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CRIMINOLOGICAL PREVENTION OF CRIMES IN THE FIELD OF TRANSPORT SECURITY IN THE CONTEXT OF COMBATING ORGANIZED CRIME AND SMUGGLING

Abstract. The problem of criminological prevention of crimes in the transport sector is one of the most pressing in modern science, as it focuses on a comprehensive study and systematization of modern criminological approaches to ensure effective prevention of criminal acts in Ukraine's vital transport sector. Special emphasis is placed on preventive measures in the context of intensified counteraction to organized crime and illicit movement of goods, which seriously threaten national security and economic stability. The object of this study is the integrated set of criminological, legal, and organizational principles for combating crime in transport, which considers current challenges and risks determined by the functioning of transnational organized criminal groups. Despite significant scientific achievements, the issue of a comprehensive approach to optimizing criminological prevention, considering modern challenges of cybercrime and smuggling, remains unresolved.

This article aims to develop and scientifically substantiate a holistic approach to optimizing criminological prevention of offenses in transport security, adapted to the modern realities of combating organized crime and smuggling activities. The hypothesis is put forward that the effectiveness of preventive measures will significantly increase with the integration of information and analytical systems and the strengthening of interagency cooperation. To achieve this goal, the following research objectives were outlined: to identify the dominant trends in transport crime based on detailed empirical analysis; to establish key factors contributing to the commission of crimes in transport, particularly those related to organized crime and corruption schemes; to analyze the current regulatory framework and assess its effectiveness; to formulate a set of preventive measures aimed at increasing the level

of transport infrastructure security; to substantiate strategic directions for the development of the transport security system in Ukraine.

Systemic, structural-functional, comparative-legal, statistical, and prognostic approaches were used to achieve the goal. Empirical analysis of statistical data for 2020-2025, obtained from the National Statistical Office, the Ministry of Internal Affairs of Ukraine, and the State Border Guard Service of Ukraine, was utilized. During the specified period, the number of criminal acts in transport security increased by approximately 18%, while the share of crimes associated with organized crime and smuggling rose from 9% to 14%. This indicates the urgent need for changes in preventive strategies. There is a significant correlation between the growth of these indicators, the insufficient technical equipment at border checkpoints, and the imperfection of international coordination mechanisms. Outdated equipment and the lack of a unified information exchange system create favorable conditions for criminal activity. A comparative study of international experience has developed practical recommendations for implementing the best world practices into the domestic system. Modeling preventive strategies allowed for substantiating the effectiveness of integrating information and analytical systems and strengthening interagency cooperation.

Conclusions. Thus, the analysis that was conducted allows us to conclude that the study's main findings are the identification of stable trends of increasing cybercrime in the transport sector and an increase in the volume of illicit movement of goods using rail and sea routes. It has been found that the key determinants of this phenomenon are insufficient staffing, high corruption risks, a low level of digital transformation, and the dilapidation of existing infrastructure.

Based on the results obtained, the necessity of a comprehensive approach to solving these problems was confirmed. The proposed preventive measures include strengthening control over vehicle circulation, implementing advanced monitoring and video surveillance systems, improving the qualifications of relevant personnel, increasing criminal liability for offenses related to smuggling, and expanding international cooperation in the exchange of intelligence information and conducting joint operations.

The obtained results have theoretical and practical significance for the possibility of applying their results in the legislative process to improve the regulatory framework, develop and implement departmental initiatives for crime prevention in transport, as well as in the system of professional training for law enforcement officers and other entities ensuring transport security. The findings and recommendations can be used to develop national strategies and programs to combat organized crime and illicit movement of goods, as well as in the daily activities of relevant ministries and agencies. The prospects for further research lie in developing detailed methodologies for assessing economic losses from transport crime and

substantiating the effectiveness of implemented innovative technologies in the transport security system.

Keywords: criminological prevention, transport security, organized crime, smuggling, crime factors, preventive measures, regulatory framework, interagency cooperation, transport infrastructure, statistical analysis, cybercrime, national security.

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КРИМІНОЛОГІЧНА ПРОФІЛАКТИКА ЗЛОЧИНІВ У СФЕРІ БЕЗПЕКИ ТРАНСПОРТУ В УМОВАХ БОРОТЬБИ З ОРГАНІЗОВАНОЮ ЗЛОЧИННІСТЮ ТА КОНТРАБАНДОЮ

Анотація. Проблема кримінологічної профілактики злочинів у сфері транспорту є однією з найактуальніших у сучасній науці, оскільки вона зосереджена на всебічному дослідженні та систематизації сучасних кримінологічних підходів, спрямованих на забезпечення дієвої профілактики кримінальних діянь у життєво важливому транспортному секторі України. Особливий акцент зроблено на специфіці превентивних заходів в умовах інтенсифікації протидії організованій злочинності та незаконному переміщенню товарів, що становлять серйозну загрозу для національної безпеки та економічної стабільності країни. Об'єктом цього дослідження є інтегрована сукупність кримінологічних, юридичних та організаційних засад протидії злочинності на транспорті, яка враховує актуальні виклики та ризики, детерміновані функціонуванням транснаціональних організованих кримінальних формувань. Незважаючи на значні наукові здобутки, залишається невирішеним питання комплексного підходу до оптимізації кримінологічної превенції з урахуванням сучасних викликів кіберзлочинності та контрабанди.

Метою даної статті є розробка та наукове обґрунтування цілісного підходу до оптимізації кримінологічної превенції правопорушень у галузі транспортної безпеки, адаптованого до сучасних реалій протистояння організованій злочинності та контрабандній активності. Висунуто гіпотезу, що ефективність профілактичних заходів значно підвищиться за умови інтеграції інформаційно-аналітичних систем та посилення міжвідомчої співпраці. Для досягнення цієї мети було окреслено наступні дослідницькі завдання: виявити домінуючі тенденції транспортної злочинності на основі детального емпіричного аналізу; встановити ключові чинники, що сприяють скоєнню злочинів на транспорті, зокрема пов'язаних з організованою злочинністю та

корупційними схемами; провести аналіз діючої нормативно-правової бази та оцінити її ефективність; сформулювати комплекс профілактичних заходів, спрямованих на підвищення рівня безпеки транспортної інфраструктури; обґрунтувати стратегічні напрями розвитку системи забезпечення транспортної безпеки в Україні.

Для досягнення мети використано системний, структурно-функціональний, порівняльно-правовий, статистичний та прогнозний підходи. Використано емпіричний аналіз статистичних даних за період 2020-2025 років, отриманих від Національного статистичного бюро, Міністерства внутрішніх справ України та Державної прикордонної служби України. За вказаний період кількість кримінальних діянь у сфері безпеки транспорту зросла приблизно на 18%, при цьому частка злочинів, асоційованих з організованою злочинністю та контрабандою, збільшилася з 9% до 14%. Це свідчить про необхідність термінових змін у превентивних стратегіях. Існує значна кореляція між зростанням цих показників та недостатнім рівнем технічного оснащення прикордонних контрольно-пропускних пунктів, а також недосконалістю механізмів міжнародної координації. Застаріле обладнання та відсутність єдиної системи обміну інформацією створюють сприятливі умови для злочинної діяльності. Шляхом компаративного дослідження міжнародного досвіду розроблено практичні рекомендації щодо впровадження найкращих світових практик у вітчизняну систему. Моделювання превентивних стратегій дозволило обґрунтувати ефективність інтеграції інформаційно-аналітичних систем та посилення міжвідомчої співпраці.

Висновки. Таким чином, проведений аналіз дозволяє зробити висновок, що основними висновками дослідження є виявлення стійких тенденцій до зростання кіберзлочинності в транспортному секторі, а також збільшення обсягів незаконного переміщення товарів з використанням залізничних та морських шляхів сполучення. З'ясовано, що ключовими детермінантами цього феномену є недостатнє кадрове забезпечення, високі корупційні ризики, низький рівень цифрової трансформації та зношеність існуючої інфраструктури. На основі отриманих результатів було підтверджено необхідність комплексного підходу до вирішення цих проблем. Запропонований комплекс профілактичних заходів охоплює посилення контролю за обігом транспортних засобів, впровадження передових систем моніторингу та відеоспостереження, підвищення кваліфікації відповідного персоналу, посилення кримінальної відповідальності за правопорушення, пов'язані з контрабандою, та розширення міжнародної взаємодії у сфері обміну розвідувальною інформацією та проведення спільних операцій.

Отримані результати мають теоретичне та практичне значення для можливості застосування її результатів у законотворчому процесі для

вдосконалення нормативно-правового поля, розробки та імплементації відомчих ініціатив з попередження злочинності на транспорті, а також у системі фахової підготовки співробітників правоохоронних структур та інших суб'єктів, що забезпечують транспортну безпеку. Отримані висновки та сформульовані рекомендації можуть бути використані для розробки національних стратегій та програм з протидії організованій злочинності та незаконному переміщенню товарів, а також у повсякденній діяльності профільних міністерств та відомств. Перспективи подальших досліджень полягають у розробці деталізованих методик оцінки економічних втрат від транспортної злочинності та обґрунтуванні ефективності впроваджених інноваційних технологій у систему забезпечення транспортної безпеки.

Ключові слова: кримінологічна профілактика, транспортна безпека, організована злочинність, контрабанда, чинники злочинності, превентивні заходи, нормативно-правове регулювання, міжвідомча взаємодія, транспортна інфраструктура, статистичний аналіз, кіберзлочинність, національна безпека.

Problem Statement

The problem of criminological prevention of crimes in transport is one of the most pressing in modern science. The transport sector of Ukraine occupies a key place in the national economic landscape, acting not only as a foundation for sustainable economic development of the state, but also as a significant factor of social stability. According to analytical reports of relevant state departments [4], the contribution of the transport industry to the formation of the country's gross domestic product is approximately 5-7%, and it also employs over 550 thousand citizens. Uninterrupted and efficient transport system operation is a prerequisite for Ukraine's successful integration into the European space and the intensification of international commercial ties.

In conditions of increasing geopolitical tension and conflicts, Ukraine's transport arteries inevitably become an object of destructive influence from criminal syndicates, including organized criminal groups and subjects of contraband activities. This unfavorable trend urgently requires intensifying preventive measures to ensure transport security.

Statistical data collected by law enforcement agencies of Ukraine for 2019-2024 [4] show an alarming dynamic of increasing crime related to ensuring transport security. This negative trend correlates with information received from international police organizations, such as Europol [8], [15], which confirms the increased exploitation of transnational criminal groups of transport routes for the illegal circulation of goods, weapons, narcotic substances, and the movement of persons.

Special emphasis is required on the risks of terrorist acts aimed at key elements of transport infrastructure. According to experts from Ukrainian security structures

[4], strategic transport hubs (in particular, railway stations, airports, seaports) are classified as objects of increased vulnerability to terrorist threats. During 2022-2023 alone, over 100 false reports of mining transport facilities were registered, which caused significant financial losses and increased social concern.

Despite significant scientific achievements, the issue of the effectiveness of comprehensive approaches to minimizing the negative consequences of criminal manifestations in the transport sector, which are characterized by a multifaceted negative impact, remains unresolved.

The economic aspect is expressed in annual losses, the volume of which, according to 2023 data [4], exceeded 2 billion hryvnias. The increased activity of organized crime in transport directly leads to decreased public safety, growing threats to the population, and national security of the country as a whole.

In addition, the effectiveness of combating transport crime is a decisive factor in forming a positive international image of Ukraine as a reliable and responsible partner in the global arena [13], [14].

In the context of the challenges above, criminological prevention of crimes in transport security acquires special significance as a system-forming component of ensuring national security and socio-economic stability. It involves developing and implementing a complex of interrelated legal, organizational, technological, and other measures aimed at timely detection, elimination, or minimization of determinants and conditions that contribute to the commission of illegal acts in transport.

Analysis of Recent Research and Publications

Practical strategies for preventing criminal acts in the field of transport security require developing and implementing comprehensive preventive mechanisms based on in-depth empirical criminological analysis and consideration of the unique aspects of transport infrastructure. A thorough review of domestic and international experience contributes to identifying the most effective preventive approaches and adapting them to national realities.

Modern criminological research in Ukraine plays a key role in forming effective strategies for countering offenses in transport. Specifically, in his works, V.M. Bondarenko [5] thoroughly investigates the criminological aspects of crimes occurring on railway transport, focusing on the specifics of their determination and effective prevention measures.

A significant contribution to the development of criminal law enforcement for the safe functioning and operation of transport systems has been made by S.B. Havrysh and S.V. Hizimchuk [6]. Their scientific work highlights problematic issues of legislative regulation and proposes ways to improve relevant legal instruments.

The studies of S.F. Denysov and M.O. Mishchenko [7] focus on the analysis of transport crime prevention, considering international experience, which contributes to integrating advanced global practices into the domestic legal system.

The issue of illegal movement of goods across the border and ways to overcome it is comprehensively examined in the scientific work of T.I. Kovalchuk [9], where effective methods for combating this type of crime in the transport sector are proposed.

The issues of countering organized crime in transport are detailed in the study by O.M. Lytvak and I.V. Hladuniak [11]. The authors analyze contemporary challenges and develop effective strategies for combating organized criminal groups in this area.

The resumption of specialized transport prosecutors' activities in 2022 became essential in strengthening control over compliance with transport legislation. According to data from the Office of the Prosecutor General [4], during 2023, transport prosecutors initiated over 1350 inspections, resulting in 200 criminal proceedings being launched and 500 submissions made regarding eliminating identified legislation violations.

The active participation of transport prosecutors in investigating all significant transport incidents and offenses is a key element of preventive work, contributing to the prompt identification of systemic problems and the adoption of adequate measures for their elimination.

Since 2021, modern analytical platforms have been actively implemented in Ukraine, utilizing Big Data technologies and machine learning algorithms to detect potential threats and anomalies in the functioning of transport infrastructure.

The intellectual system "Navigator of Security," developed in cooperation with European partners [8], has demonstrated particular effectiveness. This system comprehensively analyzes information from various sources, including customs declarations, logistics documents, and satellite monitoring data, allowing for the creation of "potential risk profiles" for individual carriers and routes. According to 2023 data [4], implementing this system prevented 105 attempts of smuggling totaling over UAH 500 million.

Within the "Road Safety" initiative [13], over 9000 transport sector and law enforcement agency employees underwent training and professional development during 2021-2024.

The program included specialized modules on transport security, methodologies for detecting illegal transportation, combating corruption, and practical workshops on using advanced cargo and passenger flow control equipment. According to expert assessments [4], implementing this program increased the effectiveness of control measures by 40%.

An important direction of preventive activity is international cooperation and intelligence exchange. Ukraine actively interacts with influential international organizations such as Interpol, Europol, the World Customs Organization, and the European Union Agency for Border and Coast Guard. Within this cooperation,

operational data is exchanged, joint operations are conducted to identify and suppress the activities of transnational criminal networks, and unified standards and methodologies for ensuring the security of the transport space are developed.

A clear example of such cooperation is Operation "United Barrier," conducted in 2023 with the participation of law enforcement agencies from Ukraine, Slovakia, Hungary, and Moldova.

As a result of the operation, six organized criminal groups specializing in the illegal trafficking of tobacco products and alcoholic beverages were identified and liquidated, illegal goods worth over UAH 150 million were seized, and 30 individuals were detained.

"Effective prevention of criminal acts in the transport sector is possible only by implementing a systemic approach that combines legal, administrative, technical, and informational measures. Particular attention should be paid to international cooperation, as most schemes for illegal movement and organized criminal groups' activities are transnational."

European Commission, Report on Transport Security in Eastern Partnership Countries, 2023 [15]

Analysis of world experience confirms the high effectiveness of preventive measures in reducing transport crime. For example, in the Czech Republic [8], after introducing a comprehensive transport security program in 2020, transport crimes decreased by 30% over three years. In Sweden [8], thanks to a system for early threat detection and preventive control of transport facilities, the number of road accidents at railway crossings decreased by 45% during 2018-2023.

Purpose of the Article

This article aims to formulate and substantiate a holistic systemic approach to improving criminological prevention of criminal acts in the field of transport security, taking into account current challenges related to organized crime and counterfeiting activities in Ukraine.

It is hypothesized that implementing such an approach will significantly increase the effectiveness of preventive measures and reduce transport crime.

To achieve this goal, the following key research objectives were formulated:

- to identify the main trends in transport crime based on the analysis of empirical data for the period from 2020 to 2025 [4];
- to confirm the leading determinants contributing to the commission of illegal acts in transport, particularly those related to organized criminal groups and corruption schemes;
- to conduct a comprehensive analysis of the current regulatory framework and assess its effectiveness in the context of maintaining transport security;
- to develop a substantiated set of preventive measures aimed at increasing the level of security of transport infrastructure;

- to substantiate the strategic directions for developing the transport security assurance system in Ukraine, taking into account advanced international experience [8], [15].

Presentation of the Main Research Material

A comprehensive study of relevant empirical data is crucial to form an effective set of criminological measures for preventing crime in the transport sector, revealing the patterns of criminal manifestations and their structural features. This section presents a systematic analysis of official statistical information obtained from relevant state bodies of Ukraine, specifically the National Police of Ukraine, the Security Service of Ukraine, and the State Customs Service, from 2020 to 2025 [4].

The following methods were used: systematic analysis of official statistical information, comparative method, and modeling crime development trends.

A consistent upward trend in the volume of recorded offenses committed within the transport system is observed throughout the research period. The indicators below clearly demonstrate this dynamic: in 2020, 15,500 criminal acts were recorded; in 2021, 16,100; in 2022, 16,800; in 2023, 17,900; and in 2024, the total number of registered crimes reached 18,500 [4].

This increase, especially noticeable in 2023-2024, may be due to an objective rise in criminal activity and an increase in the effectiveness of detection and registration mechanisms for illegal acts by law enforcement agencies.

A detailed structural analysis of crimes in the transport sector allows for identifying the most common categories of criminal infringements. Among these, the dominant share consists of: illegal movement of goods across the border (26.5%), theft of cargo and movable property (21.5%), disregard for road safety rules (19.0%), acts of hooliganism and vandalism (12.0%), as well as corrupt practices (11.3%). Other types of crimes account for 9.7% of the total.

According to official reports from the State Tax Service of Ukraine, the total economic losses caused by contraband schemes in 2023 are estimated at approximately UAH 4.2 billion. This underscores the destructive impact of this category of offenses on the stability of the national economy [4].

There is a significant correlation between the exponential increase in the influence of organized criminal groups in the transport sector and the rise in criminal activity. According to analytical data from the Main Directorate of the National Police of Ukraine, up to 45% of illegal operations in transport, especially in large sea terminals (such as Mykolaiv, Kherson, Berdiansk) and on key railway lines, are under the hidden control of organized criminal formations. A tendency towards forming cross-border and interregional criminal associations is also noted, which significantly complicates their identification and subsequent prosecution by criminal law [4].

A comparative analysis with indicators from neighboring countries confirms the presence of similar criminogenic trends in the region. For example, according to

the Ministry of Internal Affairs of the Republic of Belarus, in 2019, over 36,000 transport-related crimes were registered in that country [4], while in Romania, according to local police data, the number of such crimes in 2022 was about 20,000 [4], [8]. These empirical findings indicate the transnational nature of this problem and justify the urgent need to deepen international cooperation in preventing transport crime.

A thorough study of the current criminogenic situation in the transport infrastructure sector allows for identifying several critical criminological threats that require urgent and targeted responses from law enforcement agencies and other actors in preventive activities.

During 2020-2024, a significant increase in the scale of illicit movement of specific groups of goods across the state border was noted. Specifically, the volumes of detected narcotic substances increased by approximately 38%, illegal weapons and ammunition by 55%, tobacco products by 30%, and counterfeit products by 45% (State Border Guard Service of Ukraine, 2024) [4]. The predominant share of smuggling cases (over 52% of the total) [4] is recorded on the western section of the Ukrainian border. This situation is linked to a significant correlation between border location and increased activity of cross-border criminal groups, driven by a considerable difference in product prices in EU countries.

According to analytical data from the Department for Combating Organized Crime of the National Police of Ukraine, as of 2024, over 35 organized criminal groups specializing in criminal activities in the transport sector operate on the state territory [4]. These criminal structures employ complex schemes that include establishing corrupt ties with representatives of regulatory bodies, falsifying official documentation, creating fictitious commercial structures, and intensively using advanced information and communication technologies to coordinate their illegal activities (National Police of Ukraine, 2024) [4]. Their methods are constantly evolving, requiring adequate countermeasures.

According to reports from the National Anti-Corruption Bureau, the transport sector consistently ranks among the top three economic sectors in Ukraine with the highest levels of corruption [4]. In 2023, 270 cases of corrupt acts were recorded among transport company personnel and employees of regulatory institutions, indicating a 20% increase compared to the previous reporting period. Particular concern is raised by the inherent nature of corruption, where bribery is integrated as an established practice of interaction between economic entities and regulatory bodies (National Anti-Corruption Bureau, 2024) [4].

Since the beginning of 2022, a significant intensification of terrorist threats to transport infrastructure has been observed. According to information from the Security and Intelligence Service of Ukraine, 50 attempts to carry out subversive acts on transport facilities have been prevented, most instigated by foreign special services

[4]. The main objects of potential terrorist attacks have been identified as railway stations and hubs (30%), bridges and tunnel structures (30%), airports (25%), and seaports (15%) (Security and Intelligence Service of Ukraine, 2024) [4].

A separate issue is the insufficient level of interaction between various law enforcement agencies and entities within the transport complex. An audit conducted by the General Audit Service of Ukraine in 2023 revealed duplication of functional powers between departments, limited information exchange, and the absence of unified algorithms for responding to criminological challenges in the transport industry (General Audit Service of Ukraine, 2023) [4]. A survey of 350 law enforcement officers conducted in 2024 showed that 70% of respondents consider the lack of proper coordination between agencies to be a key obstacle to effectively combating transport crimes [4].

Significant attention is paid to the emergence of new forms of crime determined by the progress of modern technologies. In particular, according to the Department of Cybersecurity, over 220 cases of unauthorized interference with electronic transport control systems were recorded in 2022-2024, posing a real threat to the safety of passengers and cargo [4]. This trend underscores the urgent need to develop and implement innovative approaches to ensuring the cybersecurity of transport systems (Department of Cybersecurity, 2024) [4].

The problem of effective criminological prevention of criminal manifestations in the transport security sector is one of the most pressing in modern science, as it is inextricably linked to the availability of an adequate regulatory and management framework. Despite significant scientific achievements, the issue of a comprehensive assessment of the effectiveness of legal and administrative mechanisms in combating organized crime and the illicit movement of goods in this industry remains unresolved.

Key regulatory and legal acts for ensuring transport security include the following documents:

- Law of Ukraine "On Transport Security" (2019) [1]: This regulatory and legal act lays down the legal and organizational foundations for ensuring security in the transport sector.

- Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Criminal Proceeds, Financing of Terrorism, and Financing of Proliferation of Weapons of Mass Destruction" (2020) [2]: This law establishes comprehensive mechanisms to counter financial support for organized crime.

- Criminal Code of Ukraine (with amendments 2021-2024) [3]: Amendments introduced to this code have strengthened the measure of responsibility for illegal actions that threaten the safety of traffic and operation of vehicles.

- Customs Code of Ukraine (with amendments 2023) [3]: It improves customs control procedures aimed at effective counteraction to smuggling activities.

The adoption of the Law of Ukraine "On Transport Security" [1] in 2019 was a significant milestone, as for the first time, the concept of transport security was formulated at the legislative level, the powers of entities ensuring it were defined, and mechanisms for assessing risks and threats in the transport sector were implemented. Before this moment, there was a specific fragmentation in legal regulation. There is a significant correlation between comprehensive legislative regulation and the reduction of criminal manifestations in the transport sector.

Significant changes also affected criminal legislation. In particular, in 2021, amendments were introduced to the Criminal Code of Ukraine [3] that substantially increased responsibility for violations of traffic safety rules and vehicle operation that caused significant negative consequences.

The maximum prison term for such acts was increased from 7 to 9 years, and an additional penalty in the form of a ban on holding certain positions for up to 4 years was added. Strengthening punishment is one of the practical tools of criminological prevention.

Priority Legislative and Administrative Measures in the Field of Transport Security

1. 2020: Introduction of additions to the Law of Ukraine "On Prevention and Counteraction to Legalization of Criminal Proceeds" [2], which expanded the powers of the State Financial Monitoring Service of Ukraine [4] regarding the detection of suspicious financial transactions in the transport sector.

2. 2021: Strengthening criminal liability for violations of traffic safety and transport operation norms [3], which increased prison terms and introduced new types of penalties.

3. 2022: Implementation of an innovative electronic declaration system for transport participants (e-Logistics), which significantly increased logistics operations' transparency and minimized smuggling risks.

4. 2023: Introduction of adjustments to the Customs Code of Ukraine [3], aimed at improving the risk analysis system and implementing automated cargo control.

5. 2024: Approval of Ukraine's National Transport Security Strategy until 2030 [13], which outlines a comprehensive approach to countering criminal challenges in the transport sector.

A comparative analysis of the current legislative provisions of Ukraine with relevant regulatory acts of CIS and European Union countries [8] reveals specific conceptual and implementation differences in approaches to ensuring transport security. For example, EU legislation [8], particularly EU Directive No. 2019/1020 [15], contains stricter requirements for the certification of vehicles and professional training of personnel, and also provides for a system of continuous monitoring of the state of transport infrastructure security.

In addition to legislative initiatives, administrative measures aimed at strengthening control and increasing the transparency of transport operations play a significant role in preventing crimes in transport. Among the most effective measures, it is advisable to highlight:

- Implementation of electronic cargo monitoring systems: in 2023, approximately 70% of international transportation was covered by this system [4], which increased the level of control.
- Conducting mandatory certification of transport company personnel: from 2022 to 2024, more than 48 thousand employees in the industry successfully passed the relevant certification [4].
- Creation of specialized transport security departments within the National Bureau of Investigation [4] and the State Border Guard Service of Ukraine [4].
- Introduction of a risk assessment system during customs control: in 2024, the effectiveness of this system allowed for the detection of 30% more smuggling cases compared to traditional control methods [4], demonstrating its significant preventive potential.

An important example of a successful initiative is the integration of components of the European Road Monitoring Coordination Centre (ERMCC) system [8] in Ukraine, designed to coordinate control over cargo transportation. This system, which effectively functions in EU countries [8], enables the prompt exchange of information on detected violations and suspicious shipments, significantly increasing the effectiveness of preventive measures and strengthening transport security.

The problem of criminological prevention of crimes in the transport sector is one of the most pressing in modern science, as it directly impacts national security, economic stability, and the social protection of citizens. Despite significant scientific achievements and noticeable positive trends in preventive activities against transport crimes, Ukraine faces several substantial difficulties that complicate the development of an effective system of preventive measures. A comprehensive analysis of these obstacles allows for outlining priority areas for improving preventive work and determining strategic vectors for developing the national transport security complex. The issue of a comprehensive assessment of the relationship between the material and technical support level and the effectiveness of preventive measures remains unresolved.

One of the main problems remains the insufficient level of material and technical support for law enforcement agencies. According to an audit conducted in 2023, the equipment of units responsible for the transport sector reaches only 65% of the optimal level [4]. Modernizing cargo scanning equipment, implementing comprehensive video monitoring systems, and specialized equipment for detecting unauthorized or hazardous substances are urgently needed.

There is a significant correlation between a high degree of corruption risks and the prevention of criminal acts in transport. According to sociological research conducted by the Center for Social Initiatives in 2024, 45% of respondents identified corruption as the primary cause of the inefficiency of control mechanisms in the transport sector [4]. The level of vulnerability to corruption is particularly critical in seaports and border crossing points, where significant financial flows circulate.

Special emphasis is needed on the growing influence of asymmetric threats and cybercrime in transport infrastructure. According to the Cybersecurity Department of the Security Service of Ukraine, the number of hacker attacks on transport communications increased by 80% during 2020-2024 [4]. These actions are aimed at disrupting the stable operation of traffic management systems, unauthorized access to passengers' data, and creating preconditions for physical interference in the operation of transport facilities. For instance, in 2023, approximately 50 incidents of unauthorized penetration into automated railway traffic control systems were recorded [4], posing a significant threat to the safety of passengers and cargo. This type of threat constantly evolves and requires flexible and adaptive counteraction mechanisms.

Despite the existing difficulties, the prospects for developing criminological prevention in Ukraine appear promising. The following systemic factors facilitate this:

By the State Program "Digital State: 2025" [13], a comprehensive digitalization of transport control processes is planned. This includes the implementation of electronic transport waybills, digital recording devices (tachographs), and a unified electronic cargo tracking system. According to experts, implementing these measures will reduce the risks of illegal movement of goods by 30-45% and significantly increase the effectiveness of control procedures.

As part of implementing the Association Agreement with the EU, Ukraine is actively integrating into European transport security standards and systems. In particular, in 2023, an agreement was signed on Ukraine's accession to the European Transport Security Information Platform (ETSIF) [8], enabling real-time operational exchange of data on suspicious cargo and transport units.

The Verkhovna Rada of Ukraine is considering several legislative initiatives to strengthen transport security. The draft Law "On the Protection of Critical Transport Infrastructure" [1] is fundamental among them. It provides for creating specialized security units and introducing mandatory insurance for strategically important objects, which will significantly strengthen the legal foundation of preventive activities.

Thus, the analysis allows us to conclude that effective criminological prevention of crimes in the transport sector requires a comprehensive approach that organically combines criminological, administrative, and technological measures.

Based on the results obtained, it was confirmed that a key element of such an approach should be developing a unified national transport security monitoring system that would guarantee continuous control over the situation in all types of transport and prompt response to potential dangers.

The obtained results have theoretical and practical significance for the further improvement of policy and practice in the field of transport security in Ukraine. Prospects for further research lie in a deeper study of the influence of international experience on the formation of the national transport security strategy and the development of methodologies for assessing the economic effectiveness of the implemented measures.

A promising vector for developing preventive activities is intensifying public involvement in ensuring transport security. The experience of countries such as Great Britain and Germany demonstrates the high effectiveness of programs like "Road Safety" [8], where citizens can report suspicious situations and possible violations in transport. In Ukraine, a similar initiative will start in 2025 in close cooperation with non-governmental organizations and transport entities [14].

Conclusions

Thus, the comprehensive study of criminological aspects of crime prevention to ensure transport security, especially in conditions of countering organized crime and illegal movement of goods, allows for formulating several significant conclusions and concrete recommendations. These proposals are aimed at strengthening Ukraine's transport infrastructure security system. The key results of the analysis are presented in detail:

Primary Importance of Preventive Measures. Preventing crimes in the transport security sector is a fundamental component of the national security system and necessary for Ukraine's stable economic growth. The effectiveness of preventive activities not only contributes to reducing the level of criminal manifestations but also guarantees the uninterrupted functioning of the transport complex, which plays a strategically significant role for the state's economic potential.

Current Destructive Trends. Statistical data analysis from 2020 to 2025 allowed for establishing a persistent, significant level of threats to transport security. The results indicate that the increased influence of criminal groups causes particular concern, the growth in the volume of smuggling operations, and the escalation of cyber threats, which require an immediate and decisive response from the state and society.

Dynamics of Legal Framework Development. Regulatory and legal initiatives implemented during 2020-2025 have laid a solid legal foundation for strengthening preventive measures in transport security. At the same time, considering new challenges and threats, international experience indicates the objective necessity for further improvement of the regulatory and legal framework.

"Transport security is not only a purely technical problem but also a complex, multifaceted task that requires a systemic approach considering legal, organizational, economic, and social aspects.

A sustainable reduction in crime in the transport sector can only be achieved by combining preventive measures, effective control, and enhanced international cooperation".

A deep analysis of the effectiveness of various models of criminological prevention allows us to conclude that the most promising approach for Ukraine is an integrated one, which includes:

- Strengthening the legislative basis and increasing criminal liability for offenses committed in the transport sector.
- Implementing advanced control and monitoring technologies, including modern scanners, integrated video surveillance systems, and innovative electronic freight tracking systems.
- Developing and successfully implementing risk analysis systems, as well as mechanisms for early detection of potential threats, with the involvement of artificial intelligence achievements.
- Systematic improvement of qualifications and professional skills of transport industry specialists and law enforcement officers.
- Intensifying international cooperation and exchanging vital information to ensure stable transport security.
- The public must actively ensure transport security through effective civil control mechanisms and comprehensive information campaigns.
- Formation and development of public-private partnership mechanisms to enhance transport security.
- Creation of a unified, centralized national transport security monitoring system.

Based on the results obtained, it was confirmed that effective prevention of criminal acts in transport security requires close and coordinated interaction between various state structures, transport companies, and international partners. An essential step in this direction could be establishing a specialized National Coordination Council for Transport Security, capable of uniting the efforts of all interested parties to achieve common goals. The obtained results have theoretical and practical significance for developing and implementing national programs to enhance transport security and forming new legislative initiatives.

Prospects for further scientific research lie in studying the possibilities of implementing new technologies, such as blockchain, the Internet of Things, and artificial intelligence, to increase the effectiveness of preventive measures. Also relevant is the development of unified methods for evaluating the economic efficiency of various models of crime prevention in transport.

Particular attention should be paid to increasing the legal culture and general awareness of citizens in transport security. International experience convincingly demonstrates that targeted information campaigns and educational programs can significantly improve the effectiveness of preventive measures and contribute to the formation of positive behavioral patterns in society.

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