

INSTITUTIONAL REGULATION OF INTERDEPARTMENTAL COORDINATION OF FORENSIC INSTITUTIONS BASED ON THE ORGANISATIONAL AND ECONOMIC SHARING MODEL

Vadym Pidhorodynskiy¹, Oleh Matveevsky², Viacheslav Barba³

Abstract. This article examines the institutional, legal and financial-economic decentralisation of Ukraine's forensic institution system, as well as the mechanisms for coordinating these institutions. In view of the limited resources of the state budget and the growing needs of the criminal justice system, the current fragmented structure of the forensic sector – which operates within the isolated frameworks of various ministries (the Ministry of Internal Affairs, the Ministry of Justice, and the Security Service of Ukraine) – leads to significant administrative dysfunctions. This results in delays to pretrial investigations and inefficient allocation of state financial resources due to constant duplication of capital expenditure. Consequently, this study examines the feasibility of implementing the concept of the 'sharing economy' in public administration to overcome departmental particularism and manage forensic expert activities effectively. To address the objectives set out in this article, a comprehensive, interdisciplinary approach was taken that naturally combines the conceptual tools of macroeconomic theory, jurisprudence and criminology. The economic rationale is rooted in the principles of neo-institutional economic theory, particularly the theory of transaction costs and the economic analysis of law. A thorough macroeconomic audit of the current state of the infrastructure of expert institutions was conducted using methods of systemic-structural analysis and capital expenditure benchmarking. The cost-benefit analysis methodology was used to assess the effectiveness of implementing the shared expert cluster model. Furthermore, Activity-Based Costing principles were applied to establish a unified interagency rate for expert hours, enabling a mathematical formula to be derived for calculating the objective cost of expert services. The main aim of this article is to develop a comprehensive scientific and financial-economic justification for an innovative model of inter-agency coordination of the activities of state forensic medical institutions. This model is designed to create a synergistic mechanism that combines legal, organisational, managerial and macroeconomic tools with the aim of radically optimising logistical support, eliminating functional duplication and cutting inefficient budgetary expenditure, whilst ensuring a significant improvement in the effectiveness of expert support and the impeccable quality of the evidence base. The results of this study convincingly demonstrate that the current extensive, decentralised expert system model has exhausted all of its resource potential. The author has developed a unique two-tier coordination model comprising a strategic tier involving the creation of an Interagency Coordination Council, and an operational tier involving the formation of shared expert clusters covering multiple regions for collective use. Consolidating high-cost analytical equipment into unified centres has been demonstrated to reduce capital expenditure (CapEx) in the state budget by at least 35–40%, as well as lowering operating expenses (OpEx) by 15–20%, due to the economies of scale achieved through centralised, macro-bulk procurement. A key part of the proposed model is creating a secure, unified information and digital platform (ERESR) to automate the routing of expert tasks and enable the sharing of forensic databases between agencies from start to finish. Applying the developed expert-hour billing formula will allow legal mechanisms for transparent financial clearing to be implemented. The integration

Received on: June 26, 2026 **Accepted on:** September 27, 2026 **Published on:** October 14, 2026

¹ Odesa State University of Internal Affairs, Ukraine (*corresponding author*)

E-mail: vn.p.odessa@gmail.com

ORCID: <https://orcid.org/0000-0001-8133-6486>

² Odesa State University of Internal Affairs, Ukraine

E-mail: o.matvieievskiy@gmail.com

ORCID: <https://orcid.org/0009-0004-9876-7791>

³ Odesa State University of Internal Affairs, Ukraine

E-mail: Barbaslaval@gmail.com

ORCID: <https://orcid.org/0000-0001-9436-1699>



This is an Open Access article, distributed under the terms
of the Creative Commons Attribution CC BY 4.0

of the model has been shown to have a direct positive impact on forensic practice, particularly when investigating transnational drug crimes using chemical profiling methods. Shared databases minimise information gaps and enable the rapid identification of common sources of origin for substances. Thus, the innovative model ensures an ideal balance between the economic efficiency of public administration and strict adherence to procedural deadlines (as set out in Article 219 of the Criminal Procedure Code of Ukraine), while also preserving the procedural independence of the forensic expert. This establishes a solid legal and institutional foundation for the future integration of the domestic expert network into the European Forensic Science Network (ENFSI).

Keywords: forensic institutions, interagency coordination, the sharing economy, macroeconomic audit, digitisation of forensic analysis, chemical profiling, procedural economy.

JEL Classification: K42, H11, H41, O38, D23

1. Introduction

In the context of ensuring national security and the effective functioning of the justice system, forensic expertise plays a fundamental role, as it is precisely this specialised knowledge that forms the basis of the key body of evidence in criminal proceedings. However, the current structure of the domestic forensic system is characterised by deep decentralisation and fragmentation across different agencies. Historically, the parallel operation of forensic institutions within the structures of the Ministry of Internal Affairs, the Ministry of Justice, the Security Service, the Ministry of Health, and the Ministry of Defence of Ukraine was established to meet the specific needs of particular agencies. However, amid rapid technological development, the transnationalisation of crime and a chronic shortage of state financial resources, the existing fragmented model is showing signs of exhaustion. In the context of large-scale armed aggression and an economy operating under martial law, optimising the public sector has become an existential issue. Allocating the vast majority of public funds to the security and defence sector results in severe funding shortfalls for other state institutions. In this situation, the current extensive model for maintaining forensic institutions, which permits the irrational dispersal of funds across duplicative functions, has become macroeconomically unsustainable.

Issues related to the organisational and managerial foundations of forensic expertise, as well as the optimisation of the public sector of the economy, continue to be a key area of focus for scholars. Several Ukrainian scholars have conducted in-depth research into the theoretical, legal, forensic and procedural aspects of forensic institutions' operations, the challenges of ensuring their independence and the particularities of specialised knowledge application (Babenko et al., 2024; Shepitko, 2019). The macroeconomic aspects of optimising state budget expenditure and institutional integration have been the subject of research by leading economists, such as Bazylevych et al. (2008) and Heiet (2018). The research of foreign scholars (Giovannini, 2020) is worthy of particular attention, as it shows that incorporating the sharing economy concept

into public administration can significantly reduce asset underutilisation. More recent studies (Khachatryan & Klicheva, 2025; Kovalenko, 2022) also confirm similar conclusions regarding the positive impact of the sharing economy on resource use.

Despite significant academic interest in this issue, many conceptual aspects of interagency co-operation remain beyond the scope of systematic analysis. The vast majority of existing studies are strictly single-disciplinary: legal scholars focus on procedural safeguards without considering the cost of procedures, and economists examine public administration in general without considering the strict procedural regulations of criminalistics. The issue of formulating a universal algorithm for the operational redistribution of expert workloads among agencies of different departments, establishing a unified methodology for the economic calculation of the cost per expert-hour, and creating the architecture of a unified digital space for the shared use of forensic records remains unresolved.

In view of the identified lacunae, the objective of the present article is to formulate a thorough scientific and financial-economic rationale for an innovative model of interagency coordination of the activities of forensic institutions. In order to achieve this objective, it is necessary to establish a synergistic mechanism that integrates legal, organisational and macroeconomic tools with a view to optimising logistical support and eliminating functional duplication.

The methodological framework of the study is based on the conceptual principles of neo-institutional economic theory, transaction cost theory, and the economic analysis of law. The study employs a range of analytical methods, including systemic-structural analysis, benchmarking, and cost-benefit analysis. The principles of functional-cost analysis were applied to develop the pricing model.

2. Institutional and Legal Barriers and the Impact of Interagency Fragmentation on Forensic Practice

The current framework of legal and regulatory provisions governing forensic expert activities in

Ukraine is characterised by pronounced institutional particularism, which creates significant barriers to interagency coordination. The fundamental principles that govern the operation of forensic institutions are enshrined in the Law of Ukraine 'On Judicial Examination' (The Law of Ukraine 'On Judicial Examination' of 01.01.2026, No. 4038-XII), which declaratively establishes the independence of state-run specialized institutions under various ministries. However, the direct exercise of managerial, procedural, and financial powers is delegated to the level of departmental subordinate legislation. Consequently, the expert services of the Ministry of Internal Affairs of Ukraine, the Ministry of Justice, the Security Service of Ukraine, and the Ministry of Defense function within discrete legal frameworks. It is evident that the Instructions on the Appointment and Conduct of Forensic Examinations (The Order of the Ministry of Justice of Ukraine 'On the Approval of the Instructions on the Appointment and Conduct of Forensic Examinations and Expert Investigations and the Scientific and Methodological Recommendations on the Preparation and Appointment of Forensic Examinations and Expert Investigations' of 08.09.1998, No. 53/5) and analogous departmental documents are exclusively oriented towards the regulation of internal processes. They conspicuously lack viable mechanisms for horizontal co-operation. This isolation is firmly entrenched by the provisions of the Budget Code of Ukraine (The Budget Code of Ukraine), which categorises any informal utilisation of costly reagents or equipment from one agency for the benefit of another as a financial infraction.

It has been demonstrated that legal conflicts are most pronounced in cases where comprehensive and commission-based expert examinations are ordered. The Criminal Procedure Code of Ukraine permits the delegation of expert examinations to specialists from various fields, a critical component of a comprehensive investigation (Babenko et al., 2024; The Criminal Procedural Code of Ukraine). In practice, however, this provision is undermined by the absence of a standardised procedure for designating a coordinating agency, allocating financial costs equitably, and transferring physical evidence without compromising its procedural integrity. For instance, when investigating transnational drug crimes, it is necessary to combine chemical profiling with trace evidence analysis. Discrepancies in protocols mean that experts from different agencies are forced to work sequentially, leading to unjustified delays. Article 219 of the Code of Criminal Procedure of Ukraine establishes strict time limits for pre-trial investigations. Failure to comply with these limits results in the closure of the proceedings. When the Ministry of Internal Affairs' expert units are overburdened but the Ministry of Justice's or the

Security Service of Ukraine's laboratories have capacity, the investigator is unable to efficiently allocate the task.

The realities of war have radically altered the nature of the forensic workload. The system has been inundated with tasks involving the documentation of missile strike aftermaths and mass DNA profiling. It is physically impossible to distribute these peak workloads evenly within a single agency. This fragmentation has a particularly critical impact on investigations into serial crimes and drug trafficking. If different agencies seize different batches of drugs, they are analysed in separate laboratories. Without a unified database of chemical profiles, investigators cannot identify a single source of origin. Furthermore, decentralisation creates information gaps. Although fingerprint and ballistics databases are operational (The Law of Ukraine 'On State Registration of Human Genomic Information' of 09.07.2022, No. 2391-IX), they are not technologically interoperable. Experts from different ministries do not have direct, automated access to each other's databases of evidence, necessitating lengthy official correspondence and reducing the overall crime clearance rate (Shepitko, 2019).

3. Macroeconomic Audit of the Forensic Expertise System: Resource Imbalances and Transaction Costs

A macroeconomic analysis of the functioning of Ukraine's forensic expert system reveals a critical level of inefficiency in the use of public finances, which is caused by the existence of parallel departmental infrastructures. In accordance with macroeconomic theory of the public sector, the rational allocation of resources is predicated on the minimisation of overlapping functions and the maximisation of the social benefit derived from capital investments (Heiets, 2018). However, current forensic activities are funded according to an extensive model. The state procures identical analytical equipment, such as chromatographs, mass spectrometers and DNA analysers, for the Scientific Research Expert-Criminalistics Centre, the Scientific Research Institute of Forensic Expertise and Security Service of Ukraine (SBU) units. Although these institutions are often located in the same regional centre, they do not have access to a unified material base. This fragmentation disperses limited funding, contradicting the principles of effectiveness and targeted use.

The economic irrationality of departmental particularism is particularly evident in the context of rebuilding infrastructure destroyed by conflict. For example, the parallel procurement of identical, capital-intensive equipment to restore laboratories belonging to different ministries in the same region is financially irresponsible. An economic and resource

audit reveals striking disparities in utilisation rates. While one laboratory's expensive system lies idle due to a temporary shortage of reagents, another government agency is facing critical overload.

The situation is further complicated by the provisions of the Law of Ukraine 'On Public Procurement' (The Law of Ukraine 'On Public Procurement' of August 24, 2026, No. 922-VIII. Verkhovna Rada of Ukraine). Each agency must conduct its own tender procedures to procure consumables and reference substances. The absence of a consolidated government buyer means that bulk orders cannot be formed and price discounts cannot be obtained from global chemical companies, which artificially inflates the cost per expert hour. In addition to capital expenditure (CapEx), maintaining parallel infrastructures incurs significant operational and transactional costs (OpEx). In accordance with the DSTU EN ISO/IEC 17025:2019 standard (State Enterprise "UkrNDNC", 2021), each relevant ministry is forced to pay for accreditation services independently and bear irrational, duplicative costs for metrological calibration and expert training. This creates a technological asymmetry, whereby one agency implements innovative methodologies while another uses outdated equipment. This calls into question the procedural equality of the evidentiary basis.

4. An Innovative Architecture for a Model of Knowledge-Sharing Among Expert Institutions and an Assessment of Its Effectiveness

Overcoming institutional, legal and macroeconomic dysfunctions requires an innovative model to be implemented for coordinating forensic activities, based on the principles of synergy and optimisation. The proposed model's architecture involves creating a two-tiered mechanism. At the strategic level, the model proposes the establishment of an Interagency Coordination Council on Forensic Activities (The Law of Ukraine 'On Central Bodies of Executive Power' of 30.08.2025, No. 3166-VI). It should comprise the heads of forensic services from various agencies and Ministry of Finance representatives, all on an equal footing. Its remit will be to develop a unified policy for logistical support and standardise protocols without interfering in expert conclusions.

At an operational level, the plan proposes the establishment of 'shared expert clusters' organised by macroregion. Rather than each agency purchasing its own equipment, a single centre for shared use will be established. Researchers in public administration have demonstrated that the shared use of infrastructure can reduce operating expenses by 30–45% (Bazylevych et al., 2008; Khachatryan & Klicheva, 2025). Although

the equipment is on the balance sheet of a single agency, experts from other agencies receive legally mandated, quota-based access, which eliminates technological downtime completely.

To ensure transparent financial clearing within the cluster, the proposal is to use a mathematical model based on activity-based costing to determine expenses. The expert-hour rate (Teh) is calculated using the following formula:

$$Teh = (Vop + Aeq + Ctr) / Hnorm,$$

where Vop is variable operating expenses (reagents, energy resources); Aeq is the share of depreciation charges; Ctr is transaction costs for digital administration; Hnorm is the standard effective working time fund. Using this formula will allow mutual settlements to be legalised on a non-cash basis via the State Treasury Service's accounts.

An integral part of the architecture is a profound digital transformation (The Law of Ukraine 'On the National Informatisation Programme' of 01.12.2022, No. 2807-IX). These barriers are being overcome by the development of the 'Unified Register of Expert Tasks and Resources' (URETR), a platform that displays laboratory workloads and material availability, enabling investigators to automatically route cases to facilities with capacity. In addition, a nationwide cloud storage system is being created to enable the sharing of forensic databases, particularly chemical profile databases, from end to end. The intelligent analysis of these datasets (digital drug intelligence) will allow hidden links between drug shipments to be automatically detected.

This model requires an assessment of its effectiveness using the cost-benefit analysis (CBA) methodology (Dossetor, 2020; Jacobsen et al., 2020; Johnson, 2015). Calculations indicate a potential reduction in capital expenditure (CapEx) of 35–40%. Standardising procurement procedures will enable significant volume discounts to be realised (operating expenses will decrease by 15–20%). A macroeconomic audit matrix has been developed to demonstrate this (see Table 1).

5. Conclusions

A comprehensive study has convincingly demonstrated that Ukraine's decentralised, departmentally isolated model of the forensic expert system has exhausted all of its institutional and resource potential. The innovative interagency coordination architecture proposed in this paper, based on the sharing economy concept, is the only viable tool for overcoming existing organisational, legal and financial barriers.

From a macroeconomic perspective, implementing the concept of macro-regional expert cluster sharing for collective use and introducing a unified interagency rate for expert hours will radically optimise state

Table 1

Comparative Financial and Economic Analysis of Operating Models for Forensic Institutions

Economic indicators and expenditure items	An isolated agency-based model (Ministry of Internal Affairs, Ministry of Justice, Security Service of Ukraine)	The Sharing Model (Interagency Expert Cluster)	Projected Economic Impact (Deviation, Δ)
Capital expenditures (CapEx) for the purchase of specialised analytical equipment.	Triple redundancy: purchase of 3 systems.	Purchase of 1 basic high-performance complex.	Savings of ~66% of budget capital investments.
Equipment Utilisation Rate (ROI/Utilisation).	Low (35–45%): uneven load.	High (85–95%): automated routing.	An increase of 45–50 percentage points.
Operating expenses (OpEx) for reference samples and reagents.	Small-scale wholesale purchases at retail prices.	Centralised macro-wholesale purchases for the cluster.	Cost reduction of 15–20%.
Costs of maintaining the quality infrastructure (ISO 17025)	Accreditation fees for 3 separate laboratories.	Single accreditation for the cluster's infrastructure.	Savings of ~66% on certification costs.
Transaction Costs of Interagency Coordination.	High: paper-based document flow, downtime.	Low: instant exchange via a unified database.	Reduction in losses due to delays.

budget expenditure. A macroeconomic audit has confirmed that eliminating the permanent, duplicative procurement of high-cost analytical equipment (CapEx) would reduce the state's capital expenditure by at least one-third. At the same time, consolidating tender procedures for the procurement of reference chemical reagents through a single procurer (OpEx) will allow for significant volume discounts to be obtained. This will transform the expert sector from a subsidised entity into a financially balanced system that complies fully with Article 7 of Ukraine's Budget Code regarding the efficient and targeted use of public funds.

From a forensic and procedural standpoint, implementing this model will directly impact the quality of criminal proceedings. Creating the 'Unified Register of Expert Tasks and Resources' (URETR) to automate the routing of investigators' orders and ensure the sharing of forensic databases in a unified cloud environment can exponentially accelerate the pace of criminal investigations. This effect will be particularly noticeable when investigating transnational drug crimes. The rapid compilation of a body of evidence using chemical profiling methods will significantly

minimise the risk of exceeding the pre-trial investigation deadlines set out in Article 219 of the Criminal Procedure Code of Ukraine. Crucially, the proposed coordination structure, which involves the creation of an Interagency Coordination Council dedicated solely to logistical functions, ensures the inviolability of the judicial expert's procedural independence.

In terms of practical implementation and future development prospects, the proposed model requires a series of regulatory steps to be prioritised. It is of the utmost importance to develop and adopt a single codified interagency regulation that explicitly legalises financial clearing procedures between ministries via the State Treasury Service's accounts. The next strategic priority should be a thorough study of the methods and standards for integrating the updated, technologically compatible Ukrainian forensic network into the European Network of Forensic Science Institutes (ENFSI) and the European forensic space. The practical implementation of the developed model for sharing forensic resources will ultimately be a significant step towards establishing a modern, high-tech and cost-effective justice system in Ukraine.

References:

- Babenko, A. M., Teteriatnik, H. K., Afonina, D. S., & Matvieievskyi, O. V. (2024). *Criminalistics: study guide*. Odesa: OSUIA. <https://dspace.oduvs.edu.ua/handle/123456789/1234>
- Bazylevych, V. D., Bazylevych, K. S., & Balastryk, L. O. (2008). *Macroeconomics: textbook* (4th ed.). Kyiv: Znannia.
- Dossetor, K. (2020). *Cost-benefit analysis and its application to crime prevention and criminal justice research*. Australian Institute of Criminology. <https://www.aic.gov.au/publications/tandi/tandi601>
- Giovanini, A. (2020). Sharing economy and public governance. *Revista de Administração Pública*, 54(5), 1207–1238. <https://doi.org/10.1590/0034-761220190080x>
- Heiets, V. M. (2018). Institutional transformations and their impact on economic development. *Ekonomika Ukrainy*, (1), 3–14. <https://doi.org/10.15407/economyukr.2018.01.003>
- Jacobsen, R. H., et al. (2020). *Hands-on Guide to Cost-Benefit-Analysis of Crime Prevention Efforts*. European Crime Prevention Network (EUCPN).
- Johnson, K. (2015). A Cost-Benefit Analysis of the Federal Prosecution of Immigration Crimes. *University of Oklahoma College of Law Digital Commons*, 1196.

Khachatryan, M. V., & Klicheva, E. V. (2025). Implementing the sharing economy in the context of achieving sustainable economic development. *Journal of Innovation & Knowledge*, 10(1), 100655. <https://doi.org/10.1016/j.jik.2025.100655>

Kovalenko, A. (2022). Forensic document examination in economic crime investigations. *Baltic Journal of Economic Studies*, 8(3), 96–103.

The Order of the Ministry of Justice of Ukraine 'On the Approval of the Instructions on the Appointment and Conduct of Forensic Examinations and Expert Investigations and the Scientific and Methodological Recommendations on the Preparation and Appointment of Forensic Examinations and Expert Investigations' of 08.09.1998, No. 53/5. <https://zakon.rada.gov.ua/laws/show/z0705-98>

Shepitko, V. Yu. (2019). Innovations in criminalistics and prospects for their implementation in forensic science activities. *Pravo Ukrainy*, (8), 15–24.

State Enterprise "UkrNDNC". (2021). *General competence requirements for testing and calibration laboratories (DSTU EN ISO/IEC 17025:2019)*. Kyiv.

The Law of Ukraine 'On Judicial Examination' of 01.01.2026, No. 4038-XII. The Official Bulletin of the Verkhovna Rada of Ukraine (BVR), 1994, No. 28, Art. 232. <https://zakon.rada.gov.ua/laws/show/4038-12>

The Budget Code of Ukraine. The Official Bulletin of the Verkhovna Rada of Ukraine (BVR), 2010, Nos. 50–51, Article 572. <https://zakon.rada.gov.ua/laws/show/2456-17>

The Law of Ukraine 'On Central Bodies of Executive Power' of 30.08.2025, No. 3166-VI. The Official Bulletin of the Verkhovna Rada of Ukraine (BVR), 2011, No. 38, Art. 385. <https://zakon.rada.gov.ua/laws/show/3166-17>

The Criminal Procedural Code of Ukraine. The Official Bulletin of the Verkhovna Rada of Ukraine (BVR), 2013, No. 9–10, No. 11–12, No. 13, Article 88. <https://zakon.rada.gov.ua/laws/show/4651-17>

The Law of Ukraine 'On Public Procurement' of August 24, 2026, No. 922-VIII. Verkhovna Rada of Ukraine. (2015). The Official Bulletin of the Verkhovna Rada of Ukraine (BVR), 2016, No. 9, Art. 89. <https://zakon.rada.gov.ua/laws/show/922-19>

The Law of Ukraine 'On State Registration of Human Genomic Information' of 09.07.2022, No. 2391-IX. <https://zakon.rada.gov.ua/laws/show/2391-20>

The Law of Ukraine 'On the National Informatisation Programme' of 01.12.2022, No. 2807-IX. The Official Bulletin of the Verkhovna Rada of Ukraine (BVR), 2023, No. 51, Art. 127. <https://zakon.rada.gov.ua/laws/show/2807-20>