21. Art. 6643. DOI: [10.3390/molecules26216643](https://doi.org/10.3390/molecules26216643).
- Stefkov, G., Cvetkovikj Karanfilova, I., Stoilkovska Gjorgievska, V., Trajkovska, A., Geskovski, N., Karapandzova, M., Kulevanova, S. (2022). Analytical Techniques for Phytocannabinoid Profiling of Cannabis and Cannabis-Based Products — A Comprehensive Review. *Molecules*. Vol. 27. Is. 3. Art. 975. DOI: [10.3390/molecules27030975](https://doi.org/10.3390/molecules27030975).
- Valizadehderakhshan, M., Shahbazi, A., Kazem-Rostami, M., Todd, M. S., Bhowmik, A., Wang, L. (2021). Extraction of Cannabinoids from Cannabis sativa L. (Hemp) — Review. *Agriculture*. Vol. 11. Is. 5. Art. 384. DOI: [10.3390/agriculture11050384](https://doi.org/10.3390/agriculture11050384).
- Kuchynska, I. (2024). Analysis of Cannabis and its Products in the Context Forensic Science. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). P. 92—110. DOI: [10.32353/khrife.1.2024.06](https://doi.org/10.32353/khrife.1.2024.06).

Research, Verification and Evaluation of Forensic Expert Conclusion: Forensic Veterinary Aspect

Ivan Yatsenko *

* Doctor of Veterinary Medicine, State Biotechnological University, Kharkiv, Ukraine,
ORCID: <https://orcid.org/0000-0001-8903-2129>, e-mail: yacenko-1971@ukr.net

DOI: 10.32353/khrife.1.2024.07 UDC 343.148:636.09

Received: 29.02.2024 / Reviewed: 29.02.2024 / Accepted for print: 27.03.2024 /
Available online: 29.03.2024



The author aimed to outline the grounds and criteria, to single out methods and characterize procedural of research specifics, verification and evaluation of forensic veterinary expert conclusion. In order to achieve this goal, a set of interrelated research methods (dialectical, systemic-structural, systemic-functional, comparative-legal, formal logic (analysis, synthesis, deduction, induction, analogy), modeling, statistical) was applied. The grounds, criteria, methods and procedural specifics of the research, verification and assessment of forensic expert conclusion are considered. Attention is focused on forensic and veterinary aspect of this issue. It is claimed that during verification of forensic expert conclusion, it is necessary to assess its comprehensiveness, completeness and objectivity, as well as scientific validity, reliability, correctness, admissibility of using methods and techniques, means and methods of conducting expert research, as well as adequacy and relationship with other evidence collected within the framework of a criminal proceeding (case) with the aim of making a correct procedural decision (for evidence of factual data and circumstances proven by expert research). The criteria for completeness and reasonableness of the expert's conclusion are proposed, as well as the algorithm for evaluating such a conclusion by the investigator, prosecutor, defense attorney, investigative judge, and court. The application of a set of these criteria to the assessment of a forensic expert's opinion will guarantee the reliability of the verification and assessment of such conclusion, as well as create reliable conditions for making procedural decisions in legal proceedings.

This article is translation of the original Ukrainian content, which source is available at the link: <https://khrife-journal.org/index.php/journal> (translated by Andriy Bublikov). The authors acknowledge translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

Keywords: forensic veterinary medicine; forensic expert conclusion; research, verification, forensic expert conclusion evaluation; objectivity; comprehensiveness; reliability; validity; research completeness; source of evidence.

Research Problem Formulation

Forensic science in general and forensic veterinary medicine (hereinafter referred to as FVM) in particular occupy an important place in the proceedings as a scientifically substantiated means of proof, and expert's conclusion is a source of evidence ¹. FVM function of is a research on objects performed by "veterinarian, namely: forensic veterinarian according to the procedural document on the appointment of a forensic veterinary examination in order to provide an conclusion on veterinary issues that arose during pre-trial investigation in criminal proceedings or trial in any type of proceedings" ².

Certainly, forensic expert's conclusion can be considered doubtful or incorrect

for various reasons: forensic expert was provided with incorrect initial data, false objects; the expert applied unreliable methods and/or made mistakes. Therefore, the appointment subject of forensic examination and the court should carefully examine, check and evaluate expert's conclusion on a general basis ³.

In criminal, administrative, civil and economic proceedings, the main criteria for assessing evidence, in particular forensic expert conclusion, are relevance and admissibility.

Analysis of Essential Researches and Publications

Various aspects of verification and evaluation of forensic expert conclusion

- 1 Чорноус Ю., Лелюк Т. Актуальні питання організації проведення судових експертиз у кримінальному провадженні. *Актуальні питання судової експертизи і криміналістики* : зб. мат-лів міжнар. наук.-практ. конф. з нагоди 100-річ. ННЦ «ІСЕ ім. Засл. проф. М. С. Бокаріуса» (Харків, 10.11.2023). Харків, 2023. С. 416. URL: <https://drive.google.com/file/d/1Kwin74kcc8IVhymxGLXWEOAccvxnpxA6/view> (date accessed: 10.02.2024) ; Satiani Bh. Expert witness testimony: rules of engagement. *Vascular and Endovascular Surgery*. 2006. Vol. 40. Is. 3. Pp. 223—227. DOI: [10.1177/153857440604000307](https://doi.org/10.1177/153857440604000307) (date accessed: 10.02.2024).
- 2 Яценко І. В. Судова ветеринарна медицина як навчальна компонента для професійного формування лікарів ветеринарної медицини та її значення у системі підготовки судово-ветеринарних експертів у державних експертних установах України. *Current trends in the development of modern scientific thought* : Proceedings of the I International Scientific and Practical Conference (Хайфа, Ізраїль, 27—30.09.2022). Haifa, Israel, 2022. P. 183. DOI: [10.46299/ISG.2022.2.1](https://doi.org/10.46299/ISG.2022.2.1) (date accessed: 10.02.2024).
- 3 Юнацький О. Установлення достовірності висновку експерта під час його оцінки. *Актуальні питання судової експертизи і криміналістики* : зб. мат-лів міжнар. наук.-практ. конф. з нагоди 100-річ. ННЦ «ІСЕ ім. Засл. проф. М. С. Бокаріуса» (Харків, 10.11.2023). Харків, 2023. С. 434—437. URL: <https://drive.google.com/file/d/1Kwin74kcc8IVhymxGLXWEOAccvxnpxA6/view> (date accessed: 10.02.2024) ; Biedermann A., Kotsoglou K. N. Decisional Dimensions in Expert Witness Testimony — A Structural Analysis. *Frontiers in Psychology*. 2018. Vol. 31. Is. 9. Art. 2073. DOI: [10.3389/fpsyg.2018.02073](https://doi.org/10.3389/fpsyg.2018.02073) (date accessed: 10.02.2024).

were investigated by A. Amelina and A. Vorobchak ⁹, M. Dementiev ¹⁰, B. Bilousov ⁴, V. Bazhaniuk ⁵, D. Barbash ⁶, V. Zhmudinskyi ¹¹, O. Kozhushko ¹², O. Baulin and O. Izotov ⁷, D. Viter ⁸, V. Korzh ¹³, H. Kutskir ¹⁴, O. Lukianchuk ¹⁵,

- 4 Амеліна А. С., Білоусов Б. Л. Оцінка висновку експерта та його доказове значення. *Міжнародний юридичний вісник: актуальні проблеми сучасності (теорія та практика)*. 2018. Вип. 1—2 (10—11). С. 185—192. URL: http://nbuv.gov.ua/UJRN/muvnudp_2018_1-2_33 (date accessed: 10.02.2024).
- 5 Бажанюк В. В. Оцінка висновку експерта у кримінальному провадженні. *Науковий вісник Міжнародного гуманітарного університету. Серія: Юриспруденція*. 2021. № 54. Т. 2. С. 110—113. DOI: 10.32841/2307-1745.2021.54.2.24 (date accessed: 10.02.2024).
- 6 Барбаш Д. Оцінка висновку експерта судом у кримінальному провадженні: теоретичні та прикладні аспекти у світлі судової практики. *Актуальні питання судової експертизи і криміналістики* : зб. мат-лів міжнар. наук.-практ. конф. з нагоди 100-річ. ННЦ «ІСІ ім. Засл. проф. М. С. Бокаріуса» (Харків, 10.11.2023). Харків, 2023. С. 87—89. URL: <https://drive.google.com/file/d/1Kwin74kcc8IVhymxGLXWOEAccvxnpxA6/view> (date accessed: 10.02.2024).
- 7 Баулін О. В., Ізотов О. І. Перевірка і оцінка висновку експерта у кримінальному провадженні. *Криміналістика і судова експертиза*. 2021. Вип. 66. С. 95—108. DOI: 10.33994/kndise.2021.66.11 (date accessed: 10.02.2024).
- 8 Вітер Д. Оцінювання допустимості та достовірності висновку експерта слідчим під час розслідування злочинів у сфері фінансування соціальних цільових програм. *Науковий вісник Дніпропетровського державного університету внутрішніх справ*. 2020. № 3. С. 256—264. DOI: 10.31733/2078-3566-2020-3-256-264 (date accessed: 10.02.2024).
- 9 Воробчак А. Р. Висновок експерта як джерело доказів у кримінальному провадженні: дис. ... канд. юрид. наук. Одеса, 2019. 254 с. URL: <https://dspace.onua.edu.ua/server/api/core/bitstreams/d2df00ad-7eb3-460f-965f-698fd2d97b889/content> (date accessed: 10.02.2024).
- 10 Дементьев М. Умови та критерії достовірності висновку експерта. *Knowledge, Education, Law, Management*. 2021. № 6 (42). С. 155—159. DOI: 10.51647/kelm.2021.6.25 (date accessed: 10.02.2024).
- 11 Жмудінський В. П. Механізм оскарження та способи перевірки висновку експерта в кримінальному провадженні. *Copernicus Political and Legal Studies*. 2022. Vol. 1. Is. 3. Pp. 46—54. DOI: 10.15804/CPLS.20223.06 (date accessed: 10.02.2024).
- 12 Кожушко О. В. Методичний підхід до оцінки висновку судового експерта по результатам проведення судово-економічної експертизи. *Ефективна економіка*. 2020. № 6. DOI: 10.32702/2307-2105-2020.6.53 (date accessed: 10.02.2024).
- 13 Корж В. П. Оцінка висновку експерта: процесуальні підстави, криміналістичні рекомендації. *Сучасні тенденції розвитку криміналістики та кримінального процесу в умовах воєнного стану* : тези доп. Міжнар. наук.-практ. конф. (25.11.2022, Харків). Харків, 2022. С. 229—232. DOI: 10.5281/zenodo.7339681 (date accessed: 10.02.2024).
- 14 Куцкір Г. М. Процесуальні особливості допиту експерта в суді. *Науковий вісник Ужгородського національного університету. Серія: Право*. 2020. Вип. 60. С. 168—171. DOI: 10.32782/2307-3322/2020.60.37 (date accessed: 10.02.2024).
- 15 Лук'янчук О. І. Правомірність рецензування висновку експерта в судовому процесі. *Криміналістичний вісник*. 2021. № 1 (35). С. 38—47. DOI: 10.37025/1992-4437/2021-35-1-38 (date accessed: 10.02.2024).

Yu. Myroshnychenko¹⁶, D. Puchko¹⁷, Yu. Fedyk and I. Besaha¹⁸, M. Shcherbakovskyi¹⁹.

Instead, the scientists did not pay attention to the grounds, criteria and methods of investigating forensic expert conclusion, as well as the procedural specifics of its verification and evaluation during pre-trial investigation and consideration of the case in court.

Article Purpose

Outline the grounds and criteria, to single out the methods and to characterize the procedural research specifics of, verification and evaluation of conclusion of a forensic veterinary expert.

Research Methods

Achieve this goal, a set of interdependent research methods was used, namely:

dialectical, system-structural, system-functional, comparative-legal, formal logic (analysis, synthesis, deduction, induction, analogy), modeling, statistical.

Main Content Presentation

Final stage of any examination is preparation of forensic expert conclusion is a conclusion made with the use of specific expertise — and the verification and evaluation of this conclusion by the relevant entities, in particular the investigator, prosecutor, investigating judge, court “based on... internal conviction, which is based on a comprehensive, complete and impartial study of all circumstances... guided by the law” (Article 94 of Criminal Procedural Code of Ukraine²⁰; Article 89 of Code of Administrative Proceedings of Ukraine²¹; Article 86 of Commercial and Procedural Code of Ukraine²²; Article 90

- 16 Мирошніченко Ю. М. Дослідження, перевірка та оцінка судом висновку експерта. *Форум права*. 2009. № 3. С. 445—450. URL: http://nbuv.gov.ua/UJRN/FP_index.htm_2009_3_67 (date accessed: 10.02.2024).
- 17 Пучко Д. В. Належність і допустимість висновку експерта як критерії оцінювання судової експертизи. *Теорія та практика судової експертизи і криміналістики*. 2020. Вип. 22. С. 226—239. DOI: [10.32353/khrife.2.2020.17](https://doi.org/10.32353/khrife.2.2020.17) (date accessed: 10.02.2024).
- 18 Федик Ю. Я., Бесага І. В. Доказове значення висновку фахівця у галузі ветеринарної медицини у судовому процесі. *Науковий вісник Ужгородського національного університету. Серія: Право*. 2023. Вип. 77. Ч. 2. С. 258—263. DOI: [10.24144/2307-3322.2023.77.2.44](https://doi.org/10.24144/2307-3322.2023.77.2.44) (date accessed: 10.02.2024).
- 19 Щербаківський М. Г. Проведення та використання судових експертиз у кримінальному провадженні : монографія. Харків, 2015. 560 с. URL: <https://dspace.univd.edu.ua/xmlui/handle/123456789/6020> (date accessed: 10.02.2024) ; Idem. Стандарт достовірності висновку експерта у кримінальному процесі. *Теорія та практика судової експертизи і криміналістики*. 2021. Вип. 3 (25). С. 21—39. DOI: [10.32353/khrife.3.2021.03](https://doi.org/10.32353/khrife.3.2021.03) (date accessed: 10.02.2024) ; Щербаківський М. Г., Дементьев М. В., Проценко А. М. Критерії та види процесуальних порушень як підстави недопустимості висновку експерта. *Вісник Луганського державного університету внутрішніх справ ім. Е. О. Дідоренка*. 2022. Вип. 3 (99). С. 173—186. DOI: [10.33766/2524-0323.99.173-186](https://doi.org/10.33766/2524-0323.99.173-186) (date accessed: 10.02.2024).
- 20 Кримінальний процесуальний кодекс України від 13.04.2012 р. № 4651-VI (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 10.02.2024).
- 21 Цивільний процесуальний кодекс України від 18.03.2004 р. № 1618-IV (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/1618-15#Text> (date accessed: 10.02.2024).
- 22 Господарський процесуальний кодекс України від 06.11.1991 р. № 1798-XII (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/1798-12#Text> (date accessed: 10.02.2024).

of Code of Administrative Proceedings of Ukraine²³).

Since forensic expert conclusion has no predetermined force among other means of proof, it is necessary to find out whether this conclusion can be used as a source of proof of the fact of offense.

As O. Baulin and O. Izotov noted: “assessment of forensic expert conclusion is a complex mental process aimed at establishing the admissibility of this source of evidence and the completeness and reliability of information contained therein to prove the circumstances that are relevant to criminal proceedings”²⁴.

Since scientific and practical authority of expert is not unconditional, his conclusion cannot be considered impeccable. We consider the position of Supreme Court of Ukraine on the court's assessment of each of forensic expert conclusions to be reasonable, if several of them were provided in one case²⁵.

In our opinion, the *purpose of research and evaluation of forensic expert opinion* is:

- find out legal personality, competence and competence of the expert; validity and motivation,

reliability and appropriateness, significance for the system of evidence of factual data contained therein, taking into account their informativeness;

- familiarize subject of forensic examination appointment with the conclusion content;
- determine possibility of its use as a source of evidence; assess the facts clarified by an expert, on which decisions in criminal proceedings (case) are based.

Scientists distinguish the following ways to check and evaluate forensic expert conclusion:

- analysis of compliance with stipulated procedure for appointment of forensic examination and compliance with the expert conclusion content with requirements of procedural legislation²⁶;
- comparison of forensic expert conclusion with other evidence or with other conclusions, if any;
- summoning forensic expert for interrogation in order to clarify his/her conclusion²⁷;

23 Кодекс адміністративного судочинства України від 06.07.2005 р. № 2747-IV (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/2747-15#Text> (date accessed: 10.02.2024).

24 Баулін О. В., Ізотов О. І. *Op. cit.* С. 103. DOI: 10.33994/kndise.2021.66.11 (date accessed: 10.02.2024).

25 Про судову експертизу в кримінальних і цивільних справах : Постанова Пленуму ВС України від 30.05.1997 р. № 8 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/v0008700-97#Text> (date accessed: 10.02.2024).

26 Яценко І. В., Дереча Л. М., Париловський О. І. Особливості структури висновку судово-ветеринарного експерта за результатами дослідження трупа тварини з ознаками насильницької смерті. *Теорія та практика судової експертизи і криміналістики*. 2020. Вип. 21. С. 615—639. DOI: 10.32353/khrife.1.2020.44 (date accessed: 10.01.2024) ; Яценко І. В. Гносеологічна характеристика та процесуальне значення етапів і стадій призначення та проведення судово-ветеринарної експертизи. *Ibidem*. 2023. Вип. 1 (30). С. 70—111. DOI: 10.32353/khrife.1.2023.05 (date accessed: 10.01.2024).

27 Шабаровський Б. В. Способи перевірки висновку експерта у кримінальному процесі України. *Право і безпека*. 2019. № 2 (73). С. 85—86. DOI: 10.32631/pb.2019.2.13 (date accessed: 10.01.2024).

- simultaneous interrogation of two or more experts ²⁸;
- provision by the party to criminal proceedings of information related to forensic expert competence ²⁹;
- appointment of a repeated or additional examination.

It can be confidently stated that in order to verify and evaluate the expert opinion, the subject of evidence assessment (according to Art. 94 of the Criminal Procedural Code of Ukraine ³⁰) should investigate and evaluate its *content* (substantiated and reliable final conclusions) and *form* (compliance with the requirements of the procedural law), because the content and form of the expert conclusion characterize its evidentiary component in criminal proceedings: non-compliance with at least one of them excludes the possibility of recognizing the expert opinion as evidence in court. It should be noted that verification and evaluation of the forensic expert conclusion can be carried out exclusively at the stage of trial and is almost impossible at the stage of pre-trial investigation.

As Yu. Myroshnychenko rightly notes, “research on forensic expert conclusion by the court consists in its announcement, perception and analysis of its text in order to understand the essence and content of

this procedural document” ³¹. We share the position of the scientist regarding the rule: “If the court considers the case without the participation of an expert, then his conclusion is announced by the court; if the expert is present in courtroom, then it is he who should announce, justify, explain, illustrate his conclusion” ³².

Announcement of the expert's conclusion on the results of forensic examination should contain: the name of the examination; its number in the Unified Register of Pre-Trial Investigations; initiators of forensic examination appointment ; expert questions and answers to; list of objects provided for research, a description of their condition and suitability for research.

Consequently, the study, verification and evaluation of the forensic expert conclusion is a complex and multi-vector mental activity aimed at verifying compliance with the requirements of procedural law during the appointment and conduct of forensic examination (in particular, FVM), as well as verifying the reliability, scientific validity and completeness of forensic expert conclusion.

Evaluation of the expert conclusion, as M. Shcherbakovskiy ³³ notes, has several levels of the proof process: expert, investigative and judicial (*see table*).

28 Жмудінський В. П. *Op. cit.* P. 49. DOI: [10.15804/CPLS.20223.06](https://doi.org/10.15804/CPLS.20223.06) (date accessed: 10.01.2024).

29 Амеліна А. С., Білоусов Б. Л. *Op. cit.* С. 189. URL: http://nbuv.gov.ua/UJRN/muvnudp_2018_1-2_33 (date accessed: 10.01.2024).

30 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 10.02.2024).

31 Мирошніченко Ю. М. *Op. cit.* С. 445. URL: http://nbuv.gov.ua/UJRN/FP_index.htm_2009_3_67 (date accessed: 10.02.2024).

32 Ibidem.

33 Щербаківський М. Г. *Проведення та використання ...* . С. 355. URL: <https://dspace.univd.edu.ua/xmlui/handle/123456789/6020> (date accessed: 10.02.2024).

Levels of forensic expert conclusion assessment and their content

Levels	Subject	Content
1. Expert one	The head of forensic science institution or his deputy	• Verification of compliance with procedural requirements for appointment and conducting forensic examination; • verification of compliance with the formal requirements for the expert conclusion preparation
2. Investigative one	Investigator, prosecutor	• Comparison of facts found by the forensic expert with other evidence collected; • determination of degree of research completeness and scientific validity of final conclusions; • verification of compliance with procedural requirements for appointment and conducting forensic examination; • ascertaining reliability of results obtained by forensic expert
3. Legal one	Investigator-judge, court, defense counsel	• Determination of evidentiary force of circumstances clarified by forensic expert, specific event of investigated crime; • final resolution of the issue of availability or lack of facts and their adding to the system of evidence in criminal proceedings

It is worth noting that at the stage of judicial debate, prosecutor and the defense lawyer have the right to evaluate the evidence collected in criminal proceedings, in particular forensic expert conclusion, and the court can both agree with them and reject them (Article 364 of Criminal Procedural Code of Ukraine)³⁴.

According to Art. 94 of Criminal Procedural Code of Ukraine, in criminal proceedings, it is necessary to evaluate each evidence separately, in particular the

expert opinion, *according to the criteria of* “belonging, admissibility, reliability, and the totality of the collected evidence — <...> sufficiency and interconnection for making the appropriate procedural decision”³⁵.

General tasks of assessing forensic expert conclusion are set out in the monograph by M. Shcherbakovskyi³⁶.

Criteria for assessing forensic expert conclusion, in particular forensic veterinary conclusion are interrelated and complement each other; this is the

34 Кримінальний процесуальний кодекс ... URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 10.02.2024).

35 Ibidem.

36 Щербаківський М. Г. Проведення та використання С. 362. URL: <https://dspace.univd.edu.ua/xmlui/handle/123456789/6020> (date accessed: 10.02.2024).

coincidence of conclusions of the forensic expert with other data in the criminal proceedings (case).

M. Shcherbakovskyi emphasizes that epistemological and procedural criteria of reliability of forensic expert's conclusion are the basis for formation of the proof standard regarding the correspondence of forensic expert's conclusions to objective truth. The scientist notes: "Regarding the opinion of the expert, such a standard has not yet been proposed, so we will try to fill this gap"³⁷ with provisions of "beyond a reasonable doubt" standard (Article 17 of the Criminal Procedure Code³⁸), which is actively used by the European Court of Human Rights in practice. "Standard of reliability of the expert's conclusion means that conditions of propriety and admissibility of the opinion are met, the objects submitted for examination are benign, the expert's conclusions are substantiated by general scientific and methodological provisions and the results of a specific expert research based on, logically argued, consistent with the rest of the evidence of criminal proceedings and recognized as corresponding beyond a reasonable doubt to the actual circumstances of the offense"³⁹.

D. Viter expressed the right opinion that the reliability of the expert's conclusion means that it correctly reflects algorithm of conducting and the results of forensic research, that reliable evidence has been investigated, and the facts established by forensic expert are true⁴⁰.

Summarizing, it should be noted: it is practically impossible to clearly distinguish between individual components of the expert conclusion assessment, in particular the forensic veterinary one, because they are interrelated, partially complement each other, so they need to be evaluated and checked exclusively jointly.

In assessing forensic expert conclusion, two components can be distinguished: 1) logical and procedural (*formal*) one, implemented by the initiator of appointment of forensic examination, and 2) *special* one, performed only by a subject who has specific expertise in a particular field of knowledge for conducting an forensic research of provided objects.

We adapted criteria proposed by M. Shcherbakovskyi⁴¹ to check the conclusion of forensic veterinarian, summarizing the corresponding algorithm of actions.

Algorithm for assessing forensic expert conclusion (in particular, forensic veterinary) by the inquirer, investigator, prosecutor, defense lawyer, investigating judge, court

I. Logical and procedural (formal) assessment of forensic expert conclusion

1. Assessment of compliance with requirements of the procedural procedure for FVM conducting

- a) Correctness of preparation of materials for the CEE and verification of availability of following documents in the materials of criminal proceedings:

37 Idem. Стандарт достовірності С. 35. DOI: 10.32353/khrife.3.2021.03 (date accessed: 10.01.2024).

38 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 10.02.2024).

39 Щербаківський М. Г. Стандарт достовірності С. 36. DOI: 10.32353/khrife.3.2021.03 (date accessed: 10.01.2024).

40 Вітер Д. Опр. cit. С. 256–264. DOI: 10.31733/2078-3566-2020-3-256-264 (date accessed: 10.02.2024).

41 Щербаківський М. Г. Проведення та використання С. 364–373. URL: <https://dspace.uni-ivd.edu.ua/xmlui/handle/123456789/6020> (date accessed: 10.02.2024).

- protocol of inspection of the scene or detection of animal corpse at the scene;
 - minutes of sampling for forensic research with a description of the method and conditions of sampling, their quantitative and qualitative characteristics;
 - documents required from institutions, establishments, officials, etc.
- b) Procedural order to FVM appointment on the basis of the analysis of case files:
- “Is there a procedural document in the materials of the criminal proceedings on FVM appointment (resolution, ruling, lawyer’s request for forensic expert involvement)?”;
 - “Has a forensic expert been appointed (involved) in the FVM conducting in accordance with the procedure established by law?”;
 - “Is a forensic expert authorized to perform tasks regarding FVM objects containing information about the offense circumstances, conducting research and provide forensic expert conclusion or report on impossibility of its providing?”;
 - “Was the FVM conducted on written instructions of the head of forensic science institution in case of its appointment (order) to the forensic science institution which employee is forensic expert?”;
 - “Is the FVM accepted for execution by a certified forensic expert who does not work in a State specialized forensic science institution, if it is not entrusted to him personally?”;
- “Are there preliminary conclusions of forensic experts in content of criminal proceedings (in case of forensic re-examination)?”;
 - “Has the expert independently collected and/or removed materials subject to forensic examination?”;
 - “Did not forensic expert independently collect the initial data for the FVM, if they are displayed ambiguously in the content provided to him?”;
 - “Have the rights of participants in trial been respected during appointment and conduct of FVM?”.
- c) Procedure for FVM conducting:
- “Are expert tasks not performed that go beyond FVM topic, special veterinary knowledge or expert qualification?”;
 - “Has the FVM been delegated to another person?”;
 - • “Are there grounds for recusal of forensic expert? ⁴²”;
 - “Did forensic expert not resolve the issue of law and/or assess the violation of procedures regulated by regulatory legal acts?”;
 - “Did forensic expert independently involve other forensic experts or persons in FVM conducting assigned to him?”;
 - “Did the expert not enter into personal relationships with the trial participants that are not provided for by the regulations and without the consent of the subject of FVM appointment (if this calls into question his lack of interest in the results or if such persons are

42 Яценко І. В. Правовий статус судово-ветеринарного експерта як суб’єкта судово-експертної діяльності у контексті новітнього законодавства України. *Теорія та практика судової експертизи і криміналістики*. 2022. Вип. 4 (29). С. 68—109. DOI: 10.32353/khrife.4.2022.04 (date accessed: 10.01.2024).

directly or indirectly interested in FVM results)?”;

- “Is the procedural form of forensic expert conclusion followed? ⁴³”;
- “Has the subject of FVM appointment satisfied forensic expert request”;
- “Are the expert’s references in the conclusion to normative legal acts, literature sources and instructional content correct?”;
- “Did the expert indicate the reasons for the discrepancies between conclusions of the repeated and primary FVM?”.

2. Assessment of compliance of objects provided for FVM with the objects examined by forensic expert

- Acquaintance with inscription on the tag placed on packaging of objects submitted for examination;
- getting acquainted with the appearance of the objects depicted in the photo table attached to the expert’s conclusion;
- clarifying compliance of objects used in the repeated FVM with the objects used in the primary FVM and specified in the procedural document on its appointment

3. Assessment of completeness and scope of the conducted research, as well as comprehensibility of final conclusions

- “Has forensic expert examined all the objects submitted to FVM?”;
- “Are all the questions posed to the expert in the procedural document on FVM appointment or formulated at the expert initiative of the ,

resolved in reliable or probable forms or in the form “it is not possible to provide an answer?”;

- “Do the questions posed to forensic expert correspond to the field of knowledge: *Veterinary Medicine*?”;
- “Is completeness and scope of forensic research set out in the research part of forensic expert conclusion sufficient to answer the questions posed to the expert?”;
- “Is there a complete description of the course of the research performed by expert in the conclusion?”;
- “Are the final conclusions in the *Forensic expert conclusion* convincing, clear, logical and justified for all participants in the process?”.

4. Assessing conformity of the expert’s final conclusions with results of the conducted research

- “Do the expert’s final conclusions correspond to intermediate ones formulated in the conclusion research part (in multidisciplinary examinations or examinations with a multi-quality object composition)?”;
- “Are there any contradictions between the individual parts of forensic expert conclusion?”;
- “Do the descriptions of results of the conducted research in research part of the conclusion correspond to illustrations provided in the photo table?”;
- “Are arithmetical or other errors, incorrect references to normative-

43 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 25.01.2024) ; Інструкція про призначення та проведення судових експертиз та експертних досліджень : затв. наказ. Мін’юсту України від 08.10.1998 р. № 53/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 10.01.2023).

legal or normative technical acts, methods, methodical recommendations revealed in conducted researches?”;

- “Are there factual data and circumstances case files of criminal proceedings or in conclusions of the primary FVMs, which forensic expert refers to in order to substantiate his final conclusions?”.

5. Assessment of relationship between the facts stated in forensic expert's conclusion and the subject of investigated crime

- “Does the content of forensic expert's conclusion correspond to offense circumstances?”;
- “Is information contained in forensic expert's conclusion capable of confirming or refuting the facts and circumstances relating to the offense under investigation?”.

6. Assessing conformity of forensic expert's conclusion with other evidence collected in criminal proceedings

- Is a means of proof if factual data formulated in correlate with other evidence collected in the case;
- is subject to verification if it reveals a discrepancy caused by expert errors or defects in other evidence based on case files of criminal proceedings (case).

II. Content evaluation of forensic expert conclusion

1. Correctness evaluation of forensic expert conclusion

- “Is there a record in introductory part of forensic expert's conclusion that forensic expert has been

warned about criminal liability for providing a knowingly false conclusion?”;

- “Is there a record in the introductory part of the expert's conclusion that he has a certificate for the right to conduct forensic examination and is its validity specified period?”;
- “Is there expert's signature after the record that he is warned of criminal liability?”;
- “Is forensic expert's signature and the seal of forensic science institution in the final part of conclusion?”;
- “Do the photo tables that are appendices to the expert's conclusion, have the expert's signature and the imprint of the seal of forensic science institution?”.

2. Assessment of sufficiency of the objects of expert research to resolve the issues raised in procedural document on FVM appointment

- “What objects (tangible and materialized ones) are provided to the expert for research?”;
- “Do the objects provided on the FVM by the initiator of forensic examination correspond to the objects examined and described by forensic expert in the conclusion?”;
- “Are the provided objects sufficient (by mass, volume, dimensions, integrity) to apply appropriate methods of forensic research to?”.

3. Evaluation of quality of forensic research objects

- “In what condition are objects on the FVM provided?”;
- “Are the objects suitable for research and providing answers to the questions posed to the court

expert in the procedural document on FVM appointment of?”;

- “Has the principle of maximum preservation of objects during FVM been observed?”.

4. Assessment of feasibility and scientific validity of the use of forensic methods

- “Do the scientific methods and expert research methods used during the FVM belong to the expert competence?”;
- “How research methods affected condition of objects (did not affect properties of the objects; did not change outward appearances, but partially affected characteristics of objects; changed the integrity of the object, destroyed its shape and significantly changed its properties; destroyed objects)?”;
- “Has scientific validity, reliability, and provenance of the research methods used during the FVM been confirmed?”;
- “Are the forensic research results obvious and clear for all participants in the process?”;
- “Do the applied research methods ensure maximum preservation of FVM objects?”;
- “Does methods used by forensic expert correspond to performance of expert tasks set before?”;
- “Did forensic expert choose the right methods to identify the necessary characteristics of the objects provided for research and to solve specific expert issues?”;
- “Didn’t the expert have grounds for using another expert methods together with the chosen one?”;
- “Do the methods used by forensic expert contradict each other?”;

- “Does performed expert research correspond to the chosen methods?”;
- “Do the methods of expert research make possible to verify obtained results?”;
- “Is there a method used by the expert in the Register of methods of conducting forensic examinations?”.

5. Completeness evaluation of conducted research

- “Have all objects (tangible and materialized ones) been examined by the expert (research completeness)?”;
- “Are the course and results of research fully described in forensic expert’s conclusion?”;
- “Are all object research algorithms implemented in accordance with prescriptions of selected expert methods?”;
- “Did forensic expert apply additional research methods and reflect their results in the expert’s conclusion?”;
- “Are photo tables attached to the expert’s conclusion and do illustrations placed there fully reflect research component of the conclusion?”;
- “Did the expert make a forensic veterinary diagnosis?”;
- “Did the court expert answer all the questions and did they provide complete answers?”;
- “Is the expert’s refusal to answer some questions justified?”;
- “What are the reasons for the expert’s refusal to provide conclusion or limited resolution of certain issues?”.

6. Correctness evaluation of description and explanation of identified characteristics of objects

- “Are there all characteristics of the research objects necessary for formulation of final conclusions?”;
- “On what criteria did forensic expert base his evaluation of signs during the formulation of intermediate and final conclusions?”;
- “Did forensic expert correctly describe the signs of the objects during application of a specific method of expert research?”;
- “Has forensic expert comprehensively evaluated every sign of the object to formulate a diagnosis and find out the cause(s) of the animal death or the cause(s) of the health disorder of live animal?”;
- “Is diagnosis correctly formulated and does it correspond to results described in the research part of forensic expert conclusion?”;
- “Did forensic expert’s conclusion reveal errors and contradictions?”.

7. Evaluation of scientific validity of the expert’s intermediate and final conclusions

- “Are the identified signs sufficient for formulating expert’s intermediate conclusions?”;
- “Is it diagnosed?”;
- “Do the interim conclusions correspond to the results of the conducted EIA?”;
- “Is the expert’s conclusion justified in general?”;
- “Is forensic expert conclusion consistent with other sources of evidence?”.

8. Clarification of forensic expert’s competence

- “Is the expert competent enough to conduct the FVM?”;
- “Does the expert have higher veterinary education (educational degree not lower than specialist or master’s degree)?”;
- “Does forensic expert have a certificate of expert training in the 18.1 *Veterinary researches* specialization?”;
- “Does the expert have a certificate of qualification of forensic expert?”;
- “Was the FVM not conducted during the temporary suspension of the expert’s right to conduct forensic examination, his stay on vacation or on sick leave, after cancellation of expert’s certificate?”;
- “Did the forensic expert go beyond the limits of his competence during FVM?”;
- “Are there any reasons why this expert cannot perform powers of forensic expert?”.

In our deep conviction, among the subjects of evaluation of evidence (in particular, forensic expert conclusion) there should be an inquirer, therefore we propose to add him to the list of such subjects in Part 1 of Article 94 of Criminal Procedural Code of Ukraine.

Observance by forensic veterinarians of the current regulations governing the implementation of forensic activity in Ukraine, as well as the rules, techniques, procedures⁴⁴ and methods of⁴⁵ conducting FVM guarantees: “ensuring justice of

44 Яценко І. В., Париловський О. І. Правила судово-ветеринарного визначення ступеня тяжкості шкоди, заподіяної здоров’ю тварини (методичні рекомендації). Харків, 2022. 47 с.

45 Яценко І. В. Методика судово-ветеринарного дослідження тварин з метою встановлення їх каліцтва. Харків, 2021. 50 с. ; Яценко І. В., Казанцев Р. Г. Методика судово-ветеринарної експертизи трупів тварин. Харків, 2022. 336 с.

Ukraine with an independent, qualified and objective examination focused on the maximum use of scientific and technical achievements” and the application of the above-mentioned algorithm of criteria for assessing forensic expert conclusion; reliability of its verification and evaluation, creating conditions for making lawful decisions in legal proceedings⁴⁶.

Our algorithm is confirmed by the position of Supreme Court of Ukraine, which, during the verification and evaluation of forensic expert conclusion, considers it necessary to find out:

- “• whether legislation requirements were observed when appointing and conducting forensic examination;
- *whether there were circumstances that excluded participation of forensic expert in the case;*
- *expert competence and whether he/she has exceeded the limits of his/her powers;*
- *sufficiency of research objects submitted to forensic expert;*
- *completeness of answers to questions raised and their compliance with other factual data;*
- *consistency between the research part and the final conclusion of forensic examination;*
- *validity of forensic expert conclusion and its consistency with other case files”⁴⁷.*

We are not alone in our desire to unify the assessment of forensic expert conclusion: for example, according to results of the forensic economic examination, O. Kozhushko proposed to apply theory of games⁴⁸. It may be

appropriate to adapt this approach to the assessment of forensic expert conclusion.

Possible results of a comprehensive assessment of forensic expert conclusion:

- 1) conclusion is recognized as *complete, categorical, scientifically substantiated, objective, reliable, correct and true*, if it meets other materials of the case and regulatory requirements for the form and content. Correctness of expert's conclusion means the correspondence of his conclusions to objective reality. Doubts about correctness of the expert's conclusion arise when he contradicts other means of proof (testimony of witnesses, conclusions of other forensic examinations, documents in the case, etc.);
- 2) expert's conclusion reveals inaccuracies (deviations from the truth, from the norm, incorrectness), minor discrepancies in dates, unintentional errors that arose due to the expert's carelessness and do not affect conclusion reliability;
- 3) expert's conclusion is *considered unconvincing* (not containing evidence, unprovable) due to incomplete answers to the questions posed and insufficiently clear wording of the conclusions, namely:
 - fuzzy, ambiguous and vague, which do not provide categorical conclusion about the fact to be clarified;
 - which require specific expertise for their understanding;
 - presentation of factual data is vague, unspecified;

46 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: 10.01.2024).

47 Про судову експертизу в кримінальних URL: <https://zakon.rada.gov.ua/laws/show/v0008700-97#Text> (date accessed: 10.02.2024).

48 Кожушко О. В. Оп. cit. DOI: [10.32702/2307-2105-2020.6.53](https://doi.org/10.32702/2307-2105-2020.6.53) (date accessed: 10.02.2024).

4) expert's conclusion is recognized as *scientifically unfounded and unconvincing* (when the truth of the expert's conclusions is not proved and is not confirmed by facts, considerations and evidence), if:

- research methods used by forensic expert raise doubts;
- amount of research conducted is insufficient;
- set of defined characteristics (signs) of objects, arguments for conclusions are based on outdated, inaccurate data or unfounded assumptions of the expert;
- final conclusions of the expert are not logical results of research or contradict them, as well as the data given in the annexes to the expert's conclusion, and do not correspond to what is depicted in research photographs, etc.;

5) research is considered *incomplete* when:

- expert did not answer part of the questions put to him;
- scope of tasks, formulated in the document on the assignment of forensic examination has been increased or decreased;
- not all objects submitted for examination have been examined (this is possible in case of examination of a large number of objects);
- all circumstances of the case that are important for resolving the issues raised are not taken into account;
- while investigation, new facts and circumstances have arisen that are not reflected in this forensic expert conclusion;

6) *exceeding by forensic expert of the powers granted to him by law* (in particular, resolving legal issues, or issues that go beyond his competence, or issues that do not require specific expertise);

7) *contradiction of the expert's conclusion with other evidence*, which may indicate both the fallacy of the expert's conclusion and unreliability of other evidence.

Therefore, the appointment subject of forensic examination will have grounds to consider the expert's conclusion unfounded, unreliable, doubtful, unclear and incomplete or even incorrect under the following conditions:

- expert was provided with incorrect initial data or improper objects (due to negligence of the appointment initiator of forensic examination or due to insufficient experience in appointing such an examination); inadmissibility of the objects of research entails the recognition of the expert's conclusion as inadmissible in general;
- expert did not examine all objects submitted for examination; or examined objects not specified in the document on the appointment of forensic examination; or investigated an insufficient number of objects necessary to obtain objective factual data about the offense; or examined low-quality objects, from which it is impossible to reach conclusions that are formulated in his conclusion; or investigated the object incompletely;
- expert violated the rules for the selection of biological material for additional laboratory tests;

- expert applied incorrect or contradictory methods (techniques);
- interim and final conclusions of the expert are not the result of research;
- disagreements among forensic experts as part of the expert commission (in the case of commission or comprehensive forensic examination);
- availability of factual errors (miscalculations, incorrect or outdated references to scientific sources or regulations);
- general incompetence of the expert in the investigated issue. Forensic expert's conclusion is inadmissible evidence if it was provided by an expert who was subject to impeachment ⁴⁹.

Forensic veterinary expert practice indicates that the most common cases of forensic expert going beyond his competence are: performing functions that belong to other participants in the process (gathering initial information, involving other people in the examination, etc.); interference in legal matters; analysis of procedural mode of registration of materials submitted for research.

Discrepancy between the expert's conclusion and case files can be caused

not only by improperly conducted expert research, but also by erroneousness, limited or inaccurate testimony of participants of criminal proceedings (case), poor quality of documents, etc. Therefore, in case of disagreement with the expert's conclusions, appointment of a re-examination is not mandatory: in this case, it is necessary to take into account availability of other evidence, topic peculiarities of forensic examination, etc. (for example, a re-examination is sometimes impossible due to significant changes in the corpse after its dissection).

At the stage of assessing the expert's conclusion on FVM results due to topic specifics ⁵⁰, objects ⁵¹ and tasks solved by this examination, subject ⁵² of the appointment of forensic examination is unable to correctly assess the scientific validity of such a conclusion, reasonableness of the expert's application of research methods, etc., since he does not have special veterinary knowledge. In view of this, we have developed an algorithm for assessing conclusion of a forensic veterinary expert by an inquirer, investigator, prosecutor, defense lawyer, investigating judge, court (*see above*).

Taking into account the above, we propose an algorithm of actions based on the results of assessing forensic expert conclusion (*see Fig.*).

49 Яценко І. В. Правовий статус ... експерта С. 88–90. DOI: 10.32353/khrife.4.2022.04 (date accessed: 10.01.2024).

50 Idem. Предмет судово-ветеринарної експертизи та його значення в теорії і практиці судової експертизи. *Науковий вісник Ужгородського національного університету. Серія: Право*. 2022. Вип. 73. Ч. 2. С. 168. DOI: 10.24144/2307-3322.2022.73.55 (date accessed: 10.02.2024).

51 Idem. Правовий статус і ґносеологічна характеристика об'єктів судово-ветеринарної експертизи. *Теорія та практика судової експертизи і криміналістики*. 2023. Вип. 2 (31). С. 84–94. DOI: 10.32353/khrife.2.2023.05 (date accessed: 10.02.2024).

52 Idem. Завдання судово-ветеринарної експертизи: теоретичні й праксеологічні проблеми та шляхи їх вирішення. *Форум права*. 2023. Вип. 74. № 1. С. 72–82. DOI: 10.5281/zenodo.7319900 (date accessed: 10.02.2024).

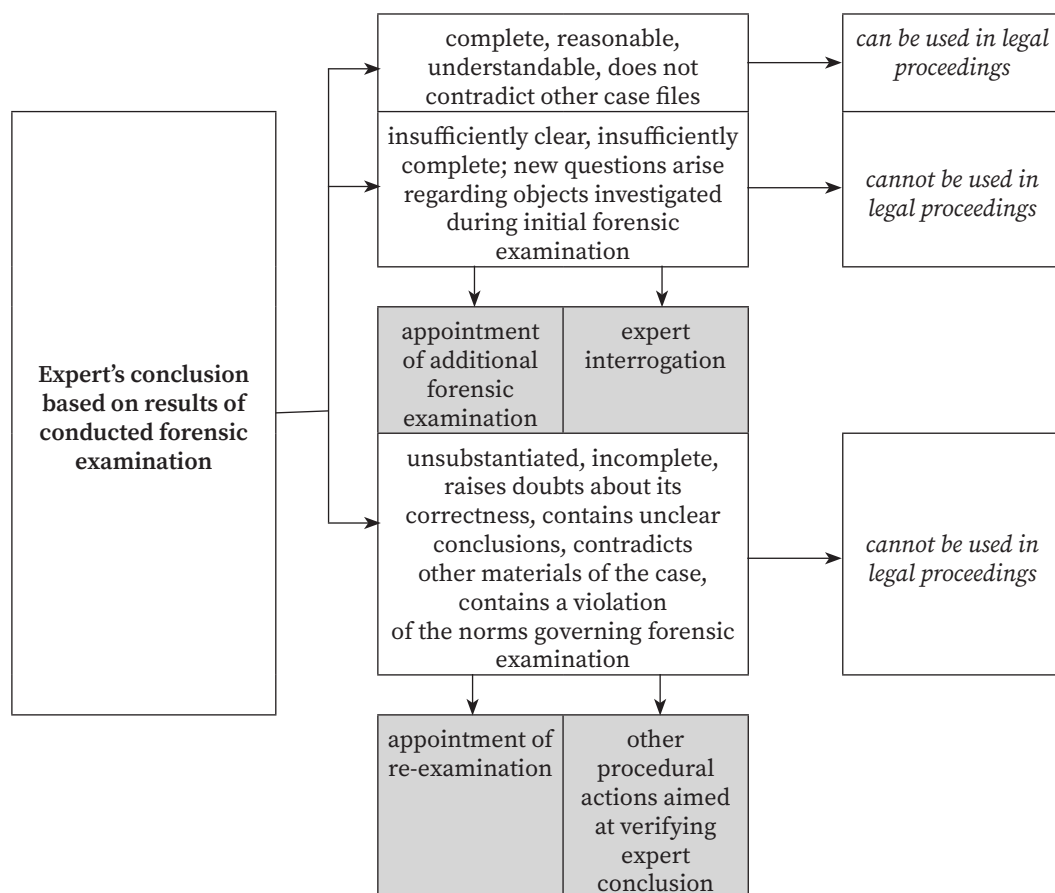


Fig. Algorithm of actions based on the results of forensic expert conclusion evaluation

The court makes the final assessment of the expert's conclusion and its evidentiary value during the sentencing.

Therefore, it is worth agreeing with D. Barbash that "providing a proper assessment of the expert's conclusion in the court decision is a mandatory condition for recognizing such a decision as legal, justified and motivated"⁵³.

Conclusions

Evaluation of forensic expert conclusion is a complex multidimensional procedure aimed at clarifying affiliation, admissibility and reliability of this source of evidence according to internal conviction of the evaluation subject; confirmation of the legality, validity and objectivity of the re-

⁵³ Барбаш Д. Оп. cit. С. 89. URL: <https://drive.google.com/file/d/1Kwin74kcc8IVhymxGLXWOEAc-cvxnpzA6/view> (date accessed: 10.02.2024).

sults of the examination and the qualifications and competence of the expert who conducted it; clarification of the consistency of interim conclusions with the research part results of forensic expert conclusion and final conclusions; with other sources of evidence; determination of the completeness and reliability of information contained therein to prove circumstances that are relevant to criminal proceedings (case).

Since, in our deep conviction, *investigating officer* should be among the subjects of evidence evaluation (in particular, the expert conclusion), we propose to add him to the list of such subjects in Part 1 of Art. 94 of Criminal Procedural Code of Ukraine.

Algorithms proposed by us for assessing the expert conclusion by investigating officer, prosecutor, defender, investigating judge, court and actions based on assessment results of such conclusion will speed up its verification and evaluation and create reliable conditions for making the right procedural decisions in legal proceedings.

Дослідження, перевірка й оцінювання висновку експерта: судово-ветеринарний аспект

Іван Яценко

Автор мав на меті окреслити підстави та критерії, виокремити способи та характеризувати процесуальні особливості дослідження, перевірки й оцінювання висновку судово-ветеринарного експерта. Для досягнення поставленої мети застосовано комплекс взаємообумовлених методів дослідження (діалектичний, системно-структурний, системно-функційний, порівняльно-правовий, формальної логіки (аналіз, синтез, дедукцію, індукцію, аналогію), моделювання, статистичний). Розглянуто підстави, критерії, способи та процесуальні особливості дослідження, перевірки й оцінювання висновку експерта. Увагу акцентовано на судово-ветеринар-

му аспекті цього питання. Стверджується, що під час перевірки висновку судового експерта необхідно оцінити його всебічність, повноту й об'єктивність, а також наукову обґрунтованість, достовірність, правильність, допустимість використання методів і методик, засобів і способів проведення експертних досліджень, а також достатність і взаємозв'язок з іншими доказами, зібраними в межах кримінального провадження (справи) із метою ухвалення правильного процесуального рішення (для доказовості фактичних даних та обставин, доведених експертним дослідженням). Запропоновано критерії повноти й обґрунтованості висновку експерта, а також алгоритм оцінювання такого висновку слідчим, прокурором, захисником, слідчим суддею, судом. Застосування сукупності цих критеріїв до оцінювання висновку судового експерта гарантуватиме надійність перевірки й оцінювання такого висновку, а також створюватиме надійні умови для ухвалення процесуальних рішень у судочинстві.

Ключові слова: судово-ветеринарна експертиза; висновок експерта; дослідження, перевірка, оцінювання висновку експерта; об'єктивність; усебічність; достовірність; обґрунтованість; повнота дослідження; джерело доказів.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the research design, data collection and analysis, decision to publish or manuscript preparation.

Participants

Author has contributed solely to intellectual discussion underlying this document, case law research, writing and editing, and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Author declares no conflict of interest.

References

- Amelina, A. S., Bilousov, B. L. (2018). Otsinka vysnovku eksperta ta yoho dokazove znachennia [Evaluation of forensic expert conclusion and its evidentiary value]. *Mizhnarodnyi yurydychnyi visnyk: aktualni problemy suchasnosti (teoriia ta praktyka)*. Vyp. 1–2 (10–11). URL: http://nbuv.gov.ua/UJRN/muvnudp_2018_1-2_33 [in Ukrainian].
- Barbash, D. (2023). Otsinka vysnovku eksperta sudom u kryminalnomu provadzhenni: teoretychni ta prykladni aspekty u svitli sudovoi praktyky [Evaluation of forensic expert conclusion by court in criminal proceedings: theoretical and applied aspects in the light of judicial practice]. *Aktualni pytannia sudovoi ekspertyzy i kryminalistyky* : zb. mat-liv mizhnar. nauk.-prakt. konf. z nahody 100-rich. NNTs «ISE im. Zasl. prof. M. S. Bokariusa» (Kharkiv, 10.11.2023). Kharkiv. URL: <https://drive.google.com/file/d/1Kwin74kcc8IVhymxGLXWOEAccvxnpzA6/view> [in Ukrainian].
- Baulin, O. V., Izotov, O. I. (2021). Perevirka i tsinka vysnovku eksperta u kryminalnomu provadzhenni [Verification and evaluation of forensic expert conclusion in criminal proceedings]. *Kryminalistyka i sudova ekspertyza*. Vyp. 66. DOI: [10.33994/kndise.2021.66.11](https://doi.org/10.33994/kndise.2021.66.11) [in Ukrainian].
- Bazhaniuk, V. V. (2021). Otsinka vysnovku eksperta u kryminalnomu provadzhenni [Evaluation of forensic expert conclusion in criminal proceedings]. *Naukovyi visnyk Mizhnarodnoho humanitarnoho universytetu. Serii: Yurysprudentsiia*. № 54. T. 2. DOI: [10.32841/2307-1745.2021.54.2.24](https://doi.org/10.32841/2307-1745.2021.54.2.24) [in Ukrainian].
- Biedermann, A., Kotsoglou, K. N. (2018). Decisional Dimensions in Expert Witness Testimony — A Structural Analysis. *Frontiers in Psychology*. Vol. 31. Is. 9. Art. 2073. DOI: [10.3389/fpsyg.2018.02073](https://doi.org/10.3389/fpsyg.2018.02073).
- Chornous, Yu., Leliuk, T. (2023). Aktualni pytannia orhanizatsii provedennia sudovykh ekspertyz u kryminalnomu provadzhenni [Topical issues of the organization of forensic examinations in criminal proceedings]. *Aktualni pytannia sudovoi ekspertyzy i kryminalistyky* : zb. mat-liv mizhnar. nauk.-prakt. konf. z nahody 100-rich. NNTs «ISE im. Zasl. prof. M. S. Bokariusa» (Kharkiv, 10.11.2023). Kharkiv. URL: <https://drive.google.com/file/d/1Kwin74kcc8IVhymxGLXWOEAccvxnpzA6/view> [in Ukrainian].
- Dementiev, M. (2021). Umovy ta kryterii dostovirnosti vysnovku eksperta [Conditions and criteria for the reliability of forensic expert conclusion]. *Knowledge, Education, Law, Management*. № 6 (42). DOI: [10.51647/kelm.2021.6.25](https://doi.org/10.51647/kelm.2021.6.25) [in Ukrainian].
- Fedyk, Yu. Ya., Besaha, I. V. (2023). Dokazove znachennia vysnovku fakhivtsia u haluzi veterynarnoi medytsyny u sudovomu protsesi [Evidence value of the conclusion of a specialist in the field of veterinary medicine in the trial]. *Naukovyi visnyk Uzhhorodskoho natsionalnoho universytetu. Serii: Pravo*. Vyp. 77. Ch. 2. DOI: [10.24144/2307-3322.2023.77.2.44](https://doi.org/10.24144/2307-3322.2023.77.2.44) [in Ukrainian].
- Korzh, V. P. (2022). Otsinka vysnovku eksperta: protsesualni pidstavy, kryminalistychni rekomendatsii [Evaluation of forensic expert conclusion: procedural grounds, forensic recommendations]. *Suchasni tendentsii rozvytku kryminalistyky ta kryminalnoho protsesu v umovakh voiennoho stanu* : tezy dop. Mizhnar. nauk.-prakt. konf. (25.11.2022, Kharkiv). Kharkiv. DOI: [10.5281/zenodo.7339681](https://doi.org/10.5281/zenodo.7339681) [in Ukrainian].
- Kozhushko, O. V. (2020). Metodychnyi pidkhid do otsinky vysnovku sudovoho eksperta po rezultatam provedennia sudovo-ekonomichnoi ekspertyzy [Methodical approach to evaluating forensic expert conclusion based on the results of a forensic economic examination]. *Efektivna ekonomika*. № 6. DOI: [10.32702/2307-2105-2020.6.53](https://doi.org/10.32702/2307-2105-2020.6.53) [in Ukrainian].
- Kutskir, H. M. (2020). Protsesualni osoblyvosti dopytu eksperta v sudi [Procedural specifics of interrogation of an expert in court]. *Naukovyi visnyk Uzhhorodskoho natsionalnoho universytetu. Serii: Pravo*. Vyp. 60. DOI: [10.32782/2307-3322/2020.60.37](https://doi.org/10.32782/2307-3322/2020.60.37) [in Ukrainian].
- Lukianchuk, O. I. (2021). Pravomirnist retsenzuвання vysnovku eksperta

- v sudovomu protsesi [Legality of reviewing forensic expert conclusion in court]. *Kryminalistychnyi visnyk*. № 1 (35). DOI: [10.37025/1992-4437/2021-35-1-38](https://doi.org/10.37025/1992-4437/2021-35-1-38) [in Ukrainian].
- Myroshnichenko, Yu. M. (2009). Doslidzhennia, perevirka ta otsinka sudom vysnovku eksperta [Examination, verification and evaluation by the court of forensic expert conclusion]. *Forum prava*. № 3. URL: http://nbuv.gov.ua/UJRN/FP_index.htm_2009_3_67 [in Ukrainian].
- Puchko, D. V. (2020). Relevance and reliability of an expert conclusion as a criteria for evaluating forensic examination [Appropriateness and admissibility of an expert's conclusion as criteria for evaluating forensic examination]. *Theory and Practice of Forensic Science and Criminalistics*. Is. 22. DOI: [10.32353/khrife.2.2020.17](https://doi.org/10.32353/khrife.2.2020.17).
- Satiani, Bh. (2006). Expert witness testimony: rules of engagement. *Vascular and Endovascular Surgery*. Vol. 40. Is. 3. DOI: [10.1177/153857440604000307](https://doi.org/10.1177/153857440604000307).
- Shabarovskyi, B. V. (2019). Sposoby perevirky vysnovku eksperta u kryminalnomu protsesi Ukrainy [Means of verifying forensic expert conclusion in legal proceedings of Ukraine]. *Pravo i bezpeka*. № 2 (73). DOI: [10.32631/pb.2019.2.13](https://doi.org/10.32631/pb.2019.2.13) [in Ukrainian].
- Shcherbakovskyi, M. H. (2015). *Provedennia ta vykorystannia sudovykh ekspertyz u kryminalnomu provadzhenni* [Conducting and using forensic examinations in criminal proceedings] : monohrafiia. Kharkiv. URL: <https://dspace.univd.edu.ua/xmlui/handle/123456789/6020> [in Ukrainian].
- Shcherbakovskyi, M. (2021). The standard of forensic report veracity in criminal proceedings [The standard of reliability of expert conclusion in criminal proceedings]. *Theory and Practice of Forensic Science and Criminalistics*. Is. 3 (25). DOI: [10.32353/khrife.3.2021.03](https://doi.org/10.32353/khrife.3.2021.03).
- Shcherbakovskyi, M. H., Dementiev, M. V., Protchenko, A. M. (2022). Kryterii ta vydy protsesualnykh porushen yak pidstavy nedopustymosti vysnovku eksperta [Criteria and types of procedural violations as grounds for the inadmissibility of an expert's conclusion]. *Visnyk Luhanskoho derzhavnoho universytetu vnutrishnikh sprav im. E. O. Didorenka*. Vyp. 3 (99). DOI: [10.33766/2524-0323.99.173-186](https://doi.org/10.33766/2524-0323.99.173-186) [in Ukrainian].
- Viter, D. (2020). Otsiniuvannia dopustymosti ta dostovirnosti vysnovku eksperta slidchym pid chas rozsliduvannia zlochyniv u sferi finansuvannia sotsialnykh tsilovykh prohram [Evaluation of admissibility and reliability of forensic expert conclusion by investigator during crime investigation]. *Naukovyi visnyk Dnipropetrovskoho derzhavnoho universytetu vnutrishnikh sprav*. № 3. DOI: [10.31733/2078-3566-2020-3-256-264](https://doi.org/10.31733/2078-3566-2020-3-256-264) [in Ukrainian].
- Vorobchak, A. R. (2019). *Vysnovok eksperta yak dzherelo dokaziv u kryminalnomu provadzhenni* [Forensic expert conclusion as a source of evidence in criminal proceedings] : dys. ... kand. yuryd. nauk. Odesa. URL: <https://dspace.onua.edu.ua/server/api/core/bitstreams/d2dfd0ad-7eb3-460f-965f-698f2d97b889/content> [in Ukrainian].
- Yatsenko, I. V. (2021). *Metodyka sudovo-veterynarnoho doslidzhennia tvaryn z metoiu vstanovlennia yikh kalitstva* [Methods of forensic veterinary examination of animals in order to establish their mutilation]. Kharkiv [in Ukrainian].
- Yatsenko, I. (2022). Legal Status of Forensic Veterinarian as a Subject of Forensic Science Activity in Context of the Latest Legislation of Ukraine. *Theory and Practice of Forensic Science and Criminalistics*. Is. 4 (29). DOI: [10.32353/khrife.4.2022.04](https://doi.org/10.32353/khrife.4.2022.04).
- Yatsenko, I. V. (2022). Predmet sudovo-veterynarnoi ekspertyzы ta yoho znachennia v teorii i praktytsi sudovoi ekspertyzы [Topic of forensic veterinary examination and its importance in the theory and practice of forensic science]. *Naukovyi visnyk Uzhhorodskoho natsionalnoho universytetu. Serii: Pravo*. Vyp. 73. Ch. 2. DOI: [10.24144/2307-3322.2022.73.55](https://doi.org/10.24144/2307-3322.2022.73.55) [in Ukrainian].
- Yatsenko, I. V. (2022). Sudova veterynarna medytsyna yak navchalna komponenta dlia profesiinoho formuvannia likariv veterynarnoi medytsyny ta yii znachennia

- u systemi pidhotovky sudovo-veterynarnykh ekspertiv u derzhavnykh ekspertnykh ustanovakh Ukrainy [Forensic veterinary medicine as an educational component for the professional formation of veterinary medicine doctors and its importance in the training system of forensic veterinary experts in the state expert institutions of Ukraine]. *Current trends in the development of modern scientific thought* : Proceedings of the I International Scientific and Practical Conference (Khaifa, Izrail, 27–30.09.2022). Haifa, Israel. DOI: 10.46299/ISG.2022.2.1 [in Ukrainian].
- Yatsenko, I. (2023). Epistemological Characteristic and Procedural Significance of Steps and Stages of Appointing and Conducting Forensic Veterinary Examination. *Theory and Practice of Forensic Science and Criminalistics*. Is. 1 (30). DOI: 10.32353/khrife.1.2023.05.
- Yatsenko, I. (2023). Legal Status and Epistemological Characteristics of Forensic Veterinary Science Objects. *Theory and Practice of Forensic Science and Criminalistics*. Is. 2 (31). DOI: 10.32353/khrife.2.2023.05.
- Yatsenko, I. V. (2023). Zavdannia sudovo-veterynarnoi ekspertyzy: teoretychni y prakseolohichni problemy ta shliakhy yikh vyryshennia [Tasks of forensic veterinary examination: theoretical and praxeological issues and ways for their solving]. *Forum prava*. Vyp. 74. № 1. DOI: 10.5281/zenodo.7319900 [in Ukrainian].
- Yatsenko, I. V., Derecha, L. M., Parylovskiy, O. I. (2020). Peculiarities of the forensic veterinarian conclusion structure based on the results of research on animal corpse bearing signs of violent death. *Theory and Practice of Forensic Science and Criminalistics*. Is. 21. DOI: 10.32353/khrife.1.2020.44.
- Yatsenko, I. V., Kazantsev, R. H. (2022). *Metodyka sudovo-veterynarnoi ekspertyzy trupiv tvaryn* [Methods of forensic veterinary examination of animal corpses]. Kharkiv [in Ukrainian].
- Yatsenko, I. V., Parylovskiy, O. I. (2022). *Pravyla sudovo-veterynarnoho vyznachennia stupenia tiazhkosti shkody, zapodiianoï zdoroviu tvaryny (metodychni rekomendatsii)* [Rules of Forensic Veterinary Determination of the Severity of Damage Caused to the Animal's Health (Guidelines)]. Kharkiv [in Ukrainian].
- Yunatskyi, O. (2023). Ustanovlennia dostovirnosti vysnovku eksperta pid chas yoho otsinky [Establishing reliability of forensic expert's conclusion during its assessment]. *Aktualni pytannia sudovoi ekspertyzy i kryminalistyky* : zb. mat-liv mizhnar. nauk.-prakt. konf. z nahody 100-rich. NNTs «ISE im. Zasl. prof. M. S. Bokariusia» (Kharkiv, 10.11.2023). Kharkiv. URL: <https://drive.google.com/file/d/1Kwin74kcc8IVhymxGLXWEOAccvxnpxA6/view> [in Ukrainian].
- Zhmudinskiy, V. P. (2022). Mekhanizm oskarzhennia ta sposoby perevirky vysnovku eksperta v kryminalnomu provadzhenni [Appeal mechanism and ways of verifying forensic expert's conclusion in criminal proceedings]. *Copernicus Political and Legal Studies*. Vol. 1. Is. 3. DOI: 10.15804/CPLS.20223.06 [in Ukrainian].
- Yatsenko, I. (2024). Research, Verification and Evaluation of Forensic Expert Conclusion: Forensic Veterinary Aspect. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). P. 111–131. DOI: 10.32353/khrife.1.2024.07.

Criminalistics and Crime Scene Investigation in Microgravity Space

Görkem Ardacan Tan *

* M.A & MSc in Institute of Addiction and Forensic Sciences, Uskudar University, Istanbul, Turkey, ORCID: <https://orcid.org/0000-0002-3050-0095>, e-mail: gorkemardacan.tan@st.uskudar.edu.tr

DOI: 10.32353/khrife.1.2024.08 UDC 343.98

Received: 07.02.2024 / Reviewed: 09.02.2024 / Accepted for print: 27.03.2024 / Available online: 29.03.2024



Addresses the challenges and considerations of criminalistics and crime scene investigation in extraterrestrial gravitational environments. Future space exploration may require the development of protocols for extraterrestrial crime scene investigations. Challenges in microgravity effects, confined space environments, forensic techniques, communication, coordination, and legal jurisdiction are highlighted in this brief. Microgravity effects create difficulties in displacing evidence, such as blood spatter patterns, which make interpretation of events difficult. Restricted areas such as spacecraft and stations require special techniques and equipment. Storing and securing evidence in microgravity makes traditional methods impractical. The lack of gravity affects fingerprint development and preservation, requiring the use of alternative methods. Compact and specialized equipment is required to analyze DNA in space. Communication delays hinder real-time collaboration between researchers on Earth and those in space. Guidance can be provided to personnel in space with remote technologies and autonomous systems. Determining legal jurisdiction for crimes committed in space or on spacecraft requires complex international cooperation and agreements. The development of space law, technology and international agreements is important to meet the challenges of extraterrestrial crime scene investigations. Future discussions and research will provide a basis for establishing protocols for extraterrestrial crime scene investigations to ensure effective and fair forensic practices. As space exploration progresses, advances need to be made in these areas. As space exploration advances, the development of space law, technology, and international

agreements is crucial to meeting the unique challenges of extraterrestrial crime scene investigations. This summary provides a basis for future discussions and research regarding the establishment of protocols to ensure effective and fair forensic practices off Earth.

Keywords: Criminalistics; Microgravity; Crime Scene Investigation; Space; Gravity.

Formulation of Research Problem

The disciplines of criminalistics and crime scene investigation, forensic science and space research in space are developing by merging and progressing in the future. However, it should be taken into consideration that crimes are committed in space and due to the micro-levels of gravity, and even due to the human factor that will increase with the increasing astronomy and space science in space where there is no gravity. It should be known how criminalistic and crime scene investigations should be carried out due to the possibility of any incident occurring in space as people are included in space and mission periods are extended. It is necessary to express the problem of uncertainty in the processes of crime scene investigation and criminalistic techniques in space, collecting, examining and analyzing scientific evidence for the purpose of solving the causes or qualities that can be considered forensic in any criminal activity or accident ¹. In order to understand the investigation of crime scenes of different types and sizes in space, it is necessary to

first know enough information about space and understand what kind of challenges the potential risks pose from a criminalistic perspective. The basis of these risks is living in space, working in an environment with microgravity, exposure to radiation and working in a closed environment, that is, in space vehicles, are some of the inherent dangers ². In addition, some of the other dangerous situations that may occur inside and outside spacecraft are equipment malfunctions, medical emergencies and even intentional sabotage. Another problem in space is the knowledge of space researchers in criminalistics and crime scene investigation. It is important that forensic astronauts are trained to be able to conduct crime scene investigations in space, collect valuable evidence, and reconstruct the incident sequence to determine the cause or identify the people involved ³. Unlike Earth, 90 percent of gravity in space is reduced to microgravity. Microgravity, which begins in Earth orbit and continues in space, may vary depending on environmental conditions, that is, according to research conducted in space geology. In this case, microgravity brings

- 1 Chowdhury M. Why CSI: Space will be a far greater challenge than forensic science on Earth / The Conversation. November 14, 2016. URL: <https://theconversation.com/why-csi-space-will-be-a-far-greater-challenge-than-forensic-science-on-earth-68549> (date accessed: 22.01.2024).
- 2 Lampkin J., White R. Space Crime / Space Criminology. Analysing Human Relationships with Outer Space. Palgrave Macmillan, 2023. Pp. 10–15. URL: <https://link.springer.com/book/9783031399114> (date accessed: 22.01.2024).
- 3 Rengert G., Wasilchick J. Space, Time, and Crime: Ethnographic Insights into Residential Burglary. Department of Criminal Justice, Temple University, Philadelphia, PA, 1989. Pp. 78–90. URL: <https://www.ncjrs.gov/pdffiles1/Digitization/127124NCJRS.pdf> (date accessed: 22.01.2024).

differences from standard environmental conditions in the evaluation of physical events by astronauts or forensic astronauts and criminal crime scene investigators. For example, blood spatter patterns may differ in microgravity conditions. This presents special challenges that must be taken into account in scientific and forensic analyzes of events occurring in space ⁴. With all this, examining crime scenes in space poses different challenges and risks compared to some traditional crime scenes, as well as physical, chemical, biological and geological conditions on Earth. For example, the absence of gravity and its presence at micro levels affects the movement and interaction of objects, making it difficult to determine the exact trajectory of bullets or the location of evidence or evidence at the time of the incident. Additionally, the absence or limited availability of vehicles and supplies in space may hinder the collection and preservation of evidence due to limited equipment and equipment. Astronaut forensic investigators must develop new techniques and adapt their practices to the environment, using new methods to effectively secure and analyze evidence. Overcoming such challenges is crucial to the successful investigation of emerging criminal activity or accident-related investigations ⁵.

In case investigation in space, it is important that astronauts, who are space officers, are competent in examining, researching and investigating crimes, even though they are not members of a special profession such as “forensic astronaut”. As life search activities increase in microgravity space, it is noteworthy that astronauts can apply criminalistic techniques at crime scenes in accordance with the environmental conditions ⁶. In recent years, with increasing space exploration and scientific research, criminalistic and forensic sciences have expanded their scope beyond Earth and into space. Increasing investments in colonization are indicators that crimes may occur as the number of people in space increases ⁷. A potential new area for future research to examine in forensic science, criminalistics, and crime scenes appears to be the microgravity of outer space ⁸. Of course, it is not possible to focus only on areas where colonization will occur. Space forensic officers will investigate accidents and crimes that may occur on celestial bodies within space geology. In addition to all these, there is a need to develop new forensic and criminal investigation techniques that can be applied in microgravity environments in cases of increased commercial tourism in space and events that occur or may occur during long-term

-
- 4 What is Microgravity? / NASA. February 13, 2009. URL: <https://www.nasa.gov/centers-and-facilities/glenn/what-is-microgravity/> (date accessed: 22.01.2024).
 - 5 Hart S. V. Crime Scene Investigation: A Reference for Law Enforcement Training. U. S. Department of Justice, Office of Justice Programs, National Institute of Justice, June 2004. Pp. 21–54. URL: <https://www.ojp.gov/pdffiles1/nij/200160.pdf> (date accessed: 22.01.2024).
 - 6 Ireland-Piper D., Freeland S. Star Laws: Criminal Jurisdiction in Outer Space. *Journal of Space Law*. 2020. Vol. 44 (1). Pp. 45–69. URL: <https://hdl.handle.net/1959.7/uws:57229> (date accessed: 22.01.2024).
 - 7 Scharmen F. Space Forces: A Critical History of Life in Outer Space. New York, 2021. 272 p.
 - 8 Trombka J. I., Schweitzer J., Selavka C., Dale M., Gahn N., Floyd S., Marie J., Hobson M., Zeosky J., Martin K., McClannahan T., Solomon P., Gottschang E. Crime scene investigations using portable, non-destructive space exploration technology. *Forensic Science International*. 2002. Vol. 129 (1). Pp. 2–5. DOI: [10.1016/S0379-0738\(02\)00079-8](https://doi.org/10.1016/S0379-0738(02)00079-8) (date accessed: 22.01.2024).

space flights ⁹. The applicability of criminalistic techniques and space crime scene investigation techniques to extraterrestrial samples and evidence will vary. Criminalistics and crime scene investigation involve many uncertainties due to new life forms, astrophysics and astrochemistry, and differences in conditions. Forensic scientists will play an important role in investigating crimes with autonomous astronomy systems, both on-site and remotely ¹⁰. Therefore, within astronomy, microgravity also has tremendous potential for crime scene investigations, criminalistic scientific discovery, and advancing our understanding of the cosmos. Space criminalists will be able to analyze artifacts or evidence in case of any crime or trace scientific research that may occur during their missions and other astronomical research.

Article Purpose

This study uses a literature review and conceptual analysis to understand hypothetical challenges associated with criminalistic and crime scene investigations in gravitational environments beyond Earth, specifically microgravity scenarios. This study conducted a literature review covering the existing literature regarding space forensic investigations and crime scene investigations. Published articles, books and scientific reports on criminalistics in space, microgravity effects, limited space environments and forensic science techniques were scanned and the knowledge on these subjects was summarized. The resulting literature was put through a conceptual analysis process. Potential challenges of crime

scene investigations under microgravity conditions in space were identified and proposed solutions to deal with these challenges were examined. Conceptual depth is provided on forensic techniques, communication and coordination, crime scene investigations in limited areas, and legal jurisdiction. Additionally, the research includes suggestions and discussions on how criminalistic or forensic science investigations and crime scene investigations in space can be improved, providing a basis for future research. Suggested methods and explanations are presented to provide guidance for future researchers. This method and methodology aims to understand the information in the literature on criminalistics and crime scene investigations in extraterrestrial microgravitational environments and to create a framework for future research in this field.

Main Content Presentation

Procedures for Conducting Crime Scene Investigations in Space

Crime scene and criminalistic investigation in space and astronomy is a relatively unexplored area of forensic science compared to other areas. As space scientific research increases, there is a need for appropriate procedures for crime scene investigation in space, and the standards of criminalistic investigation techniques need to be determined. Different conditions need to be taken into account when determining such principles. When a crime occurs within space stations or on spacecraft, it is necessary to have systematic approaches

9 Goh G. M. Keeping the peace in outer space: a legal framework for the prohibition of the use of force. *Space policy*. 2004. Vol. 20 (4). Pp. 8–15. DOI: 10.1016/j.spacepol.2004.08.002 (date accessed: 22.01.2024).

10 Freitas Jr. R. A., Valdes F. The search for extraterrestrial artifacts (SETA). *Acta Astronautica*. 1985. Vol. 12 (12). Pp. 1027–1034. DOI: 10.1016/0094-5765(85)90031-1 (date accessed: 22.01.2024).

and procedures to ensure that evidence is collected, classified, protected and analyzed correctly. It is necessary to determine forensic space criminalistic and crime scene investigation procedures externally, outside of spacecraft, that is, in the conditions of planets in celestial bodies, geological structures in stars and in the cosmos, including the universe space¹¹. The main risk and difficulty of crime scene investigations in space for astronauts who will be able to conduct criminal investigations will be microgravity¹². For this reason, the first stage of the research should be to ensure the safety of the area examined by the astronauts and the protection of the crime scene. It is inevitable to use special tools designed for fixing evidence in the air gap, establishing boundaries, for example, for evidence in liquid form¹³.

Once crime and accident crime scenes are secured, the next step is to document them. Astronauts' investigations into and around the station require continuous photographic and video recording to document the location of detailed evidence. In cases where it is very difficult to retrieve evidence that will be thrown into the void due to lack of gravity due to an accident-related explosion in space, these documents will provide the opportunity to examine the remarkable evidence quality. In addition,

researchers must prevent contamination (darkening) of evidence due to restricted air circulation in spacecraft or stations¹⁴.

While examining crime scenes in space at all these stages, the use of robotic autonomous vehicles that can act against microgravity and ensure the safety of astronauts will allow the technical development of criminalistics. Thanks to autonomous vehicles, researchers will be able to carefully document evidence, given the fragile nature of evidence in space. Additionally, appropriate surveillance procedures should be followed to ensure the security of the integrity of the evidence. An on-site examination should be carried out depending on the circumstances of the evidence and the equipment at the technical vehicle or station. Depending on the evidence, safe transportation to Earth should be provided for analysis when necessary¹⁵.

Evidence Collection and Preservation in Microgravity Field

Collecting and preserving evidence in a low-gravity environment requires special methods, techniques, and equipment to ensure the integrity of the evidence. One of the main challenges is that evidence is susceptible to contamination due to its low mass. For similar reasons, astronauts must know and be able to apply special

-
- 11 Hart S. V. Op. cit. Pp. 35–43. URL: <https://www.ojp.gov/pdffiles1/nij/200160.pdf> (date accessed: 22.01.2024).
 - 12 White R. Plugging the Leaks in Outer Space Criminal Jurisdiction: Advocacy for the Creation of a Universal Outer Space Criminal Statute. *Emory Int'l L. Rev.* 2021. Vol. 35 (2). Pp. 333–336. URL: <https://scholarlycommons.law.emory.edu/eilr/vol35/iss2/5> (date accessed: 22.01.2024).
 - 13 Montesinos C. A., Khalid R., Cristea O., Greenberger J. S., Epperly M. W., Lemon J. A., Boreham D. R., Popov D., Gorthi G., Ramkumar N., et al. Space Radiation Protection Countermeasures in Microgravity and Planetary Exploration. *Life*. 2021. Vol. 11(8):829. Pp. 20–33. DOI: [10.3390/life11080829](https://doi.org/10.3390/life11080829) (date accessed: 22.01.2024).
 - 14 Burney I., Pemberton N. Making space for criminalistics: Hans Gross and fin-de-siècle CSI. *Studies in history and philosophy of science part C: studies in history and philosophy of biological and biomedical sciences*. 2013. Vol. 44 (1). Pp. 16–19. DOI: [10.1016/j.shpsc.2012.09.002](https://doi.org/10.1016/j.shpsc.2012.09.002) (date accessed: 22.01.2024).
 - 15 Trombka J. I., et al. Op. cit. Pp. 3–5. DOI: [10.1016/S0379-0738\(02\)00079-8](https://doi.org/10.1016/S0379-0738(02)00079-8) (date accessed: 22.01.2024).

methods for collecting and preserving evidence¹⁶. To collect evidence in low-gravity space, astronauts or researchers may use special equipment different from that used on Earth. Because the possibility of radiation on the evidence from outside the station requires attention and similar situations are possible. For this reason, radiation tests are required while securing the evidence. It should not be forgotten that if not performed, it may also damage the evidence. Evidence collection kits and storage containers and similar tools are designed to secure evidence, preventing it from being lost or corrupted. As an example, a specially designed evidence immobilization collection kit consists of adhesive strips or lidded containers that can be sealed to prevent movement of evidence¹⁷. In addition, astronauts need to be careful about evidence whose components may change and deteriorate due to movements that may occur due to contact with the evidence. The portable laboratory must be protected within the station, and gloves and protective equipment are required to prevent deterioration in the examination of evidence¹⁸. Crime scene investigation in microgravity requires planned implementation. Contrary to popular belief, the use of refrigeration and leak-proof containers must be designed appropriately for space. Preferably, researchers may need to rely on alternative techniques and methods.

For example, in biological evidence, cryo-preservation may be preferred to prevent contamination in space and for reliable analysis. Additionally, digital imaging and recording devices should be used to detect visual evidence and ensure that important information is properly protected¹⁹.

Criminalistic Challenges in Microgravity Field

Criminalistics in space is the technical field that combines the principles of forensic science with unique challenges in a microgravity environment. The main difficulties here are the physical conditions in examining the crime scene as well as the preservation and collection of evidence. Due to the absence of gravity or being at micro levels, objects tend to move freely due to their mass. This is a situation that puts evidence at risk in the event of a crime or accident²⁰. Lack of gravity in space can also cause evidence to be dispersed, corrupted or contaminated, negatively affecting investigations. Another challenge is the effects of the lack of gravity on the human anatomy that criminalists can examine in microgravity space, and this should be taken into consideration for both fatal cases and the investigator. Astronauts or cosmonauts in space experience physical changes similar to muscle atrophy and loss of bone density due to low gravity²¹. This situation creates a complicating effect on investigating

- 16 Montesinos C. A., et al. Op. cit. Pp. 6—14. DOI: [10.3390/life11080829](https://doi.org/10.3390/life11080829) (date accessed: 22.01.2024).
- 17 Livesey A. K., Brochon J. C. Analyzing the Distribution of Decay Constants in Pulse-Fluorimetry Using the Maximum Entropy Method. *Biophysical Journal*. 1987. Vol. 52 (5). Pp. 698—702. DOI: [10.1016/s0006-3495\(87\)83264-2](https://doi.org/10.1016/s0006-3495(87)83264-2) (date accessed 01. 22. 2024).
- 18 Ruffell A., McKinley J. Forensic geoscience: applications of geology, geomorphology and geophysics to criminal investigations. *Earth-Science Reviews*. 2005. Vol. 69 (3—4). Pp. 236—238. DOI: [10.1016/j.earscirev.2004.08.002](https://doi.org/10.1016/j.earscirev.2004.08.002) (date accessed: 22.01.2024).
- 19 Burney I., Pemberton N. Op. cit. Pp. 16—23. DOI: [10.1016/j.shpsc.2012.09.002](https://doi.org/10.1016/j.shpsc.2012.09.002) (date accessed: 22.01.2024).
- 20 Vandeviver C., Bernasco W. The geography of crime and crime control. *Applied geography*. 2017. Vol. 86. Pp. 220—225. DOI: [10.1016/j.apgeog.2017.08.012](https://doi.org/10.1016/j.apgeog.2017.08.012) (date accessed: 22.01.2024).
- 21 Feinzeig S. D. How Does Spaceflight Affect the Human Body? *The Science Journal of the Lander College of Arts and Sciences*. 2014. Vol. 8 (1). Pp. 24—27. URL: <https://touro scholar.touro.edu/sjlcas/vol8/iss1/5> (date accessed: 22.01.2024).

crime scenes and applying criminalistic methods and forensic procedures²². Cosmonauts and astronauts can generally examine crime scenes in isolation, on or off various spacecraft, simultaneously in the same environment or in different locations. Any lack of communication or cooperation inside and outside spacecraft will present additional challenges in criminalistics²³. Criminalistic investigations and forensic investigations often require team collaboration and information transfer. Space criminal and forensic investigators need to improve their communication systems to avoid fraud, and establishing assignment protocols is essential. Also mentioned here is the importance of communication with the world, as it is possible that the need for various guidance and expertise may arise²⁴. When all is observed, crime scenes are only found on the earth's surface, and criminalistic investigations can also be carried out in space, although they involve difficulties²⁵. At this point, the importance of criminalists in space and astronomy sciences emerges. Because, in the face of the difficulties of crime scenes in the sky and on earth, investigating and solving the trace and crime path requires the unique application of special techniques and methods. Unlike on Earth, it requires special equipment and training processes to ensure the

integrity and security of evidence in the face of microgravity. Only forensic scientists and criminalistic experts should use or apply alternative criminalistic methods for crime scenes in space. All of these are important for the development and future of the search and investigation of crime scenes outside the Earth's atmosphere²⁶.

Material Evidence in Microgravity

So far, there have been no criminal cases in space for criminalistics and crime scene investigation. Although committing a crime in space and carrying out judicial investigations is an idea that is not yet foreseen in international law systems, it does not mean that it will not happen²⁷. It is clear why we will see concrete steps on this issue in the future. Astronauts, cosmonauts and space agencies sent to space and operating in space conduct research and work for peaceful goals. However, if crimes are committed in space in the future, how these events will be handled and possible issues of examining crime scenes should be subject to the legal framework or laws. Providing evidence or searching for evidence at crime scenes, as well as criminal investigations, is only possible if the crime is determined by law. The necessity of regulating and establishing universal and international space laws is likely due to these reasons.

-
- 22 Sarıtaş S., Tarlacı S. Uzay Ortamının Astronotların Duyusal Ve Motor Sistemleri Üzerine Etkisi Ve Uzay Hareket Hastalığı. *Samsun Sağlık Bilimleri Dergisi*. 2022. Vol. 7 (1). Pp 58. DOI: [10.47115/jshs.1084034](https://doi.org/10.47115/jshs.1084034) (date accessed: 22.01.2024).
- 23 Townsley M. Visualising Space Time Patterns in Crime: The Hotspot Plot. *Crime Patterns and Analysis*. 2008. Vol. 1. Pp. 62–66. URL: <http://hdl.handle.net/10072/25749> (date accessed: 22.01.2024).
- 24 Arshad I., Ferré E. R. Cognition in zero gravity: Effects of non-terrestrial gravity on human behaviour. *Quarterly journal of experimental psychology*. 2023. Vol. 76 (5). Pp. 980–986. DOI: [10.1177/17470218221113935](https://doi.org/10.1177/17470218221113935) (date accessed: 22.01.2024).
- 25 Adli Bilimlerde Örnek Alınması ve Delil / ed. O. Celbiş. Ankara, 2019. DOI: [10.37609/akya.1428](https://doi.org/10.37609/akya.1428) (date accessed: 06. 02. 2024).
- 26 Burney I., Pemberton N. Op. cit. Pp. 16–23. DOI: [10.1016/j.shpsc.2012.09.002](https://doi.org/10.1016/j.shpsc.2012.09.002) (date accessed: 22.01.2024).
- 27 Gorove S. Criminal Jurisdiction in Outer Space. *The International Lawyer*. 1972. Vol. 6. Pp. 313–318. URL: <https://scholar.smu.edu/til/vol6/iss2/7> (date accessed: 22.01.2024).

Since the staff at space stations, such as the current International Space Station, are responsible for teams with joint working and security protocols and legal protocols, they can provide material evidence under the same conditions and manage criminal investigations²⁸. However, due to the increasing private sector in space, tourism, scientific research activities and the possibility of active projects such as settlement projects in space in the future, necessary precautions will need to be taken. The issues of committing crimes in microgravity space and examining related crime scenes and judging them with concrete material evidence should be based on a common scientific idea with legal regulations that increase in importance with colonization and space field research²⁹.

It is not always possible to conduct a crime scene investigation in remote control spacecraft and in any environmental conditions in space. The way to deal with this situation can be prevented by the development of space technology and forensic technology³⁰. For example, negative situations resulting from the accident of the station or vehicle in space may also activate new crime scene reconnaissance tools with autonomous control tools. With visual and audio analysis, studies can be developed to identify the causes of the incident, identify problems in the system and prevent similar

problems in the future. Crime scenes and criminal investigations in space activities are too sensitive to be left to space companies and independent experts³¹.

For this purpose, criminalistic investigations should be carried out by joint or autonomous space forces of states and scientists. Of course, it should be noted at this point that space vehicles and equipment are in use and a confidentiality principle is required for access to the criminal laboratories to be established within the stations³². In the scientific crime laboratories to be established, not only crime scenes will be examined with spectrometers, probes, swabs and other measuring devices³³. It should be considered that it can contribute to research for signs of life on planets. Because the atmospheric conditions examined, the components in rock or soil and similar samples can be evaluated as scientific data in subsequent cases or accidents. The main reason for this situation is the formation of colonies as a result of life-search discoveries that will be opened to space in the future³⁴. Crime scene investigations with spacecraft allow us to learn more about planets, satellites, asteroids and other celestial objects. This information helps us deepen our understanding of the formation and development of the universe and provides important data for future space exploration and colonization

28 White R. Op. cit. Pp. 336–356. URL: <https://scholarlycommons.law.emory.edu/eilr/vol35/iss2/5> (date accessed: 22.01.2024).

29 Spektor B. The World's First Space Crime May Have Occurred on the International Space Station Last Year / Live Science. August 27, 2019. URL: <https://www.livescience.com/anne-mcclain-space-crime.html> (date accessed: 22.01.2024).

30 Ireland-Piper D., Freeland S. Op. cit. URL: <https://hdl.handle.net/1959.7/uws:57229> (date accessed: 22.01.2024).

31 Houck M. M., Siegel J. A. Fundamentals of forensic science. 2nd ed. Istanbul, 2009.

32 Ruffell A., McKinley J. Op. cit. Pp. 235–239. DOI: 10.1016/j.earscirev.2004.08.002 (date accessed: 22.01.2024).

33 Adli Bilimlerde DOI: 10.37609/akya.1428 (date accessed: 06. 02. 2024).

34 Hardenstein T. S. In Space, No One Can Hear You Contest Jurisdiction: Establishing Criminal Jurisdiction on the Outer Space Colonies of Tomorrow. *Journal of Air Law and Commerce*. 2016. Vol. 81. Pp. 255–283. URL: <https://scholar.smu.edu/jalc/vol81/iss2/4> (date accessed: 22.01.2024).

attempts. The task here is space forces, astronaut forensic scientists will only be able to conduct such examinations in low gravity areas³⁵. Some of the duties of the Space Force in investigating crimes can be listed as follows: Management of space activities, space security and defense, space communication and exploration, determination of space attack capacity, provision of space intelligence, investigation of crimes and conducting forensic investigations for their recovery³⁶. The missions of space forces may vary depending on the country's policies and strategies, the purposes of space activities and military requirements. Countries' space forces often work in cooperation with other military forces and civilian space agencies³⁷. The branch of ballistics has the biggest impact on space research today and in the future. In this respect, as a different similarity, the importance given to ballistic science in criminalistic and crime scene investigation applications is different³⁸. Currently, the possession of firearms in space is prohibited for defensive purposes under the 1967 bilateral International Out-

er Space Treaty with the United States and the Soviet Union and is considered a weapon-free zone. However, there is no law preventing space forces from carrying a small weapon³⁹. However, firearms cannot be used as a criminal element in space. The reasons for this are gravity at micro levels as well as the lack of oxygen to react with during ignition. However, considering that modernized weapons that may be used in the future have oxidizers, they will have an ignition effect thanks to the chemical that reacts instantly⁴⁰. However, if it is considered according to criminalistics and astronomy, when the gun is fired, the effect will be equal to the reaction force according to Newton's 3rd law, and the result will be a reversal due to microgravity⁴¹. The bullet of a gun fired in micro-level gravity in space may not stop until it hits a fixed object in space because the universe is growing faster than the moving object. Considering that the scene of the incident is a fixed or moving object and its mass is calculated, it can be measured how much impact the object it hits will suffer due to the ballistic

-
- 35 Sparavigna A. C. Astronomy and Tidal Analysis Applied to the Study of Julius Caesar's Commentarii. SSRN Electronic Journal. 2016. Pp. 1–10. DOI: [10.2139/ssrn.2817327](https://doi.org/10.2139/ssrn.2817327) (date accessed: 22.01.2024).
- 36 Brownsberger S. Seeing the Invisible: A Short History of Scientific Evidence for Dark Matter / Science in the News. March 5, 2018. URL: <https://sitn.hms.harvard.edu/flash/2018/seeing-invisible-short-history-scientific-evidence-dark-matter/> (date accessed: 22.01.2024).
- 37 Barbier R. The Purpose and Mission of the Space Force / American University. July 23, 2020. URL: <https://www.american.edu/sis/centers/security-technology/the-purpose-and-mission-of-the-space-force.cfm> (date accessed: 22.01.2024).
- 38 Wright D., Grego L., Gronlund L. The Physics of Space Security: A Reference Manual. Cambridge, 2005. Pp. 1–18. URL: <https://www.amacad.org/publication/physics-space-security-reference-manual> (date accessed: 22.01.2024).
- 39 Bourbonnière M., Lee R. J. Legality of the deployment of conventional weapons in earth orbit: balancing space law and the law of armed conflict. *European Journal of International Law*. 2007. Vol. 18 (5). Pp. 874–876. DOI: [10.1016/j.spacepol.2004.08.002](https://doi.org/10.1016/j.spacepol.2004.08.002) (date accessed: 06.02.2024).
- 40 Hitchens T., Katz-Hyman M., Lewis J. US Space Weapons: Big Intentions, Little Focus. *Nonproliferation Review*. 2006. Vol. 13 (1). Pp. 36–42. DOI: [10.1080/107367006000861350](https://doi.org/10.1080/107367006000861350) (date accessed: 22.01.2024).
- 41 Classical Mechanics: A professor-student collaboration / ed. M. Campanelli. Bristol, 2020. 376 p. URL: <https://www.tandfonline.com/doi/abs/10.1080/00107514.2021.1959648> (date accessed: 06.02.2024).

properties created by the bullet or low gravity⁴². Although there is no concrete example of crimes committed with firearms in space so far, it seems theoretically possible to conduct a crime scene investigation regarding crimes committed with weapons in space⁴³. In 2021, Russia deliberately tested weapons to destroy one of its own satellites, Cosmos 1408, and thousands of pieces were thrown into space. Similar tests The United States, China, India and Russia have tested anti-satellite weapons in space. However, the United States became the first state to ban anti-satellite weapons in 2021⁴⁴. Microgravity effects should be handled in different ways in criminalistic investigations in the space field, which should be understood from the symptoms. It is possible to observe that material evidence exhibits variable trace evidence, unlike in the world due to the lack of gravitational force⁴⁵. As understood especially from ballistic studies, the main reason for this is that the laws of physics work differently than in the world. Differences will inevitably be observed in chemical and biological evidence. Displacement of Evidence: Objects can float freely as soon as the effect of motion due to a standard force due to microgravity is observed. In this case, deterioration in the evidence may

cause location changes, making it difficult to identify the actual crime scene⁴⁶. Blood Spatter Models: Another aspect of crime scene investigation that may require criminalistic examination for crimes that may be committed in space, although not currently, is blood spatter-related analyzes and tests. Traces of blood, which can be found in liquid or dry form due to the lack of gravity, behave differently in the space environment and may affect the investigation of criminal investigation differently⁴⁷.

Forensic Techniques

Fingerprint: This type of trace evidence can be inside spacecraft or in the environment where humans may live, where a colony may have been created. The reason is to wear protective clothing in open remote areas. Therefore, microgravity has little effect on fingerprints. The same applies to footprints.

DNA Analysis: Necessary DNA analyzes in space can be performed with compact and special equipment. However, it is difficult to detect this type of evidence at crime scenes in microgravity, because this evidence, which may be quite small, may be overlooked and lost in the air space⁴⁸.

Crimes are actually being committed in space, even now, with technological tools.

42 Wright D., Grego L., Gronlund L. Op. cit. Pp. 52–65. URL: <https://www.amacad.org/publication/physics-space-security-reference-manual> (date accessed: 22.01.2024).

43 Rosa-Aquino P. What happens if you break the law in space — and 3 times people or governments have tested the rules / Business Insider. Nov 12, 2022. URL: <https://www.businessinsider.com/what-happens-if-you-break-the-law-in-space> (date accessed: 22.01.2024).

44 Reiss R. Have There Been Any Crimes Committed In Space? / Space-facts.co.uk. Mar 27, 2023. URL: <https://www.space-facts.co.uk/have-there-been-any-crimes-committed-in-space> (date accessed: 22.01.2024).

45 Hermida J. Crimes in Space: A Legal and Criminological Approach to Criminal Acts in Outer Space. *Annals of Air and Space Law*. 2006. Vol. 31. Pp. 17–19. URL: <https://www.julianhermida.com/dossier/dossiercrimmcgill.pdf> (date accessed: 22.01.2024).

46 Lampkin J., White R. Op. cit. Pp. 150–165. URL: <https://link.springer.com/book/9783031399114> (date accessed: 22.01.2024).

47 Karakuş O., Ünal B. Biyolojik İncelemeler. Olay Yeri İnceleme / Kriminalistik ; ed. O. Karakuş. 2nd ed. Ankara, 2009.

48 Sander E. Olay yerinde kriminalistik. Ankara, 1997. 416 p.

Because this is because internet networks surround the world from space. For this reason, there are concepts of “Cyber Space, Cyber Space and Cyber World”⁴⁹. When considered from a criminalistic perspective, all areas where cyber crimes occur are considered crime scenes. To give an example of the reason, disrupting, damaging or destroying an internet network and the technological tools connected to it, that is, the system of satellites, is considered a crime. Any change or touch made remotely in any system will cause many problems such as drifting in the microgravity field in space or a satellite falling to the earth in the near-earth area. If external cyber crimes are committed in outer space, the destruction of the defense systems of states will result in serious risky consequences⁵⁰. In addition to cyber security and informatics tools, the increase in artificial intelligence studies means that crimes can be committed through AI in space. Since artificial intelligence and technological devices can be used in a microgravity environment, it can be considered as a crime scene investigation, concretely or abstractly. It is necessary to collect evidence in case artificial intelligence remote sensing devices or autonomous vehicles are attacked in space where gravity is low. It is only possible to access the causes and consequences through recording systems. In addition, obtaining data mines safely will help shed light on the events⁵¹.

Conclusions

Although criminal investigations are not currently common in space, forensic

investigations will increasingly be conducted in the future because gravity is low. Its main source is the increasing speed of space and astronomy research. There is no doubt that space exploration research, including the idea of searching for life and establishing colonies, will gain differences in criminal crime scene investigations in the microgravity environment in the future. Forensic research and the examination of criminal trace evidence or crime scenes concern not only the space area where the human factor is located, as it is thought, but also all kinds of material evidence of criminal elements originating from human-dependent autonomous vehicles or technological means.

Space incident investigation is an important field that combines forensic science or criminalistics and space exploration. This discipline has become increasingly critical with the increase in space missions. In the event of a crime in space, collecting and analyzing evidence is vital to astronaut safety and the success of space missions. However, difficulties such as this low-gravity environment and limited resources make crime scene investigation in space different from the gravitational world. Increasing crime scene investigation experiments and research in space can increase the safety of future space missions and contribute to more effective space exploration. Additionally, it will be valid for colonization in space and space tourism. Advances in this field could accelerate scientific discoveries about crimes in space and analysis of extraterrestrial samples. Thus, not only criminal research and development is limited, but also leads to scientific discoveries

49 Cyberspace and National Security: Threats, Opportunities, and Power in a Virtual World / ed. D. S. Reveron. Georgetown University Press, 2012. URL: <https://www.jstor.org/stable/j.ctt2tt6rz> (date accessed: 22.01.2024).

50 Reiss R. Op. cit. URL: <https://www.space-facts.co.uk/have-there-been-any-crimes-committed-in-space> (date accessed: 22.01.2024).

51 Trombka J. I., et al. Op. cit. Pp. 1–9. DOI: 10.1016/S0379-0738(02)00079-8 (date accessed: 22.01.2024).

about the universe that are waiting to be discovered.

Depending on all these, it is inevitable to create relevant legal laws in order to prevent crimes committed in space and those that may be committed in the future. This situation has become even more critical with the increase in the exploration and use of space. Existing similar instruments, such as the International Outer Space Treaty, support the use of outer space for peaceful purposes, but do not contain detailed provisions regarding crimes. For this reason, it is obvious that there is a need for regulation in order to prevent and address the problems and risks that will be encountered in future space and astronomy activities. Establishing an effective legal framework to combat crimes in space will require international cooperation and the active participation of states with a presence in space. With the creation of the necessary laws, criminalistic and forensic science research will also increase.

Collaboration between space agencies, legal experts, and scientists is critical to identifying crimes, defining penalties, and establishing trial processes. It provides concrete evidence of scientific findings and research results, which are also mentioned in criminalistic and crime scene investigations in microgravity space. With the research conducted, it is possible to determine that it will gain more importance in the coming years in order to ensure security and order in space.

**Криміналістика
та розслідування місця злочину
в мікрогравітаційному просторі
Горкем Ардакан Тан**

Розглянуто проблеми криміналістики щодо розслідування місця злочину в позаземних гравітаційних середовищах. Майбутнє дослідження космосу може потребувати розроблення протоколів для розслідувань позаземних місць злочину.

Висвітлено проблеми, пов'язані з впливом мікрогравітації, замкнутим космічним середовищем, криміналістичними методами, комунікацією, координацією та юридичною юрисдикцією. Ефект мікрогравітації створює труднощі, пов'язані з переміщенням доказів (наприклад, крапель крові), що ускладнює інтерпретацію подій. Зони обмеженого доступу (такі, як космічні кораблі та станції) потребують спеціальних методів і обладнання. Зберігання та захист доказів в умовах мікрогравітації робить традиційні методи непрактичними. Відсутність гравітації впливає на розвиток і збереження відбитків пальців, що потребує використання альтернативних методів. Для аналізу ДНК у космосі потрібне компактне та спеціалізоване обладнання. Затримки зв'язку перешкоджають співпраці в реальному часі між дослідниками на Землі та в космосі. Визначення юридичної юрисдикції для злочинів, скоєних у космосі або на космічних кораблях, потребує складної міжнародної співпраці та відповідних угод. Розвиток космічного права, технологій і міжнародних угод важливий для розв'язання завдань позаземних розслідувань. Майбутні обговорення та дослідження стануть підґрунтям для створення протоколів позаземних розслідувань місця злочину, щоб забезпечити ефективну та справедливую судово-експертну практику. Оскільки дослідження космосу прогресує, то розвиток космічного права, технологій і міжнародних угод має вирішальне значення для розв'язання унікальних завдань розслідування на позаземному місці злочину. Це дослідження забезпечує основу для майбутніх обговорень створення протоколів для забезпечення ефективної та справедливої судово-експертної практики поза межами Землі.

Ключові слова: криміналістика; мікрогравітація; розслідування на місці злочину; космос; гравітація.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the study design, data collection and analysis, decision to publish, or manuscript preparation.

Participants

Author contributed solely to the intellectual discussion underlying this document, case law research, writing and editing and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Author declares that there are no conflict of interest.

References

- Bourbonnière, M., Lee, R. J. (2007). Legality of the deployment of conventional weapons in earth orbit: balancing space law and the law of armed conflict. *European Journal of International Law*. Vol. 18 (5). DOI: 10.1016/j.spacepol.2004.08.002.
- Brownsberger, S. (2018). *Seeing the Invisible: A Short History of Scientific Evidence for Dark Matter* / Science in the News. URL: <https://sitn.hms.harvard.edu/flash/2018/seeing-invisible-short-history-scientific-evidence-dark-matter/>.
- Burney, I., Pemberton, N. (2013). Making space for criminalistics: Hans Gross and fin-de-siècle CSI. *Studies in history and philosophy of science part C: studies in history and philosophy of biological and biomedical sciences*. Vol. 44 (1). DOI: 10.1016/j.shpsc.2012.09.002.
- Chowdhury, M. (2016). *Why CSI: Space will be a far greater challenge than forensic science on Earth* / The Conversation. URL: <https://theconversation.com/why-csi-space-will-be-a-far-greater-challenge-than-forensic-science-on-earth-68549>.
- Classical Mechanics: A professor-student collaboration (2020) / ed. M. Campanelli. Bristol. URL: <https://www.tandfonline.com/doi/abs/10.1080/00107514.2021.1959648>.
- Cyberspace and National Security: Threats, Opportunities, and Power in a Virtual World (2012) / ed. D. S. Reveron. Georgetown University Press. URL: <https://www.jstor.org/stable/j.ctt2tt6rz>.
- Feinzeig, S. D. (2014). How Does Spaceflight Affect the Human Body? *The Science Journal of the Lander College of Arts and Sciences*. Vol. 8 (1). URL: <https://touro scholar.touro.edu/sjlcas/vol8/iss1/5>.
- Freitas, R. A., Valdes, F. (1985). The search for extraterrestrial artifacts (SETA). *Acta Astronautica*. Vol. 12 (12). DOI: 10.1016/0094-5765(85)90031-1.
- Goh, G. M. (2004). Keeping the peace in outer space: a legal framework for the prohibition of the use of force. *Space policy*. Vol. 20 (4). DOI: 10.1016/j.spacepol.2004.08.002.
- Gorove, S. (1972). Criminal Jurisdiction in Outer Space. *The International Lawyer*. Vol. 6. URL: <https://scholar.smu.edu/til/vol6/iss2/7>.
- Hardenstein, T. S. (2016). In Space, No One Can Hear You Contest Jurisdiction: Establishing Criminal Jurisdiction on the Outer Space Colonies of Tomorrow. *Journal of Air Law and Commerce*. Vol. 81. URL: <https://scholar.smu.edu/jalc/vol81/iss2/4>.
- Hart, S. V. (2004). *Crime Scene Investigation: A Reference for Law Enforcement Training*. U. S. Department of Justice, Office of Justice Programs, National Institute of Justice. URL: <https://www.ojp.gov/pdffiles1/nij/200160.pdf>.
- Hermida, J. (2006). Crimes in Space: A Legal and Criminological Approach to Criminal Acts in Outer Space. *Annals of Air and Space Law*. Vol. 31. URL: <https://www.julianhermida.com/dossier/dossiercrimmcgill.pdf>.
- Hitchens, T., Katz-Hyman, M., Lewis, J. (2006). US Space Weapons: Big Intentions, Little Focus. *Nonproliferation Review*. Vol. 13 (1). DOI: 10.1080/10736700600861350.
- Houck, M. M., Siegel, J. A. (2009). *Fundamentals of forensic science*. 2nd ed. Istanbul.
- Ireland-Piper, D., Freeland, S. (2020). Star Laws: Criminal Jurisdiction in Outer Space. *Journal of Space Law*. Vol. 44 (1). URL: <https://hdl.handle.net/1959.7/uws:57229>.
- Karakuş, O., Ünal, B. (2009). Biyolojik İncelemeler. Olay Yeri İnceleme /

- Kriminalistik* ; ed. O. Karakuş. 2nd ed. Ankara [in Turkish].
- Lampkin, J., White, R. (2023). *Space Crime / Space Criminology. Analysing Human Relationships with Outer Space*. Palgrave Macmillan. URL: <https://link.springer.com/book/9783031399114>.
- Livesey, A. K., Brochon, J. C. (1987). Analyzing the Distribution of Decay Constants in Pulse-Fluorimetry Using the Maximum Entropy Method. *Biophysical Journal*. Vol. 52 (5). DOI: 10.1016/s0006-3495(87)83264-2.
- Montesinos, C. A., Khalid, R., Cristea, O., Greenberger, J. S., Epperly, M. W., Lemon, J. A., Boreham, D. R., Popov, D., Gorthi, G., Ramkumar, N., et al. (2021). Space Radiation Protection Countermeasures in Microgravity and Planetary Exploration. *Life*. Vol. 11(8):829. DOI: 10.3390/life11080829.
- Reiss, R. (2023). *Have There Been Any Crimes Committed In Space?* / Space-facts.co.uk. URL: <https://www.space-facts.co.uk/have-there-been-any-crimes-committed-in-space>.
- Rengert, G., Wasilchick, J. (1989). *Space, Time, and Crime: Ethnographic Insights into Residential Burglary*. Department of Criminal Justice, Temple University, Philadelphia, PA. URL: <https://www.ncjrs.gov/pdffiles1/Digitization/127124NCJRS.pdf>.
- Rosa-Aquino, P. (2022). *What happens if you break the law in space — and 3 times people or governments have tested the rules* / Business Insider. URL: <https://www.businessinsider.com/what-happens-if-you-break-the-law-in-space>.
- Ruffell, A., McKinley, J. (2005). Forensic geoscience: applications of geology, geomorphology and geophysics to criminal investigations. *Earth-Science Reviews*. Vol. 69 (3–4). DOI: 10.1016/j.earscirev.2004.08.002.
- Sander, E. (1997). *Olay yerinde kriminalistik*. Ankara [in Turkish].
- Sarıtaş, S., Tarlacı, S. (2022). Uzun Ortamının Astronotların Duyusal Ve Motor Sistemleri Üzerine Etkisi Ve Uzun Hareket Hastalığı. *Samsun Sağlık Bilimleri Dergisi*. Vol. 7 (1). DOI: 10.47115/jshs.1084034 [in Turkish].
- Scharmen, F. (2021). *Space Forces: A Critical History of Life in Outer Space*. New York.
- Sparavigna, A. C. (2016). Astronomy and Tidal Analysis Applied to the Study of Julius Caesar's Commentarii. *SSRN Electronic Journal*. DOI: 10.2139/ssrn.2817327.
- Spektor, B. (2019). *The World's First Space Crime May Have Occurred on the International Space Station Last Year* / Live Science. URL: <https://www.livescience.com/anne-mcclain-space-crime.html>.
- Townsley, M. (2008). Visualising Space Time Patterns in Crime: The Hotspot Plot. *Crime Patterns and Analysis*. Vol. 1. URL: <http://hdl.handle.net/10072/25749>.
- Trombka, J. I., Schweitzer, J., Selavka, C., Dale, M., Gahn, N., Floyd, S., Marie, J., Hobson, M., Zeosky, J., Martin, K., McClannahan, T., Solomon, P., Gottschang, E. (2002). Crime scene investigations using portable, non-destructive space exploration technology. *Forensic Science International*. Vol. 129 (1). DOI: 10.1016/S0379-0738(02)00079-8.
- Vandeviver, C., Bernasco, W. (2017). The geography of crime and crime control. *Applied geography*. Vol. 86. DOI: 10.1016/j.apgeog.2017.08.012.
- What is Microgravity? (2009) / NASA. URL: <https://www.nasa.gov/centers-and-facilities/glenn/what-is-microgravity/>.
- White, R. (2021). Plugging the Leaks in Outer Space Criminal Jurisdiction: Advocation for the Creation of a Universal Outer Space Criminal Statute. *Emory Int'l L. Rev.* Vol. 35 (2). URL: <https://scholarlycommons.law.emory.edu/eilr/vol35/iss2/5>.
- Wright, D., Grego, L., Gronlund, L. (2005). *The Physics of Space Security: A Reference Manual*. Cambridge. URL: <https://www.amacad.org/publication/physics-space-security-reference-manual>.

Tan, G. A. (2024). Criminalistics and Crime Scene Investigation in Microgravity Space. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). P. 132–145. DOI: 10.32353/khrife.1.2024.08.

Initial Stage of Deliberate Murder Investigation Motivated by Racial, National or Religious Intolerance

Eluchka Kazarian *

* Post-graduate student at NSC «Hon. Prof. M. S. Bokarius FSI», Kharkiv; Petro Mohyla Black Sea National University, Mykolaiv, Ukraine, ORCID: <https://orcid.org/0000-0002-7353-2599>, e-mail: elia.kazarian@ukr.net

DOI: 10.32353/khrife.1.2024.09 UDC 343.98

Received: 15.01.2024 / Reviewed: 29.01.2024 / Accepted for Print: 27.03.2024 /
Available online: 29.03.2024



The Article Purpose is to specify peculiarities of the initial investigation stage of deliberate murder motivated by racial, national or religious intolerance. To fulfil this goal, the author uses general scientific and special research methods: analysis, synthesis; formal-logical; logical-legal; legal analysis. The author studies into peculiarities of the initial investigation stage of deliberate murder driven by racial, national or religious intolerance. Emphasis is made on the importance of identifying typical investigative situations at the initial investigation stage, where specific investigative (detective) actions are taken to collect information, identify signs of a crime and develop investigative leads. At this investigation stage, forensic experts solve specific tasks, assess investigative situation, identify sources of information, determine investigation direction, plan interaction with operational agencies, and collect information about crime circumstances, the victim, and the suspect. The author notes the difficulty of determining the motive of intolerance at the initial stage and the possibility of changing criminal law qualification in the course of pre-trial investigation. The paper highlights the necessity for thorough investigation at the initial stage, especially during the development of forensic methodology, to distinguish murders based on intolerance from other types of murders. It has been established that urgent investigative (search) actions at this stage are: inspecting

This article is translation of the original Ukrainian content, which source is available at the link: <https://khrife-journal.org/index.php/journal> (translated by Daryna Dukhnenko). The author acknowledges translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

crime scene, interrogating witnesses, and appointing and conducting forensic examinations. Classification of investigative situations based on the sources of initiation of pre-trial investigation and information components serves as the basis for efficient investigation planning.

Keywords: *pre-trial investigation initial stage; deliberate murder; intolerance motive (racial, national, religious); investigative situation.*

Research Problem Formulation

The initial stage of investigating deliberate murder with motives of racial, national, or religious intolerance has a particular nature. The investigation process for this category of crimes cannot be effectively conducted without outlining the necessary investigative (search) actions and subsequent steps of the investigator. This process is crucial as it contributes to obtaining information about criminal actions, developing a specific investigative lead, and identifying suspects.

Successful resolution of tasks at the initial investigation stage can significantly enhance the efficiency of the entire investigation process and help reveal the truth about a committed crime.

These activities should be carried out under the requirements of current Criminal Procedure Law and scientific guidelines.

Article Purpose

To outline peculiarities of the initial investigation stage in cases of deliberate murder motivated by racial, national, or religious intolerance.

Research Methods

To achieve the set goal, general scientific and special research methods have been employed: analysis, synthesis; formal-logical; logical-legal; legal analysis.

Analysis of Essential Researches and Publications

Peculiarities of the initial investigation stage (particularly, deliberate murder with motives of racial, national, or religious intolerance) have been studied by both domestic (A. Borovyk ¹, A. Volobuiev ² with co-authors, O. Harasymiv ³ with

-
- 1 Боровик А. М. Особливості криміналістичної характеристики злочинів, вчинених з мотивів расової, національної чи релігійної нетерпимості, і предмету доказування у досудовому розслідуванні : дис. ... канд. юрид. наук. Маріуполь, 2021. 246 с.
 - 2 Волобуєв А. Ф., Одерій О. В., Степанюк Р. Л. та ін. Криміналістика : підручник. У 2 т. Т. 2 / за заг. ред. А. Ф. Волобуєва, Р. Л. Степанюка, В. О. Маляррової ; МВС України, ХНУВС. Харків, 2018. 312 с. URL: <https://dspace.univd.edu.ua/items/7391f531-f696-442a-b108-7ce06abbe7ad> (date accessed: 20.12.2023).
 - 3 Гарасимів О. І., Духенюк О. М., Захарова О. В. та ін. Методика розслідування окремих видів злочинів : навч. посіб. / за заг. ред. Є. В. Пряхіна. 2-ге вид., перероб. та допов. Львів, 2019. 312 с. URL: <https://dspace.lvduvs.edu.ua/handle/1234567890/2746> (date accessed: 20.12.2023).

co-authors, I. Kohutych ⁴, T. Pazynych ⁵, V. Tishchenko ⁶, V. Shevchuk ⁷, and others), and foreign researchers (C. Roberts and co-authors ⁸, M. Hagerlid and G. Granström ⁹, M. Juutinen ¹⁰). Nevertheless, despite the existing theoretical and practical developments in this area, multidisciplinary research on the peculiarities of the initial investigation stage of deliberate murder motivated by racial, national, or religious intolerance requires subsequent research.

Main Content Presentation

The initial investigation stage into deliberate murder committed on grounds of racial, national, or religious intolerance is of particular importance. In order to ensure full collection of information about committed crimes, it is vital to conduct appropriate investigative actions at the initial investigation stage, which will contribute to establishing features of a crime, collecting initial evidence from the crime scene to identify suspects, and developing and

verifying specific investigative leads. The initial investigation stage determines the general direction of investigation, aims at developing evidentiary basis, which allows establishing the suspect's guilt in committing a murder. Therefore, efficiency of investigating this crime category depends on the completeness and quality of the initial criminal procedural activities conducted by law enforcement agencies.

Thus, V. Shevchuk emphasizes that the *crime investigation stage* term defines a specific period (phase) within the overall process of investigating a crime. This stage reflects the status of the investigation and aims to address specific tasks related to establishing the subject of proof and making procedural decisions in a crime. These decisions are influenced by investigation circumstances and peculiarities of conducting investigative, operational (search), and other actions, tactical-forensic complexes, including tactical operations ¹¹.

Currently, we observe a trend towards reducing the number of stages in criminal

- 4 Когутич І. І. Типові ситуації початкового етапу розслідування вбивств та обумовлені ними алгоритми дій слідчого. *Вісник Чернівецького факультету Національного університету «Одеська юридична академія»*. 2013. Вип. 1. С. 233–247. URL: http://nbuv.gov.ua/UJRN/vchfo_2013_1_25 (date accessed: 20.12.2023).
- 5 Пазинич Т. А. Особливості розслідування вбивств з мотивів расової, національної чи релігійної нетерпимості. *Актуальні проблеми вітчизняної юриспруденції*. 2016. № 5. С. 121–124. URL: <https://dspace.univd.edu.ua/items/84e23b5a-ac49-40bb-998e-064872aaf48a> (date accessed: 20.12.2023).
- 6 Тищенко В. В. Теоретичні і практичні основи методики розслідування злочинів : монографія. Одеса, 2007. 260 с.
- 7 Шевчук В. М. Тактичні операції у криміналістиці: теоретичні засади формування та практика реалізації : монографія. Харків, 2013. 440 с.
- 8 Roberts C., Innes M., Williams M., Tregidga J., Gadd D. Understanding who commits hate crime and why they do it. Welsh Government Social Research, 2013. 73 p. URL: <https://orca.cardiff.ac.uk/id/eprint/58880/1/understanding-who-commits-hate-crime-and-why-they-do-it-en.pdf> (date accessed: 20.12.2023).
- 9 Hagerlid M., Granström G. Hate Crime Investigation and Sentencing in Sweden: What Have We Learned in the Past 20 Years? *European Journal on Criminal Policy and Research*. 2023. 18 p. DOI: [10.1007/s10610-023-09563-9](https://doi.org/10.1007/s10610-023-09563-9) (date accessed: 20.12.2023).
- 10 Juutinen M. Hate crimes and their handling in the criminal process. Ministry of Justice, Finland, Helsinki, 2021. 119 p. URL: <https://julkaisut.valtioneuvosto.fi/handle/10024/163385> (date accessed: 20.12.2023).
- 11 Шевчук В. М. *Op. cit.*

investigation methodology. A. Milevska notes that earlier most researchers preferred to distinguish three stages of pre-trial investigation (initial, subsequent, and final) with certain variations in their names. At present, in connection with the updating of the Criminal Procedure Law of Ukraine, the emphasis is made on two stages of this stage¹².

M. Juutinen points out that a criminal proceeding begins with crime notification, which is recorded by the police. The police consider notifications of crimes in two stages, the first of which is preliminary investigation of offenses. The actual pre-trial investigation constitutes the second stage. During preliminary investigation, the police establish grounds for suspicion of committing an offense, and if such grounds exist, they initiate pre-trial investigation¹³.

As set out in Part 1 of Article 214 of the Criminal Procedure Code of Ukraine (hereinafter referred to as the CPC of Ukraine), “investigator, inquiring officer or public prosecutor shall immediately but in any case no later than within 24 hours after submission of a report, notification on a criminal offence that has been committed or after he has learned on his own from any source about circumstances which are likely to indicate that a criminal offence has been committed, to enter the information concerned in the Unified Register of Pre-Trial Investigations, and to initiate in-

vestigation”¹⁴. In urgent situations, it is permissible to conduct scene inspection before entering information into the Unified Register of Pre-trial Investigations (hereinafter referred to as *the URPI*); in such cases, the information is entered promptly after inspection completion¹⁵.

In addition to scene inspection, the Law of Ukraine *On the National Police* envisages the following preventive measures:

- “1) document check of the person;
- 2) questioning of the person;
- 3) frisk and inspection;
- 4) stopping a vehicle;
- 5) requiring to leave the place and restricting access to the specific territory;
- 6) restricting of movement of the person or the vehicle or actual ownership of a thing;
- 7) entering the home or other property of the person;
- 8) verification of compliance with requirements of the permit system of bodies of internal affairs;
- 9) use of technical equipment and technical means which have functions of photo and filming, video recording, photographic, filming and video equipment;
- 10) control of compliance with restrictions established by law in respect of persons who are under administrative supervision, and other categories of persons;
- 11) police custody” (Part 1 Art. 31)¹⁶.

The initial stage of investigating any criminal offense includes a set of

12 Мілевська А. О. Слідчі ситуації на початковому етапі розслідування кримінальних правопорушень, пов'язаних з підробленням нотаріальних документів. *Міжнародний юридичний вісник: збірник наукових праць Національного університету державної податкової служби України*. 2016. Вип. 2 (4). С. 30—37. URL: <https://docplayer.net/72551064-Mizhnarodniy-yuridichniy-visnik-zbirnik-naukovih-prac-nacionalnogo-universitetu-derzhavnoyi-podatkovoyi-sluzhbi-ukrayini.html> (date accessed: 20.12.2023).

13 Juutinen M. Op. cit. URL: <https://julkaisut.valtioneuvosto.fi/handle/10024/163385> (date accessed: 20.12.2023).

14 Кримінальний процесуальний кодекс України від 13.04.2012 р. № 4651-VI (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 20.12.2023).

15 Ibid.

16 Про Національну поліцію : Закон України від 02.07.2015 р. № 580-VIII (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/580-19#Text> (date accessed: 20.12.2023).

organizational measures (planning the start of investigation, developing leads, etc.), urgent investigative (search) actions, and operational (search) actions.

For example, V. Maliarova, defining the content and limits of the stages of crime investigation, notes that the initial stage begins with the registration of information about the event in the URPI and ends with the issuance of a written notification of suspicion taking place when there is sufficient evidence (clause 3 of Part 1 of Article 276 of the Criminal Procedure Code of Ukraine)¹⁷. I. Kohutych differentiates between three stages in the process of investigating crimes (including murders):

- 1) *the initial stage*, which includes the period of conducting investigative (search) actions, the time aspect of which is characterized by urgency. According to the author, it starts simultaneously with the pre-trial investigation, as specified in Part 1 of Article 214 of the Criminal Procedure Code of Ukraine, and ends with fulfilment of tasks associated with this stage;
- 2) *the next (subsequent) stage* encompasses the period of conducting remaining investigative (search) actions aimed at systematically and thoroughly collecting and examining evidence in a proceeding;
- 3) *the final stage* begins from the moment the investigator (prosecutor) decides to complete the investigation and continues until an authorized person adopts one of the procedural decisions stipulated in Article 283 of the Criminal Procedure Code of Ukraine¹⁸.

So, there are various approaches to staging the process of investigating crimes, which significantly affect determination of boundaries for these stages.

We find the viewpoint regarding determination of the initial stage boundaries quite controversial, particularly the identification of its beginning with the start of pre-trial investigation, which (as envisaged in clause 5 of Part 1 of Article 3 of the Criminal Procedure Code of Ukraine) is a stage of a criminal proceeding that begins from the moment information about a criminal offense is entered into the Unified Register of Pre-Trial Investigations¹⁹. Since investigative (search) actions can be carried out before information about a crime is entered into the Unified Register of Pre-trial Investigations, the initial stage of pre-trial investigation begins earlier. For example, in the case of a murder, after which a crime scene investigation team is dispatched to the scene of the murder where it conducts informational and investigative activities, i.e., examines the crime scene and the body, and identifies, collects physical evidence.

According to V. Tishchenko, the tasks of the initial stage of investigating crimes include:

- without a delay identifying and documenting evidence of the investigated crime at the scene;
- taking measures to prevent the loss of evidentiary information contained in traces, documents, and other objects, and its timely detection and documentation;
- clarifying and assessing the investigative situation developed after the criminal case is initiated;

17 Малярова В. О. Етапізація процесу розслідування злочинів проти моральності у сфері статевих стосунків. *Право і Безпека*. 2013. № 3 (50). С. 86–91. URL: http://nbuv.gov.ua/UJRN/Pib_2013_3_19 (date accessed: 20.12.2023).

18 Когутич І. І. *Оп. cit.* URL: http://nbuv.gov.ua/UJRN/vchfo_2013_1_25 (date accessed: 20.12.2023).

19 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 20.12.2023).

- determining sources of information about the investigated crime;
 - developing an investigation plan;
 - selecting forms and methods of interaction with agencies and services involved in operational (search) activities;
 - searching for and gaining information about the mechanism and circumstances of a committed crime;
 - collecting and studying information about the victim;
 - searching for, obtaining, and analyzing information about persons who have committed a crime, as well as searching for and apprehending them ²⁰.
- services engaged in operational activities;
 - searching for and obtaining information about the mechanism and circumstances of the committed crime;
 - collecting and analyzing information about the victim;
 - searching for, collecting and analyzing information about the perpetrators of the crime, as well as searching for and arresting them ²¹.

The initial stage of qualifying a socially dangerous act containing features of a criminal offense is entering information about the commission of a criminal offense into the URPI. Thus, according to clause 5 of Part 5 of Article 214 of the Criminal Procedure Code of Ukraine, the following information shall be entered in the Unified Register of Pre-Trial Investigations: provisional legal qualification of the criminal offence with indication of Article (part of the Article) of the Ukrainian law on criminal liability ²². This provision is duplicated in paragraph 6 of clause 1 of Chapter 1 of Section II of the Provisions on the Unified Register of Pre-trial Investigations, its Formation and Maintenance ²³.

M. Hagerlid and G. Granström point out that challenges related to collecting evidence confirming the presence of intolerance motives arise during the investigation stage. Thorough documentation of a crime at the initial investigation stage is

In turn, H. Moskalenko emphasizes that the tasks of the initial investigation stage are:

- clarification and assessment of the investigative situation that has occurred after the start of criminal investigation (further leads are developed, tactical tasks are determined, and means for their verification and resolution are selected);
- identifying sources of information about the crime being investigated;
- determining the direction of the investigation and developing an investigation plan;
- selecting forms and methods of interaction with agencies and

20 Тіщенко В. В. *Op. cit.*

21 Москаленко Г. В. Поняття та особливості етапів розслідування злочинів. *Актуальні проблеми держави і права*. 2009. Вип. 49. С. 376—380. URL: <http://www.apdp.in.ua/v49/64.pdf> (date accessed: 20.12.2023).

22 Кримінальний процесуальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 20.12.2023).

23 Положення про Єдиний реєстр досудових розслідувань, порядок його формування та ведення : затв. наказом Генпрокурора від 17.08.2023 р. № 231. URL: <https://zakon.rada.gov.ua/laws/show/v0298905-20#Text> (date accessed: 20.12.2023).

crucial for further investigation and trial. Additionally, measures should be taken to document the existence of intolerance motives: photographing symbols of intolerance, verifying inconsistencies in the perpetrator's statements; investigating signs of repeat offenses; and checking the perpetrator's membership in organizations associated with intolerance ²⁴.

O. Harasymiv and his co-authors note that it is not always possible to qualify the suspect's actions during investigation of violent crimes based on intolerance motives at the beginning of pre-trial investigation. Such qualification becomes possible only from the moment when the suspect is identified as the perpetrator of the crime, i.e., from the moment of suspicion announcement, because the motive is an element of the subjective side of a crime, and its proof is practically impossible without the participation of the suspect or the accused. What is more, the information entered into the URPI should contain details about the initial criminal legal qualification. Therefore, in the investigation of crimes committed for intolerance motives, the primary criminal-legal qualification always includes the qualification as a crime against life and health, without specifying any qualifying signs or other qualifying features that are evident at the time of entering the information into the URPI ²⁵.

It is worth mentioning that at the initial stage of investigating deliberate murder based on racial, national, or religious intolerance motives, it is quite challenging to prove the fact of deliberate murder spe-

cifically motivated by racial, national, or religious intolerance. Events under such conditions can be classified as murder (Part 1 of Article 115 of the Criminal Code of Ukraine ²⁶, hereinafter referred to as *the CC of Ukraine*) or as a murder based on hooligan motives (clause 7 of Part 2 of Article 115 of the CC of Ukraine ²⁷). After registering a criminal proceeding and conducting overt and covert investigative (search) actions aimed at clarifying case circumstances, and in the availability of sufficient evidence confirming commission of deliberate murder specifically motivated by racial, national or religious intolerance, investigators change the legal qualification of the criminal offense from Part 1 of Article 115 of the Criminal Code of Ukraine or clause 7 of Part 2 of Article 115 of the Criminal Code of Ukraine to clause 14 of Part 2 of Article 115 of the Criminal Code of Ukraine ²⁸.

The decision to amend initial legal qualification is typically taken prior to formally informing a person of suspicion, and is accompanied by an appropriate resolution. If new factual details pertaining to a criminal offense come to light during the pre-trial investigation or trial involving the accused, there exists the possibility of adjusting the offense's qualification. This may involve creating a new suspicion or modifying a previously issued one. The change in the notice of suspicion may be expressed in a change in the qualification formula or only in a change in the scope of charge without changing the qualification formula. Where notice of suspicion was given by the public prosecutor, only the public prosecutor shall have the right to

24 Hagerlid M., Granström G. Op. cit. DOI: [10.1007/s10610-023-09563-9](https://doi.org/10.1007/s10610-023-09563-9) (date accessed: 20.12.2023).

25 Гарасимів О. І., Дуфенюк О. М., Захарова О. В. та ін. Op. cit. URL: <https://dspace.lvduvs.edu.ua/handle/1234567890/2746> (date accessed: 20.12.2023).

26 Кримінальний кодекс України від 05.04.2001 р. № 2341-III (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/2341-14#Text> (date accessed: 20.12.2023).

27 Ibid.

28 Ibid.

notify of the new suspicion or to change previously notified suspicion²⁹).

For instance, in criminal case No. 12020050790001071, the legal qualification of the criminal offense was changed from Part 2 of Article 15, clause 7 of Article 115 of the Criminal Code of Ukraine to Part 2 of Article 15, clause 14 of Article 115 of the CC of Ukraine based on the fact of attempted deliberate murder motivated by religious intolerance. After collecting enough evidence to suspect a person of committing the crime, a suspicion notice for committing the criminal offense under Part 2 of Article 15, clause 14 of Article 115 of the Criminal Code of Ukraine was drawn up³⁰.

From O. Pchelina's perspective, the main tactical tasks of the initial investigation stage are:

“• establishing location, time, and circumstances of a crime;

- identifying, documenting, and collecting evidence of a crime and other physical evidence;
- identifying, searching for, and apprehending the suspect;
- assessing the extent of damage and searching for stolen or seized property to ensure compensation for losses incurred;
- gathering sufficient evidence to bring charges against a person;

• identification of possible witnesses, etc.”³¹.

C. Roberts and co-authors focus on certain patterns leading to incidents motivated by intolerance. As an example, they note that in areas with high societal tension, incidents may occur in “chains” or sequentially, as the processes of action and reaction are linked to specific events in time³².

The circumstances requiring clarification during the investigation of deliberate murder motivated by racial, national, or religious intolerance unquestionably demand thorough examination when forming a distinct forensic methodology. This is stipulated in the provisions of Part 2 of Article 9 of the CPC of Ukraine: “Public prosecutor, chief officer of pre-trial investigation agency, investigator shall be required to examine the circumstances of criminal proceedings comprehensively, fully and impartially; find circumstances both of incriminating and exculpatory nature in respect of the suspect, the accused, as well as the circumstances mitigating and aggravating their punishment; provide due legal evaluation thereof and ensure the adoption of lawful and impartial procedural decisions”³³.

Particularly, it is important to pay attention to the circumstances that make it possible to distinguish deliberate murder motivated by racial, national, or religious

29 Кримінальний процесуальний кодекс ... URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 20.12.2023).

30 Ухвала Красногвардійського райсуду м. Дніпропетровська від 24.10.2022 р. Справа № 227/1045/22. Провадж. № 1-кв/204/1930/22. URL: <https://revestr.court.gov.ua/Review/106910601> (date accessed: 20.12.2023).

31 Пчеліна О. В. Тактичні завдання розслідування злочинів і криміналістична методика. *Криміналістичний вісник*. 2012. № 2 (18). С. 48–52. URL: <https://dspace.univd.edu.ua/items/144f347d-933a-4fbf-ad60-77f1e7603198> (date accessed: 20.12.2023).

32 Roberts C., Innes M., Williams M., Tregidga J., Gadd D. Op. cit. URL: <https://orca.cardiff.ac.uk/id/eprint/58880/1/understanding-who-commits-hate-crime-and-why-they-do-it-en.pdf> (date accessed: 20.12.2023).

33 Кримінальний процесуальний кодекс ... URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 20.12.2023).

intolerance from other types of murders at the initial investigation stage. These circumstances include:

- a victim's belonging to a specific race, nationality, or religion or a perpetrator's acceptance of such belonging;
- existence of reasons indicating the perpetrator's desire to prove the victim's inferiority due to belonging to a certain race, nationality or religion, demonstrating prejudice and hatred towards a certain social group.

T. Pazynych has identified the following urgent investigative (search) actions at the initial stage of investigating murders with signs of racial, national, or religious intolerance motive:

- inspection of the scene to identify features indicating a xenophobic motive for the crime (such as the presence of specific items, attributes, inscriptions, symbols, etc.);
- interrogation of witnesses and eyewitnesses about circumstances preceding a crime, circumstances of the attack itself, and events afterward;
- submission of a request to the criminal investigation unit for information regarding the whereabouts of an individual registered in connection with the case;
- submission of a request to the criminal investigation team to look into youth groups with the aim of locating suspects and monitoring pertinent internet resources in order to gather potential information about the conducted action;

- conduct of personal searches and presenting apprehended suspects for identification;
- arrangement and appointment of forensic medical examinations of the corpse and other examinations depending on seized objects (trace evidence, dactyloscopic, ballistic, forensic, cold weapons, forensic medical, molecular-biological [DNA analysis], etc.)³⁴.

Stemming from the above, at the initial stage of investigating deliberate murder motivated by racial, national, or religious intolerance, the following investigation program can be developed:

- analyze the initial information and typify investigative situations considering information about the perpetrator and the victim;
- develop investigative leads about a committed crime (regarding a crime, method of commission, etc.);
- identify primary and secondary investigation tasks.

To address the tasks at the initial stage of investigating deliberate murder motivated by racial, national, or religious intolerance, the investigator should: inspect a crime scene; record information in the URPI; interrogate the applicant and witnesses; appoint forensic examinations. After entering the information into the URPI, it is advisable to conduct these investigative (search) actions:

- interrogate eyewitnesses of a murder in order to gather their testimonies as witnesses to a crime;
- interrogate individuals who possess information about the perpetrator and the victim (origin, distinctive marks, etc.);
- appoint forensic examinations.

34 Пазинич Т. А. Оп. cit. URL: <https://dspace.univd.edu.ua/items/84e23b5a-ac49-40bb-998e-064872aaf48a> (date accessed: 20.12.2023).

In Ye. Khyzhniak's view, the investigative situation, much like the forensic profile, is a vital tool for investigators, allowing them to maximize the efficiency of crime investigations. Knowledge of typical investigative situations helps identify priority tasks and avoid waste of time and effort. By comparing a typical investigative situation with that encountered during the investigation of a specific crime and considering the relationships between components of the forensic profile for this group of crimes, investigators can develop an investigation plan and effectively solve the task of establishing the perpetrator's identity³⁵.

Other scientists are convinced that the investigative situation is a category of forensic tactics. For example, V. Veselskyi asserts that the investigative situation belongs to the realm of concepts of forensic tactics and, like other tactical-forensic terms, is implemented in forensic methodology. He justifies this conclusion by stating that the investigative situation specifically defines the tactics of certain investigative actions³⁶.

In our opinion, the investigative situation can be viewed as both a forensic tactic and a forensic methodology. However, forensic methodology takes precedence because the investigative situation arises at the beginning of the preliminary investigation and investigative actions serve as a means of investigating a crime.

V. Piaskovskyi has found out that typification of investigative situations at

the initial stage of crime investigations may stem from various criteria, namely: the volume and content of data for entry into the URPI; the nature of the typical "trace pattern"; methods for crime commission (situations of preparation, immediate commission, concealment, and use of criminal activity outcomes)³⁷.

It is worth pointing out that the classification of typical investigative situations at the initial stage of investigating deliberate murder motivated by racial, national or religious intolerance may include such characteristics as: the amount of evidence obtained, the presence of suspects, the presence or absence of forensically significant information during the investigation process, etc.

Specifically, A. Volobuiev, along with co-authors, notes that typical investigative situations at the initial investigation stage are of particular importance for developing specific practical guidelines for each individual investigation methodology. He views the investigative situation in criminalistics as the conditions of investigating a criminal offense at a certain point in time. Scholars highlight the following investigation factors:

- informational (in particular, data about a crime: evidence, operational search information);
- procedural (for example, the presence of a suspect at a certain point in an investigation);
- tactical (for example, the position taken by the suspect during interrogation);

35 Хижняк Є. С. Типові слідчі ситуації при розслідуванні статевих злочинів щодо малолітніх. *Південноукраїнський правничий часопис*. 2012. № 4. С. 197–199. URL: http://nbuv.gov.ua/UJRN/Pupch_2012_4_68 (date accessed: 20.12.2023).

36 Весельський В. К. Слідча ситуація як категорія криміналістичної тактики. *Боротьба з організованою злочинністю і корупцією (теорія і практика)*. 2011. Вип. 25–26. С. 193–199. URL: http://nbuv.gov.ua/UJRN/boz_2011_25-26_22 (date accessed: 20.12.2023).

37 Пясковський В. В. Методика розслідування торгівлі людьми : дис. ... канд. юрид. наук. Київ, 2004. 225 с.

- psychological (peculiarities of the psychology of persons participating in an investigation);
- material, technical and organizational (availability of necessary resources and possibilities for their use)³⁸.

Researchers acknowledge that they approach the investigative situation concept broadly. However, while developing specific investigation methodologies, they have found it challenging to typify certain factors (such as psychological, material-technical, and organizational). Consequently, in forensic methodology, the *investigative situation* term is used narrowly, referring to a compilation of crime-related information that dictates investigative tasks and corresponding methods for their resolution, encompassing both overt and covert investigative actions. Typical investigative situations emerge within specific investigation methodologies during the initiation of a criminal proceeding, contingent upon the nature of the initial crime-related information³⁹.

T. Volikov defines a typical investigative situation as *“a set of conditions at a specific moment in the investigation of a criminal offense that influences the selection of actions by authorized individuals for the optimal resolution of tasks in a criminal proceeding”*⁴⁰.

In proceedings involving deliberate murder motivated by racial, national, or religious intolerance, it is essential to clarify the following circumstances:

- the place, time, and environment, including events that preceded and

could have provoked the attack on a person;

- the method of committing a murder, means and instruments of a crime, the number of accomplices, and their roles;
- the existence of statements or actions (gestures, looks, etc.) of a xenophobic nature from the suspect before, during, or after the attack;
- information about the suspect's identity that could mitigate or aggravate a punishment;
- data about the victim, including their belonging to a specific racial, national, or religious group;
- detailed circumstances of the victim's presence at the site of the attack;
- the victim's actions before and during the attack, and the presence or absence of conflict, provocation, or attempts to resist the perpetrators;
- types of violence inflicted on a victim, including physical injuries resulting in death⁴¹.

Given the above, let's note that typical investigative situations are a significant component of the methodology for investigating certain types of crimes, specifically deliberate murders motivated by racial, national, or religious intolerance. For example, K. Nazarenko emphasizes the significance of analyzing and evaluating the investigative situation, as it enables an understanding of the wide range of

38 Волобуєв А. Ф., Одерій О. В., Степанюк Р. Л. та ін. *Op. cit.* URL: <https://dspace.univd.edu.ua/items/7391f531-f696-442a-b108-7ce06abbe7ad> (date accessed: 20.12.2023).

39 Ibid.

40 Воликов Т. Наукові диспути стосовно типових слідчих ситуацій при розслідуванні кримінальних правопорушень проти власності, вчинених в умовах воєнного стану. *Актуальні питання у сучасній науці*. 2023. № 7 (13). С. 250—260. DOI: 10.52058/2786-6300-2023-7(13)-250-260 (date accessed: 20.12.2023).

41 Пазинич Т. А. *Op. cit.* URL: <https://dspace.univd.edu.ua/items/84e23b5a-ac49-40bb-998e-064872aaf48a> (date accessed: 20.12.2023).

facts and phenomena associated with the perpetrator at this stage of an investigation. Additionally, the scholar notes that this process contributes to the understanding of scientific knowledge in forensic science, particularly concerning typical physical evidence (traces). This approach enables the study of methods and practices for locating sources, extracting information from them, documenting it, and preserving it. The researcher emphasizes that the investigative situation influences the formulation of leads regarding the whereabouts and traces containing information about the perpetrator. Consequently, this aids in selecting the most suitable tactical approaches, combinations, and recommendations for evidence collection. It should be noted that the analysis of the investigative situation helps the authorized person to select effective forensic techniques and methods for fulfilling the goal, as well as the most efficient forms of applying specific expertise and cooperating with investigative bodies in order to obtain forensically significant information about the perpetrator⁴². Thus, the analysis of specific typical investigative situations aids in the resolution of all the mentioned tasks.

Depending on the level of conflict, investigative situations are divided into conflictual (when the subject withholds information); non-conflictual (when the subject reports known information without withholding or distorting anything), and weakly conflictual (when the subject has important information to convey but, due to certain subjective or objective factors, perceives and reproduces it with misrepresentation)⁴³. Let's point out

that during the investigation of criminal proceedings involving deliberate murder motivated by racial, national, or religious intolerance, conflictual investigative situations may take place (especially during procedural actions involving the suspect) along with non-conflictual investigative situations (during interrogation of individual witnesses).

Investigative situations at the initial stage of investigating deliberate murder motivated by racial, national, or religious intolerance can be classified based on the characteristics of the investigation progress, which encompass typical investigative situations according to the criteria listed below:

- source of information about the crime event;
- level of the suspect's awareness regarding the identification of features indicating his / her involvement in the murder;
- counteraction to murder investigation.

Stemming from the analysis of criminal proceedings, it is important to emphasize that typical investigative situations at the initial stage should be classified depending on the source of information about the committed criminal offense. Such an approach impacts the volume of initial objective data and determines the moment of commencement of a criminal proceeding. Typical investigative situations at the initial investigation stage should be defined in accordance with the grounds for initiating pre-trial investigation set out in Article 214 of the Criminal Procedure Code of Ukraine. According to the materials of criminal proceedings related

42 Назаренко К. Ю. Розслідування злочинів, пов'язаних зі створенням або утриманням місць розпусти і звідництвом : дис. ... канд. юрид. наук. Дніпро, 2016. 218 с.

43 Вигівський І. М., Дрозд В. Г. Теоретичні та практичні основи формування методики досудового розслідування захоплення заручників : монографія. Київ, 2023. 368 с. URL: <https://dspace.oduvs.edu.ua/items/0acc7a5d-81af-4cd7-9c59-c1dab9f1c1a2> (date accessed: 20.12.2023).

to deliberate murders motivated by racial, national, or religious intolerance, pre-trial investigations are initiated upon the appeal of individual citizens, particularly when information is received from an eyewitness to a murder. In such investigative situations, after entering the information into the URPI to establish the circumstances of a criminal offense, the applicant is interrogated as a witness.

For instance, the verdict of the Zhytomyr Oblast Court of Appeals in criminal case No. 12017060170000543 states the statement on the committed offense ⁴⁴ that the wife reported that her husband had been stabbed by an unknown person and that she had also been physically assaulted in.

It is also important to consider the suspects' level of awareness about the discovery of their crime by relevant authorities when determining the direction for an investigation, especially with regard to whether investigative (search) actions are sudden in nature. For example, if: 1) the involvement of individuals in the discovered crime by law enforcement agencies is known, their actions are either completed or interrupted; 2) certain individuals are aware of crime discovery, but the criminal activity has not completely ceased; 3) persons involved in a crime are aware that law enforcement agencies are cognizant of their criminal activity, which has not ceased. From the perspective of countering the investigation at the initial stage, the following types of similar situations can be distinguished: 1) lack of

resistance to investigation; 2) resistance to investigation ⁴⁵.

A. Borovyk distinguishes the following two typical investigative situations at the beginning of pre-trial investigations into crimes committed on grounds of racial, national, or religious intolerance:

- 1) *the first investigative situation* occurs when a suspect as well as information about his/her identity and specific circumstances of a crime at the time of opening a criminal proceeding have been identified. This situation is marked by the fact that the information about the crime entered into the URPI contains sufficient features of motive, and the crime is classified according to the article of the Criminal Code of Ukraine that directly envisages this qualifying feature. Consequently, the perpetrator committed the crime with a specific motive, reflecting a hostile and biased attitude towards the victim based on his/her race, nationality, or religion;
- 2) *the second investigative situation* arises when the suspect is not identified at the time a criminal case is opened and must be searched for and identified, while certain circumstances of the crime are already known. This investigative situation is characterized by the fact that information entered into the URPI does not contain sufficient features of motive. Therefore, the crime is qualified without specifying the article that defines this qualifying feature ⁴⁶.

44 Вирок Житомирського апеляційного суду від 20.11.2023 р. Справа № 278/1904/17. Провадж. № 11-кп/4805/408/23. URL: <https://reyestr.court.gov.ua/Review/115015816> (date accessed: 20.12.2023).

45 Тімченко І. С. Типові слідчі ситуації початкового етапу розслідування умисного випуску на ринок України небезпечної продукції. *Молодий вчений*. 2014. № 12 (15). С. 285–288. URL: [http://irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?C21COM=2&I21DBN=UJRN&P21DBN=UJRN&IMAGE_FILE_DOWNLOAD=1&Image_file_name=PDF/molv_2014_12\(1\)_68.pdf](http://irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?C21COM=2&I21DBN=UJRN&P21DBN=UJRN&IMAGE_FILE_DOWNLOAD=1&Image_file_name=PDF/molv_2014_12(1)_68.pdf) (date accessed: 20.12.2023).

46 Боровик А. М. Оп. cit.

Another investigative situation should be mentioned: a person suspected of committing deliberate murder motivated by racial, national, or religious intolerance has been identified, but is evading pre-trial investigation authorities in order to avoid criminal liability.

An example of such an investigative situation is the ruling of Krasnohvardiyskyi District Court of Dnipropetrovsk City in criminal case No. 12020050790001071, where during the pre-trial investigation it was established that the suspect avoided appearing at the investigator's summons (without a valid reason failed to appear more than twice), was placed on the international wanted list, and is currently on the territory of the Russian Federation, which is recognized as an aggressor state (according to the appeal of the Verkhovna Rada of Ukraine No. 129-VIII dated 27.01.2015⁴⁷). The search for the suspect continues; he has not received permits to cross the contact line within the Donetsk region and has not crossed the state border of Ukraine. The court ruled that there is reasonable suspicion of this person committing criminal offenses, as he / she intentionally evades investigation and court on the territory of a state recognized by the Verkhovna Rada of Ukraine as an aggressor state, in order to avoid criminal liability, as specified in Part 2 of Article 15 and Part 1, clause 14 of Part 2 of Article 115 of the Criminal Code of Ukraine⁴⁸. Consequently, he / she has been declared internationally wanted, thus providing all legally defined grounds

for initiating special pre-trial investigation regarding this suspect⁴⁹.

Let's note: it is necessary to possess exhaustive information about a murder and its participants in order to typify investigative situations. Thus, during investigation of deliberate murder motivated by racial, national, or religious intolerance, based on information about the victim and the perpetrator of the murder (i.e., the informational component), the following typical investigative situations at the beginning of a pre-trial investigation can be singled out:

- identities of both the victim and the perpetrator are known;
- the victim is known, but the perpetrator is unknown;
- the victim is unknown, but the perpetrator is known;
- both the victim and the perpetrator are unknown, and the motive, time, place, and other circumstances of a murder are unknown;
- both the victim and the perpetrator are known, but the perpetrator is evading pre-trial investigation authorities in order to avoid criminal liability.

Conclusions

We have thoroughly analyzed approaches to defining the concept of the initial investigation stage and investigative situation, noting the complexity of

47 Звернення до Організації Об'єднаних Націй, Європейського Парламенту, Парламентської Асамблеї Ради Європи, Парламентської Асамблеї НАТО, Парламентської Асамблеї ОБСЄ, Парламентської Асамблеї ГУАМ, національних парламентів держав світу про визнання Російської Федерації державою-агресором : затв. постановою ВР України від 27.01.2015 р. № 129-VIII. URL: <https://zakon.rada.gov.ua/laws/show/129-19#Text> (date accessed: 20.12.2023).

48 Кримінальний кодекс URL: <https://zakon.rada.gov.ua/laws/show/2341-14#Text> (date accessed: 20.12.2023).

49 Ухвала Красногвардійського райсуду URL: <https://reyestr.court.gov.ua/Review/106910601> (date accessed: 20.12.2023).

determining the motive of intolerance at the initial stage and the possibility of changing the criminal-legal qualification during a pre-trial investigation. We have identified various types of typical investigative situations at the initial stage of deliberate murder motivated by racial, national, or religious intolerance, depending on the source of initiation of a pre-trial investigation and the informational component.

**Початковий етап розслідування
умисного вбивства з мотивів
расової, національної або релігійної
нетерпимості**

Елущка Казарян

Мета статті полягає в окресленні особливостей початкового етапу розслідування умисного вбивства з мотивів расової, національної або релігійної нетерпимості. Для досягнення поставленої мети використано загальнонаукові та спеціальні методи дослідження: аналіз, синтез; формально-логічний; логіко-юридичний; юридичного аналізу. Розглянуто особливості початкового етапу розслідування умисного вбивства з мотивів расової, національної або релігійної нетерпимості. Наголошено на важливості визначення типових слідчих ситуацій на початковому етапі розслідування, де проводяться конкретні слідчі (розшукові) дії зі збору інформації, виявлення ознак злочину та формування слідчих версій. На цьому етапі розслідування фахівці розв'язують конкретні завдання, оцінюють слідчу ситуацію, виявляють джерела інформації, визначають напрям розслідування, планують взаємодію з оперативними органами, збирають інформацію про обставини злочину, потерпілого й підозрюваного. Зауважено складність визначити мотив нетерпимості на почат-

ковому етапі та можливість змінити кримінально-правову кваліфікацію у процесі досудового розслідування. Підкреслено необхідність ретельного дослідження на початковому етапі, особливо під час розроблення криміналістичної методики, для відмежування вбивства на ґрунті нетерпимості від інших видів убивств. Визначено, що невідкладними слідчими (розшуковими) діями на цьому етапі є: огляд місця події, допит свідків, призначення та проведення судово-медичних експертиз. Класифікація слідчих ситуацій на основі джерел початку досудового розслідування й інформаційних компонентів є підґрунтям для ефективного планування розслідування.

Ключові слова: початковий етап досудового розслідування; умисне вбивство; мотив нетерпимості (расової, національної, релігійної); слідча ситуація.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the study design, data collection and analysis, decision to publish or manuscript preparation.

Participants

Author contributed solely to the intellectual discussion underlying this document, case law research, writing and editing and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Author declare no conflict of interest.

References

- Borovyk, A. M. (2021). *Osoblyvosti kryminalistychnoi kharakterystyky zlochyniv, vchynenykh z motyviv rasovoi, natsionalnoi chy relihiinoi neterpymosti, i predmetu dokazuvannia u dosudovomu rozsliduvanni* [Forensic characteristics of violent crimes committed on the grounds of racial,

- national or religious intolerance, and its connection with the subject of proof] : dys. ... kand. yuryd. nauk. Mariupol [in Ukrainian].
- Hagerlid, M., Granström, G. (2023). Hate Crime Investigation and Sentencing in Sweden: What Have We Learned in the Past 20 Years? *European Journal on Criminal Policy and Research*. DOI: 10.1007/s10610-023-09563-9.
- Harasymiv, O. I., Dufeniuk, O. M., Zakharova, O. V. ta in. (2019). *Metodyka rozsliduvannia okremykh vydiv zlochyniv* [Methods of investigation of certain types of crimes] : navch. posib. / za zah. red. Ye. V. Priakhina. 2-he vyd., pererob. ta dopov. Lviv. URL: <https://dspace.lvduvs.edu.ua/handle/1234567890/2746> [in Ukrainian].
- Juutinen, M. (2021). Hate crimes and their handling in the criminal process. Ministry of Justice, Finland, Helsinki. URL: <https://julkaisut.valtioneuvosto.fi/handle/10024/163385>.
- Khyzhniak, Ye. S. (2012). Typovi slidchi sytuatsii pry rozsliduvanni statevykh zlochyniv shchodo malolitnikh [Typical investigative situations in the investigation of sexual offenses against juveniles]. *Pivdennoukrainskyi pravnychi chasopys*. № 4. URL: http://nbuv.gov.ua/UJRN/Pupch_2012_4_68 [in Ukrainian].
- Kohutych, I. I. (2013). Typovi sytuatsii pochatkovoho etapu rozsliduvannia vbystv ta obumovleni nymy alhorytmy dii slidchoho [Common scenarios encountered during the initial stage of murder investigations and the corresponding action algorithms determined for the investigator]. *Visnyk Chernivetskoho fakultetu Natsionalnoho universytetu «Odeska yurydychna akademiia»*. Vyp. 1. URL: http://nbuv.gov.ua/UJRN/vchfo_2013_1_25 [in Ukrainian].
- Maliarova, V. O. (2013). Etapizatsiia protsesu rozsliduvannia zlochyniv proty moralnosti u sferi statevykh stosunkiv [Stage process while investigating crimes against morality in sexual intercourse]. *Pravo i Bezpeka*. № 3 (50). URL: http://nbuv.gov.ua/UJRN/Pib_2013_3_19 [in Ukrainian].
- Milevska, A. O. (2016). Slidchi sytuatsii na pochatkovomu etapi rozsliduvannia kryminalnykh pravoporushen, poviazanykh z pidroblenniam notarialnykh dokumentiv [Investigative situations at the initial stage of investigating criminal offenses related to forgery of notarial documents]. *Mizhnarodnyi yurydychnyi visnyk: zbirnyk naukovykh prats Natsionalnoho universytetu derzhavnoi podatkovoi sluzhby Ukrainy*. Vyp. 2 (4). URL: <https://docplayer.net/72551064-Mizhnarodniy-yuridichniy-visnyk-zbirnyk-naukovih-prac-natsionalnogo-universitetu-derzhavnoyi-podatkovoyi-sluzhbi-ukrayini.html> [in Ukrainian].
- Moskalenko, H. V. (2009). Poniattia ta osoblyvosti etapiv rozsliduvannia zlochyniv [Concept and features of the stages of crimes investigation]. *Aktualni problemy derzhavy i prava*. Vyp. 49. URL: <http://www.apdp.in.ua/v49/64.pdf> [in Ukrainian].
- Nazarenko, K. Yu. (2016). *Rozsliduvannia zlochyniv, poviazanykh zi stvorenniam abo utrymanniam mistv rozpusty i zvidnystv* [Investigation of crimes related to the establishment or maintenance of brothels and procurement] : dys. ... kand. yuryd. nauk. Dnipro [in Ukrainian].
- Pazynych, T. A. (2016). Osoblyvosti rozsliduvannia vbystv z motyviv rasovoi, natsionalnoi chy relihiinoi neterpymosti [Features of investigation of murders on reasons of racial, national or religious intolerance]. *Aktualni problemy vitchyznianoï yurysprudentsii*. № 5. URL: <https://dspace.univd.edu.ua/items/84e23b5a-ac49-40bb-998e-064872aaf48a> [in Ukrainian].
- Pchelina, O. V. (2012). Taktychni zavdannia rozsliduvannia zlochyniv i kryminalistychna metodyka [Tactical tasks of criminal investigation and forensic methodology]. *Kryminalistychnyi visnyk*. № 2 (18). URL: <https://dspace.univd.edu.ua/items/144f347d-933a-4fbf-ad60-77f1e7603198> [in Ukrainian].
- Piaskovskyy, V. V. (2004). *Metodyka rozsliduvannia torhivli liudmy* [Methodology for investigating human trafficking]: dys. ... kand. yuryd. nauk. Kyiv [in Ukrainian].
- Roberts, C., Innes, M., Williams, M., Tregidga, J., Gadd, D. (2013). *Understanding who commits hate crime and why they do it*. Welsh Government Social Research. URL:

<https://orca.cardiff.ac.uk/id/eprint/58880/1/understanding-who-commits-hate-crime-and-why-they-do-it-en.pdf>.

- Shevchuk, V. M. (2013). *Taktychni operatsii u kryminalistytsi: teoretychni zasady formuvannia ta praktyka realizatsii* [Tactical operations in forensic science: theoretical backgrounds of development and practical implementation] : monohrafiia. Kharkiv [in Ukrainian].
- Timchenko, I. S. (2014). Typovi slidchi sytuatsii pochatkovoho etapu rozsliduvannia umysnogo vypusku na rynek Ukrainy nebezpechnoi produktsii [Typical investigatory situations at the initial investigative stage of intentional dangerous product release at the market of Ukraine]. *Molodyi vchenyi*. № 12 (15). URL: [http://irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?C21COM=2&I21DBN=UJRN&P21DBN=UJRN&IMAGE_FILE_DOWNLOAD=1&Image_file_name=PDF/molv_2014_12\(1\)__68.pdf](http://irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?C21COM=2&I21DBN=UJRN&P21DBN=UJRN&IMAGE_FILE_DOWNLOAD=1&Image_file_name=PDF/molv_2014_12(1)__68.pdf) [in Ukrainian].
- Tishchenko, V. V. (2007). *Teoretychni i praktychni osnovy metodyky rozsliduvannia zlochyniv* [Theoretical and practical foundations of crime investigation methodology] : monohrafiia. Odesa [in Ukrainian].
- Veselskyi, V. K. (2011). Slidcha sytuatsiia yak katehoriia kryminalistychnoi taktyky [Investigative situation as a category of forensic tactics]. *Borotba z orhanizovanoiu zlochynnistiu i koruptsiieiu (teoriia i praktyka)*. Vyp. 25–26. URL: http://nbuv.gov.ua/UJRN/boz_2011_25-26_22 [in Ukrainian].
- Volikov, T. (2023). Naukovi dysputy stosovno typovykh slidchykh sytuatsii pry rozsliduvanni kryminalnykh pravoporushen proty vlasnosti, vchynenykh v umovakh voiennoho stanu [Scientific disputes regarding typical investigative situations in the investigation of criminal offenses against property committed under the conditions of marital state]. *Aktualni pytannia u suchasni nautsi*. № 7 (13). DOI: [10.52058/2786-6300-2023-7\(13\)-250-260](https://doi.org/10.52058/2786-6300-2023-7(13)-250-260) [in Ukrainian].
- Volobuiev, A. F., Oderii, O. V., Stepaniuk, R. L. ta in. (2018). *Kryminalistyka* [Criminalistics] : pidruchnyk. U 2 t. T. 2 / za zah. red. A. F. Volobuieva, R. L. Stepaniuka, V. O. Maliarovoi ; MVS Ukrainy, KhNUVS. Kharkiv. URL: <https://dspace.univd.edu.ua/items/7391f531-f696-442a-b108-7ce06abbe7ad> [in Ukrainian].
- Vyhivskyi, I. M., Drozd, V. H. (2023). *Teoretychni ta praktychni osnovy formuvannia metodyky dosudovoho rozsliduvannia zakhoplennia zaruchnykiv* [Theoretical and practical bases of developing methodology for pre-trial investigation of hostage-taking]: monohrafiia. Kyiv. URL: <https://dspace.oduvs.edu.ua/items/0acc7a5d-81af-4cd7-9c59-c1dab9f1c1a2> [in Ukrainian].

Kazarian, E. (2024). Initial Stage of Deliberate Murder Investigation Motivated by Racial, National or Religious Intolerance. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). P. 146–162. DOI: [10.32353/khrife.1.2024.09](https://doi.org/10.32353/khrife.1.2024.09).

Criminal Investigation Methods according to Hans Gross: Past and Present

Anatolii Starushkevych *

* PhD in Law, Docent, The University of Modern Knowledge, Kyiv, Ukraine,
ORCID: <https://orcid.org/0000-0001-7659-6646>, e-mail: stargdoc@gmail.com

DOI: 10.32353/khrife.1.2024.10 UDC 343.98

Received: 02.02.2024 / Reviewed: 02.02.2024 / Accepted for print: 27.03.2024 /

Available online: 29.03.2024



The primary concerns of this paper are to determine the role of the methods proposed by H. Gross during the formation and development of criminalistics and to prove their relevance today. To fulfil this goal, methods of scientific cognition have been applied: observation, comparison, abstraction, analysis, synthesis, modeling, etc. The contribution made by H. Gross to establishing criminalistics as a science has been demonstrated. Emphasis is placed on two methods he proposed for investigating crimes: setting a moment of firm conviction about case circumstances (the investigator's impartial attitude to the information received at the beginning of an investigation) and graphic tables (visualization of relevant forensic information). From these methods, the following conclusions have been drawn: crime investigation involves the use of specific actions and techniques; the investigator must approach the information received during the investigation impartially; at the beginning of alleged crime investigation, one should not rush to conclusions; they should be developed as the truth is clarified; the investigator may involve other experts (well-versed assistants); the basis of crime investigation methods is the step-by-step execution of the algorithm of actions. After implementing each subsequent stage (step), the investigator should summarize received results (preferably in written, tabular [visual] form). It has been argued that the methods proposed by H. Gross are still relevant today due to the prospects of developing a modern

This article is translation of the original Ukrainian content, which source is available at the link: <https://khrife-journal.org/index.php/journal> (translated by Daryna Dukhnenko). The authors acknowledge translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

applied scientific area (forensic technologies ensuring visualization in a criminal proceeding) and certain issues of unbiased analysis of relevant forensic information by investigators at the initial stage of investigating crimes.

Keywords: *cognition methods in criminalistics; investigation method; criminal offenses investigation; criminalistics history; forensic methodology; criminal proceeding visualization; investigator's unbiased attitude towards information; criminal analysis.*

Research Problem Formulation

The process of developing civil society foundations, which began as early as the mid-17th century, was extremely uneven. England, the United States and France (as the most advanced countries at the time) led the process, and only a century later Austria, Germany, Italy and other European states joined them.

The late 18th and mid-19th centuries saw significant changes in Western civilization: urbanization, industrialization, the spread of new socio-political ideas and the beginning of political democratization. The ideal of the new society became the recognition of the human being as the highest social value, the satisfaction of the interests of various social groups and individuals, and the guarantee of economic, political and ideological freedom for citizens and their associations.

In the second half of the 19th century and the beginning of the 20th century, Western European countries underwent economic, social and legal changes that necessitated the use of scientific methods in pre-trial investigations and trial.

During this period, which modern historians refer to as the Modern Age, a new era in Western civilization began: a shift in the socio-legal character of

society towards civic-mindedness. This was facilitated by radical changes influenced by socio-economic, political and ideological processes, which effectively shaped a new consciousness among people and created a system of values for the new Western society.

Nevertheless, rapid development of capitalist relations and industrialization led to an increase in urban population, which resulted in a rise in urban crime, becoming more organized and technologically complex. This phenomenon was particularly evident in Germany, France, England, the United States, and other leading countries. The criminals of the time made active use of the advances in science and technology (such as rapid rail transport, telephone communication, telegraphy, state-of-the-art polygraphic tools, etc.), resulting in a complete transformation of criminal activity.

The incapability of the then authorities to prevent social conflicts brought about the need for a special instrument that would ensure optimal conditions for the normal functioning of the emerging civil society. This instrument became the state of a new type with updated mechanisms and functions. In the era of civil society development, the law enforcement role of the state also transformed and acquired

new meaning, and the police officers underwent structural, organizational and functional changes: their actions were centralized, and their rights were extended.

Police reform and the enhancement of its efficiency in new conditions required new knowledge and innovative methods to combat crime and ensure justice during trial. In the past, law enforcement officers relied solely on their experience and common sense to solve crimes; but in the Modern era, this is no longer enough, as professional and organized crime has armed itself with the most advanced technologies of the time (the number of crimes increased, offenders significantly complicated the process of their commission and advanced methods of concealment).

That is why leading countries have established a social order aimed at developing new, efficient means and methods of combating crime (which would meet the requirements of the time and be based on the latest achievements of science and technology) and standardizing investigation methods and means of collecting evidence.

Scientific discoveries in natural and engineering sciences have provided new opportunities for detecting and preserving crime evidence, revealing the truth, and proving suspects' guilt. The success of applying these advancements in crime-solving has demonstrated that physical evidence, rather than testimonies, should hold a leading position among investigation methods, resulting in a more active involvement of individuals with specific expertise (well-versed persons) in the investigation and justice administration.

With the aim of identifying criminals and developing an evidential base, photography, anthropometric criminal records, and fingerprints were introduced at that time: the application of scientific methods significantly improved the quality of both pre-trial investigations and trial ¹.

All the aforementioned prerequisites have contributed to the consolidation of forensic knowledge; and the needs of investigative practice have necessitated the urgent application and systematization of this knowledge within a distinct scientific field. One of the first to understand this was *Hans Gustav Adolf Gross*, an Austrian lawyer and forensic scientist, one of the founders of criminalistics as a science. We consider the investigative methods developed by H. Gross as an important stage in the development of modern forensic science.

Analysis of Essential Researches and Publications

In the post-imperial territories of the Russian Empire before the civil war, the scientific achievements of H. Gross were mentioned only in individual publications by experts in criminal law and procedure (who were later called criminalists). For instance, in 1908, L. Vladimirov emphasized the natural science direction within the course of criminal law, separately highlighting the application of "*methods and perceptions of natural sciences*" to the study of crime, and mentioned H. Gross among the known representatives of this direction ². M. Rosen understood criminalistics as "*the technical doctrine of evidence in a criminal procedure*" and "*the art of obtaining the highest number of accurate conclusions from*

-
- 1 Комаха В. О. Історія криміналістики як одна з актуальних проблем сучасності. *Актуальні проблеми криміналістики* : мат.-ли міжнар. наук.-практ. конф. (Харків, 25–26.09.2003). Харків, 2003. С. 60–61.
 - 2 Владимиров Л. Е. Курс уголовного права. Москва, 1908. Ч. 1 : Основы нынешнего уголовного права. С. 171–172.

evidence in a criminal procedure”, referring to H. Gross as an “*authoritative representative of criminalistics*”³.

In the 1930s, Bolshevik authors emphasized the *systematic organization of forensic knowledge and the mixed legal-scientific method* developed by H. Gross among his significant scientific achievements. We consider such a designation of Gross’s method as a certain substitution of concepts: it is more appropriate to call it the *use and adaptation* to the needs of criminal justice of methods from the natural sciences, which were then undergoing rapid development. At that time, Soviet criminalists provided an objective assessment of H. Gross’s scientific contributions, recognizing his pioneering approach to studying the material aspect (substantive element) of crime and its investigation as the first significant contribution to criminalistics, which soon emerged as an independent science, and his proposed method *a mixed, simultaneously legal and natural-scientific one*.

During the analyzed period, scientists and practitioners paid particular attention to the fact that H. Gross oriented the investigator towards collection, examination, and evaluation of physical evidence: which, according to the scientist, was more objective compared to subjective evidence (such as testimonies of eyewitness and other participants in a crime). H. Gross was called the father of criminalistics, and his opinion on setting priorities during criminal investigations was shared: to focus primarily on objective evidence obtained

through examination of material objects, which always have greater value and probative force than subjective evidence, the reliability of which cannot always be verified (i.e., testimonies).

One of the first Soviet textbooks on criminalistics (1938) discussed the appropriateness of using data from various sciences (mostly natural sciences) specifically adapted for investigative purposes in investigative practice, which had been proposed many years earlier by H. Gross in *a Practical Handbook for Magistrates as a System of Criminalistics*⁴ (hereinafter referred to as *A Practical Handbook...*) and generalized the experience of investigative work. The criminologist defined the field of knowledge introduced by him as a science dealing with the *realities of criminal law*, based on a mixed legal and natural-historical method. This science focuses on the factual aspects of crimes and the information necessary for conducting individual investigative actions. In later editions of his book, H. Gross referred to this science as criminalistics.

The *method of reconstructing the crime scene through its consequences*, developed by Hans Gross, provides that the investigator must determine exactly what criminal event occurred (by identifying, investigating, and analyzing the circumstances that preceded, accompanied, and followed the commission of a crime) with the help of separate, distinct acts and their consequences aimed at both the preparation of a crime and the commission of the crime itself, as well as at concealing its traces. Thus, the investigator must reconstruct the entire

3 Розин Н. Н. Уголовное судопроизводство : пособ. к лекц. С.-Петербург, 1914. С. 338, 384.

4 Gross H. Handbuch für Untersuchungsrichter als System der Kriminalistik. Teil I. München, 1908. 546 s. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false. Teil II. München ; Berlin und Leipzig, 1914. 1216 s. URL: https://books.google.com.ua/books?id=VIozAQAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

pattern of the committed crime, uncover its motives, identify perpetrators, establish consequences, etc.

In the textbook on criminalistics of the first postwar year (1945), Soviet experts recognized *A Practical Handbook...* by H. Gross as the *first comprehensive systematized course on criminalistics*, the use of which significantly facilitated the detection of crimes and the search for criminals, while at the same time noting that *each success in criminalistics increased the importance of tangible evidence and simultaneously decreased the importance of witness testimony*. Guided by communist narratives, they even declared that the *search for true scientific methods of evidence detection and investigation was replaced by the desire to find a formula suitable for all cases, a kind of universal key to unlocking the secrets of any criminal case* in *A Practical Handbook* by Hans Gross.

Later (in 1950), Soviet rhetoric regarding Hans Gross and his developed methods became even more militant: as a *bourgeois scientist*, he was considered to be *fully committed to the ideologies of his class* and therefore incapable of creating a *true science* that would accurately and comprehensively reflect reality; *his research method is pseudo-scientific and metaphysical*; he treats described phenomena in isolation and examines them from *mechanistic positions*; his social and political conclusions resulted in *erroneous and deceitful statements, distortion of facts*; while assessing witness testimony, he *advocated bourgeois views*, thus tending towards *mechanization of the criminal procedure, which involved excluding the witness – a living person – from the court and replacing his/her with evidence*. They vehemently condemned Gross's position, which he laid out in the preface to the third edition of *A Practical Handbook...*, even arguing that the *opposition of evidence collected from*

“people” to evidence collected from “things” is a program of bourgeois forensics that paves the way for evidence falsification, especially in political processes.

Later, in the USSR (1962), a similar detrimental position was declared: *Hans Gross initiated the fetishization of “silent” witnesses under the guise of a supposedly “scientific objectification” of the investigative process, which essentially conceals arbitrariness and terror towards everything progressive and democratic*. As far as we know, Hans Gross did not intend to create a “true science” of criminalistics: he merely systematized the existing forensic knowledge of the time (mostly natural scientific) and demonstrated the possibility of its use for the needs of crime investigation, illustrating the expediency of initiating a new scientific direction, rather modestly defining its place among the existing legal sciences at that time). Biographers of Hans Gross do not mention his familiarity with the dialectical method of Karl Marx or the Marxist positions on antagonistic and non-antagonistic classes. However, we remember that the *idea of intensifying class struggle during the construction of socialism and capitalism* was cultivated in Soviet science until the death of Joseph Stalin himself. It was this idea that led to massive repression in the USSR, in which the “silent witnesses” of Hans Gross played no role, in contrast to the “confessions” and “testimonies” that were mostly obtained after prolonged torture of detainees in the course of pre-trial investigations during the mass repressions of the 1930s–1950s.

In the 1960s, J. Torwald, a German popularizer of criminalistics, noted that H. Gross, recognizing the inadequacy of crime identification methods used by rural police officers, as well as the erroneous practice of obtaining confessions of guilt from suspects, independently mastered the basics of various natural and engineering

sciences. He attempted to create a moral and, above all, a scientific-technical basis for criminalistics. At the same time, he strongly advocated for the introduction of anthropometry in Austria as a progressive method of identifying criminals and a means of keeping criminal records ⁵.

At the end of the 1980s, distinguished Ukrainian criminalistics and practitioners V. Honcharenko and V. Berger hailed Hans Gross's scientific work, which was grounded in extensive analysis of scientific literature and his own twenty years of experience, as a catalyst for addressing issues related to the implementation of forensic methods in many countries around the world ⁶.

At the turn of the 1990s and 2000s, analyzing H. Gross's contribution to the development of the modern forensics foundations, scholars recognized his primacy not only in systematizing forensic knowledge and adapting the methods of natural sciences to the needs of criminal procedure, but also in developing tactics for conducting investigative actions, studying the psychological traits of individual participants in a criminal proceeding, systematizing requirements for an investigator, and utilizing interdisciplinary methods during crime investigations (observation, analysis, etc.).

M. Saltevsykyi pointed out that "according to H. Gross, criminalistics should study the methods of committing a crime and the methods of its disclosure" ⁷.

The rhetoric of the Soviet era successors changed at the turn of the century: for some, substantially (*the name of this field of human knowledge [criminalistics] was proposed by Hans Gross, an Austrian scientist, who defined it as the study of physical evidence, offenses, or*

phenomena that are components of a criminal case, as well as the characterization of the psychological traits, habits, and activities of individuals participating in a criminal proceeding), for others, radically (*Hans Gross's merit lies in substantiating the independent nature of criminalistics as a branch of scientific knowledge, constructing the system of this science [he himself proposed the term "criminalistics"], systematizing and significantly expanding scientific means and methods of detecting and investigating crimes, including methods of working with traces and other physical evidence*). However, analyzing the translation into Russian (1908) of *A Practical Handbook* by H. Gross, opportunistic criminalists (chameleons) did not emphasize investigation methods proposed by the author; they merely noted his distinction in criminalistics between two main teachings: 1) about detecting crimes (theoretical part) and 2) about conducting investigations (practical part). However, they ultimately acknowledged its historical significance and relevance for the present. A year later (2001), the same analysts observed that the development of forensic methodology as *a branch of science and the systemization of its recommendations in investigative practice were accompanied by an investigation into the possibility of the existence of a general method for investigating crimes regardless of their types*, and recognized that Western forensic science had attempted to provide *a positive answer to this question: Hans Gross asserted the existence of a mixed legal and natural-scientific method for disclosing crimes*.

L. Gschwend meticulously described the methods used by Hans Gross in the *Justice Reaches for the Magnifying Glass*

5 Thorwald J. Das Jahrhundert der Detektive. Weg und Abenteuer der Kriminalistik. Zürich, 1965. P. 56.

6 Гончаренко В. И., Бергер В. Е. Криміналістика і криміналісти. Київ, 1989. С. 24—25.

7 Салтевський М. В. Криміналістика : підручник. У 2 ч. Харків, 1999. Ч. 1. С. 4.

book⁸. In his opinion, the Austrian scientist employed the casuistic-pragmatic method, the basis of which was the qualitative evaluation of a large number of individual cases: quantitative research, observation, and information gathering enabled him to systematize practical experience, which yielded positive results⁹. As a judge and prosecutor, H. Gross accumulated various practical skills by investigating and evaluating numerous criminal cases. Gross's field of study was crime scene: each separate case in his own experience served as an *epistemological monad*; he, as a "hunter-gatherer", relied on his own experience and the experience of his colleagues, rather than on scientific theories¹⁰.

Hans Gross presented his acquired experience both domestically (in Austria) and abroad, considering its results reliable due to his use of inductive research and organization. He viewed the formation of theories as "completely alien" in the "modern sociological understanding"¹¹. Gross's work is characterized by qualitative, reflective connection of his own observations and experience with the state of science at that time (for example, he used the method of mass individual observation, which was popular at the time), and the direct expression of his own position makes his conclusions convincing¹².

The authors of the textbook edited by V. Tishchenko (2017) noted that in the

preface to the 4th edition of *A Practical Handbook...* by Hans Gross, he planned to describe a new system of criminalistics consisting of two parts (*Theoretical Doctrine on the Detection of Crimes* and *Practical Handbook for Investigation*). This indicated the need to distinguish two objects of study in criminalistics: 1) criminal activity and 2) crime investigation activity. It is regrettable that he did not implement his idea, although "the main outlines of the new science – criminalistics – were defined during this period, serving as the initial basis for its further development"¹³.

In one of the new Ukrainian textbooks on criminalistics (2018), A. Volobuiev observes: "After working for a long time as an examining magistrate, Hans Gross realized that crime investigation is, above all, a deep analytical work requiring the use of knowledge from various sciences... By thoroughly studying all available literature and relying on the scientific developments of his predecessors, Hans Gross concluded that virtually any achievement in the natural sciences can be applied to solve tasks in crime investigation. He succeeded in formulating a number of significant theoretical principles and practical recommendations, collectively termed the 'criminalistics system'¹⁴.

Yu. Chornous believes that "among the foreign papers that significantly impacted the further development of forensic tactics, it is necessary to mention the works by H. Gross. In

8 Gschwend L. Justitias Griff zur Lupe. Zur Verwissenschaftlichung der Kriminalistik im 19. Jahrhundert. Verfasst anlässlich der Eröffnung des Kriminalmuseums der Karl-Franzens-Universität in Graz am 28. Februar 2003. Graz, 2004. Pp. 70–71. URL: <https://www.alexandria.unisg.ch/server/api/core/bitstreams/3f29cd0e-c1f7-484d-98de-c50917d1427f/content> (date accessed: 28.01.2024).

9 Ibid.

10 Ibid.

11 Ibid.

12 Ibid.

13 Алєнін Ю. П., Аркуша Л. І., Подобний О. О. та ін. Криміналістика : підручник / за ред. В. В. Тіщенко. Одеса, 2017. С. 29.

14 Волобуєв А. Ф., Даньшин М. В., Іщенко А. В. та ін. Криміналістика : підручник. У 2 т. / за заг. ред. А. Ф. Волобуєва, Р. Л. Степанюка, В. О. Маляррової. Харків, 2018. Т. 1. С. 7.

these works, the author not only summarized the experience of investigative practice but also proposed using the methods developed and adapted by him and some predecessors for crime investigation activities”¹⁵. It is worth pointing out that until the mid-1920s, forensic tactics included not only the study of issues related to the organization of investigative activities but also the first theoretical developments of crime investigation methods.

Recognizing the considerable scientific achievements and organizational efforts of Hans Gross aimed at the development of criminalistics and forensic science institutions, M. Shepitko unfortunately does not mention the investigative methods developed by him in the *Great Legal Encyclopedia*¹⁶. Similarly, the article about H. Gross in *Encyclopedia of Criminalistics in Personalities*¹⁷ and one of the most recent forensic encyclopedias *Criminal Law, Criminalistics and Forensic Sciences* do not address this issue¹⁸.

Therefore, the so-called “mixed legal and natural-scientific method” (“mixed legal and natural-historical method”) is nothing but “the use of data from natural and engineering sciences in criminal proceedings”, while “forensic methods”, “scientific methods of evidence detection and examination”, and “methods of investigating the material (physical) side of a crime” are “techniques for working with physical evidence”, since at the beginning of the formation of criminalistics as a science and the

development of its individual branches, scholars and practitioners did not clearly distinguish between the terms “method”, “technique”, and “way”.

Few attempted to identify and analyze individual investigative methods proposed by H. Gross. Most simply stated that the researcher had instructed criminalists to “study the methods of committing crimes, their disclosure” and to “develop methods of detecting and investigating crimes”, without “delving into these methods themselves”. As for the casuistic-pragmatic method mentioned by L. Gschwend, it is a research method (activity) used by H. Gross, not a method of crime investigation. In modern understanding, it is recognized as a method of criminalistics.

Article Purpose

Scientific analysis of the investigation methods developed by H. Gross in the second half of the 19th century aims to define their role in the formation of the criminalistics doctrine on methods of investigating criminal offenses and their significance for the development of modern criminalistics.

Research Methods

To fulfil the stated purpose, scientific methods of cognition have been applied: observation, comparison, abstraction, analysis, synthesis, modeling, etc.

URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/1c71481e-5339-4203-a94d-5fcac8dfec32/content> (date accessed: 28.01.2024).

- 15 Пясковський В. В., Чорноус Ю. М., Самодін А. В. та ін. Криміналістика : підручник / за заг. ред. В. В. Пясковського. 2-ге вид., перероб. і допов. Київ, 2020. С. 373.
- 16 Шепітько М. В. Гросс Ганс Густав Адольф / Велика українська юридична енциклопедія. У 20 т. Харків, 2016. Т. 20 : Криміналістика, судова експертиза, юридична психологія // редкол.: В. Ю. Шепітько (голова) та ін. 2018. С. 144–148.
- 17 Енциклопедія криміналістики в лицах / под ред. В. Ю. Шепітько. Харьков, 2014. С. 112–114.
- 18 Шепітько В., Шепітько М. Кримінальне право, криміналістика та судові науки : енциклопедія. Харків, 2021. С. 203–207.

Main Content Presentation

Already at the beginning of the 20th century, theorists in the field of crime detection and investigation unanimously recognized Hans Gross, an Austrian examining magistrate, deputy prosecutor, and later a renowned scholar and professor at universities in Graz, Prague, and Chernivtsi, as the undisputed founder of a special scientific knowledge: criminalistics. He believed that the task of criminalistics was to adapt the methods of natural and exact sciences to the objectives of crime detection and investigation, identify criminals, and work with forensic evidence (traces).

In the preface to the third edition of *A Practical Handbook...*, Hans Gross wrote: *"If we consider criminalistics as a component of criminal law, then criminalistics must introduce its natural-scientific methods into criminal law... However, if criminalistics does not belong to criminal law as an integral component, then it must provide its own methods for development. Both the conclusions drawn by criminalistics and their value cannot be denied by criminal jurisprudence"*¹⁹.

In Hans Gross's numerous publications, he convincingly demonstrated that various advancements in natural and engineering sciences can be effectively utilized in crime investigation. From the researcher's perspective, criminalistics has a dual purpose: practical and theoretical. The practical aims to uncover the truth in every criminal case, while the theoretical seeks to study the criminal and

gain insights into the nature of a crime. H. Gross believed that criminalistics should study physical evidence, actions, and phenomena associated with crime commission, the character, habits, and behavior of participants in a criminal proceeding, as well as develop methods for detecting and investigating various traces, forged documents, etc.²⁰.

Having defined criminal anthropology as the science of spiritual and physical manifestations that indicate a connection with criminal behavior in humans²¹, Hans Gross strongly directed investigators to apply the method of observation: he recommended that criminals and the consequences of their crimes be closely observed, and that information about them be collected, compared, and explained. *Archiv für Kriminal-Anthropologie und Kriminalistik*, a periodical initiated by Hans Gross in 1898, aimed to familiarize lawyers with knowledge from various scientific fields and to teach them how to use this knowledge and methods for solving individual crimes through practical educational examples.

After teaching himself the basics of physics and chemistry, botany and zoology, photography and microscopy, psychology and anthropology, Hans Gross was one of the first to attempt to adapt the methods (cognitive procedures) of these sciences to the practice of criminal investigation. And not just to *adjust*, but *specifically to adapt*, that is, to *actually create new cognitive procedures*.

The above conditions contributed to the creation by Hans Gross of a set

19 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbg_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

20 Гончаренко В. И., Бєргєр В. Е. Указ. соч. С. 24.

21 Gross H. Aufgabe und Ziele. *Archiv für Kriminal-Anthropologie und Kriminalistik*. 1899. Vol. 01. P. 2. URL: <https://archive.org/details/ArchivFrKriminalAnthropologieUndKriminalistik.V01.1899/page/n3/mode/2up> (date accessed: 28.01.2024).

of crime investigation methods that became a significant contribution to the development of the theoretical foundations of forensic methodology in general and the forensic teaching of crime investigation methods in particular.

The fourth edition of *A Practical Handbook...* by Hans Gross outlines two methods of crime investigation developed by him, which can conditionally be called *the method of determining the moment of firm conviction about circumstances of a case* and *the method of graphic tables*.

Explaining the essence of the method for determining the moment of firm conviction about the circumstances of a case, Hans Gross noted that for an examining magistrate, *“the most important thing is, above all, to find the right moment when he is ready to develop a firm conviction about a case. The success of the entire case almost always depends on this extremely important circumstance. If the investigator forms such a conviction prematurely, he will adhere to this bias more or less tenaciously, eventually losing precious time when the traces of a crime disappear forever. However, if the examining magistrate misses the moment of forming the correct view of the case, they conduct pre-trial investigation without a plan, haphazardly, through indecisive attempts and aimless searches. When exactly this important moment occurs is impossible to predict: neither generally nor in each specific case. However, the examining magistrate will definitely feel this moment if they start the investigation with correct and unwavering principles and understand that such conviction cannot arise fully formed; he/she must arrive at this conviction gradually, step by step, relying*

*on the foundations they prepare through careful and thorough individual convictions regarding the facts and episodes of a case”*²².

During the direct implementation of the *method for determining the moment of firm conviction about the circumstances of a case*, Hans Gross suggests adhering to the following basic rules:

- 1) one should refrain from forming a specific opinion about the event at the outset of the investigation (police reports and statements from private individuals should be used only to help the investigator establish known facts, such as *“it is reported that a certain crime was committed there”*);
- 2) it is necessary to receive consistent further notifications (about the guilty party in crime commission, about the damage caused as a result of a crime, about its motives, etc., which should only mean *“according to the rumors it is true”*);
- 3) the investigator forms opinions about the case (whose testimonies are credible, how the suspect gained access to the crime scene, what tools were used, when exactly the actions were committed) as the case progresses;
- 4) opinions about separate aspects of a crime can be combined according to common features (arrive at a conclusion simultaneously: *“the way the event is presented is not true: it has been skillfully altered”* or *“a positive belief is formed that such a crime has been committed”*)²³.

Hans Gross concludes his advice as follows: *“To avoid...complications, there is only one means: to be skeptical about*

22 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAAAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

23 Ibid.

biased ideas. If one firmly adheres to this fundamental rule...and does not scatter in all directions, then from this arises a new rule: to have people at hand who are willing to help, to know their abilities and qualities well, and to be able to use their assistance effectively"²⁴. Therefore, for the successful implementation of the proposed method, H. Gross recommends that the investigator choose assistants who are willing to help in crime investigation, and skillfully manage them, utilizing their abilities and qualities efficiently to achieve the investigation's goal.

The method of investigation proposed by H. Gross is a combination of theoretical principles (an intellectual concept) and specific practical guidelines regulating the investigator's activities aimed at the systematic collection, examination, and utilization of relevant forensic information (clarification of crime circumstances through the sequential execution of assigned tasks) during the investigation of a crime. Consequently, H. Gross considered investigative actions as a certain form of implementing special (private-scientific) methods, which the investigator applies in practical activities with the aim of understanding the crime and uncovering the truth in a case, and which, by their nature, serve as a means of understanding the surrounding reality.

Given the modern understanding of the activity approach theory, H. Gross suggests that the investigator should undertake specific social acts (actions) intended for achieving a particular socially significant outcome (understanding the event; clarifying what happened).

Furthermore, H. Gross elaborately describes the elements of such a social act (the investigator's activity): 1) goal (the act is aimed at achieving it); 2) means, tools (not just specific objects or tools, but interaction with other people: investigation participants); 3) procedure (the investigator directs certain volitional efforts to overcome obstacles in order to achieve the planned result); 4) conditions (under which these efforts should be made, without relying on a single biased idea, etc.); 5) results (the changes that the action contributes to, i.e., the changes that actually occur).

In our opinion, Hans Gross understood well that the era of sole investigators solving crimes had passed, and the future belonged to group methods. Therefore, he recommended that investigators carefully select assistants with specific abilities and qualities and skillfully manage them. It is these ideas of Hans Gross that are realized today in the group method of crime investigation.

Describing the method with clear algorithmic attributions, H. Gross warned investigators against mistakes: inappropriate, incorrect, one-sided, or illusory awareness of reality. These mistakes should not be identified with a deliberate, conscious distortion of the true state of affairs. With his extensive practical experience in investigating crimes, H. Gross understood better than anyone else that an investigator who makes a mistake often sincerely believes that he/she is close to the truth.

In H. Gross's view, truth is the representation in a person's consciousness of objects, phenomena, and regularities of objective reality as they truly exist,

²⁴ Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

independent of and beyond the subject who perceives it (the investigator). In this case, the characterization of truth belongs to the thoughts of the investigator, rather than to the things themselves or the means of their verbal expression.

Hans Gross advised the investigator not to develop a specific opinion about the event at the beginning of the investigation, as an opinion without sufficient justification, unsupported by necessary arguments and factual verification, is subjective and unreliable knowledge. Instead, judgments should be formed as relevant forensic information is obtained.

In our opinion, H. Gross regarded the process of scientific research as akin to investigating a crime. And it is not just an analogy but an essential connection. Both of these processes are varieties of a single cognitive process; both should be carried out with observance of its laws. Hence, it is impossible to completely equate criminal investigation with the process of scientific cognition, since they have significant differences, primarily due to the fact that a person investigating a crime (the investigator) does not pursue scientific goals but rather seeks to clarify the circumstances of an offense (including the guilt of the accused), thus performing practical tasks associated with justice administration.

We believe that the method proposed by H. Gross has laid the foundation for the use of scientific hypotheses (investigative leads) in criminal investigations, thus becoming the source for the development of another method: *forensic leading*.

H. Gross's recommendations remain quite relevant today. It is known that at the initial stage of investigating a criminal offense, an investigator often lacks sufficient grounds to determine which of the proposed leads to reject and which is the most promising and should be further

confirmed. This approach is likely to indicate the investigator's bias in evaluating the initial data and demonstrates subjectivity in the investigation of a crime. Even at the final stage of an investigation, it is tactically, procedurally, and psychologically wrong to dismiss a newly emerging lead as unlikely and to prejudicially reject it because such a belief has already been formed in advance.

In our opinion, H. Gross understood well that the high quality of verifying the proposed leads (hypotheses) and the logical consequences derived from them depend on the promptness and efficiency of the investigative actions conducted by the investigator, as well as the interaction of the investigator with the police and assistants. The most plausible lead, if verified incorrectly, can bring the criminal investigation to a standstill, much like how the verification of leads may yield no results if they are proposed too late, fail to explore all potential explanations, do not align with the circumstances of a case, or do not lead to all logical conclusions.

In addition to the above-mentioned *method for establishing a firm conviction regarding the circumstances of a case*, *A Practical Handbook...* by H. Gross also details a method of investigating crimes known as *the graphical table method*. The algorithm for implementing this method is as follows:

- 1) it is recommended that the investigator make a list of everything that needs to be done in a case (such lists are especially useful such lists are especially useful in the form of ordinary lists or reference sheets when a person is suspected of committing several crimes or when there are several suspects). The purpose of compiling such lists is twofold: to facilitate the work of those who will continue the investigation af-

ter the examining magistrate, and to provide the successor with an opportunity to familiarize himself/herself with the circumstances of the case, verify its completeness, and complete any unfinished tasks²⁵;

- 2) the planned stages should be executed gradually, one step at a time.
- 3) for the most important moments of an investigation, it is vital to provide separate sections solving the questions: “Who?”, “What?”, “Where?”, “By what means?”, “In what way?”, and “When?”;
- 4) it is necessary to summarize the “*names of accomplices*”, “*evidence in favor of and against the suspects*”, and to thoroughly outline the “*signs of a crime and the most important circumstances*” in each case. These notes should be organized in such a way that it can be seen at a glance whether the investigation has been sufficiently comprehensive and what needs to be added;
- 5) in certain investigative proceedings, it is advisable to create special tables that graphically display investigation results, allowing important aspects to be grasped at a glance. It is worthwhile to extract and visually represent only the crucial and essential details from a case, setting aside all non-essential and incidental information (such tables are useful when it comes to tracking the movements of a person or object; when a suspect commits crimes in different locations or has encounters with various individuals; when an item changes hands; when multiple injuries are inflicted on several victims in a large altercation; or when the ag-

gregate of evidence collected against the accused contains numerous elements, each of which is insignificant on its own but gains significance only through their sequence)²⁶.

Thus, H. Gross understood that a crime as an object of cognition by an investigator has a rather low degree of visualization (because the investigator is actually unable to directly perceive the events of the past, i.e., to observe the process of committing a criminal offense in real time, except when there is a video recording of such an offense).

It is worth noting that since the 1860s, devices such as the zoetrope and the praxinoscope have become widespread. These are simple optical devices capable of displaying a sequence of still images at a speed that creates the impression of movement for the entire image (due to the persistence of visual perception). Soon after, the invention of celluloid film made it possible to capture objects in motion in real-time (chronophotography), but a special device was needed to achieve this effect. In the 1880s, motion picture cameras gained popularity, storing images on a single roll of film, while film projectors transferred these images onto a screen. However, it is notable that H. Gross does not mention such visual aids. Furthermore, they were not widely utilized in criminal proceedings and investigative practices until much later.

It should be stressed that the process of introducing photography into the practice of criminal investigation stretched over many decades. Detection, documentation, and examination of evidence through photography owe their

25 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

26 Ibid.

existence to the discovery by J. N. Niépce and L. J. M. Daguerre of the method for obtaining images on light-sensitive silver plates, as well as to the invention by W. G. F. Talbot of the negative-positive process of obtaining photographs (1839). Already in the 1840s, the first photo studios began operating in leading Western European countries. By the 1880s, photography became a commonplace tool, actively used in scientific fields, including astronomy and medicine (X-rays).

In the 1840s, one of the first to use photography for criminal investigation purposes were the French police and the Brussels prison authorities²⁷. In the early 1870s, in Great Britain, O. G. Rejlander made the first attempts at forensic photography and published concise guidelines on photographing criminals. The 1870s also saw the first serious attempts to use photography in the investigation of offenses and for registering individuals suspected of criminal activity (rogues' gallery, etc.). Subsequently, photographing criminals became commonplace in Belgium, Switzerland, and other European countries. It was during this time that specialized techniques, methods, and equipment for photographing criminals were rapidly developed. Significant progress in this field was achieved by the French criminologist A. Bertillon, who constructed several cameras for identification photography, crime scene photography, and photographing corpses.

He also developed rules for signaletics and metric photography (1885–1888)²⁸.

When first publishing *A Practical Handbook...* at the end of the 19th century, H. Gross envisioned the prospects of introducing photography as a means of visualization into the process of crime detection and investigation: *"The greatest utility of photography is demonstrated in its application to criminal procedure: only recently has it been introduced into this field for the first time, and its application is already so diverse. While we can only anticipate its successful future, in some cases photography proves to be expedient, but we cannot even imagine all the spheres of photography application, as the cases known to us are only a tiny fraction of all the assistance that photography can provide to the cause of justice"*²⁹.

To illustrate the criminal case, H. Gross recommends using photography for footprints at the crime scene; bloodstains; papillary patterns; physical evidence; documents and manuscripts; individuals; objects in X-rays; microobjects.

A Practical Handbook... by H. Gross reflects on the prospects of using photography in criminalistics: *"Among lawyers, there are many amateur photographers who understand how photography can serve the cause of justice, so there is hope that all more or less valuable discoveries in this field will not remain fruitless. In any case, we must work systematically and utilize everything that can be somewhat useful for*

27 Thorwald J. Die Stunde der Detektive. Werden und Welten der Kriminalistik. Zürich und München, 1966. 286 p.

28 Комаха В. В. До питання стосовно хронології створення окремих криміналістичних установ. *Актуальні проблеми держави і права*. 2008. Вип. 44. С. 245–246. URL: <http://www.apdp.in.ua/v44/47.pdf> (date accessed: 28.01.2024) ; Юсупов В. В. Криміналістика в Україні у XX — на початку XXI ст. (історико-теоретичне дослідження) : дис. ... д-ра юрид. наук. Київ, 2018. С. 83.

29 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAAAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

*crime investigation in this direction. For the convenience of review, we must comment on all photography achievements from two sides: what can we, as criminalists, achieve today through photography? when could we use it later?"*³⁰.

Later, photography became an essential element of *visualization technology* in criminalistics. It began to be combined with specialized visualization devices or graphic aids (chalkboards, marker boards, flip charts, etc.). In the digital age, such tools constitute a certain intellectual system of criminal analysis.

However, according to H. Gross, a list, table, and photograph are not the only means of providing visualization in a criminal case. He notes that small bloodstains (splatters) are better preserved in the form of a drawing: *"For example, splatters... can be drawn while preserving their true dimensions; in other cases, it is advisable to limit to a seizure, but in any case, after the completion of the inspection protocol"*. Further, he states: *"Photography will never completely replace drawing and is only its most desirable complement"*³¹.

In the 20th century, criminalistics had an arsenal of scientific and technical tools that allowed not only to describe the course and results of investigative actions but also to visually present them to all participants in a criminal proceeding. And the leading place among such means belonged precisely to graphic tools and methods: plans and flowcharts.

A considerable amount of detail in the photographs made it difficult for the investigator to identify the main points and to track the routes of participants in an investigation, relative positioning

of distant objects, their placement on the terrain, etc., in large areas. Most frequently, other means of recording/visualizing (such as photography) did not replace plans and flowcharts but rather substantially supplemented them (especially in adverse weather conditions [fog, rain, snowfall, etc.], as well as in situations involving cluttered areas or premises, or equipment malfunctions).

There arose a need to develop forensic recommendations both for preparing plans and flowcharts during interrogations (since sometimes it is quite difficult to describe with words the placement of people, vehicles, or other objects at the time of the event, their movements, etc.: in this case, the interrogated person drew up a flowchart (plan) independently or with the assistance of the investigator, specifying information relevant to the case, which was then noted in the interrogation protocol), and for explaining specific graphic terms (in particular, "plan", "flowchart", "technical drawing", "diagram", "draft", "figure", "illustration", "sketch", "drawing", "croquis", etc.).

In the second half of the 20th century, while working on complex multi-episode and group cases, understanding the relationships between separate crimes, analyzing digital indicators and reporting, and illustrating document flow in financial accounting, investigators were recommended to create graphic flowcharts. Therefore, flowcharts illustrating criminal connections of suspects (defendants), relationships between different organizations and institutions, departments (plants) within a single enterprise (institution), the

30 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbg_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

31 Ibid.

structure of the department where crimes had been committed, rapid turnover or accounting document flow, places and methods of committing crimes, and evidence belonging to specific episodes or persons, etc., became widespread.

Most often, in cases with several episodes, “chessboard” flowcharts were created, indicating the concise content of episodes and other details (i.e., specific evidence incriminating the defendant, specifying whether he/she admits guilt and for which episodes of criminal activity, the amount of damage caused by his/her actions, etc.).

Graphic flowcharts with conventional symbols helped the investigator to quickly locate the necessary places on the plan, saving time on adding new relevant forensic information to it. Such improvement of symbolic images in flowcharts fulfilled one of the main requirements of organizing an investigator’s work: the rational use of working time.

The recommended “chessboard” flowchart proved useful for organizing a crime and compiling the indictment, making it the most common document complementing the investigation plan for complex multi-episode group cases.

Even flowcharts with the same content and purpose could take different forms. Sometimes different geometric shapes were used, connected by lines (often of different colors) according to identified and anticipated relationships (identified relationships were indicated by solid lines, anticipated ones by dotted lines).

To attain the highest level of organization and clarity in work, the leader of the investigative group should be familiar with the current information about a crime under investigation (or series of crimes) and take measures to ensure that all members of the investigative group (brigade)

are informed. If such a group (brigade) is small but dispersed in different locations, it is recommended to plan special days for meetings and to obtain part of the information not from protocols and other documents, but from “chessboard” flowcharts, flowcharts, defendant accounts and graphs, which reflect information of interest to all members of the investigative group (brigade).

In the 20th century, criminalists (consciously or unconsciously following the recommendations of H. Gross) continued to refine the existing and develop new means of visualizing criminal cases.

Turning back to the analysis of the forensic guidelines presented in *A Practical Handbook...* by H. Gross, it is noteworthy that his proposed approach to investigating crimes stems from reconstructing the event of a crime through its consequences (evidence-traces), that is, based on the objective-trace environment at the crime scene. According to H. Gross’s intent, the outcome of such reconstruction should be a *mental model of the crime event* formed in the investigator’s mind through constant analysis of relevant forensic information acquired during the investigation process. Additionally, the investigator also constructs a *physical model*: a criminal case (criminal proceeding). These two crime models are intended to create a comprehensive and objective picture of the committed unlawful act, as well as to facilitate its understanding during trial.

From our perspective, H. Gross, an experienced practitioner, understood that the above-mentioned process of modeling forensic information occurs exclusively in the investigator who investigates the crime from its discovery, through the moment of disclosure (clarification of all essential circumstances of the unlawful event), and up to the compilation of the final

report, which systematically organizes evidence. However, if the investigator has not completed an investigation and has transferred the materials of a criminal case (proceeding) to another, then the described process of model formation will not immediately be evident for the new investigator, as he/she has not personally examined the crime scene, interrogated the victim and witnesses, or conducted other investigative actions. That is why, according to H. Gross, graphic representations and lists (from which everything unimportant is crossed out) should assist a new investigator in transitioning from ignorance to knowledge in a criminal case by familiarizing themselves with both non-visual (non-obvious) traces of evidence and visual (obvious) ones. At the same time, the described process of perceiving criminal case (proceeding) materials by the new investigator allowed him to look at the case from a different angle and apply his/her own analytical skills.

The *technology of ensuring visualization in a criminal case*, proposed by H. Gross and intended by the author of *A Practical Handbook...* to become the basis for crime investigation, requires implementing

two main operations: 1) creating a visual image of the object (trace, object, process, phenomenon, etc.); 2) visualizing the object by reproducing (presenting) its fixed image. H. Gross believed that such reproduction should, if necessary, be combined with the general scientific method of measurement: *"If possible, photographs, technical drawings, and the results of precise measurements of not only the entire scene but also individual objects, as indicated by forensic experts, should be included in the case..."*³².

Over the past four decades, the described method of graphical visualization has gained popularity in investigative practice and scientific research by criminalists due to the development of computer forensics³³, spread of computer technology, and application software. Some publications illustrate current possibilities of using this method in investigative practice, particularly for the analysis of stages (phases) of criminal activity³⁴; structure of criminal activity; predictive model of a series of crimes³⁵; the process of investigating crime in general and preparation for a tactical operation in particular; phone calls during the investigation of organized criminal activity³⁶; scenes, dependencies

32 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

33 Хахановський В. Г. Проблеми теорії і практики криміналістичної інформатики : монографія. Київ, 2010. С. 138–210.

34 Таран О. В. Криміналістичне забезпечення розслідування злочинної діяльності у сфері порушення авторського і суміжних прав : дис. ... канд. юрид. наук. Київ, 2005. С. 45–47.

35 Старушкевич А. В. Криміналістичний мережевий аналіз організованої злочинної діяльності та можливості його використання у сфері протидії нелегальній міграції та торгівлі людьми. *Митна справа*. 2004. № 3 (33). С. 19–32.

36 Idem. Метод криміналістичного аналізу телефонних викликів та можливості його використання у розслідуванні організованої злочинної діяльності. *Бюлетень Міністерства юстиції України*. 2003. № 11. С. 49–67 ; Idem. Метод криміналістичного аналізу телефонних викликів і особливості його використання при розслідуванні злочинної діяльності у сфері наркобізнесу. *Вісник Київського національного університету імені Тараса Шевченка. Серія «Юридичні науки»*. 2004. Вип. 60–62. С. 39–47. URL: http://visnyk.law.knu.ua/images/pdf/60-62_2004.pdf (date accessed: 28.01.2024).

(relationships) between various phenomena and processes, quantitative data of criminal economic activity³⁷; quantitative data of criminal economic activity³⁸; tracking the movements and detection of suspects during crime commission; chronology of criminal activity within an organized criminal group³⁹; interactions (relationships), flows of money and goods, events, individual actions, telecommunications data, hidden profits⁴⁰; materials of a criminal case (proceeding), etc.

In the preceding twenty years, such an applied area of forensic research as *Criminal Intelligence GIS Solutions for Intelligence Analysis* has become widespread

in leading countries of Western Europe⁴¹. Under the concept of this research area, each crime starts from a specific location. GIS software products assist investigators in visualizing events, people, and critical infrastructure, allowing them to address immediate tactical challenges by determining the whereabouts of potential suspects for subsequent analysis. These modern software products enable investigators to actively engage, obtain needed information, support their planning in criminal proceedings, and allocate resources (time, people, means, etc.). Modern GIS systems provide an integrated platform for various types of relevant forensic information, facilitating

- 37 Комарков В. С., Митрохина З. И. Графические изображения в следственном осмотре места происшествия. *Криминалистика и судебная экспертиза*. 1976. Вып. 13. С. 17–23.
- 38 Мочкош Я. В. Наочно-інформаційні таблиці в слідчій практиці. *Радянське право*. 1976. № 1. С. 32–34; Idem. Засоби дослідження кількісних даних злочинної економічної діяльності. *Право України*. 2001. № 5. С. 114–117.
- 39 Аленин Ю. П., Лазарев А. А., Сухова Г. И., Тищенко В. В. Взаимодействие при раскрытии и расследовании очагов корыстно-насильственных и половых преступлений : метод. рек. Одесса ; Симферополь, 1995. С. 79–81.
- 40 Бейкманис Ю. У. Возможности анализа оперативно-розыскной информации, используя информационные технологии (специальные компьютерные программы). *Спеціальна техніка у правоохоронній діяльності* : мат-ли II Міжнар. наук.-практ. конф. (Київ, 22–23.11.2005). Київ, 2006. С. 198–216 ; Никифорчук Д. Й., Бусол О. Ю. Проведення аналізу оперативно-розшукової інформації: аналітична розвідка : монографія. Київ, 2010. С. 33–47 ; Цільмак О. М., Користін О. Є., Заець О. М. та ін. Сучасні методи досудового розслідування кримінальних правопорушень : підручник / за заг. ред. О. М. Цільмак. Одеса, 2017. 352 с. URL: <https://dspace.oduvs.edu.ua/server/api/core/bitstreams/b8885019-499a-4287-aa91-7feb15b6721e/content> (date accessed: 28.01.2024) ; Федчак І. А. Основи кримінального аналізу : навч. посіб. Львів, 2021. 288 с. URL: <https://dspace.lvduvs.edu.ua/bitstream/1234567890/3723/3/%D1%84%D0%B5%D0%B4%D1%87%D0%B0%D0%BA%20%D0%BE%D1%81%D0%BD%D0%BE%D0%B2%D0%B8%20%D0%BA%D1%80%D0%B8%D0%BC%20%D0%B0%D0%BD-%D0%B0%D0%BB%D1%96%D0%B7%D1%83.pdf> (date accessed: 28.01.2024).
- 41 Chen H., Miranda R., Zeng D. D., Demchak Ch., Schroeder J., Madhusudan Th. (Eds.) *Intelligence and Security Informatics: First NSF/NIJ Symposium, ISI 2003 Tucson, AZ, USA, June 2–3, 2003. Proceedings*. Berlin, 2003. 392 p. ; Chen H. *Intelligence and Security Informatics for International Security. Information Sharing and Data Mining*. New York, 2006. 182 p. DOI: [10.1007/0-387-30332-4](https://doi.org/10.1007/0-387-30332-4) (date accessed: 28.01.2024) ; Ratcliffe J. H. *Intelligence-Led Policing*. Portland, Oregon, 2008. 265 p. ; Scott Jr. E. D. *Police Information Sharing All-Crimes Approach to Homeland Security*. El Paso, 2009. 212 p. ; Ronczkowski M. R. *Terrorism and Organized Hate Crime. Intelligence Gathering, Analysis, and Investigations*. Boca Raton London New York, 2012. 381 p. ; Milne R. *Forensic Intelligence*. Boca Raton FL, 2013. 262 p. ; Boba Santos R. *Crime Analysis With Crime Mapping*. Thousand Oaks, California, 2017. 663 p.

spatial analysis and visualization. The indicated information systems are useful for collecting, analyzing, visualizing, disseminating, and evaluating forensically significant information, as well as for creating predictive models of criminal activity to support the tactical and strategic decisions of investigators.

During the last decade, research findings aimed at creating semantic models have been published. These models “link” an event to time, place, specific objects, and subjects of activity, thus associating them with specific unlawful actions. The technology for constructing such a *semantic model* involves defining numerous concepts necessary for describing a crime, which are then grouped semantically closely together. In our view, the future lies in the use of network models, which are best able to comprehensively describe the content of criminal proceedings using intelligent information systems. That’s why, effectively formalizing the structure of criminal activity will enhance the information support provided in criminal investigations, bringing it to a new, modern standard.

The method of graphic tables presented by H. Gross essentially anticipated an entire area for future research: *forensic technologies for enhancing visualization in criminal proceedings*. These technologies encompass a system of organizational and managerial measures, scientific and technical tools, operations, techniques, methods, processes, devices, and materials, as well as scientific descriptions of how to utilize scientific methods and technical means for capturing, demonstrating, and visualizing information during proving of the stages of pre-trial investigations and trial.

Today, virtually every investigator has access to means of visualizing a crime event model (specialized computer programs capable of modeling and visualizing the crime scene, as well as the crime event itself in the form of a 3D model: this can be conditionally referred to as a *virtual investigative experiment*). Creating such a computer-animated 3D model of a crime event is possible, for example, using programs such as *3DEyeWitness* and *TheCrimeZone*.

Using computer programs, an investigator also has the ability to create and visualize complex analytical schemes (intelligent maps), graphs and diagrams (i.e., *Microsoft Visio*, *EDraw Mind Map*, *Visual Understanding Environment*, *Xmind*), and flowcharts with visual representation of various relationships (for example, flowcharts depicting relationships between members of criminal groups, flowcharts showing connections between pieces of evidence in a criminal proceeding, etc.).

Sometimes, the information-analytical support for investigating serial (multi-episode) criminal offenses requires analyzing significant volumes of data and identifying hidden connections within them. Much of this analytical work involves identifying relationships between different objects (such as people, events, evidence, etc.), with the key concepts being “object” and “relationship”. This information is often impossible to aggregate, making traditional methods of presenting it through screen forms and tables largely inefficient.

In addition, information may sometimes originate from interrelated or entirely independent sources, which can be inconvenient and unreliable for identifying information objects and effectively selecting them from such data

sources, given the significant volume of duplicate information. This issue can be addressed using visual analysis tools and graphic data such as specific diagrams depicting relationships, event sequences, and transactions. The use of such visualization tools should not impede the ability to work with a separate object to identify its connections with other objects⁴². In the USA and leading European countries, investigators commonly use *IBM i2 Analyst's Notebook* software to overcome this problem and analyze the mentioned data. This software suite serves as a visual analytical environment recommended as a standard in the field of criminal analysis. The efficiency of using *IBM i2 Analyst's Notebook* was tested by Polish researchers⁴³: it enables quick and efficient analysis of interconnected object systems and the dynamics of sequential events, displaying research findings in easy-to-understand flowcharts and diagrams

Conclusions

Therefore, there arose a need to counter professional, organized, and transnational forms of crime, promoting changes in the organizational structure of police services and also leading to the improvement of means and methods for such counteraction in leading Western European countries in the second half of the 19th century. H. Gross, an examining magistrate with years of experience, successfully systematized the existing forensic knowledge at that time, establishing

a new direction in applied scientific knowledge: criminalistics. One of his fundamental and detailed works revealed the essence of two crime investigation methods: the method of determining the moment of firm conviction about case circumstances and the method of graphic tables. Analysis of these methods has shown their orientation towards the investigator's impartial approach to the information received at the outset of a potential criminal investigation, as well as the appropriateness of visualizing relevant forensic information separately from criminal case materials to facilitate its perception and systematization.

From these methods, the following conclusions have been drawn: crime investigation involves the use of specific actions and techniques; the investigator must approach the information received during the investigation impartially; at the beginning of alleged crime investigation, one should not rush to conclusions, they should be developed as the truth is clarified; the investigator may involve other experts (well-versed assistants); the basis of crime investigation methods is the step-by-step execution of the algorithm of actions. After implementing each subsequent stage (step), the investigator has to summarize received results (preferably in written, tabular [visual] form).

H. Gross's analysis of investigation methods has demonstrated that his developments remain relevant today due to the prospects of developing a modern applied scientific area (forensic technologies for enhancing visualization

42 Воронов І. Використання технологій візуального аналізу даних та виявлення прихованих зв'язків у протидії терористичній діяльності. *Протидія терористичній діяльності: міжнародний досвід і його актуальність для України* : мат-ли міжнар. наук.-практ. конф. (Київ, 30.09.2016). Київ, 2016. С. 60.

43 Chlebowicz P., Filipkowski W. *Analiza kryminalna. Aspekty kryminalistyczne i prawnodowodowe*. Warszawa, 2011. P. 108.

in criminal proceedings) and specific challenges related to unbiased analysis by forensic investigators of relevant information at the initial stage of criminal offense investigations.

Методи розслідування злочинів за Гансом Гроссом: минуле та сучасність

Анатолій Старушкевич

Метою дослідження є визначити роль запропонованих Г. Гроссом методів розслідування злочинів у становленні й розвитку криміналістики та довести їхню актуальність сьогодні. Для досягнення поставленої мети застосовано методи наукового пізнання: спостереження, порівняння, абстрагування, аналіз, синтез, моделювання тощо. Доведено внесок Г. Гросса в започаткування криміналістики як науки. Увагу акцентовано на двох запропонованих ним методах розслідування злочинів — визначення моменту твердого переконання про обставини справи (неупереджене ставлення слідчого до отриманих на початку розслідування відомостей) і графічних таблиць (візуалізування криміналістично значущої інформації). Підґрунтя цих методів склали такі висновки: розслідування злочинів передбачає застосування особливих дій і прийомів; слідчий має неупереджено ставитися до відомостей, які отримує у процесі розслідування; на початку розслідування ймовірного злочину не можна поспішати із висновками, їх слід формувати в міру з'ясування істини; слідчий може залучати інших фахівців (обізнаних помічників); основою методів розслідування злочинів є покрокове виконання алгоритму дій, після реалізації чергового етапу (кроку) слідчий повинен узагальнити здобуті результати (найкраще — у письмовому, табличному

(наочному) вигляді). Аргументовано, що запропоновані Г. Гроссом методи розслідування актуальні до сьогодні у зв'язку з перспективами розроблення сучасного прикладного наукового напрямку (криміналістичні технології забезпечення наочності у кримінальному судочинстві) та окремими проблемами неупередженого аналізування слідчим криміналістично значущої інформації на початковому етапі розслідування кримінальних правопорушень.

Ключові слова: метод пізнання у криміналістиці; метод розслідування; розслідування кримінальних правопорушень; історія криміналістики; криміналістична методика; забезпечення наочності у кримінальному судочинстві; неупереджене ставлення слідчого до інформації; кримінальний аналіз.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Disclaimer

The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Contributors

The author contributed solely to the intellectual discussion underlying this paper, case-law exploration, writing and editing, and accept responsibility for the content and interpretation.

Declaration of Competing Interest

The author declare that they have no conflict of interest.

References

- Alenin, Yu. P., Arkusha, L. I., Podobnyi, O. O. et al. (2017). Kryminalistyka [Criminalistics] : pidruchnyk / za red. V. V. Tishchenka. Odesa [in Ukrainian].
- Alenin, Yu. P., Lazarev, A. A., Suhova, G. I., Tishenko, V. V. (1995). Vzaimodejstvie pri

- raskrytii i rassledovanii ochagov korystno-nasilstvennyh i polovyh prestuplenij [Interaction during the disclosure and investigation of hotbeds of profit-driven violent and sexual crimes] : metod. rek. Odessa ; Simferopol [in Russian].
- Bejkmannis, Yu. U. (2006). Vozmozhnosti analiza operativno-rozysknoj informacii, ispolzuya informacionnye tehnologii (specialnye kompyuternye programmy) [Analysis opportunities of operative-search information using information technologies (special computer programs)]. *Spetsialna tekhnika u pravookhoronni diialnosti* : matly II Mizhnar. nauk.-prakt. konf. (Kyiv, 22—23.11.2005). Kyiv [in Russian].
- Boba Santos, R. (2017). *Crime Analysis With Crime Mapping*. Thousand Oaks, California.
- Chen, H., Miranda, R., Zeng, D. D., Demchak, Ch., Schroeder, J., Madhusudan, Th. (Eds.) (2003). *Intelligence and Security Informatics* : First NSF/NIJ Symposium, ISI 2003 Tucson, AZ, USA, June 2—3, 2003. Proceedings. Berlin.
- Chen, H. (2006). *Intelligence and Security Informatics for International Security. Information Sharing and Data Mining*. New York. DOI: [10.1007/0-387-30332-4](https://doi.org/10.1007/0-387-30332-4).
- Chlebownicz, P., Filipkowski, W. (2011). *Analiza kryminalna. Aspekty kryminalistyczne i prawnowodowe*. Warszawa.
- Encyklopediya kriminalistiki v lichah* [Encyclopedia of Criminalistics in Personalities] (2014) / pod red. V. Yu. Shepitko. Harkov, 2014 [in Russian].
- Fedchak, I. A. (2021). *Osnovy kryminalnoho analizu* [Basics of criminal analysis] : navch. posib. Lviv. URL: <http://surl.li/gjeaa> [in Ukrainian].
- Goncharenko, V. I., Berger, V. E. (1989). *Kriminalistika i kriminalisty* [Criminalistics and criminalists]. Kiev [in Russian].
- Gross, H. (1899). Aufgabe und Ziele. *Archiv für Kriminal-Anthropologie und Kriminalistik*. Vol. 01. URL: <https://archive.org/details/ArchivFrKriminalAnthropologieUndKriminalistik.V.01.1899/page/n3/mode/2up>.
- Gross, H. (1908, 1914). *Handbuch für Untersuchungsrichter als System der Kriminalistik*. Teil I. München. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false. Teil II. München ; Berlin und Leipzig. URL: https://books.google.com.ua/books?id=VIOzAQAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.
- Gschwend, L. (2004). *Justitias Griff zur Lupe. Zur Verwissenschaftlichung der Kriminalistik im 19. Jahrhundert*. Verfasst anlässlich der Eröffnung des Kriminalmuseums der Karl-Franzens-Universität in Graz am 28. Februar 2003. Graz. URL: <https://www.alexandria.unisg.ch/server/api/core/bitstreams/3f29cd0e-c1f7-484d-98de-c50917d1427f/content>.
- Khakhanovskiy, V. H. (2010). *Problemy teorii i praktyky kryminalistychnoi informatyky* [Problems of the theory and practice of computer forensics] : monohrafiia. Kyiv [in Ukrainian].
- Komakha, V. O. (2003). Istoriia kryminalistyky yak odna z aktualnykh problem suchasnosti [Criminalistics history as one of the relevant issues of our time]. *Aktualni problemy kryminalistyky* : matly mizhnar. nauk.-prakt. konf. (Kharkiv, 25—26.09.2003). Kharkiv [in Ukrainian].
- Komakha, V. V. (2008). Do pytannia stosovno khronolohii stvorennia okremykh kryminalistychnykh ustanov [To the question regarding the chronology of establishing individual forensic institutions]. *Aktualni problemy derzhavy i prava*. Vyp. 44. URL: <http://www.apdp.in.ua/v44/47.pdf> [in Ukrainian].
- Komarkov, V. S., Mitrohina, Z. I. (1976). Graficheskie izobrazheniya v sledstvennom osmotre mesta proisshestiya [Graphic images in the investigation of the crime scene]. *Kriminalistika i sudebnaya ekspertiza*. Vyp. 13 [in Russian].
- Milne, R. (2013). *Forensic Intelligence*. Boca Raton FL.
- Mochkosh, Ya. V. (1976). Nauchno-informatsiini tablytsi v slidchii praktytsi [Visual-informative tables in investigative practice]. *Radianske pravo*. № 1 [in Ukrainian].
- Mochkosh, Ya. V. (2001). Zasoby doslidzhennia killisnykh danykh zlochynnoi ekonomichnoi diialnosti [Means for studying quantitative data of criminal

- economic activity]. *Pravo Ukrainy*. № 5 [in Ukrainian].
- Nykyforchuk, D. Y., Busol, O. Yu. (2010). *Provedennia analizu operativno-rozshukovoi informatsii: analitychna rozvidka* [Conducting analysis of operative-search information: analytical intelligence] : monohrafiia. Kyiv [in Ukrainian].
- Piaskovskiy, V. V., Chornous, Yu. M., Samodin, A. V. ta in. (2020). *Kryminalistyka* [Criminalistics] : pidruchnyk / za zah. red. V. V. Piaskovskoho. 2-he vyd., pererob. i dopov. Kyiv [in Ukrainian].
- Ratcliffe, J. H. (2008). *Intelligence-Led Policing*. Portland, Oregon.
- Ronczkowski, M. R. (2012). *Terrorism and Organized Hate Crime. Intelligence Gathering, Analysis, and Investigations*. Boca Raton ; London ; New York.
- Rozin, N. N. (1914). *Ugolovnoe sudoproizvodstvo* [Criminal procedure] : posob. k lekc. S.-Peterburg [in Russian].
- Saltevs'kyi, M. V. (1999). *Kryminalistyka* [Criminalistics] : pidruchnyk. U 2 ch. Kharkiv. Ch. 1 [in Ukrainian].
- Scott, Jr. E. D. (2009). *Police Information Sharing All-Crimes Approach to Homeland Security*. El Paso.
- Shepitko, M. V. (2018). Hross Hans Hustav Adolf / Velyka ukrainska yurydychna entsyklopediia [Hans Gustav Adolf Gross / Great Ukrainian Legal Encyclopedia]. U 20 t. Kharkiv. T. 20 : *Kryminalistyka, sudova ekspertyza, yurydychna psykhologhiia* // redkol.: V. Yu. Shepitko (holova) ta in. [in Ukrainian].
- Shepitko, V., Shepitko, M. (2021). *Kryminalne pravo, kryminalistyka ta sudovi nauky* [Criminal Law, Criminalistics and Forensic Sciences] : entsyklopediia. Kharkiv [in Ukrainian].
- Starushkevych, A. V. (2003). Metod kryminalistychnoho analizu telefonnykh vyklykiv ta mozhlyvosti yoho vykorystannia u rozsliduvanni orhanizovanoi zlochyynnoi diialnosti [Forensic analysis method of phone calls and its potential use in investigating organized criminal activity]. *Biuleten Ministerstva yustytstii Ukrainy*. № 11 [in Ukrainian].
- Starushkevych, A. V. (2004). Kryminalistychnyi merezhevi analiz orhanizovanoi zlochyynnoi diialnosti ta mozhlyvosti yoho vykorystannia u sferi protydii nelegalnii mihratsii ta torhivli liudmy [Forensic network analysis of organized criminal activity and its potential use in countering illegal migration and human trafficking]. *Mytna sprava*. № 3 (33) [in Ukrainian].
- Starushkevych, A. V. (2004). Metod kryminalistychnoho analizu telefonnykh vyklykiv i osoblyvosti yoho vykorystannia pry rozsliduvanni zlochyynnoi diialnosti u sferi narkobiznesu [The criminal telephone recjrd analysis method and particularity it's using for crime activity investigation in drug business sphere]. *Visnyk Kyivskoho natsionalnoho universytetu imeni Tarasa Shevchenka. Seriiia «Iurydychni nauky»*. Vyp. 60–62. URL: http://visnyk.law.knu.ua/images/pdf/60-62_2004.pdf [in Ukrainian].
- Taran, O. V. (2005). *Kryminalistychnie zabezpechennia rozsliduvannia zlochyynnoi diialnosti u sferi porushennia avtorskoho i sumizhnykh prav* [Forensic support for investigating criminal activity related to copyright and related rights infringement] : dys. ... kand. yuryd. nauk. Kyiv [in Ukrainian].
- Thorwald, J. (1965). *Das Jahrhundert der Detektive. Weg und Abenteuer der Kriminalistik*. Zürich.
- Thorwald, J. (1966). *Die Stunde der Detektive. Werden und Welten der Kriminalistik*. Zürich und München.
- Tsilmak, O. M., Korystin, O. Ye., Zaiets, O. M. ta in. (2017). *Suchasni metody dosudovoho rozsliduvannia kryminalnykh pravoporushen* [Current methods for pre-trial investigation of criminal offenses]: pidruchnyk / za zah. red. O. M. Tsilmak. Odesa. URL: <https://dspace.oduvs.edu.ua/server/api/core/bitstreams/b8885019-499a-4287-aa91-7feb15b6721e/content> [in Ukrainian].
- Vladimirov, L. E. (1908). *Kurs ugovnogo prava* [Criminal law course]. Moskva. Ch. 1 : Osnovy nyneshnego ugovnogo prava [in Russian].
- Volobuiev, A. F., Danshyn, M. V., Ishchenko, A. V. ta in. (2018). *Kryminalistyka*

[Criminalistics] : pidruchnyk. U 2 t. / za zah. red. A. F. Volobuieva, R. L. Stepaniuka, V. O. Maliarovi. Kharkiv. T. 1. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/1c71481e-5339-4203-a94d-5fcac8dfee32/content> [in Ukrainian].

Voronov, I. (2016). Vykorystannia tekhnolohii vizualnoho analizu danykh ta vyiavlennia prykhovanykh zaviazkiv u protydii terorystychnii diialnosti [Using visual data analysis technologies to uncover

hidden connections in countering terrorist activities]. *Protydiia terorystychnii diialnosti: mizhnarodnyi dosvid i yoho aktualnist dlia Ukrainy*: mat-ly mizhnar. nauk.-prakt. konf. (Kyiv, 30.09.2016). Kyiv [in Ukrainian].

Yusupov, V. V. (2018). *Kryminalistyka v Ukraini u XX — na pochatku XXI st. (istoryko-teoretychne doslidzhennia)* [Forensic science in Ukraine in the XX — early XXI centuries (historical and theoretical research)] : dys. ... d-ra yuryd. nauk. Kyiv [in Ukrainian].

Starushkevych, A. (2024). Criminal Investigation Methods according to Hans Gross: Past and Present. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). Pp. 163—186. DOI: [10.32353/khrife.1.2024.10](https://doi.org/10.32353/khrife.1.2024.10).

Survey as a Method of Scientific Cognition and Its Influence on the Formation of Forensic Road-Technical Examination Methodology

Yevhen Pivnov *

* Postgraduate student at NSC «Hon. Prof. M. S. Bokarius FSI», Kharkiv, Ukraine,
ORCID: <https://orcid.org/0009-0005-2430-3510>, e-mail: Pivnov@hniise.gov.ua

DOI: [10.32353/khrife.1.2024.11](https://doi.org/10.32353/khrife.1.2024.11) UDC [303.621.34::165.191:343.98](477)

Received: 04.03.2024 / Reviewed: 06.03.2024 / Accepted for print: 27.03.2024 /
Available online: 29.03.2024



The research paper analyzes the main terms (concepts) related to methodology of forensic examination and the survey's results of forensic experts. The research paper's purpose is to analyze the methods of forensic examinations as a basis for developing algorithms for performing forensic examination tasks. Based on the survey results of forensic experts, the main provisions of organizing forensic examinations in general and forensic road-technical examination in particular have been determined, which will be useful for developing general methodological principals of road-technical examinations. It is claimed that methods and techniques of examination can be considered a particular specification of the cognitive method. Expert methodology is a combination of methods, techniques, and means of performing an expert task on one hand, and on the other hand, a special method of forensic examination. a complex of methods of scientific cognition (including general scientific methods) was applied to analyze the survey's results. Due to the complexity and regulatory gaps in the provisions on complex expert examinations, changes to the regulatory legal acts have been proposed to establish the mechanism for formalizing the complex of examinations and comprehensive examination as different forms of integrating specific expertise. The issue of further development of forensic sciences has been considered. It is emphasized that knowledge of the theory of forensic science and pro-

This article is translation of the original Ukrainian content, which source is available at the link: <https://khrife-journal.org/index.php/journal> (translated by Andriy Bublikov). The authors acknowledge translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

cedural issues of conducting forensic activities is a guarantee of the proper level of professional training for forensic experts. The author's definition of the concept of forensic science in criminal proceedings is provided, and proposals from forensic experts on improving the effectiveness of forensic activities are summarized.

Keywords: *specific expertise; forensic expert; method, methodology, forensic methodology; expert conclusion; pre-trial investigation; statistical data; forensic road-technical examination; road infrastructure.*

Research Problem Formulation

For proper comprehension of the basic methodological postulates, it is necessary to analyze the fundamental terms (concepts) related to the issue under consideration. Let us start by elucidating the meanings of “methodology” and “cognitive methods”. “The **methodology** (from Greek. μέθοδος — a way of research and cognition; λέξη — doctrine) — 1) A set of approaches, methods, techniques and procedures used in the process of scientific cognition and practical activity to achieve a predetermined goal. <...> 2) The field of theoretical knowledge and ideas about the essence and forms, laws, orders, and conditions of application approaches, methods, techniques, and procedures in the process of scientific cognition and practical activities. Considering the theoretical and socio-cultural experience, M. develops general principles for creating new cognitive tools. The main object

*of study for M. is the productive creative and effective method, its essence and sphere of functioning, structure and interaction with other methods and elements of cognitive instrumentation, its correspondence to the nature of the object of study and the connection with the cognitive purpose or goals of practical activity”¹. The methodology is interpreted as “philosophical doctrine about the research methods of cognition of the surrounding world; a field of science that studies general and special methods of scientific research; a set of methods used in any science; principles of approaching different types of objects of reality and different classes of scientific tasks”². Consequently, the defining aspect in any understanding of the concept of methodology is the notion of the **cognitive method** as a systematic way of “achieving theoretical or practical results, solving problems or obtaining new information based on certain regulatory principles of cognition*

- 1 Йолон П. Методологія / Філософський енциклопедичний словник редкол.: В. І. Шинкарук (голова) ; Ін-т філос. ім. Г. С. Сковороди НАНУ. Київ, 2002. С. 374. URL: https://shron1.chtyvo.org.ua/Shynkaruk_Volodymyr/Filosofskyi_entsyklopedychnyi_slovyk.pdf (date accessed: 25.02.2024).
- 2 Бліхар В. С., Козловець М. А., Горохова Л. В., Федоренко В. В., Федоренко В. О. Філософія: словник термінів та персоналій. Київ, 2020. С. 160. URL: https://dspace.lvduvs.edu.ua/bitstream/1234567890/3551/1/%D0%91%D0%BB%D1%96%D1%85%D0%B0%D1%80__%D0%9C.%C2%A0%D0%90.%D0%A4I%D0%9B%D0%9E%D0%A1%D0%9E%D0%A4I%D0%AF_%D0%A1%D0%BB%D0%BE%D0%B2%D0%BD%D0%B8%D0%BA_%D0%BE%D1%81%D1%82%D0%B0%D1%82%D0%BE%D1%87%D0%BD%D0%B8%D0%B9_%282%29.pdf (date accessed: 25.02.2024).

and action, awareness of the specificity of the studied subject area and the laws of functioning of its objects”³. Considering the philosophical interpretations of methodology and methods cognitive methods, based on the opinion of foreign scholars who do not rigidly differentiate these concepts⁴, as well as based on the

ideas of Ukrainian scientists who consider methodology either as the doctrine of the scientific method of cognition, or as a system of scientific principles underlying research and the selection of a set of cognitive means, methods, research techniques⁵, E. B. Simakova-Yefremian notes that the most often methodology

- 3 Кримський С. Метод / Філософський енциклопедичний словник С. 373. URL: https://shron1.chtyvo.org.ua/Shynkaruk_Volodymyr/Filosofskyi_entsyklopedychnyi_slovyk.pdf (date accessed: 25.02.2024).
- 4 E. g., Miller G. A. The cognitive revolution: a historical perspective. *Trends in Cognitiv Sciences*. 2003. Vol. 7. Is. 3. Pp. 141–144. DOI: [10.1016/S1364-6613\(03\)00029-9](https://doi.org/10.1016/S1364-6613(03)00029-9) (date accessed: 25.02.2024) ; Bailenson J. N., Beall A. C., Loomis J., Blascovich J., Turk M. Transformed Social Interaction, Augmented Gaze, and Social Influence in Immersive Virtual Environments. *Human Communication Research*. 2005. Vol. 31. Is. 4. Pp. 511–537. DOI: [10.1111/j.1468-2958.2005.tb00881.x](https://doi.org/10.1111/j.1468-2958.2005.tb00881.x) (date accessed: 25.02.2024) ; Cappella J. N., Pelachaud C. Rules for Responsive Robots: Using Human Interactions to Build Virtual Interactions / Stability and Change in Relationships ; Ed. by Vangelisti A. L., Reis H. T., Fitzpatrick M. A. Cambridge : Cambridge University Press, 2009. Pp. 325–354. DOI: [10.1017/CBO9780511499876](https://doi.org/10.1017/CBO9780511499876) (date accessed: 25.02.2024) ; Craig R. T. Cognitive Science: A New Approach to Cognition, Language and Communication. *Quarterly Journal of Speech*. 1978. Vol. 64. Is. 4. Pp. 439–450. DOI: [10.1080/00335637809383449](https://doi.org/10.1080/00335637809383449) (date accessed: 25.02.2024) ; Idem. Communication Theory as a Field. *Communication Theory*. 1999. Vol. 9. Is. 2. Pp. 119–161. DOI: [10.1111/j.1468-2885.1999.tb00355.x](https://doi.org/10.1111/j.1468-2885.1999.tb00355.x) (date accessed: 25.02.2024) ; Kendon A. Movement coordination in social interaction: Some examples described. *Acta Psychologica*. 1970. Vol. 32. Is. 2. Pp. 101–125. DOI: [10.1016/0001-6918\(70\)90094-6](https://doi.org/10.1016/0001-6918(70)90094-6) (date accessed: 25.02.2024) ; Lee K. M. The Multiple Source Effect and Synthesized Speech: Doubly Disembodied Language as a Conceptual Framework. *Human Communication Research*. 2004. Vol. 30. Is. 2. Pp. 182–207. DOI: [10.1093/hcr/30.2.182](https://doi.org/10.1093/hcr/30.2.182) (date accessed: 25.02.2024) ; Macleod C. M. Half a Century of Research on the Stroop Effect — An Integrative Review. *Psychological Bulletin*. 1991. Vol. 109. Is. 2. Pp. 163–203. DOI: [10.1037/0033-2909.109.2.163](https://doi.org/10.1037/0033-2909.109.2.163) (date accessed: 25.02.2024) ; Medin D. L., Ross B. H., Markman A. B. Cognitive Psychology. 3rd ed. Austin, TX : Harcourt College Publishers, 2001. 633 p. ; Stroop J. R. Studies of Interference in Serial Verbal Reactions. *Journal of Experimental Psychology: General*. 1992. Vol. 121. No. 1. Pp. 15–23. URL: <https://psych.hanover.edu/classes/Cognition/Archive/2009/Papers/stroop%201933.pdf> (date accessed: 25.02.2024) ; Thagard P. Mind: Introduction to Cognitive Science. 2nd ed. Cambridge, MA : Bradford Books, 2005. 280 p. URL: <https://users.metu.edu.tr/baykan/arch586/Readings/Cognition/Background/Thagard.pdf> (date accessed: 25.02.2024) ; Walther J. B. Computer-Mediated Communication: Impersonal, Interpersonal and Hyperpersonal Interaction. *Communication Research*. 1996. Vol. 23. Is. 1. Pp. 3–43. DOI: [10.1177/009365096023001001](https://doi.org/10.1177/009365096023001001) (date accessed: 25.02.2024) та ін.
- 5 E. g., Булкат М. С. Зовнішні функції України: теоретико-правовий аналіз : дис. ... канд. юрид. наук. Київ, 2014. 237 с. ; Цвік М. В., Петришин О. В., Авраменко Л. В. та ін. Загальна теорія держави і права : підруч. для студ. юрид. вищ. навч. закл. / за ред. М. В. Цвіка, О. В. Петришина. Харків, 2009. 584 с. URL: https://library.nlu.edu.ua/POLN_TEXT/KNIGI_2009/TEorijaDerjav_2009.pdf (date accessed: 25.02.2024) ; Кириленко І. С. Локальна нормотворчість в сучасному суспільстві: теоретико-правові аспекти : дис. ... канд. юрид. наук. Київ, 2015. 210 с. ; Козюбра М. Праворозуміння: поняття, типи та рівні. *Право України*. 2010. № 4. С. 10–21. URL: https://pravoua.com.ua/ua/store/pravoukr/pravoukr_2010_4/ (date accessed: 25.02.2024) ; Мала енциклопедія теорії держави і права / за заг. ред. Ю. Л. Бошицького. Київ, 2010. 368 с. ; Манжук І. В. Визначення методів пізнання в науковій літературі.

is interpreted as a theory of research methods, the creation of concepts, as a system of knowledge about the theory of science or a system of research methods. Under the methodology, the scientist means a set of methods, techniques, ways of research, including techniques and various operations with factual material, which are most often used in a certain sequence ⁶. Therefore, the method is an important component of methodology, its concept, although the development of its leading principles and techniques, the sequence of their application, are primarily determined by conceptual principles, and *“the decisive significance for the development of methods of forensic science has an impact of scientific and technical progress”*⁷.

Article Purpose

The purpose of this research is to analyze the methods of forensic examinations, as the correct methodology of any cognitive process is the cornerstone that allows building an algorithm for performing forensic tasks, namely – to create a methodology for expert examination and implement it into expert practice. Since the arsenal of forensic examination methods (general, specific

and special) includes, among others, a survey method (as a general method of cognition), we have outlined this research's purpose as follows: based on the results of the conducted survey of forensic experts, to determine the main principles of organizing forensic examinations in general and forensic road-technical examinations in particular. These principles will be useful for building general methodological provisions for road-technical examinations.

Research Methods

To achieve the set goal, general (general scientific) methods have been applied: the dialectical method and methods of logic at this level (abstraction, analysis, synthesis, comparison, induction, deduction, idealization, formalization, axiomatic, systemic-structural, as well as observation, surveying, description, planning, modeling, hypothesis construction, programmatic-mathematical, and statistical methods, etc.).

It should be noted that research techniques, in our opinion, can be considered a certain specification of the cognitive method. At the same time, an expert methodology is a combination of methods,

Бюлетень Міністерства юстиції України. 2012. № 11. С. 11–17. URL: http://nbuv.gov.ua/UJRN/bmju_2012_11_4 (date accessed: 25.02.2024) ; Рабінович П. Категорії та закони діалектики — актуальний інструмент сучасного правопізнання (за матеріалами практики Страсбурзького суду). Вісник Національної академії правових наук України. 2009. № 4 (59). С. 8–19. URL: http://nbuv.gov.ua/UJRN/vapny_2009_4_2 (date accessed: 25.02.2024) ; Цехмістрова Г. С. Основи наукових досліджень : навч. посіб. Київ, 2003. 240 с. URL: <http://www.info-library.com.ua/books-book-96.html> (date accessed: 25.02.2024) ; Циппеліус Р. Юридична методологія / Роман Корнута (пер., адапт., прикл. з права Укр. і спис. термін.). Київ, 2004. 176 с. ; Колесниченко А. Н. Общие положения методики расследования отдельных видов преступлений / Лисиченко В. К., Гончаренко В. И., Салтеский М. В. и др. Советская криминалистика. Методика расследования отдельных видов преступлений // под ред. В. К. Лисиченко. Киев, 1988. С. 7–15 ; Шепітько В. Ю., Коновалова В. О., Журавель В. А., Глібоко В. М., Дудніков А. Л., Шевчук В. М. Криміналістика : підручник / за ред. В. Ю. Шепітька. 4-те вид., перероб. і допов. Харків, 2008. 464 с. URL: <https://law.sspu.edu.ua/files/documents/books/library/17/shepitzko.pdf> (date accessed: 25.02.2024).

- 6 Сімакова-Єфремян Е. Б. Комплексні судово-експертні дослідження: теорія та практика : монографія. Харків, 2016. С. 165–166.
- 7 Оп. cit. С. 166.

approaches, and means of performing an expert task on one hand, and a specialized method of forensic examination on the other.

Analysis of Essential Research and Publications

In the Ukrainian scientific literature, the issue on defining methods of cognition has been repeatedly considered. Thus, I. Manzhul studied Ukrainian⁸ and foreign literary sources on the definition and classification of general scientific, specialized-legal, and other methods of cognition, their interconnection and interdependence in the process of scientific research⁹. In particular, she stated that *“legal science has not developed a single classification of cognitive methods of phenomena and processes of real reality, the authors distinguish and group methods of cognition in accordance with the tasks set for the completeness and comprehensiveness of the chosen research; <...> fully and comprehensively studying a particular phenomenon or process is possible only through the application of a system of interconnected*

*and interdependent methods, their selection is determined by the nature and essence of the chosen specific phenomenon”*¹⁰.

Considering research methods in social work, O. Povidaichyk and R. Zhylenko, note that the survey is *“a form of questioning a researched group of individuals based on a pre-prepared list of questions. The responses to the questionnaire serve as initial empirical material for generalizations and conclusions.*

A questionnaire survey is considered one of the most efficient methods of collecting <...> information.

*A survey is a system of questions united by a single research idea aimed at identifying quantitative and qualitative characteristics of the object and subject of research. The main function of the survey is to provide the researcher with reliable information about the subject of analysis”*¹¹.

Considering the above, let's present the results of the survey of forensic experts from specialized institutions of the Ministry of Justice of Ukraine on organizational and methodological issues of forensic examination.

-
- 8 Див.: Бачиний В. А., Журавський В. С., Панов М. І. Філософія права : словник. Київ, 2003. 404 с. ; Волинка К. Г. Теорія держави і права : навч. посіб. 2-ге вид., стер. Київ, 2006. 235 с. ; Сухонос В. В. Теорія держави і права : підручник. Суми, 2014. 544 с. URL: https://essuir.sumdu.edu.ua/bitstream-download/123456789/47858/1/Sukhonos_ml_TDP_uchebnik.pdf (date accessed: 25.02.2024) ; Філософія права : навч. посіб. / за ред. О. Г. Данильяна. Київ, 2009. 269 с. ; Ржевська В. С. Право держави на самооборону в світлі розвитку юридичних гарантій міжнародної безпеки : автореф. дис. ... канд. юрид. наук. Київ, 2003. 22 с. ; Шляхтун П. П. Політологія: історія та теорія : підручник. Київ, 2010. 472 с. URL: https://shron1.chtyvo.org.ua/Shliakhtun_Petro/Politolohiia_istoriia_ta_teoriia.pdf (date accessed: 25.02.2024) ; Галака С. П. Ядерне нерозповсюдження у світовій практиці : автореф. дис. ... д-ра політ. наук. Київ, 2006. 26 с. ; Шейко В. М., Кушнарченко Н. М. Організація та методика дослідницької діяльності : підручник. 4-ге вид., випр. і допов. Київ, 2004. 307 с. URL: https://shron1.chtyvo.org.ua/Sheiko_Vasyl/Orhanizatsiia_ta_metodyka_naukovo-doslidnytskoi_dialnosti.pdf (date accessed: 25.02.2024) ; Скакун О. Ф. Теорія держави і права : підручник. Харків, 2001. 656 с. URL: <http://politics.ellib.org.ua/pages-cat-51.html> (date accessed: 25.02.2024) та ін.
- 9 Манжұл І. В. Зазнач. твір. URL: http://nbuv.gov.ua/UJRN/bmju_2012_11_4 (date accessed: 25.02.2024).
- 10 Манжұл І. В. Зазнач. твір. С. 16.
- 11 Повідайчик О., Жиленко Р. Методи досліджень у соціальній роботі : навч. посіб. Ужгород, 2018. С. 68. URL: <https://www.uzhnu.edu.ua/uk/infocentre/get/42750> (date accessed: 25.02.2024).

Main Content Presentation

First of all, we express sincere gratitude to all the employees of the specialized institutions of the Ministry of Justice of Ukraine who participated in the survey (432 forensic experts were surveyed).

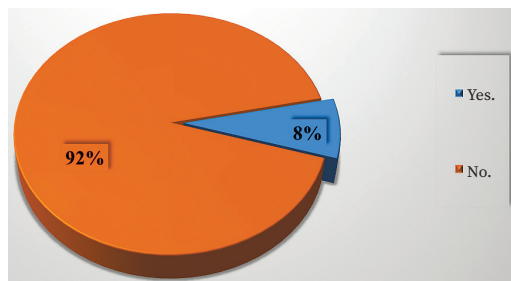


Fig. 1. Permissibility of posing legal issues to a forensic expert

Since it is prohibited by law to ask forensic experts legal questions, the majority of respondents also consider this unacceptable (see Fig. 1). At the same time, 8 % of respondents provided the opposite answer, indicating the ambiguous attitude of experts towards the norm of the Criminal Procedure Code of Ukraine (hereinafter referred to as *CPC of Ukraine*), which prohibits conducting examinations on legal issues (Part 1 of Article 242) ¹².

Meanwhile, regarding issues that cannot be resolved by forensic experts, 61 % of respondents mentioned determining the guilt of a person in committing an offense, 38 % – determining the facts of violations of the law by a specific person, 1 % – other legal issues, including: issues

where a forensic expert is a subject of law by education; compliance of individual regulatory provisions with legislation; proving the inconsistency of a person's actions with the requirements of regulatory legal acts; the degree of a person's guilt (see Fig. 2).

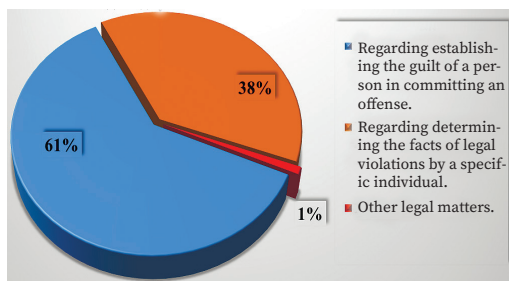


Fig. 2. Issues that cannot be investigated by a forensic expert

The integrative processes taking place at the current stage of the development of forensic science are stirring up an active discussion around complex forensic examinations. The issue of complexity also concerns the organization of road engineering examination when (in addition to specific expertise in specialty 10.16 "Road engineering examination") ¹³ it is necessary to apply specific expertise from other fields of science and technology (for example, when it is necessary to calculate the amount of damage from the destruction of road objects infrastructure as a result of shelling or bombing, it is advisable to appoint a comprehensive explosive-technical, construction-technical and road-technical forensic examination).

12 Кримінальний процесуальний кодекс України від 13.04.2012 р. № 4651-VI (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/4651-17#Text> (date accessed: 25.02.2024).

13 Положення про Центральну експертно-кваліфікаційну комісію при Міністерстві юстиції України та атестацію судових експертів : затв. наказом Мін'юсту України від 03.03.2015 р. № 301/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/z0249-15#Text> (date accessed: 25.02.2024).

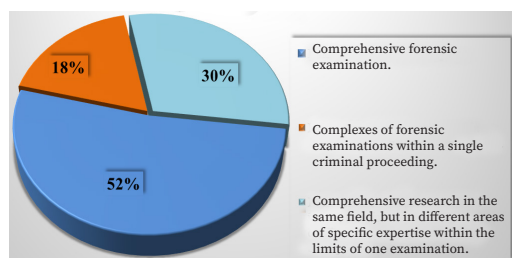


Fig. 3. Forms of complexity in conducting forensic examinations

In particular, in response to issues on the forms that a comprehensive approach can take during forensic examinations, the majority of respondents gave priority to complex forensic examination (52%). At the same time, a fairly significant percentage of forensic experts singled out complex studies from the same field, but in different areas of knowledge (30%), as well as complexes of forensic examinations for one proceeding (18%).

Therefore, due to the complexity and legal unsettledness of the provisions on complex expert research, the following questions remain unresolved and subject to debate until today: how should experts proceed if an examination is designated as comprehensive but in essence, it is not (whether it is necessary to submit a request to change the status or category of the examination to the person who appointed it, or if the head of the institution can do this independently?). In our opinion, the Instructions on the Appointment and Conduct of Forensic Examinations and Expert Research ¹⁴ should provide a mechanism for the preparation of a set of examinations, if in one resolution (court decision) questions are raised that relate to different fields of knowledge and do not contain

a general task (common) for all experts. We also consider it appropriate to set out Para. 1 Clause 4.1 Ch. IV of the Instructions ¹⁵ in the following wording: *“If the examination is assigned to an expert institution, the head of such an institution entrusts the examination to one or more experts. These experts provide an opinion on their own behalf and are personally responsible for it”*.

Closely related to the problem of integration of specific expertise outlined above is the issue of integration of sciences, namely: is the trend towards the development of basic forensic sciences (forensic medicine, forensic pharmacy, forensic biology, forensic engineering (for example, forensic construction engineering) justified from a praxeological point of view) forensic ecology, etc.)? The answer to this question united the respondents into three groups: 40% answered unequivocally about such a need for all possible areas of expert research, 30% preferred only certain areas, and 29% did not see this need (see Fig. 4). The respondents' own proposals are as follows: it is advisable to develop forensic sciences only if there is a necessary base for this and support for the development of relevant branches of “mother” sciences, it makes sense to develop a section of one forensic science – forensic examination, it is worth introducing educational disciplines in higher education institutions in the areas of expert specialties within the “mother” sciences. Undoubtedly, each of these proposals is acceptable for the development of forensic examination, since *“forensic examination is a study based on specific expertise in the field of science, technology, art, craft, etc. of objects, phenomena and*

14 Інструкція про призначення та проведення судових експертиз та експертних досліджень : затв. наказом Мініюсту України від 08.10.1998 р. № 53/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 25.02.2024).

15 Op. cit.

processes in order to provide a conclusion on issues that are or will be the subject of legal proceedings”¹⁶.

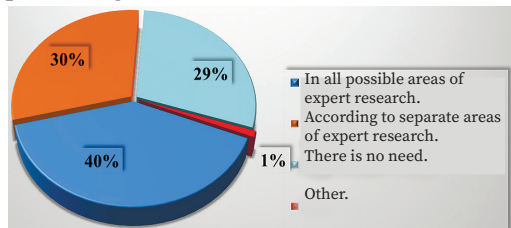


Fig. 4. It is necessary to develop basic forensic sciences (forensic science, forensic pharmacy, forensic biology, forensic engineering (e.g., forensic construction engineering), forensic ecology, etc.

Since the majority of respondents provided a positive response to the previous question, there arose a need to inquire about their opinion on the expediency of training specialists in academic disciplines in the fields of forensic sciences during the education of individuals in the respective institution of higher education. The survey results are as follows: 80 % of respondents answered “yes”, 19% answered “no”, and 1 % indicated otherwise (see Fig. 5). In particular, respondents suggested introducing into higher education institutions: specialties in the fields of law and the duties of a forensic expert, interaction with investigative authorities, courtroom conduct; the subject of “forensic science” with the study of the legal foundations of the activities of forensic experts (including involvement of practicing forensic experts in teaching); academic disciplines covering the maximum number of expert specialties in various fields of science and technology; such disciplines only if there

are appropriate licenses and educational programs. We support the training of expert personnel both in higher education institutions and based on scientific (including forensic) institutions, provided that such activities are appropriately licensed. It should be noted that the first steps in this direction have already been taken: for example, the National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» has obtained a license to conduct educational activities in the field of postgraduate education for individuals with higher education in the branch of knowledge 08 “Law”, specializing in 081 “Law”, under the educational program “Theoretical, Organizational and Procedural Issues of Forensic Science”. This license was issued by the Ministry of Education and Science of Ukraine dated on November 23, 2020, under Order No. 256-L¹⁷.

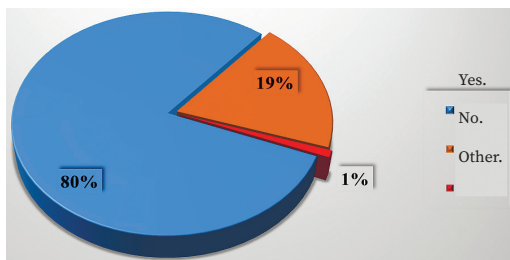


Fig. 5. It is advisable to train specialists in academic disciplines in the fields of forensic science during their education at the relevant institution of higher education

Due to the significant interest indicated above, the question of mandatory knowledge by forensic experts of the theory of forensic science, criminology, and procedural legislation is of considerable importance: 86 % of respondents gave a definite positive response, while 14 %

16 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: 25.02.2024).

17 Про ліцензування освітньої діяльності : наказ МОН України від 23.11.2020 р. № 256-л. URL: <https://mon.gov.ua/ua/ministerstvo/poslugi/licenzuvannya/protokoli-zasidan-licenzij-noyi-komisiyi-rishennya-mon/2020-rik> (date accessed: 25.02.2024).

gave a definite negative one (see Figure 6). In our opinion, this indicates a certain professional distortion among experts who provided such a negative response, as without knowledge of the theory of forensic science and procedural issues related to forensic activities, it is inappropriate to talk about the proper level of professional training.

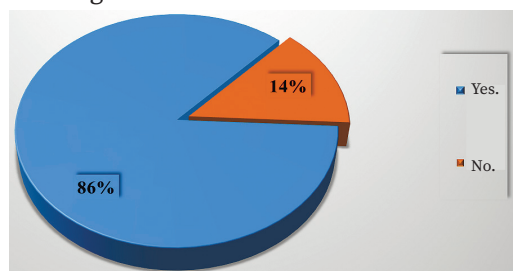


Fig. 6. a forensic expert should be well-versed in the theory of forensic science, criminology, and procedural legislation

That is why the following question of the survey regarding respondents' knowledge of theoretical and procedural issues of forensic science in defining the object of forensic science is relevant. The majority of respondents (80 %) identify the object of forensic science as the carrier of information about factual data and circumstances of the case falling within the scope of the expert examination's subject. At the same time, 20 % of the respondents confuse the concepts of the object and subject of forensic science (see Figure 7). Thus, the survey results have shown that the lack of knowledge (or disregard) of theoretical and procedural issues of forensic science has negatively affected the professional level of experts who mix up the fundamental concepts of the subject and object of forensic science.

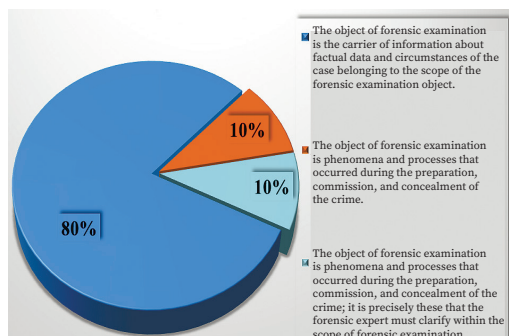


Fig. 7. Correct definition of the forensic examination object

It should be noted that such responses somehow contribute to a certain inconsistency in the definition of forensic science enshrined in the legislation of Ukraine. According to Article 1 of the Law of Ukraine "On Forensic Examination" (hereinafter referred to as relevant Law), "forensic science is an **examination** ¹⁸ based on specific expertise in the field of science, technology, art, craftsmanship, etc., of objects, **phenomena, and processes** in order to provide conclusions on issues that are or will be the subject of legal proceedings" ¹⁹. In our opinion, phenomena and processes belong not to objects, but to the subject to the forensic science. As an example, performers of complex road technical, construction and engineering examination, and explosive engineering examination have the task of calculating the extent of damage caused by shelling a section of road infrastructure. Obviously, the phenomena and processes of artillery shelling, which caused the damage, are not the object of this investigation, as they occurred during the commission of a crime – a violation of the laws and customs of war. The subject of investigation for the commission of forensic experts in this case is the carriers of information about the mentioned phenomena and processes, and clarifying

¹⁸ Тут і далі позначено мною.— Прим. авт.

¹⁹ Про судову експертизу ... URL: <https://zakon.rada.gov.ua/laws/show/4038-12#Text> (date accessed: 25.02.2024).

the fact and circumstances of obtaining damage as a result of shelling will fall within the scope of the subject of complex examination in calculating damages. We share the opinion of scientists who have long noted the somewhat imprecise delineation of the circle of “objects of expert research, including phenomena and processes”²⁰ in the Ukrainian regulatory framework. We propose our own definition of this concept: **forensic examination in criminal proceedings** is the examination by a forensic expert of material (materialized) objects with the purpose of providing conclusions on issues that are or will be the subject of forensic consideration in order to clarify, based on the use of specific expertise in the fields of science, technology, art, crafts, etc., the factual data and circumstances of the criminal proceedings regarding certain objects, phenomena, and processes that occurred (were used) during the preparation, commission, and concealment of the criminal offense.

Above, we have already focused on the integration of specific expertise. Since drawing conclusions by an expert is one of the most crucial stages of forensic investigations, respondents were asked which approach they consider correct for forming conclusions in complex forensic examination. According to the survey results, 74% of forensic experts supported the following mechanism: first, individual examinations by each forensic expert within their competence, then joint evaluation of all results in the synthesizing part of the conclusion, and finally, forming a general conclusion. We also propose such an approach to the implementation of road-technical examinations in conjunction with other types of expert specialties. At the same time, it should be noted that a quarter of respondents consider it appropriate to provide conclusions separately (see Fig. 8). Other response options were also offered

to experts surveyed: the head of the expert institution independently determines the method of conducting examination, or forensic experts are allowed to make such decisions individually, in the course of their work. Those 1% of experts who share the latter statement do not understand the essence of performing integrative tasks, which a forensic expert is unable to solve within the confines of only their “own” specific expertise. Therefore, the example provided confirms the need for developing methodologies for comprehensive forensic investigations across all types and prompts the issuance of a specific legal act regarding the appointment and conduct of comprehensive forensic examinations.

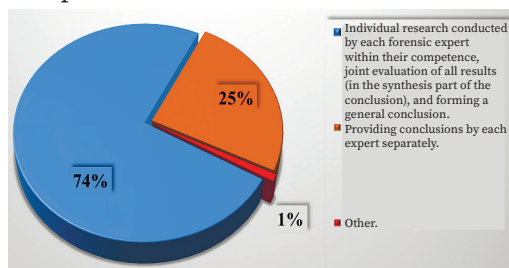


Fig. 8. The correct method of forming conclusions in comprehensive forensic examination

During the survey, questions regarding the differentiation of forensic examination methods were also investigated (see Fig. 9): 54% of respondents categorize forensic examination methods into three main categories (general (scientific), individual, and specialized), while 45% categorize them into two (general (scientific) and specialized), and 1% according to other criteria (universal, scientific, specialized; universal, interdisciplinary, specific scientific, specialized; dialectical, general scientific, specific scientific, and specialized). Without delving into detailed analysis, let's note that the distinction of universal methods, by their essence, does

20 Е. г., Сімакова-Єфремян Е. Б. Зазнач. твір. С. 147.

not differ from general ones; we also do not see grounds for distinguishing specific scientific methods (in our opinion, it coincides with the basis for individual methods). At the same time, for all differentiations, the isolation of specific methods of forensic science is characteristic, the functions of which are performed by forensic examination techniques.

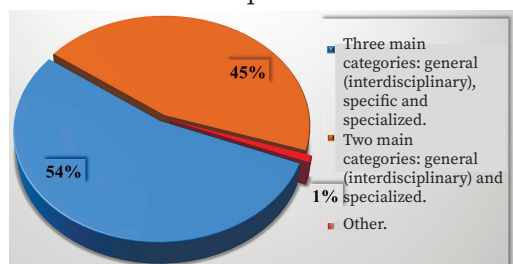


Fig. 9. Differentiation of forensic science methods

A pressing issue for ensuring the proper level of forensic activity in our state (aside from problems of regulatory framework, the need to improve theoretical and methodological bases, material provision of forensic experts, and increase funding for enhancing instrumental base) is the illegal influence (pressure) on forensic experts aimed at persuading them to

provide knowingly false conclusions or to refuse to perform their duties. Although 86 % of respondents did not fall under such external influence, 14% found themselves under similar pressure (*see Fig. 10*), meaning that every 14 out of 100 individuals experienced negative influence aimed at persuading them to violate the law.

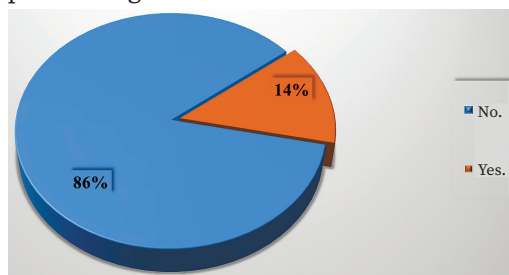


Fig. 10. Feeling of influence (pressure) on a forensic expert in order to persuade them to provide a false expert conclusion (to refrain from fulfilling their duties)

Figure 11 depicts a diagram clearly illustrating from what persons (authorities) forensic experts experienced such unlawful influence (pressure): from investigators — 24%, from defenders — 4%, from the prosecutor — 11%, from judges — 2%, from the head of the expert institution — 8%, from the victim — 3%, from the suspect (defendant) — 3%, from the representative of the party in the case — 20%, from the witness — 1%, from the anonymous person — 9%.

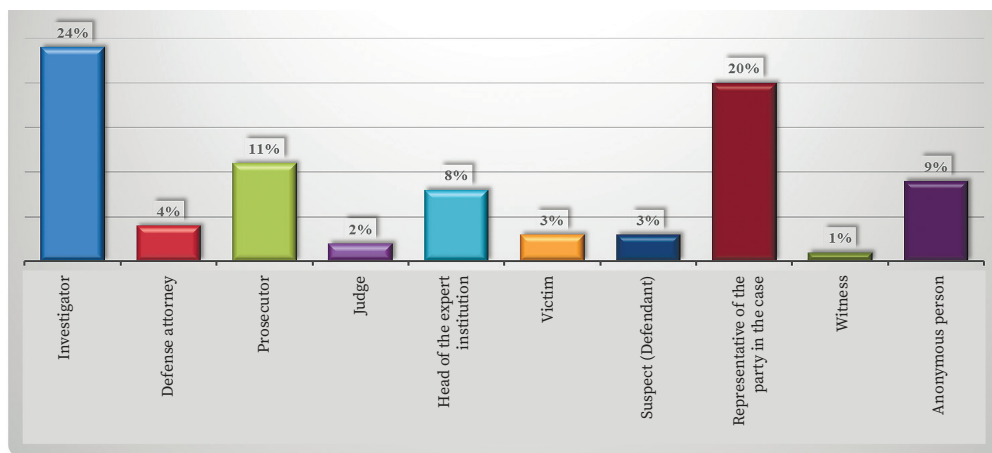


Fig. 11. A person who attempted to influence (press) the forensic expert in order to persuade them to provide a false conclusion (to refuse to fulfill duties)

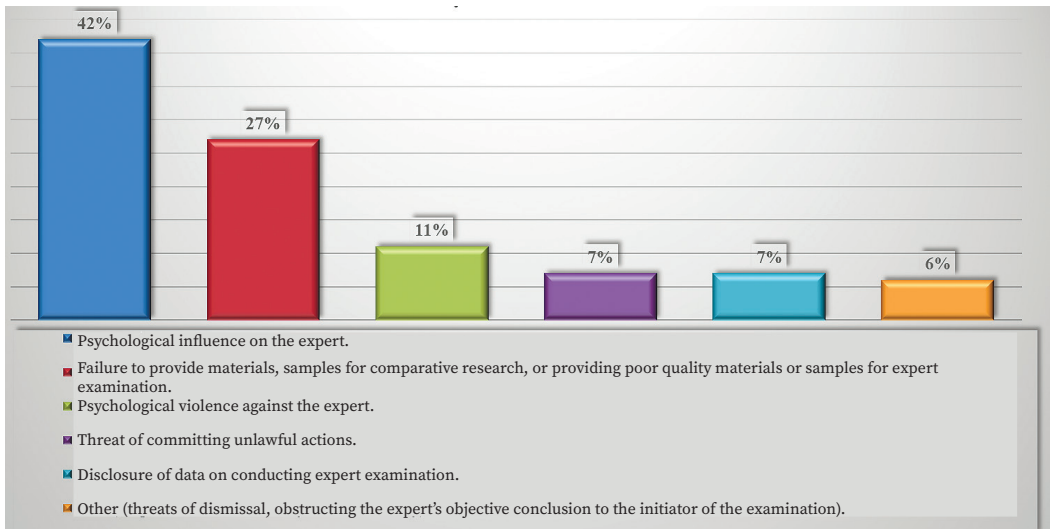


Fig. 12. Features of influencing (pressure) on the expert in order to induce them to provide a false conclusion (refusal to perform duties)

in the case – 20 %, from witnesses – 1 % and from anonymous individuals – 9 %. Additionally, Fig. 12 demonstrates what this influence consisted of: 42 % – psychological influence; 11 % – psychological violence against the expert; 27 % – failure to assist the expert in accessing the object, failure to provide materials or providing knowingly poor-quality materials or samples for expert examination; 7 % – threat of unlawful actions; 7 % – disclosure of data on conducting expert examination; 6 % – other (threats of dismissal, unlawful alteration of conclusions, etc.).

The above diagrams indicate the necessity of taking effective measures to counteract such negative phenomena, therefore, we propose to amend Article 386 of the Criminal Code of Ukraine ²¹ as follows:

“Article 386. Obstruction of the appearance in court, participation in a court session of a witness, victim, expert, specialist,

coercion to refuse to give testimony or conclusion, pressure on an expert to induce him to engage in other illegal actions”.

Obstruction of the appearance of a witness, victim, expert, specialist in court, pre-trial investigation authorities, temporary investigators, and special temporary investigative commission of the Verkhovna Rada of Ukraine, coercion to refrain from giving testimony or conclusions, as well as to give knowingly false testimony or conclusion by means of threats of murder, violence, destruction of property of these persons or their close relatives or disclosure of information that dishonors them, or bribery of a witness, victim, or expert for the same purpose, pressure on a forensic expert to commit other illegal actions related to the performance of their duties, as well as threats to take the specified actions in revenge for previously given testimony or conclusion – shall be punishable by a fine of fifty to three hundred non-taxable minimum incomes of citizens or corrective labor for

21 Кримінальний кодекс України від 05.04.2001 р. № 2341-III (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/2341-14#Text> (date accessed: 25.02.2024).

a term of up to two years, or arrest for a term of up to six months, or restriction of liberty for a term of one to three years with deprivation of the right to hold certain positions or engage in certain activities for a term of up to three years.”

The motivation and influential factor for preventing violations in the field of forensic activity is the increase in remuneration, monetary and pension provision for forensic experts, improvement of norms of their social protection, since the issue of implementing the provision of Part 2 of Article 18 of the relevant Law (according to which “employees of state specialized institutions (non-military personnel and those without ranks of ordinary and officer staff), who have the qualification of forensic expert, are entitled to salaries at least 10 times the subsistence minimum established for able-bodied persons as of January 1 of the calendar year”) ²² is extremely acute: the budget legislation of Ukraine suspends the operation of this provision every year, starting from 2018. As of today, the official salary of a forensic expert is 10,284 UAH. At some enterprises, the pay for unskilled workers is several times higher. Salaries for highly qualified scientific personnel, who are certified as forensic experts and hold scientific degrees and titles, amount to approximately 13,000 UAH. However, the risks associated with the work of forensic experts have not been taken into account, especially during a state of war, when working conditions are more difficult, and there are risks of corruption and the burden of personal responsibility for each expert. As a result, talented forensic experts are leaving forensic institutions, which reduces the level of expert support for justice in Ukraine, leading to unprecedented expert

overload and accumulation of unfulfilled examinations. In some departments, a single forensic expert simultaneously handles hundreds of expert proceedings, with deadlines exceeding all permissible norms. Implementation of Part 2 of Article 18 of the relevant Law would have a significant positive effect: then the work of a forensic expert would gain prestigious status, attracting the best specialists - both talented youth and experienced scientists. Moreover, this Law should also include provisions regarding the pension provision for forensic experts, which should have a special character.

There is also an urgent need to update the scientific, methodological and instrumental base of state specialized expert institutions. Thus, in response to the question about the sufficiency of technical and forensic support, 80 % of respondents gave a negative answer and only 20 % gave a positive answer (see Fig. 13).

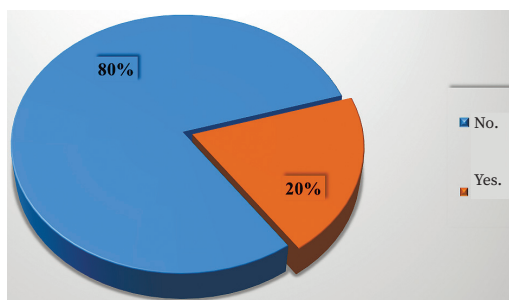


Fig. 13. Sufficiency of technical and forensic support for expert activities

Fig. 14 presents information on potential qualitative changes in such provisions: in particular, 59 % respondents mentioned updating the material and technical base for conducting expert research, 28 % mentioned the automation of expert research (development of an automated workplace (hereinafter – AW)

22 Про судову експертизу ... URL: <https://zakon.rada.gov.ua/laws/show/4038-12#Text> (date accessed: 25.02.2024).

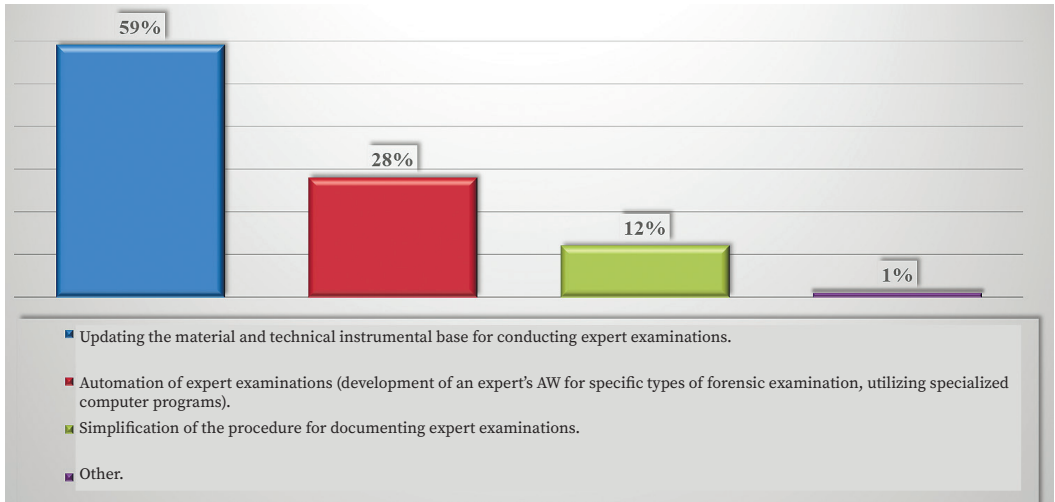


Fig. 14. Proposals for technical and forensic support of expert activities

for experts, etc.), 12 % insist on simplifying the procedure for formalizing expert research; 1 % specify other (optimization of electronic document flow; automatic creation of accompanying documents; development and use of artificial intelligence for composing accompanying documentation). In our opinion, the main obstacle in solving the issue of material and technical support is insufficient funding for the purchase of modern equipment, especially during times of war, when all funds in the country, understandably, are directed towards the needs of the Armed Forces of Ukraine.

We will continue to consider problematic issues of expert support for justice in Ukraine. In our publications, we have repeatedly emphasized the lack of methodological support for forensic activities in general and road-technical examination in particular. Let's prove it with the answers of the respondents to the question: "Do you consider the existing methodological support for

expert examinations to be sufficient?", to which 65 % of respondents gave a negative answer, and 35 % consider the level of methodological support to be sufficient (see Fig. 15).

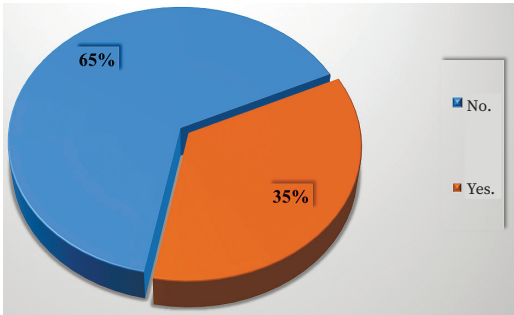


Fig. 15. Sufficiency of existing methodological support for expert examinations

Commenting on the results of this survey, you can conclude that the methodological support of forensic activities is only 35%, which is clearly insufficient for the proper level of expert support for justice in the state.

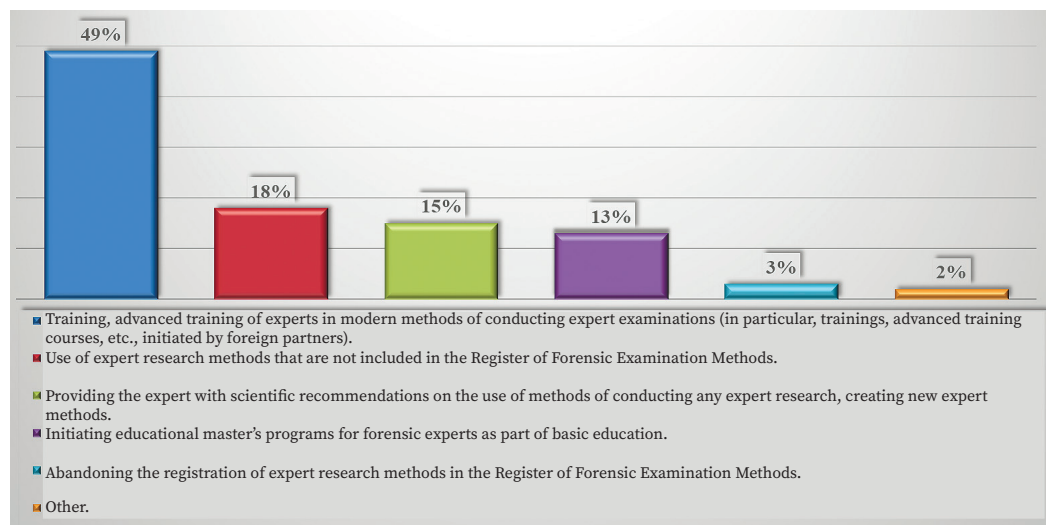


Fig. 16. Proposals for qualitative changes in the methodological support of expert examinations

Fig. 16 illustrates the results of responses to the question: “What may constitute qualitative changes in such provision?”, where 49% of respondents provided an answer related to training, upgrading the qualifications of experts in modern methods of conducting expert examinations (including training, qualification courses, etc., initiated by foreign partners); 18% mentioned the use of expert research methods not included in the Register of Forensic Examination Methods²³; 15% consider it expedient to develop advanced expert methodologies and provide the expert with scientific recommendations on the application of methods for conducting expert examinations; 13% suggested initiating educational master’s programs for forensic experts within the framework of basic education; 3% (for reasons unclear to us) advocate for the abandonment of registering forensic examination methods, while 2% mention other suggestions (creating a centralized information

database for all research directions within the Department of Scientific and Methodological Support of the Department of Expert Support of Justice of the Ministry of Justice of Ukraine to provide informational assistance to experts upon their requests; developing investigation algorithms for typical questions (we believe this proposal includes the development of expert methodologies); replenishing the library collection with literature used by foreign colleagues (with translation provided) and/or creating an electronic library); establishing a full-text information base of methodologies for conducting forensic examinations with access for all experts (since the Ministry of Justice of Ukraine is the custodian of this Registry, it is appropriate for the Department of Expert Support of Justice of the Ministry of Justice to oversee this information base); continuous education of forensic experts in scientific and technical fields, which we do not see as identical to the professional development of forensic experts.

²³ Реєстр методик проведення судових експертиз : офіц. сайт. URL: <https://rmpse.minjust.gov.ua> (date accessed: 25.02.2024).

Turning to issues concerning the organization of complex forensic examinations, let's consider the survey results on two more questions. To the first of them ("Have you encountered cases in your practice when, instead of a number of separate examinations in one proceeding, it would be more appropriate to appoint a complex forensic examination in one proceeding?") 48 % provided an affirmative answer, while 51 % of respondents stated that all resolutions, which they were tasked with carrying out examinations contained the correct definition of the category of forensic examination (*see. Fig. 17*).

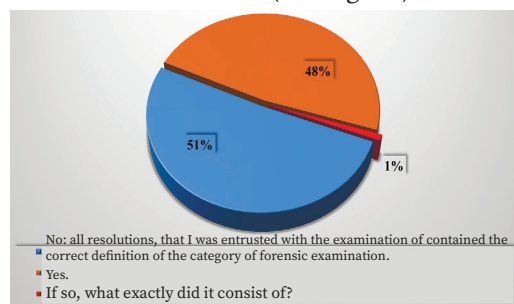


Fig. 17. Cases of expedient appointment of a complex forensic examination instead of a number of separate examinations in one proceeding

One percent of respondents cited the following reasons for appointing a number of individual expert examinations instead of complex forensic examinations: lack of education or incompetence of persons appointing the forensic examination (engaging a forensic expert); improperly formulated questions: incorrect determination of the category of forensic examination. In our opinion, all the reasons mentioned presuppose the development and implementation of a regulatory legal act on the appointment and conduct of complex forensic examinations in expert practice.

The last question of our survey is related to the previous one: "Can a single

forensic expert conduct a complex forensic examination in criminal proceedings (if he/she has two or more higher education degrees and, accordingly, two or more certificates of qualification in different expert specialties?". 80 % of respondents answered affirmatively, while 20 % answered negatively (*see Fig. 18*).

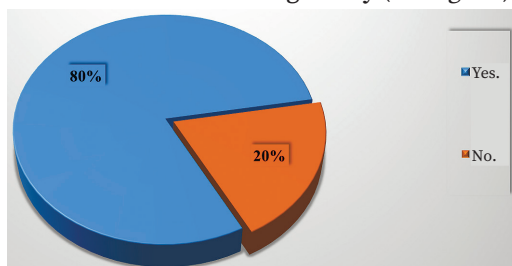


Fig. 18. The possibility of conducting a complex forensic examination by one forensic expert (if he or she has two or more higher education degrees and, accordingly, two or more certificates of qualification in different expert specialties)

We share the opinion of the majority of respondents, since the Criminal Procedure Code of Ukraine does not contain the concept of complex examination (including commission, initial, additional, or repeated), which does not at all indicate the impossibility of appointing and conducting such categories of examination in criminal proceedings. Moreover, investigative, judicial, and expert practice confirm the active application of these examinations in the criminal process. Therefore, we consider it necessary to introduce into the Criminal Procedure Code of Ukraine a provision that would allow for the appointment and conduct of such forensic examinations (including its conduct by a commission of experts, as well as by a single expert who has the relevant expert specialties in the fields of science and technology necessary to perform the expert task).

The algorithms for performing such tasks should be set out in the forensic examination methods that serve as special forensic methods. For example, the methodology for calculating the amount of material damage and the cost of restoration of a road infrastructure facility damaged as a result of shelling (bombing) is a special method characteristic of forensic road and technical examination. The concept of methodology has received a regulatory definition: it is interpreted as the result of scientific work containing a system of research methods used by an expert in the process of sequential actions to perform a specific expert task ²⁴. According to the Procedure for Certification and State Registration of Methods of Conducting Forensic Examinations, methodologies for conducting forensic examinations (except forensic-medical and forensic-psychiatric ones) are subject to certification and state registration in the manner prescribed by law by being included in the Register of Forensic Examination Methods.

In addition to the methods, the arsenal of cognitive tools includes other sources of information used by a forensic expert, such as legal acts and regulatory documents (international, national and industry standards, specifications, rules, regulations, provisions, instructions, recommendations, lists, guidelines of the State Consumer Standard of Ukraine), as well as the current republican standards of the former Ukrainian SSR and state classifiers, industry standards and specifications of the former USSR, etc. If necessary, information from scientific,

technical and reference literature, the list of which is approved by the order of the Ministry of Justice of Ukraine, may also be used during the examination ²⁵. It is also worth noting that the choice of the method of conducting forensic examination is the prerogative of the expert, who (in addition to the aforementioned sources of information) may also apply others belonging to the scientific or technical knowledge of a particular field of science and technology.

Therefore, the analysis of literary and regulatory legal sources and the results of surveys of forensic experts allow reaching the conclusions presented below.

Conclusions

The method, as an important component, belongs to the structure of the methodology of forensic examination. A scientifically substantiated methodology of any cognitive process is the cornerstone that contributes to the construction of an algorithm for performing forensic tasks, namely, the development of expert examination methodology and its implementation in expert practice.

Among other methods of forensic examination, differentiated into general, specific, and special, there is the method of surveying as a general method of cognition: the results of its application have made it possible to develop certain recommendations aimed at increasing the efficiency of forensic activities in organizational and general-methodological issues of forensic examination.

24 Порядок атестації та державної реєстрації методик проведення судових експертиз : затв. постановою КМУ від 02.07.2008 р. № 595 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/595-2008-%D0%BF#Text> (date accessed: 25.02.2024).

25 Про затвердження переліків рекомендованої науково-технічної та довідкової літератури, що використовується під час проведення судових експертиз : наказ Мініюсту України від 30.07.2010 р. № 1722/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/v1722323-10#Text> (date accessed: 25.02.2024).

Methods and techniques of research can be considered a certain specification of the method of cognition. Expert methodology is a combination of methods, techniques, and means of performing an expert task on one hand, and on the other hand, a special method of forensic examination.

The integrative processes occurring in the modern stage of forensic examination development provoke active discussions about complex forensic investigations. Due to the complexity and regulatory ambiguity of provisions regarding complex expert investigations, questions regarding the mechanisms of appointment and conduct of complex forensic examinations and sets of examinations within one criminal proceeding remain debatable to this day. It is also advisable to develop forensic sciences formed on the basis of integrative processes in forensic science.

The proposals for supporting exclusively licensed activities in training expert personnel, both in higher education institutions and at the level of scientific institutions (including forensic science), are justified.

The author's definition of the concept "*forensic science in criminal proceedings*" is proposed: it is the examination by a forensic expert of material (materialized) objects with the aim of providing conclusions on issues that are or will be the subject of judicial consideration for the clarification, based on the use of specific expertise in the fields of science, technology, art, crafts, etc., of factual data and circumstances of criminal proceedings regarding certain objects, phenomena, and processes that occurred (were used) during the preparation, commission, and concealment of criminal offenses.

The need to develop methods for complex forensic examinations of all possible types and a regulatory legal

act on the appointment and conduct of complex forensic examinations has been undoubtedly proved.

A pressing issue for ensuring the proper level of forensic activity in our state (aside from regulatory problems, the need to improve theoretical and methodological foundations, material provision for forensic experts, and increasing funding to enhance instrumental resources) is the unlawful influence (pressure) on a forensic expert aimed at inducing them to provide a knowingly false conclusion or to refuse to fulfill their duties assigned to them.

The motivation and influential factor for preventing offenses in the field of forensic activity is the increase in remuneration, monetary and pension provision of a forensic expert, and the improvement of norms for their social protection.

Taking the above into account, we propose:

1) Article 386 of the Criminal Code of Ukraine shall be amended to read as follows:

"Article 386. *Obstructing the appearance in court, participation in the court hearing of a witness, victim, expert, specialist, forcing them to refuse to give testimony or an opinion, pressure on an expert to persuade him/her to commit other illegal actions*

Obstructing the appearance of a witness, victim, expert, or specialist in court, pre-trial investigation bodies, temporary investigators, and a special temporary investigative commission of the Verkhovna Rada of Ukraine, forcing them to refuse to give testimony or a conclusion, or to give deliberately false testimony or a conclusion by threatening them with murder or violence, destruction of property of these persons or their close relatives or disclosure of information that defames them, or bribery of a witness, victim or expert for the same purpose, pressure on a forensic expert to commit other illegal actions related

to the performance of his/her duties, as well as threats to commit the said actions in retaliation for previously given testimony or conclusion shall be punishable by a fine of fifty to three hundred tax-free minimum incomes, or correctional labor for a term up to two years, or arrest for a term up to six months, or restraint of liberty for a term of one to three years with disqualification to hold certain positions or engage in certain activities for a term up to three years”;

2) Paragraph 1 of Clause 4.1 of Section IV of the Instruction on the Appointment and Conduct of Forensic Examinations and Expert Studies shall be set forth in the following wording:

“4.1. If an expert institution is appointed to conduct an expert examination, the head of such institution shall entrust the examination to one or more experts. These experts shall provide an opinion on their own behalf and be personally responsible for it”.

**Анкетування як метод
наукового пізнання та його вплив
на формування методології
судово-експертних
дорожньо-технічних досліджень**

Євген Півнюв

Здійснено аналіз основних термінів (понять) із питань методології судово-експертного дослідження та результатів анкетування судових експертів. Метою статті є аналіз методів судово-експертних досліджень як підґрунтя для побудови алгоритмів виконання завдань судової експертизи. За результатами анкетування судових експертів визначено основні положення організації проведення судової експертизи загалом та судової дорожньо-технічної експертизи зокрема, які стануть у пригоді для побудови загальних методичних положень дорожньо-технічних досліджень. Зазна-

чено, що прийоми та способи дослідження можна вважати певною конкретизацією методу пізнання. Експертна методика є сукупністю методів, прийомів і способів (засобів) виконання експертного завдання з одного боку, а з іншого — спеціальним методом судової експертизи. Для аналізу результатів анкетування застосовано комплекс методів наукового пізнання (зокрема, загальнонаукових). У зв'язку зі складністю й нормативно-правовою неврегульованістю положень про комплексні експертні дослідження запропоновано зміни до нормативно-правових актів, які обумовлюють механізм оформлення комплексу експертиз і комплексної експертизи як різних форм інтегрування спеціальних знань. Розглянуто питання подальшого формування судових наук. Наголошено, що знання теорії судової експертизи та процесуальних питань здійснення судово-експертної діяльності мови є запорукою належного рівня професійної підготовки судових експертів. Наведено авторське визначення поняття судової експертизи в кримінальному провадженні й узагальнено пропозиції судових експертів із підвищення ефективності судово-експертної діяльності.

Ключові слова: спеціальні знання; судовий експерт; метод, методологія, судово-експертна методика; висновок експерта; досудове розслідування; статистичні дані; судова дорожньо-технічна експертиза; дорожня інфраструктура.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the study design, data collection and analysis, decision to publish, or manuscript preparation.

Participants

Author contributed solely to the intellectual discussion underlying this document, case law

research, writing and editing and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Author declare no conflict of interest.

References

- Bachynin, V. A., Zhuravskiy, V. S., Panov, M. I. (2003). *Filosofia prava* [Philosophy of Law] : slovnyk. Kyiv [in Ukrainian].
- Bailenson, J. N., Beall, A. C., Loomis, J., Blascovich, J., Turk, M. (2005). Transformed Social Interaction, Augmented Gaze, and Social Influence in Immersive Virtual Environments. *Human Communication Research*. Vol. 31. Is. 4. DOI: [10.1111/j.1468-2958.2005.tb00881.x](https://doi.org/10.1111/j.1468-2958.2005.tb00881.x).
- Blikhar, V. S., Kozlovets, M. A., Horokhova, L. V., Fedorenko, V. V., Fedorenko, V. O. (2020). *Filosofia: slovnyk terminiv ta personalii* [Philosophy: Dictionary of Terms and Personalities]. Kyiv. URL: <http://surl.li/rsfnk> [in Ukrainian].
- Bulkat, M. S. (2014). *Zovnishni funktsii Ukrainy: teoretyko-pravovyi analiz* [External Functions of Ukraine: Theoretical-legal Analysis] : dys. ... kand. yuryd. nauk. Kyiv [in Ukrainian].
- Cappella, J. N., Pelachaud, C. (2009). Rules for Responsive Robots: Using Human Interactions to Build Virtual Interactions / *Stability and Change in Relationships* ; Ed. by Vangelisti A. L., Reis H. T., Fitzpatrick M. A. Cambridge : Cambridge University Press. DOI: [10.1017/CBO9780511499876](https://doi.org/10.1017/CBO9780511499876).
- Craig, R. T. (1978). Cognitive Science: A New Approach to Cognition, Language and Communication. *Quarterly Journal of Speech*. Vol. 64. Is. 4. DOI: [10.1080/00335637809383449](https://doi.org/10.1080/00335637809383449).
- Craig, R. T. (1999). Communication Theory as a Field. *Communication Theory*. Vol. 9. Is. 2. DOI: [10.1111/j.1468-2885.1999.tb00355.x](https://doi.org/10.1111/j.1468-2885.1999.tb00355.x).
- Filosofia prava* (2009) [Philosophy of Law] : navch. posib. / za red. O. H. Danyliana. Kyiv [in Ukrainian].
- Halaka, S. P. (2006). *Yaderne nerozpovsiudzhenia u svitovii praktytsi* [Nuclear Non-Proliferation in World Practice] : avtoref. dys. ... d-ra polit. nauk. Kyiv [in Ukrainian].
- Kendon, A. (1970). Movement coordination in social interaction: Some examples described. *Acta Psychologica*. Vol. 32. Is. 2. DOI: [10.1016/0001-6918\(70\)90094-6](https://doi.org/10.1016/0001-6918(70)90094-6).
- Kolesnichenko A. N. (1988). Obshie polozheniya metodiki rassledovaniya otdelnykh vidov prestupleniy [General Provisions of the Methodology of Investigating Specific Types of Crimes] / Lisichenko V. K., Goncharenko V. I., Saltevskiy M. V. i dr. *Sovetskaya kriminalistika. Metodika rassledovaniya otdelnykh vidov prestupleniy* [Soviet Criminology. Methodology of Investigating Specific Types of Crimes] // pod red. V. K. Lisichenko. Kiev [in Russian].
- Koziubra, M. (2010). Pravorozuminnia: poniattia, typy ta rivni [Legal Understanding: Concept, Type, and Levels]. *Pravo Ukrainy*. № 4. URL: https://pravoua.com.ua/ua/store/pravoukr/pravoukr_2010_4/ [in Ukrainian].
- Krymskyi, S. (2002). *Metod / Filosofskiy entsyklopedychnyi slovnyk* [Method / Philosophical Encyclopedic Dictionary] // redkol.: V. I. Shynkaruk (holova) ; In-t filos. im. H. S. Skovorody NANU. Kyiv. URL: https://shron1.chtyvo.org.ua/Shynkaruk_Volodymyr/Filosofskiy_entsyklopedychnyi_slovnyk.pdf [in Ukrainian].
- Kyrylenko, I. S. (2015). *Lokalna normotvorchist v suchasnomu suspilstvi: teoretyko-pravovi aspekty* [Local Lawmaking in Modern Society: Theoretical and Legal Aspects] : dys. ... kand. yuryd. nauk. Kyiv [in Ukrainian].
- Lee, K. M. (2004). The Multiple Source Effect and Synthesized Speech: Doubly Disembodied Language as a Conceptual Framework. *Human Communication Research*. Vol. 30. Is. 2. DOI: [10.1093/hcr/30.2.182](https://doi.org/10.1093/hcr/30.2.182).
- Macleod, C. M. (1991). Half a Century of Research on the Stroop Effect — An Integrative Review. *Psychological Bulletin*. Vol. 109. Is. 2. DOI: [10.1037/0033-2909.109.2.163](https://doi.org/10.1037/0033-2909.109.2.163).
- Mala entsyklopediia teorii derzhavy i prava* (2010) [Small Encyclopedia of the Theory of State and Law] / za zah. red. Yu. L. Boshytskoho. Kyiv [in Ukrainian].
- Manzhul, I. V. (2012). Vyznachennia metodiv piznannia v naukovi literaturi [Definitions of Methods of Cognition in Scientific Literature]. *Biuletyn Ministerstva yustytсии Ukrainy*. № 11. URL: http://nbuv.gov.ua/UJRN/bmj_2012_11_4 [in Ukrainian].

- Medin, D. L., Ross, B. H., Markman, A. B. (2001). *Cognitive Psychology*. 3rd ed. Austin, TX : Harcourt College Publishers.
- Miller, G. A. (2003). The cognitive revolution: a historical perspective. *Trends in Cognitive Sciences*. Vol. 7. Is. 3. DOI: [10.1016/S1364-6613\(03\)00029-9](https://doi.org/10.1016/S1364-6613(03)00029-9).
- Povidaichyk, O., Zhylenko, R. (2018). *Metody doslidzhen u sotsialnii roboti* [Research Methods in Social Work] : navch. posib. Uzhhorod. URL: <https://www.uzhnu.edu.ua/uk/infocentre/get/42750> [in Ukrainian].
- Rabinovych, P. (2009). Katehorii ta zakony dialektyky — aktualnyi instrument suchasnoho pravopiznannia (za materialamy praktyky Strasburzkoho sudu) [Categories and Laws of Dialectics as a Relevant Tool of Modern Legal Understanding (based on the materials of the practice of the Strasbourg Court)]. *Visnyk Natsionalnoi akademii pravovykh nauk Ukrainy*. № 4 (59). URL: http://nbuv.gov.ua/UJRN/vapny_2009_4_2 [in Ukrainian].
- Rzhevskaya, V. S. (2003). *Pravo derzhavy na samooboronu v svitli rozvytku yurydychnykh harantii mizhnarodnoi bezpeky* [The State's Right to Self-Defense in the Context of International Security Legal Guarantees] : avtoref. dys. ... kand. yuryd. nauk. Kyiv [in Ukrainian].
- Sheiko, V. M., Kushnarenko, N. M. (2004). *Orhanizatsiia ta metodyka doslidnytskoi diialnosti* [Organization and Methodology of Research Activity] : pidruchnyk. 4-te vyd., vypr. i dopov. Kyiv. URL: https://shron1.chtyvo.org.ua/Sheiko_Vasyl/Orhanizatsiia_ta_metodyka_naukovo-doslidnytskoi_diialnosti.pdf [in Ukrainian].
- Shepitko, V. Yu., Konovalova, V. O., Zhuravel, V. A., Hlibko, V. M., Dudnikov, A. L., Shevchuk, V. M. (2008). *Kryminalistyka* [Criminology] : pidruchnyk / za red. V. Yu. Shepitka. 4-te vyd., pererob. i dopov. Kharkiv. URL: <https://law.sspu.edu.ua/files/documents/books/library/17/shepitko.pdf> [in Ukrainian].
- Shliakhtun, P. P. (2010). *Politolohiia: istoriia ta teoriia* [Political Science: History and Theory] : pidruchnyk. Kyiv. URL: https://shron1.chtyvo.org.ua/Shliakhtun_Petro/Politolohiia_istoriia_ta_teoriia.pdf [in Ukrainian].
- Simakova-Yefremian, E. B. (2016). *Kompleksni sudovo-ekspertni doslidzhennia: teoriia ta praktyka* [Comprehensive Forensic Research: Theory and Practice] : monohrafiia. Kharkiv [in Ukrainian].
- Skakun, O. F. (2001). *Teoriia derzhavy i prava* [Theory of State and Law] : pidruchnyk. Kharkiv. URL: <http://politics.ellib.org.ua/pages-cat-51.html> [in Ukrainian].
- Stroop, J. R. (1992). Studies of Interference in Serial Verbal Reactions. *Journal of Experimental Psychology: General*. Vol. 121. No. 1. URL: <https://psych.hanover.edu/classes/Cognition/Archive/2009/Papers/stroop%201933.pdf>.
- Sukhonos, V. V. (2014). *Teoriia derzhavy i prava* [Theory of State and Law] : pidruchnyk. Sumy. URL: https://essuir.sumdu.edu.ua/bitstream-download/123456789/47858/1/Sukhonos_ml_TDP_uchebnik.pdf [in Ukrainian].
- Thagard, P. (2005). *Mind: Introduction to Cognitive Science*. 2nd ed. Cambridge, MA : Bradford Books. URL: <https://users.metu.edu.tr/baykan/arch586/Readings/Cognition/Background/Thagard.pdf>.
- Tsekhmistrova, H. S. (2003). *Osnovy naukovykh doslidzhen* [Fundamentals of Scientific Research] : navch. posib. Kyiv. URL: <http://www.info-library.com.ua/books-book-96.html> [in Ukrainian].
- Tsvik, M. V., Petryshyn, O. V., Avramenko, L. V. ta in. (2009). *Zahalna teoriia derzhavy i prava* [General Theory of State and Law] : pidruch. dlia stud. yuryd. vyshch. navch. zakl. / za red. M. V. Tsvika, O. V. Petryshyna. Kharkiv. URL: https://library.nlu.edu.ua/POLN-TEXT/KNIGI_2009/TEorijaDerjav_2009.pdf [in Ukrainian].
- Tsyppelius, R. (2004). *Yurydychna metodolohiia* [Legal Methodology] / Roman Kornuta (per., adapt., prykl. z prava Ukr. i spys. termin.). Kyiv [in Ukrainian].
- Volynka, K. H. (2006). *Teoriia derzhavy i prava* [Theory of State and Law] : navch. posib. 2-he vyd., ster. Kyiv [in Ukrainian].
- Walther, J. B. (1996). *Computer-Mediated Communication: Impersonal, Interpersonal and Hyperpersonal Interaction*. *Com-*

munication Research. Vol. 23. Is. 1. DOI:
[10.1177/009365096023001001](https://doi.org/10.1177/009365096023001001).

Yolon, P. (2002). *Metodolohiia / Filosofskyi entsyklopedychnyi slovnyk* [Methodology / Philosophical Dictionary]// redkol.:

V. I. Shynkaruk (holova) ; In-t filos. im. H. S. Skovorody NANU. Kyiv. URL: https://shron1.chtyvo.org.ua/Shynkaruk_Volodymyr/Filosofskyi_entsyklopedychnyi_slovnyk.pdf [in Ukrainian].

Pivnov, Ye. (2024). Survey as a Method of Scientific Cognition and Its Influence on the Formation of Forensic Road-Technical Examination Methodology. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). Pp. 187–208. DOI: [10.32353/khrife.1.2024.11](https://doi.org/10.32353/khrife.1.2024.11).

Conducting Forensic Multidisciplinary Examinations and Sets of Forensic Examinations Using Specific Expertise in Economics

Viktoriya Slyusarenko * ^a, Oleksiy Khomutenko ** ^b, Svitlana Tarasyutina *** ^c

* PhD in Economics, Docent, NSC «Hon. Prof. M. S. Bokarius FSI», Kyiv, Ukraine,

ORCID: <https://orcid.org/0009-0005-3700-2100>, e-mail: viktoorijsaaa@gmail.com

** PhD in Economics, Senior Researcher, NSC «Hon. Prof. M. S. Bokarius FSI», Kharkiv, Ukraine, ORCID: <https://orcid.org/0000-0001-7096-7944>, e-mail: lsed@ukr.net

*** NSC «Hon. Prof. M. S. Bokarius FSI», Kharkiv, Ukraine, ORCID: <https://orcid.org/0000-0002-4271-0487>, e-mail: ex0953191170@gmail.com

^a Writing – original draft, project administration, supervision.

^b Resources, writing – original draft.

^c Software, writing – original draft.

DOI: [10.32353/khrife.1.2024.12](https://doi.org/10.32353/khrife.1.2024.12) UDC 343.98

Received: 27.02.2024 / Reviewed: 28.02.2024 / Accepted for print: 27.03.2024 /

Available online: 29.03.2024



The quality of forensic examination depends on a forensic expert's qualification and his/her in-depth and responsible research on objects, the investigation of which arose during pre-trial investigation or trial. Currently, expert methodologies for conducting forensic multidisciplinary economic examinations and sets of forensic examinations require improvement, especially in light of wartime conditions. Multidisciplinary examination reflects contemporary theoretical trends by integrating legal norms into practical application to address urgent tasks in pre-trial investigations and court proceedings. The most efficient approach is to use a set of methods and technical means that give rise to new branches of scientific knowledge, determine the regularities of their practical significance, and establish interdisciplinary links. At the same time, multidisciplinary examination demonstrates high efficiency and broad possibilities through the combined and synthesized application of knowledge from diverse scientific fields and technical tools in

This article is translation of the original Ukrainian content, which source is available at the link: <https://khrife-journal.org/index.php/journal> (translated by Daryna Dukhnenko). The authors acknowledge translation as corresponding to the original.

© 2024 The Author(s). Published by National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» & Yaroslav Mudryi National Law University.

This is an open access article distributed under Creative Commons Attribution License (CC_BY_4.0.0) allowing unlimited use, distribution and reproduction on any medium, subject to reference to the Author and original sources.

addressing tasks assigned to a forensic expert. Sequential conduct of various types of forensic examinations during the resolution of multidisciplinary tasks in some cases ensures the reliability of expert conclusions and optimizes the judicial process. Multidisciplinary examination conclusions have a varied impact on the decisions made by the parties to the dispute. Therefore, improving the methodology of conducting forensic multidisciplinary examinations or sets of forensic examinations during the resolution of complex issues, which often arise in conditions of martial law, is relevant. This allows for the determination of unified approaches to addressing problematic aspects of such research.

Keywords: forensic multidisciplinary examination; sets of forensic examinations.

Research Problem Formulation

The efficiency of conducting a forensic examination depends on a forensic expert's qualification and methodological toolkit he/she uses when researching objects that have raised questions from pre-trial investigation bodies, the court, defense counsel, or parties to civil-commercial proceedings.

Today, the work of a forensic expert in Ukraine is complicated by the introduction of martial law, under which new objects, phenomena and processes appear, which were previously either not studied at all or insufficiently studied. In addition, issues at the intersection of different fields¹ and that cannot be solved by a single expert within a single area of expertise become relevant. Among the most pressing issues are the destruction of buildings and structures, documentary registration of business transactions involving the transfer of property to the military, forgery of signatures in documents, etc. A significant portion of expert tasks involves conducting research with the participation of forensic experts who are qualified in various

fields of knowledge or different experts: specialists in specific fields of knowledge. This is done with the aim of completing a joint multidisciplinary task or conducting a set of forensic examinations.

The need for conducting forensic multidisciplinary examinations or sets of forensic examinations under martial law has emphasized the importance of our research, especially the necessity to enhance expert methodologies by involving forensic economists.

Article Purpose

To justify the necessity for developing scientific and methodological guidelines on issues associated with the appointment and conduct of multidisciplinary examinations requiring specific expertise (particularly, economic expertise).

The research task is to analyze and determine the criteria for distinguishing between the reasons for conducting forensic multidisciplinary examinations and sets of forensic examinations when resolving complex issues arising from the implementation of martial law.

1 Сімакова-Єфремян Е. Б. Теоретико-правові та методологічні засади комплексних судово-експертних досліджень : автореф. дис. ... д-ра юрид. наук. Харків, 2017. 40 с. URL: <https://dspace.nlu.edu.ua/jspui/handle/123456789/13451> (date accessed: 06.02.2024).

Research Methods

As is known, the methodology of scientific research is a set of principles, means, methods, and forms of organization and conduct of scientific exploration of a given issue ².

To address the specific problematics outlined in this article, the authors utilized general methods (such as comparison, induction, deduction, etc.), individual methods, and special methods. Comparison enabled the identification of similarities and differences between objects and phenomena studied by forensic experts in various fields of knowledge, identifying commonalities and differences in the conduct of multidisciplinary examinations and sets of examinations.

Also, a variety of the comparison method, analogy, has been used, which allows one to understand certain objects

and phenomena based on their similarity to others.

Induction is a method of investigation whereby a general conclusion about the features of a set of elements is drawn based on the study of these features in a subset of elements from one set.

Deduction is a method of logical inference from the general to the specific, in which the object is first examined as a whole, and then its components are studied.

Analysis of Essential Researches and Publications

Foreign and Ukrainian experts in forensic science (namely, V. Bondar ³, O. Bondarenko ⁴, H. Dondyk ⁵, H. Veretun ⁶, N. Klymenko ⁷, M. Kostytskyi and M. Lutskyi ⁸, O. Lytvynov with co-authors ⁹,

- 2 Смирний М. Ф. Основи наукових досліджень : конспект лекцій (для студент. усіх форм навч. за спец. 141 — Електроенерг., електротехн. та електромех.). Харків, 2018. 111 с. URL: <https://core.ac.uk/download/pdf/162019668.pdf> (date accessed: 02.02.2024).
- 3 Бондар В. С. Інформаційно-аналітичне забезпечення проведення судово-балістичних експертиз. *Криміналістика і судова експертиза*. 2017. Вип. 62. С. 280—289. URL: http://nbuv.gov.ua/UJRN/krise_2017_62_34 (date accessed: 02.02.2024).
- 4 Бондаренко О. О. Класифікація судових експертиз у кримінальному судочинстві. *Вісник Харківського національного університету імені В. Н. Каразіна. Серія «Право»*. 2012. № 1028 (12). С. 339—342. URL: <https://univd.edu.ua/science-issue/issue/749> (date accessed: 02.02.2024).
- 5 Дондик Г. П. Особливості процесу дослідження при проведенні комісійних та комплексних експертиз. *Ученые записки Таврического национального университета им. В. И. Вернадского. Серия «Юридические науки»*. 2013. Т. 26 (65). № 2—2. С. 382—388. URL: https://juris.vernadskyjournals.in.ua/journals/2013/2-2_2013/55.pdf (date accessed: 02.02.2024).
- 6 Веретун Г. С. Особливості та відмінності понять «комплексна експертиза» та «комплекс експертиз». *Вісник ОНДІСЕ*. 2018. Вип. 3. С. 14—17. URL: <http://ondise.od.ua/DOC/vipusk3/oso-blivostitavidminostiponyatkomplecexpertiza.pdf> (date accessed: 02.02.2024).
- 7 Клименко Н. І. Поняття та завдання загальної теорії судової експертології в системі юридичних наук. *Криміналістика і судова експертиза*. 2019. Вип. 64. С. 48—57. URL: http://nbuv.gov.ua/UJRN/krise_2019_64_6 (date accessed: 02.02.2024).
- 8 Костицький М. В., Луцький М. І. Судово-психологічна експертиза в адміністративному процесі : монографія. Івано-Франківськ, 2011. 307 с.
- 9 Джужа О. М., Василевич В. В., Черней В. В., Чернявський С. С. та ін. Кримінологія : підручник / за заг. ред. В. В. Чернея ; за наук. ред. О. М. Джужі. Київ, 2020. 612 с. URL: https://vo.uu.edu.ua/pluginfile.php/520868/mod_resource/content/3/2020_%D0%9F%D1%96%D0%B4%D1%80%D1%83%D1%87%D0%BD%D0%B8%D0%BA_%D0%9A%D1%80%D0%B8%D0%BC%D1%96%D0%BD%D0%BE%D0%BB%D0%BE%D0%B3%D1%96%D1%8F.pdf (date accessed: 02.02.2024).

N. Loboda and O. Chabaniuk¹⁰, M. Sehai¹¹, E. Simakova-Yefremian¹², V. Sliusarenko¹³, M. Shcherbakovskiy¹⁴, V. Yurchyshyn¹⁵, etc.) have studied the issue of scientific and methodological support as one of the leading principles for the functioning of forensic institutions in Ukraine in their research papers.

V. Bondar¹⁶ highlights the potential of information-analytical support for forensic activities during the pre-trial investigation of terrorism-related crimes, suggesting a series of organizational, legal, and methodological measures aimed at enhancing the information-analytical support for investigating crimes of this nature.

H. Veretun¹⁷ analyzes forensic expert practice from the standpoint of investigating criminal offenses and the possibilities of conducting forensic examinations simultaneously by a few experts (expert committee), depending on the questions

they are addressing and the quantity and characteristics of the objects under study. It is emphasized that the committee may comprise forensic experts from the same field (a forensic examination is considered penal in this case) or from different areas of expertise (various directions within the same field): this kind of examination is multidisciplinary.

O. Bondarenko¹⁸ believes that multidisciplinary examination needs to be distinguished from the examination of complex objects, which is also conducted by a few experts of the same specialty, and from a set of interrelated examinations of the same objects. Research multidisciplinaryity also stems from the so-called synthetic examination, during which one of the forensic experts (who is the most well-versed in the field of methodology and techniques of forensic examination) can synthesize conclusions drawn by other forensic experts.

-
- 10 Чабанюк О. М., Лобода Н. О. Комплексна судова експертиза та особливості її проведення. *Сучасні проблеми екології* : тези XVIII Всеукр. наук. on-line конф. здобув. вищ. освіти і молод. учен. з міжнар. участю (Житомир, 06.10.2022). С. 37. URL: <https://conf.ztu.edu.ua/wp-content/uploads/2022/11/37.pdf> (date accessed: 02.02.2024).
 - 11 Сегай М. Я., Надгортний Г. М., Ісакович Б. М. Пропозиції з питань удосконалення регламентації судової експертизи в проектах процесуальних кодексів України. *Вісник Академії правових наук України*. 1999. № 2 (17). С. 124–133.
 - 12 Сімакова-Єфремян Е. Б. Сутність суб'єкта інтеграції знань при проведенні комплексних судово-експертних досліджень. *Теорія та практика судової експертизи і криміналістики*. 2006. Вип. 6. С. 108–117.
 - 13 Слюсаренко В. Є. Економічна експертиза. Теорія і практика в Україні. *Експерт: парадигми юридичних наук і державного управління*. 2020. № 3 (9). С. 101–107. DOI: [10.32689/2617-9660-2020-3\(9\)-101-107](https://doi.org/10.32689/2617-9660-2020-3(9)-101-107) (date accessed: 02.02.2024).
 - 14 Щербаковський М. Г. Проведення та використання судових експертиз у кримінальному провадженні : монографія. Харків, 2015. 560 с. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/0dd2821b-1646-4d5c-965f-c20e08dc1479/content> (date accessed: 06.02.2024).
 - 15 Юрчишин В. Д. *Op. cit.* URL: http://www.pjv.nuoua.od.ua/v1_2013/42.pdf (date accessed: 02.02.2024).
 - 16 Бондар В. С. *Op. cit.* URL: http://nbuv.gov.ua/UJRN/krise_2017_62_34 (date accessed: 02.02.2024).
 - 17 Веретун Г. С. *Op. cit.* URL: <http://ondise.od.ua/DOC/vipusk3/osoblivostitavidminostiponyatkomplecexpertiza.pdf> (date accessed: 02.02.2024).
 - 18 Бондаренко О. О. *Op. cit.* URL: <https://univd.edu.ua/science-issue/issue/749> (date accessed: 02.02.2024).

H. Dondyk ¹⁹ delves into research process peculiarities during the conduct of penal and forensic multidisciplinary examinations.

While exploring the issues of multidisciplinary forensic examination in trial, N. Klymenko ²⁰, N. Loboda, and O. Chabaniuk ²¹ determine the stages of preparation, conduct, and implementation of such a forensic examination.

O. Kerevych ²² places an emphasis on the legislative and practical peculiarities of appointing forensic examinations to determine individual psychological traits of a suspect (defendant) in a criminal proceeding and stresses the need to legislatively regulate certain provisions regarding the procedure for appointing forensic examinations of this kind in order to safeguard the rights and lawful interests of persons with mental disabilities.

O. Lytvynov ²³ studies the criminology issue from the perspective of cybersecurity, particularly during the conduct of multidisciplinary and penal forensic examinations.

Y. O. Shulga ²⁴ sheds light on the peculiarities of engaging a forensic expert at the initial stage of investigating brigandism.

V. Yurchyshyn ²⁵, in research papers dedicated to the analysis and classification of expert conclusions in a criminal proceeding, views theoretical and practical aspects of using multidisciplinary examination findings as a means of proof.

At the same time, the above authors have failed to address the distinctions between conducting multidisciplinary forensic-economic examinations requiring specialists in the field of economic knowledge, and other sets of forensic examinations, as well as scientific-methodological guidelines that would outline peculiarities of expert tasks under martial law.

Main Content Presentation

Forensic examination utilizes modern advancements from various fields of science and technology; thus, its

19 Дондик Г. П. О. р. cit. URL: https://juris.vernadskyjournals.in.ua/journals/2013/2-2_2013/55.pdf (date accessed: 02.02.2024).

20 Клименко Н. И. О. р. cit. URL: http://nbuv.gov.ua/UJRN/krise_2019_64_6 (date accessed: 02.02.2024).

21 Чабанюк О. М., Лобода Н. О. О. р. cit. URL: <https://conf.ztu.edu.ua/wp-content/uploads/2022/11/37.pdf> (date accessed: 02.02.2024).

22 Керевич О. В. Особливості призначення судових експертиз для встановлення індивідуально-психологічних особливостей підозрюваного (обвинувачуваного). *Вісник кримінального судочинства*. 2015. № 2. С. 31–36. URL: https://vkslaw.knu.ua/images/verstka/2_2015_Kerevuch.pdf (date accessed: 02.02.2024).

23 Джу́жа О. М., Васи́левич В. В., Черней В. В., Чернявський С. С. та ін. О. р. cit. URL: https://vo.uu.edu.ua/pluginfile.php/520868/mod_resource/content/3/2020_%D0%9F%D1%96%D0%B4%D1%80%D1%83%D1%87%D0%BD%D0%B8%D0%BA_%D0%9A%D1%80%D0%B8%D0%BC%D1%96%D0%BD%D0%BE%D0%BB%D0%BE%D0%B3%D1%96%D1%8F.pdf (date accessed: 02.02.2024).

24 Шульга Ю. О. Особливості залучення експерта на початковому етапі розслідування розбоїв, вчинених із проникненням у житло. *Науковий вісник Ужгородського національного університету. Серія: Право*. 2018. Вип. 53. Т. 2. С. 96–100. URL: <https://dspace.uzhnu.edu.ua/jspui/handle/lib/30686> (date accessed: 02.02.2024).

25 Юрчишин В. Д. О. р. cit. URL: http://www.pjv.nuoua.od.ua/v1_2013/42.pdf (date accessed: 02.02.2024).

nature is comprehensive and inclusive, incorporating a wide range of specific expertise used.

Multidisciplinary examination reflects the tendency of theory and practice towards integrating specific expertise into practical application for addressing urgent tasks of pre-trial investigation and a court proceeding.

Integration of knowledge from experts in various fields opens up new prospects for the development of forensic examination, while the needs of judicial practice increasingly require solutions to issues that lie at the intersection of different disciplines. A multidisciplinary approach allows for the creation of a more complete and adequate picture of the object under study compared to separate subject-based approaches, which is a defining indicator of scientific research efficiency ²⁶. Moreover, as practice demonstrates, employing a set of methods and technical tools to solve tasks proves more efficient, leading to

the emergence of new fields of scientific knowledge that unveil patterns of practical significance and foster interdisciplinary links. Therefore, thoroughness of a studied phenomenon is realized through applying a multidisciplinary approach. Forms of interaction between forensic experts are closely related to the procedures for solving specific examination tasks, requiring the development of basic cooperation principles among these specialists. Adequate level of cooperation can only be ensured through organized, professional communication between forensic experts ²⁷.

Comparative analysis of the norms of the Instructions on the Appointment and Conduct of Forensic Examinations and Expert Studies (hereinafter referred to as *the Instructions* ²⁸), governing the conduct of forensic multidisciplinary examinations and sets of forensic examinations, taking into account other types of forensic examinations, is provided in the Table.

Comparing the application scope of forensic multidisciplinary examination and examination considering other types of forensic examinations

Forensic multidisciplinary examination	Forensic examination considering other types of forensic examinations
Paragraph 6, subclause 1.2.14, clause 1.2, Section I: “Forensic examination is considered multidisciplinary when performed using specific expertise from various fields of science, technology, or other specific expertise (different directions within the same field of knowledge) to address a common (integration) task (or issue). If necessary, forensic experts from forensic science institutions,	Paragraph 4.2 of Section IV: “4.2. If one document on the appointment of a forensic examination (involvement of a forensic expert) contains issues associated with various types of unrelated forensic examinations, the Institution head determines which issues should be addressed in the respective subdivision and the sequence of their resolution. Paragraph 11 of clause 4.12 of Section IV:

26 Капустник К., Хомутенко О., Кіпоурас П. Щодо вдосконалення науково-методичної бази проведення судово-економічних експертиз із урахуванням інших видів експертиз (оглядова стаття). *Теорія та практика судової експертизи і криміналістики*. 2022. Вип. 4 (29). С. 160—169. DOI: [10.32353/khrife.4.2022.09](https://doi.org/10.32353/khrife.4.2022.09) (date accessed: 02.02.2024).

27 Сімакова-Єфремян Е. Б. Сутність суб'єкта ...

28 Інструкція про призначення та проведення судових експертиз та експертних досліджень : затв. наказ. Мін'юсту України від 08.10.1998 р. № 53/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 02.02.2024).

Forensic multidisciplinary examination	Forensic examination considering other types of forensic examinations
as well as specialists from institutions and services (departments) of other central executive bodies, or other experts not employed in state specialized expert institutions, may be involved in conducting such examinations” ²⁹	“4.12. <...> The expert conclusion introduction section outlines the following: <...> <...> If certain questions specified in the document on the appointment of a forensic examination (engagement of a forensic expert) were addressed during the conduct of other types of forensic examinations, relevant information (such as the expert institution, number, and date of a conclusion) about these forensic examinations is provided. If the questions posed for a forensic examination are considered more appropriate to be addressed in a different order than that specified in the document on the appointment of a forensic examination (involvement of a forensic expert), the sequence in which these questions will be addressed is specified”³⁰.

As Table shows, various clauses of the Instructions govern the conduct of forensic multidisciplinary examinations and forensic examinations involving the use of findings obtained from other types of forensic examinations (sets of examinations).

The distinction in conducting forensic examinations utilizing results from other types of forensic examinations lies in the unique expertise used to formulate a conclusion. At the same time, conclusions of forensic experts specialized in other areas serve as source data. Without analyzing and assessing these data, a forensic expert conducting an examination cannot effectively solve a task.

This provision is supported by forensic expert practice confirming the complexity encountered by forensic experts in resolving tasks assigned to them within the framework of conducting forensic multidisciplinary examinations.

This complexity can be attributed to various factors (including the term for conducting each type of research, the influence of conclusions from one study on the advisability of conducting others, and the expansion of specialists’ expertise across different specialties to fully clarify circumstances of a case, which are the subject of pre-trial investigation or trial).

Hence, conducting different types of examinations sequentially while resolving multidisciplinary tasks can optimize the administration of justice process in some cases.

1st example. During the calculation of the deviation of products’ purchase price from their market price in conditions of non-compliance with the tender procedure, the commodity examination determined that the purchase price equals or is lower than the average market price. In this case, appointing a forensic economic examination taking into account the

29 Інструкція URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 02.02.2024).

30 Op. cit.

conclusion of a commodity examination to determine the total deviation paid for the entire batch of supplies makes no sense, as it saves time for the procedural decision-making by the investigator ³¹.

2nd example. While the examination of equipment, machines and mechanisms by a forensic expert for the purpose of determining their value, it is expedient to conduct a multidisciplinary forensic examination with the participation of a commodity expert certified in expert specialty 10.23 "Examination of technical condition and operating conditions of machines and mechanisms" ³². The determined actual condition of pieces of other equipment parts and defects will be used by the expert in commodity research for further investigations aimed at calculating wear coefficient.

3rd example. During research on the market value of jewelry with gemstones, multidisciplinary research is conducted with experts in metallurgy and gemology. Examining metals, alloys, and products made from them, the metallurgist determines from which metal (or alloy) the object under study is made. Examination of stones and their value is carried out by a gemology expert. Using the obtained data, the market value of the jewelry is determined, and conclusions are developed relying on metallurgical and gemological research findings.

4th example. Examination of alcohol-containing mixtures is performed by an expert in commodity research and an expert qualified in 8.7 "Examination of alcohol-

containing mixtures" ³³ in combination with other examinations, addressing questions such as: "Does the alcoholic beverage in a specific bottle match the characteristics of the beverage indicated on the label?" and "Does this liquid belong to strong alcoholic beverages?". Based on the findings, the expert in commodity research conducts research and answers the question: "What characteristics does the product correspond to according to Ukrainian Classification of Goods for Foreign Economic Activity?", while the conclusion is formulated by the expert committee.

5th example. In the course of research on damages caused by deforestation, a forensic economist utilizes a set of conclusions from environmental and commodity examinations as source data.

6th example. Examination of unjustified acquisition of cash funds by a forensic economist is conducted taking into account handwriting analysis results.

7th example. When calculating damages (lost profits) resulting from the destruction of real estate due to artillery shelling or bombing, a forensic economist uses conclusions obtained as a result of ballistic, construction, and commodity examinations.

8th example. The forensic economist calculates unpaid taxes arising from illegal border crossings using conclusions from commodity examinations.

The main feature of multidisciplinary forensic examination is resolving related issues across different competencies, which cannot be resolved using only one

31 Капустник К., Хомутенко О., Кіпоурас П. Оп. cit. DOI: 10.32353/khrife.4.2022.09 (date accessed: 02.02.2024).

32 Перелік видів судових експертиз та експертних спеціальностей, за якими присвоюється кваліфікація судового експерта фахівцям науково-дослідних установ судових експертиз Міністерства юстиції України : дод. 5 до Положення про Центральну експертно-кваліфікаційну комісію при Міністерстві юстиції України та атестацію судових експертів, затв. наказ. Мін'юсту України від 03.03.2015 р. № 301/5 (зі змін. та допов.). URL: <https://zakon.rada.gov.ua/laws/show/z0249-15#Text> (date accessed: 02.02.2024).

33 Ibid.

area of specific expertise. The procedure for conducting research, as well as specifying the sequence and terms for individual studies, is determined during a meeting organized by the head of the expert institution for all committee-involved experts, taking into consideration the functions of each. Findings are also collectively evaluated.

If questions related to different types of forensic examinations concerning the same objects are addressed by forensic experts of various specialties without collaborative research and evaluation of findings, such examination can be considered a set of forensic examinations³⁴. In this case, it is crucial to consider the sequence of actions of experts from different fields when researching a shared object, the types and sequence of research methods applied, while ensuring adherence to preservation and handling rules for objects.

The expert committee joint conclusion is signed by forensic experts who *“participated in overall evaluation of results obtained from all studies and reached an agreement”* (clauses 4.5 and 4.9 of Section IV of the Instructions)³⁵. If an agreement between them has not been reached, then several expert conclusions (corresponding to the number of different positions) are drawn up, or one opinion is compiled, in which the introduction and research sections are signed by all experts, while the conclusion section is signed only by those presenting their own findings from their conducted research. The results of such examination are utilized by a customer who engaged experts, as well as other entities who received the expert conclusion.

At the same time, multidisciplinary forensic examination is highly efficient

and offers ample opportunities for the collective and synthesized application of knowledge from various fields of science and technology during the resolution of tasks addressed to forensic experts. Conclusions obtained as a result of such examination comprehensively influence the decision-making of the entities resolving disputes. During multidisciplinary examinations, specialists from different fields of knowledge study the phenomenon considering only their own area of expertise in accordance with procedural law and reach a joint decision (or express a particular opinion based on specific expertise in their field).

Therefore, conducting a multidisciplinary forensic examination to answer the posed question requires synthesis of various fields of knowledge considering different data about the research subject and enabling resolution of the issue as quickly as possible.

When examining and comparing sets of forensic examinations with other types of multidisciplinary examinations, it is worth noting that criminal procedural legislation does not directly define the *multidisciplinary* concept. Conducting a multidisciplinary forensic examination in compliance with clause 3.7 of Chapter III of the Instructions³⁶ is ensured by the institution(s) to which the procedural document regarding its appointment has been submitted. During forensic examinations, while considering the conclusions of other examinations (a set of forensic examinations), the synthesis of knowledge from different fields occurs when the expert utilizes the results of research conducted by forensic experts from other field(s) of knowledge. This

34 Сімакова-Єфремян Е. Б. Сутність суб'єкта ...

35 Інструкція ... URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text> (date accessed: 02.02.2024).

36 Ibid.

leads to a deeper understanding of the phenomenon that was the subject of controversy and was examined by various forensic experts.

When drafting a conclusion based on findings of forensic experts in other areas of expertise that reveal the essence of the studied phenomenon, the forensic expert utilizes them and simultaneously applies his/her specific expertise, which is one of the differences in conducting a forensic examination of this kind.

Hence, the conclusion of a multidisciplinary forensic examination and conclusions of other forensic examinations, which are considered during its preparation, are components of a holistic system of the studied phenomenon necessary for the court (investigation) to understand the phenomenon regarding which an objective decision on the merits needs to be made. Multidisciplinary examinations provide a comprehensive cause-and-effect understanding of the object under study. In expert conclusions based on the results of individual types of forensic examinations, one component is determined by factual data, requiring specific expertise in one field, while the other component necessitates knowledge in another field, along with additional explanations.

Considering the conclusions of other types of forensic examinations by forensic experts is a means of broadening the background information concerning specific objects of study or circumstances of a case. This is particularly useful when the data are partially or completely absent in the objects submitted for examination, and when utilization of such information in the forensic examination process is only feasible after it has been processed by forensic experts in other specialties.

Practice of conducting these kinds of forensic examinations requires the development of a preliminary set of questions that can be addressed by forensic experts, specifying the conclusions of which forensic examinations in other areas of expertise may (or must) be provided as source data and taken into account when formulating conclusions. Therefore, it is necessary to classify sets of forensic examinations. This will positively impact the activities of forensic science institutions, streamline the terms for conducting forensic examinations, and contribute to obtaining objective and unbiased conclusions³⁷.

Customers, when appointing multidisciplinary or additional types of forensic examinations that involve other types of examinations, ought to have a clear understanding of the tasks that can be addressed during such examinations. They should also consider that conducting individual types of forensic examinations with utilization of other examination types requires more time.

During the state of war, there has been an increased relevance of forensic multidisciplinary examinations involving economists. They can be categorized into types and subtypes, as outlined below.

Economic. Subtypes: sets of forensic economic examinations considering the conclusions of previously conducted forensic examinations of accounting and tax accounting, financial and economic activities, and financial and credit transactions (that is, taking into account conclusions of other forensic economic examinations). The need for such sets arises from the fact that forensic experts use conclusions from other forensic examinations as source data without re-examining objects (if it is needed to expand the conducted research due to

37 Капустник К., Хомутенко О., Кіпоурас П. *Op. cit.* DOI: 10.32353/khrife.4.2022.09 (date accessed: 02.02.2024).

the lack of already studied objects or time for their re-processing).

Economic-criminalistics. Subtypes: sets of forensic economic examinations taking into account conclusions of handwriting analysis; linguistic examination of speech; questioned document examination; examination of weapons and traces and circumstances of their use; trace evidence analysis (except for the examination of traces of damage to clothing with simultaneous infliction of bodily injury conducted in forensic medical examination bureaus); examination of hologram, video and audio recording; explosive engineering; examination of man-made explosions; examination of materials, substances, and products (paint and varnish materials and coatings; polymeric materials; fibrous materials; petroleum products and lubricants; glass, ceramics; narcotic substances, psychotropic substances, their analogs, and precursors; alcohol-containing mixtures; soils; metals and alloys and products made from them; pesticides presence in the environment; chemical production substances and special chemical substances; food products; highly potent and poisonous substances); biological examination.

Economic-handwriting. Subtypes: sets of forensic economic examinations that incorporate conclusions from handwriting analysis conducted on original documents found in accounting records, contracts, financial statements, and tax reports.

Economic-commodity. Subtypes: sets of forensic economic examinations taking into account the conclusions from commodity examinations of machinery, equipment, raw materials, and consumer goods; transportation-commodity examination; valuation of military assets and equipment and weaponry; aviation-technical examination, etc.

Economic and Intellectual Property. Subtypes: sets of forensic economic examina-

tions incorporating conclusions from forensic examinations of literary and artistic works; investigations associated with phonograms, videograms, phonograms, shows (broadcasts) of broadcasting organizations; examinations of inventions and utility models; investigations related to industrial designs; examination of plant varieties and animal breeds; examination of commercial (corporate) names, trademarks (marks for goods and services), geographical indications; examination of integrated circuit layout; examination of commercial secrets (know-how) and innovative proposals; economic examination in the field of intellectual property.

Economic-construction-commodity. Subtypes: sets of forensic economic examinations taking into account conclusions from commodity examination of buildings, structures, and infrastructure facilities.

Economic-engineering-technical. Subtypes: sets of forensic economic examinations considering conclusions of transportation-engineering examination (engineer vehicular investigation, vehicle and trace studies, rail transport examination); road-technical examination; construction and engineering examination; estimate examination in construction; land and technical examination; land evaluation examination; expert examination of land management issues; fire and technical examination; life safety examination; mining engineering examination; environmental and engineering examination; electrical engineering expert examination; computer examination; water engineering examination.

The classification of forensic examination sets undergoes changes over time; its updating is primarily due to the need to address new tasks concerning objects that have not been previously studied. That is why the proposed classification may be transformed in the future, considering new expert knowledge and tasks.

Conclusions

Conducting a forensic multidisciplinary examination is regulated at the level of subordinate instruments and by-laws; its value lies in the ability to study phenomena and obtain full justification in conditions of collective work of experts in various fields of knowledge. This, in turn, will provide the entity appointing a forensic examination with greater confidence in reaching an objective decision during the process of pre-trial investigation and trial.

Performing a forensic examination using knowledge from various fields enables a forensic expert to apply it in addressing the essence of the question posed to him/her. Multidisciplinary examinations are conducted much faster than sets of forensic examinations which significantly impacts the speed of investigation and trial, a critical factor in today's context.

Therefore, enhancing the methodology for conducting forensic multidisciplinary examinations and sets of forensic examinations to address complex issues arising in connection with the military situation will further facilitate the development of unified approaches to resolving challenging aspects of such research.

Проведення комплексних і комплексів судових експертиз із використанням спеціальних знань у галузі економіки

**Вікторія Слюсаренко,
Олексій Хомутенко,
Світлана Тарасютина**

Якість проведення експертизи залежить від кваліфікації судового експерта й докладного та відповідального дослідження ним об'єктів, дослідити які виникла потреба в процесі досудового слідства або суду. Сьогодні експертні методики з пи-

тань проведення комплексних судово-економічних експертиз і комплексу експертиз потребують удосконалення, зважаючи на умови воєнного часу. Комплексна експертиза відображає сучасні теоретичні тенденції щодо інтеграції норм законодавства в прикладну складову для виконання загальних завдань у судовому слідстві та судочинстві. Найефективнішим у цьому контексті є використання комплексу методів і технічних засобів, завдяки яким формуються нові галузі наукового знання, що обумовлюють закономірності їх практичного значення, а також утворюються міжгалузеві та міждисциплінарні зв'язки. Водночас комплексна експертиза має високу ефективність і широкі можливості сукупного, синтезованого застосування знань із різних галузей наук та технічних засобів під час розв'язання завдань, поставлених перед експертом. Почергове проведення експертиз різних видів під час розв'язання комплексних завдань у деяких випадках забезпечує достовірність експертних висновків та оптимізує процес правосуддя. Висновки комплексної експертизи мають різнобічний вплив на ухвалення рішень суб'єктами, які вирішують суперечку. Тому вдосконалення методики проведення комплексних або комплексу судових експертиз під час розв'язання складних питань, що часто виникають в умовах дії військового стану, є актуальним, даючи змогу визначати єдині підходи до розв'язання проблемних аспектів такого дослідження.

Ключові слова: комплексна судова експертиза; комплекси судових експертиз.

Financing

This research did not receive any specific grant from funding institutions in the public, commercial or non-commercial sectors.

Disclaimer

Founders had no role in the study design, data collection and analysis, decision to publish, or manuscript preparation.

Participants

Authors contributed solely to the intellectual discussion underlying this document, case law research, writing and editing and assumes responsibility for its content and interpretation.

Declaration of Competing Interest

Authors declare no conflict of interest.

References

- Bondar, V. S. (2017). Informatsiino-analitychne zabezpechennia provedennia sudovobalistychnykh ekspertyz [Information and analytical support for forensic ballistic examination]. *Kryminalistyka i sudova ekspertyza*. Vyp. 62. URL: http://nbuv.gov.ua/UJRN/krise_2017_62_34 [in Ukrainian].
- Bondarenko, O. O. (2012). Klasyfikatsiia sudovykh ekspertyz u kryminalnomu sudochynstvi [Classification of forensic examinations in a criminal proceeding]. *Visnyk Kharkivskoho natsionalnoho universytetu imeni V. N. Karazina. Seriya «Pravo»*. № 1028 (12). URL: <https://univd.edu.ua/science-issue/issue/749> [in Ukrainian].
- Chabaniuk, O. M., Loboda, N. O. (2022). Kompleksna sudova ekspertyza ta osoblyvosti yii provedennia [Multidisciplinary forensic examination and peculiarities of its conduct]. *Suchasni problemy ekolohii : tezy KhVIII Vseukr. nauk. on-line konf. zdobuv. vyshch. osvity i molod. uchen. z mizhnar. uchastiu* (Zhytomyr, 06.10.2022). URL: <https://conf.ztu.edu.ua/wp-content/uploads/2022/11/37.pdf> [in Ukrainian].
- Dondyk, H. P. (2013). Osoblyvosti protsesu doslidzhennia pry provedenni komisiinykh ta kompleksnykh ekspertyz [Features of research process in conducting commission and comprehensive forensic examinations]. *Uchenye zapiski Tavricheskogo nacionalnogo universiteta im. V. I. Vernadskogo. Seriya «Yuridicheskie nauki»*. T. 26 (65). № 2—2. URL: https://juris.vernadskyjournals.in.ua/journals/2013/2-2_2013/55.pdf [in Ukrainian].
- Dzhuzha, O. M., Vasylevych, V. V., Cherniei, V. V., Cherniavskiy, S. S. ta in. (2020). Kryminolohiia [Criminology] : pidruchnyk / za zah. red. V. V. Chernieia ; za nauk. red. O. M. Dzhuzhi. Kyiv. URL: https://vo.uu.edu.ua/pluginfile.php/520868/mod_resource/content/3/2020_%D0%9F%D1%96%D0%B4%D1%80%D1%83%D1%87%D0%BD%D0%B8%D0%BA_%D0%9A%D1%80%D0%B8%D0%BC%D1%96%D0%BD%D0%BE%D0%BB%D0%BE%D0%B3%D1%96%D1%8F.pdf [in Ukrainian].
- Kapustnik, K., Khomutenko, O., Kipouras, P. (2022). On Improvement of Scientific and Methodological Basis for Conducting Forensic Economic Examinations Considering Other Types of Forensic Examinations (review article). *Theory and Practice of Forensic Science and Criminalistics*. Issue 4 (29). P. 160—169. DOI: 10.32353/khrife.4.2022.06.
- Kerevych, O. V. (2015). Osoblyvosti pryznachennia sudovykh ekspertyz dlia vstanovlennia individualno-psychologichnykh osoblyvostei pidozriuvanoho (obvynuvachuvanoho) [Features purpose of forensic examination to establish individual psychological characteristics of the suspect (accused)]. *Visnyk kryminalnogo sudochynstva*. № 2. URL: https://vkslaw.knu.ua/images/verstka/2_2015_Kerevuch.pdf [in Ukrainian].
- Klymenko, N. I. (2019). Poniattia ta zavdannia zahalnoi teorii sudovoi ekspertolohii v systemi yurydychnykh nauk [Theory of forensic expertology in the system of law]. *Kryminalistyka i sudova ekspertyza*. Vyp. 64. URL: http://nbuv.gov.ua/UJRN/krise_2019_64_6 [in Ukrainian].
- Kostytskiy, M. V., Lutskiy, M. I. (2011). Sudovopsykhologichna ekspertyza v administrativnomu protsesi [Forensic psychological examination in administrative process] : monohrafiia. Ivano-Frankivsk [in Ukrainian].
- Sehai, M. Ya., Nadjorny, H. M., Isakovych, B. M. (1999). Propozytzii z pytan udoskonalennia rehlamentatsii sudovoi ekspertyz v proektakh protsesualnykh kodeksiv Ukrainy [Proposals on the improvement of forensic examination regulation in Ukrainian draft procedural codes]. *Visnyk Akademii pravovykh nauk Ukrainy*. № 2 (17). [in Ukrainian].
- Shcherbakovskiy, M. H. (2015). *Provedennia ta vykorystannia sudovykh ekspertyz u kryminalnomu provadzhenni* [Conducting and utilizing forensic examinations in a criminal

- proceeding] : monohrafiia. Kharkiv. URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/0dd2821b-1646-4d5c-965f-c20e08dc1479/content> [in Ukrainian].
- Shulha, Yu. O. (2018). Osoblyvosti zaluchennia eksperta na pochatkovomu etapi rozsliduvannia rozboiu, vchynenykh iz pronyknenniam u zhytlo [Peculiarities of involving an expert at the initial stage of investigation of home-invasion robberies]. *Naukovyi visnyk Uzhhorodskoho natsionalnoho universytetu. Seriya: Pravo*. Vyp. 53. T. 2. URL: <https://dspace.uzhnu.edu.ua/jspui/handle/lib/30686> [in Ukrainian].
- Simakova-Yefremian, E. B. (2006). Sutnist subiekta intehtatsii znan pry provedenni kompleksnykh sudovo-ekspertnykh doslidzhen. *Teoriia ta praktyka sudovoi ekspertyzy i kryminalistyky*. Vyp. 6 [in Ukrainian].
- Simakova-Yefremian, E. B. (2017). Teoretyko-pravovi ta metodolohichni zasady kompleksnykh sudovo-ekspertnykh doslidzhen [Theoretical-legal and methodological foundations of complex forensic research] : avtoref. dys. ... d-ra yuryd. nauk. Kharkiv. URL: <https://dspace.nlu.edu.ua/jspui/handle/123456789/13451> [in Ukrainian].
- Sliusarenko, V. Ye. (2020). Ekonomichna ekspertyza. Teoriia i praktyka v Ukraini [Economic examination. Theory and practice in Ukraine]. *Ekspert: paradyhmy yurydychnykh nauk i derzhavnoho upravlinnia*. № 3 (9). DOI: [10.32689/2617-9660-2020-3\(9\)-101-107](https://doi.org/10.32689/2617-9660-2020-3(9)-101-107) [in Ukrainian].
- Smyrnyi, M. F. (2018). Osnovy naukovykh doslidzhen [Scientific Research Fundamentals] : konspekt lektsii (dlia student. usikh form navch. za spets. 141 — Elektroenerh., elektrotekhn. ta elektromekh.). Kharkiv. URL: <https://core.ac.uk/download/pdf/162019668.pdf> [in Ukrainian].
- Veretun, H. S. (2018). Osoblyvosti ta vidminnosti poniat «kompleksna ekspertyza» ta «kompleks ekspertyz» [Features and distinctions of concepts «complex expertise» and «expertises complex»]. *Visnyk ONDISE*. Vyp. 3. URL: <http://ondise.od.ua/DOC/vipusk3/osoblivostitavidminostiponyatkomplecexpertiza.pdf> [in Ukrainian].
- Slyusarenko, V., Khomutenko, O., Tarasyutina, S. (2024). Conducting Forensic Multidisciplinary Examinations and Sets of Forensic Examinations Using Specific Expertise in Economics. *Theory and Practice of Forensic Science and Criminalistics*. Issue 1 (34). Pp. 209–222. DOI: [10.32353/khrife.1.2024.12](https://doi.org/10.32353/khrife.1.2024.12).

All-Ukrainian Scientific and Practical Conference “30 Years of the Law of Ukraine ‘On Forensic Examination’: Current Status and Prospects for Improvement”

The staff of the National Scientific Center «Hon. Prof. M. S. Bokarius Forensic Science Institute» of the Ministry of Justice of Ukraine actively participated in the scientific events of the 1st quarter of 2024, one of which was the All-Ukrainian Scientific and Practical Conference dedicated to the 30th anniversary of the Law of Ukraine “On Forensic Examination”, organized by our colleagues – Odesa Scientific Research Institute of Forensic Expertise. It's worth mentioning that Ukraine was the first among the post-Soviet republics to adopt this Law, which was perceived by the scientific and legal community as a progressive phenomenon, serving as an example for many countries. Today, the Law “On Forensic Examination” is burdened with numerous amendments and additions in accordance with the practice of its legal application, including its presentation in a new edition. At the suggestion of forensic institutions, the Ministry of Justice of Ukraine has prepared a draft law on forensic activities, which the Cabinet of Ministers (as the subject of legislative initiative) has submitted for consideration to the Verkhovna Rada of Ukraine.

The conference was opened by **Dmytro Kishko**, Director of Odesa SRIFE. Participants were also greeted by: **Andrii Haichenko**, the Deputy Minister of Justice of Ukraine, Doctor of Philosophy in Law; **Nataliia Tkachenko**, Director of the Department of Expert Support of Justice of the Ministry of Justice of Ukraine, Ph.D. in Law, Honored Lawyer of Ukraine; **Oleksandr Ruvin**, Director of the Kyiv Scientific Research Institute of Forensic Expertise, Doctor of Law, Senior Researcher, Honored Lawyer of Ukraine; **Serhii Rozumnyi**, Director of Dnipro SRIFE; **Mykhailo Mozhaiev**, acting Director of the Scientific Research Center of Forensic Expertise in the Field of Information Technologies and Intellectual Property, Doctor of Technical Sciences, etc.

Andrii Lubentsov, Deputy Director for Forensic Examinations, Ph.D. in Law, addressed the participants



on behalf of the NSC FSI. He noted that today it is particularly important not only to adhere to the norms of legislation, including the Law of Ukraine “On Forensic Examination”, but also to find ways and means to improve it, which will contribute to optimizing the work of forensic experts, especially against the backdrop of the challenges of martial law.

Employees of the NSC FSI actively responded to participation in this event, as avenues for improving the law, which experts use daily in their work, are an extremely fertile platform for expressing their own ideas, exchanging experiences, and discussing with colleagues.

At the Conference, **Ivan Yatsenko**, Doctor of Veterinary Sciences, Professor, Leading Researcher at the Laboratory Physical, Chemical, Biological, and Veterinary Research, delivered a report titled “The Legal Status of Forensic Experts Requires Improvement”. **Vadym Ilin**, Candidate of Historical Sciences, Senior Research at the Laboratory of Art Studies, Linguistic, and Psychological Research, presented on “Current Issues in the Professional Training of Forensic Experts - Archaeologists in the Context of Updating Legislation on Forensic Examination”. **Tetiana Kipusheva**, Researcher at R&D and Publishing, International Cooperation Laboratory, emphasized in her theses the urgent need for Ukrainian terminology localization in the Law of Ukraine “On Forensic Examination”.

It's also worth noting the extremely interesting and thorough presentations “The Law of Ukraine ‘On Forensic Examination’: Time for Changes?” by **Olesia Vashchuk**, Doctor of Law, Professor, Assistant Professor of Criminalistics, Detective and Operative Search Activities Department at the National University “Odesa Law Academy”, and “30 Years of the Law of Ukraine ‘On Forensic Examination’: Evolutionary Advances and Corruption Risks” by **Mykhailo Rohovyk**, First Deputy Director of the Lviv NDEKC of the Ministry of Internal Affairs of Ukraine.

The collection of conference materials comprises a total of 73 papers, with 20 of them authored by employees of NSC FSI. In particular, 33 scientific staff members (both sole and co-authors) submitted abstracts for publication.

Conducting such scientific events even in times of war contributes to a deeper and more substantive examination of urgent issues in forensic activity, fostering constructive dialogue, and further implementation of scientific achievements in practice.

*Information prepared by **Sofia Karpova**,
employee of NSC «Hon. Prof. M. S. Bokarius FSI»*

All-Ukrainian Educational Project “Unbreakable Legal Schools of Ukraine”

In February 2024, the team of NSC «Hon. Prof. M. S. Bokarius FSI» joined the All-Ukrainian Educational Project “Unbreakable Legal Schools of Ukraine”, organized with the support and initiative of 13 legal schools of the country’s leading educational institutions (the main organizers are Yaroslav Mudryi National Law University and *IntelligenTtrident* Center for Forensic Innovation). The key ideas of the project are to support education seekers at the third educational-scientific level, scientific and pedagogical staff of Ukrainian legal schools during a challenging time for our state, exchange positive educational practices, popularize the latest achievements of legal schools in organizational and methodological support of the educational process, and provide additional opportunities to enhance cooperation.

At the invitation of the project moderator, **Vasyl Bilous**, Ph.D. in Law, Associate Professor of the Department of Criminalistics of Yaroslav Mudryi National Law University, the NSC FSI employees joined the participation, namely, **Ella Simakova-Yefremian**, Deputy Director for Academic Affairs, Doctor of Law, Professor, Honored Worker of Science and Technology of Ukraine; **Oleksandr Sviderskyi**, Head of R&D and Publishing, International Cooperation Laboratory, Ph.D. in Law, Senior Researcher; **Ivan Yatsenko**, Doctor of Veterinary Sciences, Professor, Leading Researcher; **Maksym Shypilov**, Senior Forensic Expert; **Andrii Huriev** and **Kostiantyn Chernihivskyi**, forensic experts, and **Sofiia Karpova**, an employee of R&D and Publishing, International Cooperation Laboratory, representative of the press center.

The project implementation started on February 12, 2024, with a duration of 14 weeks. During one week, legal support for one educational component is planned. The fifth day of the first week was dedicated to aerospace criminology



and related disciplines. **Ella Simakova-Yefremian** briefed the audience on the activities and functions of the NSC FSI, its achievements in scientific and expert activities, as well as the types of forensic expert examinations carried out by its specialists, and presented a video about the 100-year history of the NSC FSI.

Maksym Shypilov, military research expert, explained how drones are used during the scene inspections and about training for their effective use, which was made possible with the support of Vasyl Bilous, the project manager. **Andrii Huriev** demonstrated a 3D scanner, essential today in the work of any expert institution, as its application promotes the efficiency of research, speeding up and enhancing their quality and accuracy. **Ivan Yatsenko** discussed the possibilities and relevance of forensic veterinary examination in wartime, focusing on the impact on the entire ecosystem of our country due to enemy shelling and other terrorist actions.

Holding such a large-scale project in online mode (the event was broadcast on *YouTube*) at a high level once again confirms that Kharkiv is a city of resilience and strength.

*Information prepared by **Ihor Lushchuk**,
Researcher of NSC «Hon. Prof. M. S. Bokarius FSI»*



Forensic Psychological Examination as a Means of Protecting Minors Under Conditions of Martial Law

On February 15, 2024, employees of NSC «Hon. Prof. M. S. Bokarius FSI» joined the roundtable discussion “Improving the Mechanism of Conducting Forensic Psychological Examinations of Minors, Victims of Domestic Violence, Taking into Account the Victim-Oriented Approach”, organized by the State Scientific Research Forensic Center of the Ministry of Internal Affairs of Ukraine. Active participation in the discussion was taken by expert psychologists from our institution: **Svitlana Babych**, Sector Head of Criminalistics and Psychological Research of the Symu Branch, and **Olena Slipets**, Sector Head of Criminalistics and Psychological Research of the Poltava Branch.

The participants of the event discussed urgent issues of forensic psychological examinations, namely: the possibility of conducting forensic psychological examinations of underage victims online and at the location of the victim; means of optimizing the involvement of forensic psychologists and specialist psychologists during the investigation of criminal offenses related to domestic violence; the sequence of actions of a forensic psychologist in case circumstances indicating domestic violence are identified; legislative regulation of the differentiation of functions between “Barnahus” and “Green Room” systems, their similarities and differences with the involvement of a psychologist specialist and conducting forensic psychological examination, etc.

On March 21, 2024, a thematic scientific and methodological seminar with practical cases on the topic “Disputes Regarding the Determination of Children’s Place of Residence and Parental Involvement in Their Upbringing During the State of War (Involvement of Specific Expertise and Judicial Practice)” took place at the Kyiv Branch of the NSC «Hon. Prof. M. S. Bokarius FSI».



The event was attended by many experts from both governmental and non-governmental institutions (lawyers, judges, psychologists, etc.). The speakers were experienced forensic psychologists from NSC FSI: **Olena Slipets**, Senior Researcher, Forensic Expert of the first qualification class of the Poltava Branch of NSC FSI, and **Tetiana Yehorova**, Leading Forensic Expert of higher qualification class of the Poltava Branch of NSC FSI, Chair of forensic psychological examination section of the Scientific Advisory and Methodological Council on Forensic Examination at the Ministry of Justice of Ukraine, as well as **Nataliia Tokar**, a judge of the Krasnohvardiisk district court of Dnipro city with many years of experience in civil case adjudication, candidate of legal sciences.

The participants discussed a range of relevant issues, including the boundaries of competence for a forensic expert-psychologist in disputes between parents (guardians) regarding the determination of a child's place of residence; complex issues arising during the organization and conduct of examination in conditions of martial law; psychological characteristics of children of different ages and the specifics of interaction with them during the conduct of examination; conditions and limitations regarding the provision of categorical conclusions; situations of parents' evasion of participation and obstacles to conducting psychological examination, etc.

In the first part of the event, seminar speakers provided recommendations on the preparation and selection of research subjects and informed participants about some details of the process of conducting forensic psychological research: what information may be relevant for resolving the issues raised; how to use information about family life posted on social media; the role of medical documentation; shortcomings of official characteristics provided for conducting forensic psychological expertise in disputes between parents (guardians) regarding the determination of a child's place of residence during a state of war; peculiarities of formulating questions and typical mistakes in questions posed to a forensic expert; the expert's algorithm of actions determined by the Methodology of Expert Examination of Features of a Child's Perception of Family Situation (reg. code 14.1.73); psychological criteria relevant for drawing conclusions.

The second part of the event was devoted to the analysis of the current state of court practice in disputes concerning the determination of children's place of residence and parental involvement in their upbringing during martial law. Other urgent issues were also discussed: approaches and criteria for evaluating evidence; consideration of circumstances related to martial law (including the presence of certain participants outside

Ukraine and mechanisms for ensuring their participation in judicial proceedings, remote questioning of the child, one parent's service in the Armed Forces of Ukraine, peculiarities of expert testimony, etc.); changes in the child's age during the judicial process; features of decision-making in case of improper performance of parental duties by one parent; recognition of the respondent's claim; cohabitation of parents at one address; child's residence abroad; impossibility of obtaining a conclusion from the guardianship authority; balancing the rights of the child and parents; joint physical custody model; place of psychological assessment in the evidence system; evaluation of expert opinion, and others.

Based on the Kyiv Branch of the NSC FSI, similar scientific seminars are held not for the first time, as well as lectures to improve the qualifications of forensic experts, notaries, arbitration managers, who receive positive feedback thanks to the powerful training base and the experts' knowledge of the NNC ISE.

Scientific-practical conferences and round tables allow the scientific community not only to discuss urgent issues and exchange acquired experience but also to find and adopt the most effective ways to solve current issues of forensic science.

*Information prepared by **Tetiana Kipusheva**,
Researcher of NSC «Hon. Prof. M. S. Bokarius FSI»*

Scientific and Practical Conference “Transformation of Criminalistics Tasks in Conditions of Martial Law and European Integration Processes”

On March 28, 2024, the Department of Criminalistics at Yaroslav Mudryi National Law University held a Scientific and Practical Conference “Transformation of Criminalistics Tasks in Conditions of Martial Law and European Integration Processes” dedicated to the memory of Violetta Omelianivna Konovalova, an Emeritus Professor of Yaroslav Mudryi National Law University, Academician of the National Academy of Legal Sciences of Ukraine, Doctor of Law, Professor, Honored Worker of Science and Technology of Ukraine.

The National Academy of Legal Sciences of Ukraine and Academician Stashis Scientific Research Institute for the Study of Crime Problems also joined the organization of the event.

From NSC «Hon. Prof. M. S. Bokarius FSI» the following participants took part in the conference online: with welcoming words - **Hanna Spitsyna**, First Deputy Director, Doctor of Law, Professor; **Ella Simakova-Yefremian**, Deputy Director for Academic Affairs, Doctor of Law, Professor, Honored Worker of Science and Technology of Ukraine, with a report on “Violetta Konovalova - a Teacher with a Capital Letter for Representatives of the Kharkiv Scientific School of Forensic Experts”; **Svitlana Yevdokimenko**, Principal Researcher of the Postgraduate and Postdoctoral Studies Department, Doctor of Law, Professor, with a presentation on Violetta Omelianivna as a professor, teacher, and extraordinary personality.

The event was moderated by **Viktor Shevchuk**, Head of the Department of Criminalistics, Doctor of Law, Professor. The first stand of the event featured speeches about Violetta Konovalova's contribution to the development of criminalistics and forensic science, exciting memories of her life, mentoring for many generations, etc. Among the speakers were **Volodymyr Zhuravel**, President of the



National Academy of Legal Sciences of Ukraine, Doctor of Law, Professor, Academician of the National Academy of Legal Sciences of Ukraine; **Valerii Shepitko**, Professor of the Department of Criminalistics at Yaroslav Mudryi National Law University, Doctor of Law, Professor, Academician of the National Academy of Legal Sciences of Ukraine; **Yuliia Chornous**, Professor of the Department of Criminology and Forensic Medicine of the National Academy of Internal Affairs, Doctor of Law, Professor; **Oleksii Oderii**, Professor of the Department of Criminal Procedure and Criminalistics at Donetsk State University of Internal Affairs, Doctor of Law, Professor; **Mykhailo Shepitko**, Professor of the Department of Criminal Law at Yaroslav Mudryi National Law University, Doctor of Law, Professor, etc.

Another platform for discussions was the direct development and changes in forensic science in the conditions of martial law and European integration, in particular, in the theses of the report by **Ruslan Stepaniuk**, Doctor of Law, Professor of Department of Criminalistics, Forensic Expertology and Pre-Medical Training of at Kharkiv National University of Internal Affairs, discussed the latest forensic technologies in solving procedural tasks in wartime; **Kateryna Latysh**, Ph.D. in Law, Associate Professor, Assistant of the Department of Criminalistics at Yaroslav Mudryi National Law University prepared the theses of the report on the topic “Artificial Intelligence and Investigative Versions: Paths of Intersection”; **Yaroslav Nedilko**, Doctor of Philosophy in Law, Assistant of the Department of Criminal Procedure and Criminalistics at the Educational and Scientific Law Institute of Taras Shevchenko National University of Kyiv, submitted for publication a report on the directions of development of digital forensics in Ukraine.

Remembering and honoring with commemorative events those who have made an invaluable contribution to the development of science and practice is a good tradition of educational institutions, forensic, and expert scientific institutions of our state.

Information was prepared by

Inna Kopytina,

Researcher of NSC «Hon. Prof.

M. S. Bokarius FSI»



Scientific Achievements of Candidates for the Doctoral Degree in the Field of Law at NSC FSI

In order to train highly qualified scientific and scientific pedagogical personnel, the Postgraduate and Doctoral Studies Department in the specialty 081 “Law” (a forensic expert profile) operates at the NSC «Hon. Prof. M. S. Bokarius FSI».

In 2021, the educational and scientific program of the third level of higher education (PhD) “Doctor of Philosophy” in the specialty 081 “Law” was accredited by the National Agency for Higher Education Quality Assurance. The accreditation certificate is valid until 01.07.2027.

The Ministry of Education and Science of Ukraine has granted a license to the NSC FSI for educational activities in the field of higher education at the third educational and scientific level (training philosophy doctors) with license capacity of 40 individuals (including foreigners and stateless persons) in specialty 081 “Law”.

In 2023, according to the results of the licensing procedure conducted by the Ministry of Education and Science of Ukraine, the Center received a license capacity of 10 individuals per year.

In January 2024, dissertation defenses for the degree of Doctor of Philosophy in the specialty 081 “Law” began at NSC FSI. The candidates are postgraduate students of the Center,



namely, **Anna Protsenko**, **Fedir Adamov**, **Oleh Mieshkov**, **Inessa Ovsianynykova** and **Mykola Dementiev**. The academic supervisors for the dissertations are: **Hanna Spitsyna**, Doctor of Law, Professor, First Deputy Director of NSC FSI; **Ella Simakova-Yefremian**, Doctor of Law, Professor, Honored Worker of Science and Technology of Ukraine, Deputy Director for Academic Affairs at NSC FSI; **Mykhailo Shcherbakovskiy**, Doctor of Law, Professor, Head of the Department of Criminal Procedure, Criminalistics and Expertology at Kharkiv National University of Internal Affairs.

Each defense took place at a meeting of the one-time Specialized Academic Council in the presence of reviewers and official opponents (scientists from the Law Faculty of Black Sea National University named after Petro Mohyla, Yaroslav Mudryi National Law University, Kharkiv National University of Internal Affairs, and other scientific institutions and higher education establishments).

Each of the postgraduate students' presentations was broadcasted live on the YouTube channel of the NSC FSI. Today, everyone has the opportunity to observe the defense process, because everything is transparent and open. All postgraduates students conducted a thorough and fruitful scientific work on chosen dissertation topics at a high professional level, answering questions clearly and comprehensively. Members of the Specialized Academic Council unanimously decided to award the candidates the academic degrees of Doctors of Philosophy in the specialty 081 "Law".

During the general meeting of the staff, Serhii Tiulieniev, the NSC FSI Director, solemnly presented diplomas for obtaining scientific degrees. We take pride in the scientific achievements of our postgraduate students and wish each of them not to stop at what has been achieved, but to continue conquering new scientific heights!



*Information was prepared
by **Anatolii Tiapkin**,
Researcher of NSC «Hon.
Prof. M. S. Bokarius FSI»*

Requirements for Research Papers

Requirements for content

According to the Edition subject matter, content regarding coverage of criminalistic current issues, relevant issues of performing various types of forensic examinations and specific expertise application in legal proceedings is published on the pages of the Scientific Edition.

Based on research, presentational, evaluative and communicative functions of the Scientific Edition, **research papers** (where an author outlines main work outcomes); **research and methodological papers** (where an author analyses methods, processes, tools helping to achieve certain scientific results); **research and theoretical papers** (texts where an author presents results of theoretical ways for problem solution); **research and practical** (articles where an author describes his personal practical experience and performed scientific experiments), **review research papers** (dedicated to evaluation, conclusions, overview, analysis of earlier published information). The Editorial Board is also interested in **debatable articles**, **research ideas** or **short reports**: results of an experiment, personal experience, etc. Scientific style of the content presentation (accuracy, logic, conciseness, clarity, connectivity, integrity, completeness) and its high scientific level.

Article structural elements should include:

- Article Title;
- Abstract and Keywords. Abstract (summary) text should be not less than 1,800 characters (separately in article language and English). Abstract should include the following: outline of research problem, *purpose*, main research results, conclusions, keywords (7–10 words, should match the content of the article and display the publication topic). Titles of annotation structural parts other except the purpose should not be indicated;
- Formulation of research problem, its connection with scientific and practical interests (it is necessary to reveal essence and state of the scientific problem, theoretical and practical significance of a research, connection with scientific

and practical tasks, substantiation of the research relevance);

- Article purpose (it is necessary to formulate the publication main thesis differing from previously considered research on the chosen topic in accordance with outlined problem and analysis of current researches);
- Research methods applied (are presented individually if they contain novelty and are notable, given the article subject matter);
- Analysis of essential researches and publications on the selected article topic, outlining the problematic field of the research that article is devoted; with obligatory reference to authors and their scientific papers;
- Main content presentation with obtained results (to reveal important theoretical positions and research results, analyze scientific facts, ideas, thoughts, regularities, concepts, as well as trends of further topic development, emphasizing personal contribution of the research author(s));
- Conclusions (main research results in a clear, consistent, logically presented form in compliance with set goal);
- References (the list of used sources transliterated according to the Roman alphabet, for example, on the site of Vernadsky National Library of Ukraine: <http://nbuv.gov.ua/node/929>);
- Abstract in English, indicating the author(s) surname, article title and keywords.

Requirements for scope

Total scope of a scientific article (information about the author, article title, abstract, keywords, article text, bibliographic references, extended resume) should be not less than 36,000 characters.

Requirements for design

Article is submitted for publication in Ukrainian or English.

Text of the article should be printed using the Microsoft Word processor; A4 paper size; page orientation. Text should not contain hyphens and macros.

Article information should be presented according to the following sequence.

Information about the publication author (co-authors) The author's full name, academic degree, academic rank, place of employment, locality, country, Researcher ID, ORCID ID, official email address). One publication permits no more than three co-authors. If the article is prepared by a group of authors, it is important to stress participation of each according to the methodology: CRediT (Contributor Roles Taxonomy, for more details: <https://credit.niso.org/>).

Article title should be without acronyms and abbreviations.

If a research is executed within the framework of international projects (grants), then it should be mentioned.

Analyzing main researches on the article problematics, it is obligatory to consider the status of the issue in foreign and domestic sources (not less than 20 publications, at the same time the majority should be represented by international indexed editions). References to the author(s) personal scientific papers are allowed only if they do not exceed 10% of all references.

The article text should adhere to requirements for content, general rules of citation and references to used sources. Each quotation should be accompanied by a reference to the source which bibliographic description should be completed depending on its type (primary or secondary source) according to the National Standard of Ukraine ДСТУ 8302: 2015: *Information and documentation. Bibliographic reference. General terms and conditions of compilation*.

In bibliographic references, it is necessary to use footnotes or endnotes involving separate reference to each source. While numbering references, authors should use continuous numbering (in Arabic numerals) throughout the article text.

Illustrations (tables, diagrams, graphics, schemes, formulas) can be submitted in the text article. Illustrations should be delivered in separate files. They should be provided in

a format enabling to format (for translation purposes). Formulas should be performed using the Math Type formula editor not using Cyrillic characters.

Requirements for submission

Author (co-authors) should provide reference (the reference of such content file name should consist of the last name (last names) of the author (co-authors) and the sent date with the note: research paper title; author full name (co-authors) in Ukrainian and English; academic degree (area of specialization code); academic rank (department name or area of specialization code); job position; institutional affiliation; settlement, country; ORCID (if available) or Researcher ID (if available); official and personal email address; mailing address; phone.

By submitting a research paper for publication to the *Theory and Practice of Forensic Science and Criminalistics* Scientific Edition, the author (co-authors) fully and unconditionally accepts the Licensing Agreement terms.

Since each article submitted for publication operates double anonymized peer review.

Licensing & Copyright

The author (co-authors) bears the responsibility for the accuracy of the provided content, and the affiliation of the latter to him personally and the translation quality of the quotations from foreign sources.

Content submitted in violation of these requirements are not published.

The Editorial Board has the right to review (double anonymized peer review), edit, reduce and reject research papers.

License Terms: Authors preserve the copyright and entitle the Scientific Edition Editorial Board to publish original research papers and claim that the results of their experimental and theoretical researches provided in the submitted article are not under consideration for publication to other publishing houses. All content is distributed according to Creative Commons Attribution License International CC-BY allowing third parties to distribute research content if research paper copyright and first publication in this Scientific Edition are recognized.

A note to readers! Katerina Latysh has reported receiving funding within the MSCA4Ukraine Project, funded by the European Union, for the publication "Shepitko M., Latysh K. Criminal Policy in the Field of Digital Counterpropaganda During the War" in Issue 4 (33) for 2023

Scientific Edition

**THEORY AND PRACTICE OF FORENSIC SCIENCE
AND CRIMINALISTICS**

Research Paper Collection

Issue 1 (34)

Executive Editor: *Oleksandr Sviderskyi*

Proofreaders: *Andriy Bublikov, Daryna Dukhnenko, Tetiana Droshchenko*

Desktop Publisher: *Ihor Lushchik*

Cover design by *Anatoliy Tiapkin*

Certificate of State Registration of printed mass media:

KB No 23467-13307IIP dated on 06.08.2018.

Manuscript Accepted for print: 27.03.2024. Format: 70×100/16.

Wood free uncoated paper (WFU). Typeface: Source Serif Variable.

Conventional printed sheets: 16,94.

Circulation of 100 copies. Order No

National Scientific Center

“Hon. Prof. M. S. Bokarius Forensic Science Institute”,

8a, Zolochivska St., Kharkiv, Ukraine, 61177

Phone: +38 (057) 372-20-01

Certificate on the entry of publishing business subject in the State Register

of Publishers, Manufacturers and Distributors of Publishing Products –

series: ДК No 7420 dated on 09.08.2021

Publishing House “Pravo” of the National Academy of Legal Sciences

of Ukraine and Yaroslav Mudryi National Law University,

80a, Chernyshevskaya St., Kharkiv, Ukraine, 61002

Phone / Fax: +38 (057) 716-45-53

Website: <https://www.pravo-izdat.com.ua>

E-mail for authors: verstka@pravo-izdat.com.ua

E-mail for orders: sales@pravo-izdat.com.ua

Certificate on the entry of publishing business subject in the State Register

of Publishers, Manufacturers and Distributors of Publishing Products –

series: ДК No 4219 dated on 01.12.2011

Printed by Printing House “PROMART”

12, Vesnina St., Kharkiv, Ukraine, 61023

Phone: +38 (057) 717-28-80

Certificate on the entry of publishing business subject in the State Register

of Publishers, Manufacturers and Distributors of Publishing Products –

series: ДК No 5748 dated on 06.11.2017