

Unified rules of driver conduct on the territory of factories and logistics hubs: an international approach

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Abstract. The logistics and transport system is currently characterized by active development, which requires the involvement of new approaches to regulating certain aspects of road traffic. The purpose of the article is to analyze the potential of modern concepts of unification of the rules of behavior of drivers on the territory of manufacturing enterprises and logistics hubs in the context of the experience of the USA, the European Union countries and Ukraine. The study considers the categories of basic traffic rules (observance of road signs, markings, priority of movement and pedestrian safety, availability of necessary documents, etc.), as well as specific requirements for the territory of factories and logistics hubs, which take into account the specifics of transportation, cargo and rolling stock (speed limits, parking rules, prohibition of movement for certain categories of transport or in certain areas, etc.). Various requirements for the behavior of drivers on private territories in Europe, the USA, Ukraine, which are components of the strategies for ensuring road traffic in individual countries, are studied. New directions of digital optimization of driver behavior regulation in private areas are analyzed, complementary to modern demands of "smart" and "green" logistics, with the integration of individual elements of information and communication systems. It is substantiated that the implementation of unified standards of driver behavior in Ukraine faces a number of challenges, in particular, limited funding and insufficient managerial support. The promising potential of intelligent transport systems for improving the management of logistics and transport systems and developing responsible driving practices for traffic safety in closed areas is proven.

Keywords: transport and logistics system, general requirements, special conditions, road traffic, intelligent transport systems.

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Introduction

General requirements for logistics on the territories of enterprises should include the optimization of internal material flows, ensuring timely delivery, storage and movement of goods in the required quantity and quality, as well as minimizing costs. The process, as a whole, covers the basic requirements for optimizing material flow management to achieve goals related to the creation of material goods or the provision of services, and provides for the timely delivery of goods at a precisely defined time, while complying with the requirements for the correct quantity and quality, delivery location.

Logistics on the territory of the enterprise is closely related to other functions, such as procurement, production, warehousing and transport, which complicates the management of transport flows on the territory of factories and logistics hubs. This makes the issue of unification of requirements for the behavior of road users in certain conditions relevant. In this case, it is important to effectively combine the achievements of international experience with local cultural specifics.

Increased attention has been paid to the need to analyze foreign experience in the field of the outlined issues due to such prerequisites as the fragmentation of research in this area, the lack of publicly available translated versions of the texts of strategies and programs in the field of road safety of individual countries, the European integration direction of Ukraine's development, and the need to involve many years of experience of leading countries in the world in developing and implementing Ukraine's state policy in the field of road safety and transport operation, etc.

Familiarization with various requirements in Europe, the USA, and Ukraine for driver behavior on private territories, which are components of road safety strategies of the European Union and the USA, will allow us to more fully substantiate the feasibility of introducing a proactive unified road safety model in Ukraine. It should be based on the awareness of the determining concepts of foreign experience in the legal, organizational, managerial, informational, and other areas.

Review literature

Ensuring the resilience of the logistics and transport system to potential crises should be a key goal of transport policy. Such narratives have been developed in numerous works by scientists (Bak et al. (2020), Ekhsonov & Khoshimov (2023), Shtal et al. (2020), Winkelhaus & Grosse (2020), who have successfully integrated various concepts and tools to implement unified strategies for the functioning of the transport and logistics system, including the regulation of driver behavior.

Scientists Batarlienė & Bazaras (2023), Khan et al. (2021) actualize the greening of mobility, which should be a kind of new license for the development of the transport and logistics sector. As scientists convince, an effective multimodal transport system can be achieved through the development of logistics network infrastructure, the priority of renewable and low-carbon fuels, as well as digitalization.

In continuation, Petrukha et al. (2021), Deja et al. (2021), Zhan et al. (2022) position the digital upgrade of transport process management as a driving force for increasing the efficiency and smoothness of the modernization of the entire logistics system, updating the level of safety and reliability, improving the competitiveness of companies through efficient and sustainable logistics chains. The publications of Gizetdinov (2024), Kannan (2021), Zhou et al. (2021) indicate the active integration of modern information and communication technologies as a powerful practical tool for resolving problematic aspects. In particular, the use of GPS navigators and other modern technologies allows you to optimize the route and avoid possible problems associated with the transportation of goods.

Researchers Donald et al. (2020), Pečený et al. (2020) focus on key aspects of driver behavior on private property, including parking and cargo transportation rules, taking into

account their size, weight, and type, as well as taking into account height, weight, and other restrictions set by road signs when planning routes.

Despite the significance of the developments of modern scientists, the problems of practical integration of international experience in regulating the behavior of drivers in the territories of logistics hubs and enterprises remain poorly studied. Ukraine, due to its Soviet past, has long been outside the global trends in the formation of transport and logistics strategies. This makes the expanded study of this topic relevant, taking into account the specifics of mentality and cultural and historical context. The practice of normalizing these legal relations in states with a high legal culture, established legal traditions and legal awareness of citizens is of particular scientific interest.

Purpose of the article

The purpose of the article is to analyze the potential of modern concepts of unifying the rules of behavior of drivers on the territory of manufacturing enterprises and logistics hubs in the context of the experience of the United States, the European Union countries, and Ukraine.

Materials and methods

To achieve the set goal, a combination of general scientific and special research methods was used: the analytical method was used to systematize scientific approaches to the functionality of unified standards of driver behavior in the transport and logistics system; modeling method - for assessing crisis scenarios; synthesis and generalization methods - for developing a generalized concept for forming effective mechanisms for regulating driver behavior in the territory of logistics locations in Ukraine based on international experience.

Limitations of the study are related to the difficulties of experimentally verifying theoretical conclusions, as well as the non-systematic study and potential regional bias.

Results and discussion

The legal framework in the field of fundamental international approaches to securing transport in logistics systems is formed on the modern institutional framework of the regulatory and legal system, consisting of legislative and other acts aimed at implementing international standards at the national level, which should ensure the unification of transport and road traffic operating rules, as well as determine long-term strategies for securing and regulating road traffic.

Road traffic is a dynamic complex system, the peculiarity of which lies in the close interaction of human and technical factors. Within this system, each traffic participant, and primarily the driver, functions under the influence of the main negative factors: chronic lack of time resources, overload with external information that requires continuous analysis and synthesis, as well as a high level of responsibility for the decisions made (Batarlienė & Bazaras, 2023). In view of this, ensuring the effective functioning of the transport and logistics system can be achieved only if effective information is established for its traffic participants using information and communication technologies and road traffic management.

In general, transport and logistics solutions are based on the requirements of market participants and the needs of the production and distribution sectors. Freight transportation is fragmented by mode of transport, origin of goods and type of operator. Among the largest categories of urban logistics supply chains, it is necessary to distinguish individual retail stores, retail chains and commercial centers, food markets, parcel transportation, address deliveries, etc. Vehicles from the world's leading express transport companies (UPS, FedEx, DHL, TNT) currently operate in most cities in the world with a certain geographical specialization (DHL - in European cities, UPS - in US cities).

Private areas within the European Union, including locations of enterprises, factories, and logistics hubs, are subject to similar road safety regulations as public roads. Local regulations established by the owner of a particular area may also apply (Ekhsanov & Khoshimov, 2023).

General requirements include, first of all, speed limits, seat belts, parking rules. The car must be equipped with a first aid kit, fire extinguisher, spare tire, and emergency stop sign, and the driver must have the necessary document case with him.

Additional requirements on private property may be imposed by the owner, including prohibitions on entry, parking, or movement of certain vehicles. The use of mobile phones while driving, even with a hands-free headset, may also be prohibited, which may result in significant fines. Drivers should check for signs regarding parking and movement on private property.

Specific requirements of private areas (e.g., businesses) may require speed limits that may be lower than those set for public roads. Also, locations of logistics hubs or factories may have access rules that require a check or a pass.

In the US, driving requirements on private property are primarily determined by state and facility regulations, but common key requirements include safety requirements (safe driving, proper documentation, and compliance with signs and regulations) and compliance with local laws. General requirements include driving safely, in accordance with state traffic laws, even on private property, and carrying a valid driver's license, insurance, and vehicle registration documents. Obey all posted signs on private property (e.g., "Stop," "One-Way," "Speed Limit"). On private property in the US where no posted signs are posted, you should drive at a safe speed that takes into account the conditions (e.g., pedestrians, other vehicles) (Winkelhaus & Grosse, 2020; Zhou et al., 2021).

Particular attention in the US is paid to drunk driving, which is illegal and dangerous, as well as using a mobile phone to send messages or talk without a headset, which is prohibited in virtually all states.

Owners of parking lots on the territory of enterprises and logistics hubs can set their own rules (in particular, parking exclusively for customers), for violation of which there may be legal consequences (fines, deprivation of rights), if these violations contradict state laws, up to and including towing the car. Also, the owner of the territory can take measures against violators, in particular - a ban on entry.

As for Ukraine, its territory has been outside the global trends of formation for a long time. The organization of traffic and driver behavior on the territory of factories, enterprises and logistics locations involves the use of road signs, markings and technical means, as well as the development of a traffic scheme taking into account turns, stops and exits. Logistics hubs currently set speed limits (10 km/h on the territory, 5 km/h indoors), determine the rules of entry/exit, parking and towing. It is common practice to develop a traffic scheme on the territory, which includes signs, markings and technical means of organizing traffic, in accordance with general traffic rules, but taking into account the specifics of the enterprise. Specific rules for drivers include maneuvering (keeping a distance of at least 1 m from obstacles during maneuvering; entering a parking lot in forward gear with one reverse gear maneuver to turn; entering and leaving a parking lot in a truck combination only in forward gear, etc.), as well as towing (broken cars are towed only with a hard clutch, towing to start the engine is prohibited, etc.).

The digital economy supports innovations in transport and logistics processes. In particular, the Transport Management System (TMS) has proven to be effective. This system is a practical tool for optimizing transportation processes, taking into account various factors. In this context, maintaining communication with drivers and carriers is of particular importance for promptly resolving any issues that arise during transportation (Pečený et al., 2020).

, which is aimed at minimizing the negative impact on the environment, is also gaining particular popularity in developed countries. The rules for drivers in the context of "green" logistics focus on environmentally responsible behavior, in particular, observing the rules of economical driving, choosing optimal routes, and caring for the car. Economical driving can be

achieved by avoiding sudden acceleration and braking, maintaining a steady, moderate speed, and using engine braking where possible. Choosing optimal routes involves planning a route using modern navigation systems to avoid traffic jams, taking into account the shortest distance and the lowest fuel consumption. At the same time, timely maintenance is important to maintain optimal engine and other vehicle systems, as well as maintaining correct tire pressure to reduce fuel consumption.

In developed countries, considerable attention is paid to road safety campaigns. In particular, a number of effective projects have been implemented at the initiative of the British government - "Take Extra Care", "Be the Mate who won't Speed", "Put your phone away" which included a set of videos on social networks and the Internet, including stories on Instagram, Snapchat and gaming applications. Another example is "Belt Up. Live On" – a social campaign initiated by the New Zealand Transport Agency, in which participants in road accidents share stories about how a seat belt saved their lives. "Look the road in the eye" – the Latvian Road Safety Department created a social advertising video about a driver and the road, which did not forgive the driver for being distracted by his phone. The video encourages drivers to "look the road in the eye".

In general, it becomes obvious that the international approach to unifying the rules of behavior of drivers on the territory of enterprises and logistics hubs involves focusing on the use of seat belts, preventing distraction by gadgets while driving, making it impossible to drive while intoxicated or drunk, prohibiting exceeding the permitted speed limit - social projects on road safety. In Ukraine, unfortunately, this mechanism is developing very slowly. Social advertising, which has a powerful potential to change social standards and moral guidelines, should play an important role in the formation of narratives of social psychological and behavioral stereotypes.

"Responsible logistics" should become a leading trend in the development of the industry. Its embodiment is intelligent transport systems (ITS) - a systemic integration of modern digital technologies with transport infrastructure, vehicles and users, which aims to increase the safety and efficiency of the transport process, comfort for drivers and transport users. ITS involves the formation of a single open system architecture, accumulates information about the management object, analyzes it and directly or indirectly controls this object (Kannan, 2021).

In particular, the use of GPS monitoring allows for the resolution of global issues in a short time and with minimal costs and offers unique solutions for managing logistics and transport systems, focusing on mutually beneficial partnership relations with the client and an individual approach, close cooperation with the road traffic inspection department, etc. GPS monitoring allows you to track and analyze driver behavior, controlling speed, sudden braking, acceleration, and maneuvers. This increases safety, helps optimize routes and driving style to save fuel, and improves overall fleet performance.

Thus, as international experience shows, the integration of digital systems and innovative capabilities of information and communication technologies contributes to the development of transport and logistics processes towards sustainable development, "green" logistics and traffic safety. At the same time, these processes require the implementation of a sustainable systemic approach, which involves continuous monitoring and analysis to find ways to improve.

Conclusions

On private areas of enterprises, factories and logistics hubs, drivers must comply with basic traffic rules (observance of road signs, markings, priority of movement and pedestrian safety), but also take into account specific requirements of the territory that take into account the specifics of transportation, cargo and rolling stock, for example, speed limits, parking rules and traffic bans for certain categories of transport or in certain areas. General requirements

include courtesy, attentiveness and compliance with the rules, as well as the presence of the necessary documents identifying the person and vehicle, as well as an appropriate insurance policy.

Analysis of various requirements for driver behavior on private territories in Europe, the USA, and Ukraine, which are components of the countries' road safety strategies, allowed us to formulate directions for introducing a proactive unified road safety model in Ukraine, which should be based on the awareness of the determining concepts of foreign experience in the legal, organizational, managerial, and informational context. The priorities should be "green" and "smart" logistics, as well as the active use of digital technologies as a powerful practical tool for resolving problematic aspects.

Promising scientific developments should be devoted to in-depth research into the effectiveness of modern intelligent transport systems in various organizations, using statistical analysis methods.

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