

ROAD ACCIDENTS AND THE NATIONAL ECONOMY: LEGAL ANALYSIS

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Abstract. The present publication aims to conduct a legal analysis of the mutual influence of road accidents and the national economy, which is manifested at different levels of relevant public relations. *The research subject* is road accidents and the national economy. The publication's *methodology* relies on an organic combination of well-known laws and techniques of dialectics (the transition of quantitative changes into qualitative, unity and struggle of opposites, and the negation of negation), general scientific methods of research (techniques of the logical method, comparative method, techniques of the sociological method, systemic and structural-functional methods), and special legal methods (legal statistics, formal-legal method, methods of comparative jurisprudence and legal modeling). *Results.* Road safety is inextricably linked with economic processes taking place in a particular state. In addition, as economic indicators affect the number of road accidents so the dynamics and consequences of road accidents significantly affect the national economy. The most important economic factors affecting the number of road accidents are as follows: underdeveloped road infrastructure, outdated vehicle fleet, poor financial and logistic support of law enforcement agencies, insufficient number of traffic enforcement cameras, and other innovative means of preventing road accidents. The priority in traffic accident prevention is the maximum automation of means ensuring road safety: coverage of all key traffic intersections with traffic enforcement cameras, equipment of modern cars with automatic speed limit systems and alcohol intoxication testers, which automatically block the ignition system, the development of a fleet of AI-based self-driving cars and automated traffic control systems. Other economic and administrative means of road accident prevention are equally important, i.e., financial incentives for compliance with traffic rules, development and improvement of public transport efficiency, and investments in multi-level road infrastructure to reduce traffic congestion in available highways and transport interchange.

Key words: road accident, economy, traffic safety, economic indicators, prevention.

JEL Classification: D73, K23

1. Introduction

Law and the economy are interrelated systems, as law is a superstructure on an economic foundation. The economy provides the legal system with the means necessary to conduct legal activities. In turn, law ensures the enjoyment of the economic interests of social groups and society as a whole, complements economic activity, and gives it a legal form. The economic level's influence on road safety is vividly manifested as the latter is directly associated with the quality of road infrastructure, obsolescence of the vehicle fleet, and the equipment of law enforcement agencies with the means necessary for prevention and countermeasures against offenses in the specific area of public relations.

Thus, a legal analysis of road accidents as an object of administrative regulation taken in conjunction with the national economy is a relevant research area and of theoretical and practical significance.

The present publication aims to conduct a legal analysis of road accidents and study their influence on the national economy. The goal's achievement requires the accomplishment of the following tasks: to determine a degree of scientific development of the topic under consideration; to establish the economic causes of traffic accidents; to characterize the influence of quantitative indicators of traffic accidents on economic processes; to summarize and compare the financial indicators of traffic accidents in Ukraine and EU countries; to identify economic and legal means of preventing traffic accidents.

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V. Sokurenko, A. Stryzhak (Sokurenko, Stryzhak, 2021) devoted their contribution to the general characteristics of administrative law means of ensuring traffic safety in Ukraine. Administrative responsibility for traffic safety violation is fully covered in the work by O. Kuzmenko (Kuzmenko, 2016). O. Salmanova (Salmanova, 2002) studied administrative means of ensuring road traffic safety.

Different aspects of road accidents and challenging issues of ensuring road safety were covered in the article by prominent scientists V. Babych, O. Mukhina, and Yu. Pesotska "Administrative Responsibility for Traffic Violation"; O. Bytiak "Proceedings in Cases of Administrative Automatically Recorded Offenses on Road Safety: Individual Issues" (Bytiak, 2021); D. Boiko "Proceedings in Cases of Administrative Violations of Vehicle Operation Rules" (Boiko, 2014); S. Butnyk "On Improving the Legislation on Ensuring Road Traffic Safety" (Butnyk, 2013); V. Vvedenska "Administrative Mechanism of Prosecution for Automatically Recorded Road Offenses" (Vvedenska, 2014); M. Veselova, A. Mammedova "Controversial Issues of Responsibility of Vehicle Owners for Automatically Recorded Administrative Offenses against Road Safety" (Veselova, Mammedova, 2018); S. Husarov "Administrative Principles of Public Administration of Road Safety in Ukraine" (Husarov, 2001); M. Dolhopolova "Some Aspects of the Application of Laws on Administrative Offenses related to Road Safety by the courts of Ukraine" (Dolhopolova, 2003); M. Lazarenko "Theoretical and Legal Fundamentals of Administrative Regulation of Road Safety in Automatic Mode" (Lazarenko, 2016); R. Molchanov "Features of Proceedings in Cases of Administrative Offenses against Road Safety Committed by the Patrol Police" (Molchanov, 2017); M. Pluhatyry "Compliance with Constitutional Guarantees when Considering Cases of Administrative Offenses Recorded in Automatic Mode" (Pluhatyry, 2021); A. Filippov "Responsibility for Administrative Automatically Recorded Offenses in the field of Road Safety in the Context of Human Rights" (Filippov, 2016); H. Yarmaki, R. Pylypiv & M. Veselov "Administrative Regulation of the Activities of the Patrol Police to Ensure Road Safety in Ukraine" (Yarmaki, Pylypiv, Veselov, 2019), and other well-known experts. However, the mutual impact of road traffic accidents and the national economy remains a poorly studied issue that actualizes the preparation of the present publication.

2. Statistics of road traffic accidents in Ukraine and EU countries

Road traffic accidents are one of the most destructive factors that cause heavy losses to

the national economy, the state, and society as a whole.

S. Koziakov and M. Berlin note that during 30 years of Ukraine's independence, almost 180 thousand people died in road accidents. According to official statistics, 26,700 people were killed from 2011 to 2016, and 210,400 people were injured. At the same time, more than 42.6% of those killed in road accidents in 2016 were pedestrians and cyclists. Road accidents in Ukraine are the first most common cause of death for young people aged 15 to 24 years and the second most common cause of death for children aged 5 to 14 years (Koziakov, Berlin, 2021).

Such terrible figures prove the utterly unsatisfactory state of road safety in Ukraine and the need to take drastic measures to improve such a deplorable situation.

S. Koziakov and M. Berlin highlight that the above figures are official statistics provided by the Cabinet of Ministers in two crucial documents with equally loud titles "Strategy for Improving Road Safety". Moreover, the implementation of the former document was planned for the period until 2020 (not implemented, including because the document was annulled by the adoption of another document). And the latter one is recent enough, adopted in 2020 and scheduled for 2024.

These documents are more declarative by their nature. For example, the Strategy for Improving Road Safety in Ukraine for the period up to 2024, approved by the Resolution of the Cabinet of Ministers of Ukraine on October 21, 2020, No. 1360-r, names traditional causes of road accidents and notes that road infrastructure also affects accident rates. Thus, in 2019, there were 948 road accidents due to unsatisfactory road conditions, in which 51 people were killed and 359 – injured, of which 890 happened on principal roads and 58 – on local roads. In addition, global climate changes and abnormal snowfall in recent years have led to the formation of large-scale traffic congestion, long-term cessation of passenger and freight traffic, deterioration of people's livelihoods, and significant economic losses.

A large number of road accidents and their victims also affect the economy and health sector of Ukraine. According to World Bank experts, Ukraine's socio-economic losses caused by road traffic injuries are estimated at UAH 68.6 billion per year, which is about 1.91 percent of the gross domestic product (2019 calculations), including financial expenses associated with property damage, a decrease in labor productivity, and human losses due to severe road traffic injuries or deaths (On the approval of the Strategy for increasing the level of road safety in Ukraine for the period until 2024).

Guidelines for the Strategy's implementation are quite systematical but lack specifics (the phrases like "stimulating the development", "introducing modern technologies", "elaborating the procedure", "ensuring the audit", "determining infrastructure factors", etc. are mainly used).

Moreover, the Action Plan for the implementation of the Strategy for Improving Road Safety in Ukraine for the period up to 2024, drafted by the Ministry of Infrastructure together with other interested executive authorities, predominantly contains the same declarative goals and expressions such as "improvement", "strengthening the role", "introduction of the training system", etc.

In addition, it is a mystery how road safety progress in Ukraine may be influenced by coordination councils on road safety in cities and other settlements (one of the plan points).

The outcome of years-long "strategic" efforts of most government agencies with their programs and plans is sad – Ukraine has one of the highest levels of road accident mortality and injuries in Europe, and the level of road safety organization remains extremely low. This was repeatedly emphasized in their reports by experts from WHO, the World Bank, and other international institutions.

At the same time, unlike the Members States of the European Union, even during the quarantine, Ukraine did not manage to decrease the statistics of road traffic deaths and injuries. In 2020, there were 168,107 road accidents, of which 26,140 entailed the deaths of 3,541 people and injuries of 31,974 people (Koziakov, Berlin, 2021).

As of today, due to the introduction of martial law in Ukraine and curfew restrictions in settlements, a decrease in the total number of road accidents has been recorded from the beginning, but it gradually returned to pre-war indicators. The temporary decrease in the indicators was "supported" by the fact that a significant number of traffic enforcement cameras did not work, the movement of civilian vehicles in the frontline zones was noticeably limited, and there was a drastic internal migration of the population to the western regions of the state, which decreased the vehicle fleet of metropolises in the east of the country. At the same time, it had an adverse impact on road safety due to the blackout in settlements caused by the strikes of the Russian occupation forces on the energy infrastructure.

In this regard, V. Prykhodko and M. Alexandrov hold that the administrative prevention of road accidents under martial law should consider the situation and adjust to the current conditions depending on the security level in each region. Different territories were affected by the war differently. Administrative measures on road traffic

which have been relevant in peacetime can be challenging to implement in relatively peaceful territories and are generally impossible in hostilities. However, given martial law, it is worthwhile mentioning that the state of administrative prevention of traffic accidents in Ukraine cannot be called satisfactory due to the high level of accidents, which is why the introduction of effective measures and improvement of current areas in road safety is necessary as soon as possible (Prykhodko, Aleksandrov, 2022, p. 111).

A comparative analysis of road safety in Ukraine and the EU member states deserves closer scrutiny. Thus, S. Koziakov and M. Berlin emphasize that the number of road traffic deaths steadily decreased in Europe in ten-year periods over the past 30, 20, and 10 years.

18,844 people died in road traffic accidents throughout the EU in 2020, which is 10,847 less than in 2010 (-37%). During the reporting period, 56,305 fewer people died on EU roads than it would have been if the death toll had remained at the same level as in 2010.

The monetary value of human losses saved by the national economies of the EU member states through the prevention of road traffic deaths is approximately 156 billion euros (Koziakov, Berlin, 2021).

The above figures indicate a substantial influence of road safety on the economic indicators of a particular state.

During the 2010–2020 reporting period, the highest annual reduction of road deaths in the EU was achieved in 2020: 3,919 deaths per year were prevented compared to 2019 – an unprecedented reduction of 17% in one year. However, analyzing the 2020 statistics, Europeans frankly admit that those exceptional results were not an extraordinary outcome of sweeping changes in road safety policy but rather an effect of unprecedented restrictions related to the COVID-19 pandemic. A decrease of almost 40% in the number of road traffic deaths was evident in the EU, for example, in April 2020, when most European countries were in the first-blockade zone compared to April in the previous three years (Koziakov, Berlin, 2021).

Thus, the EU's positive experience in introducing an economic analysis of the causes and consequences of road accidents, including an economic assessment of human losses resulting from fatal accidents, is critical to Ukraine.

3. Economic indicators of road accidents

The following should be attributed to economic reasons for a road accident:

– critical road conditions (triggered, among other things, by insufficient funding for the construction

and repair of road infrastructure), e.g., bad lighting on the road, low-quality road surface, construction along roads with violation of protective zones, etc.;

- the poor-quality vehicle fleet of a particular region or state as a whole, when the low standard of living makes people buy mostly second-hand cars that have already depleted their primary resource and need capital repair, replacement of key nodes, re-equipment, etc.;

- insufficient level of financial and logistical support for the police and support services of the Patrol Police of Ukraine: a frequent shortage of high-quality certified equipment for measuring speed, detecting signs of alcohol or drug intoxication, bad quality of chest video recorders used by police officers, limited vehicle fleet of patrol police, etc.;

- shortage of traffic enforcement cameras for an automatic traffic violation (speeding) recording due to their sufficiently high cost and maintenance complexity, which makes it impossible to cover all key intersections and highways with video surveillance;
- underfunding of national and regional road safety programs, including the construction of new road junctions, bypass roads, tunnels and underground road crossings, the introduction of innovative means of traffic regulation and European standards of road infrastructure.

The above list is non-exhaustive and requires a separate economic and legal study using statistical data and conducting relevant sociological studies.

It is essential to dwell separately on the impact of road accidents on economic processes. Thus, the increase in road accidents can considerably affect the national economy for the following reasons:

- treatment and rehabilitation costs: road accidents often result in serious injury or death. Treatment and rehabilitation of victims usually require considerable financial resources (which cannot be borne by the culprit and cannot be covered by insurance payments), which leads to increased healthcare and social service expenditures;

- production losses: after a traffic accident, if the victim cannot work, he loses income and labor time. In addition, under serious accidents, when many cars are crashed, provoke traffic cessation, which causes delays in deliveries and production losses (especially in cases where the car is the primary means of production and purchased for credit funds);

- losses for insurance companies: road accidents have a significant impact on insurance companies. The latter should pay a substantial amount of money to compensate for damage associated with accidents, which can lead to the a revaluation of auto insurance (the legal costs of recourse actions against accident perpetrators should be additionally mentioned);

- losses for individual farms and regions: road accidents can influence individual regions due to

additional costs (which were not provided for by local budgets) for the repair of roads and bridge crossings, a decrease in tourist flow in areas where frequent road accidents occur, and also lead to additional costs for transport and logistics (search for alternative ways and means of freight and passenger transportation);

- adverse impact on the banking sector: the expansion in the number of road accidents results in the number of bad bank loans, if, for example, the lost vehicle was the principal means of production for a person, or a person who has lost his job due to injury cannot timely pay loan installments;

- adverse impact on macroeconomic indicators: due to the increase in the number of road accidents with fatal consequences, demographic indicators are decreasing, which in turn causes a labor shortfall in industries and the service sector and reduces the economic activity of the population of a particular state.

Consequently, road accidents can considerably affect the country's economy through treatment and rehabilitation costs, loss of production, negative profit for insurance companies, etc.

In addition, road accidents can have different financial indicators that can influence the national economy. The most common financial indicators of road accidents are as follows:

- costs of material inputs: it refers to costs associated with vehicle repair or replacement and other property holdings that have suffered damage in a traffic accident (it is essential to correctly and independently assess the material damage because a frequent problem faced by a person injured in an accident is an underestimation of the amount of insurance valuation of losses or, conversely, an overestimation of the loss amount by the interested subjects of auto expertise, which is often one of the methods of fraud);

- treatment and medical care costs: these are the costs of medical care and treatment (rehabilitation) necessary to recover the victims' health;

- moral damage cost, which often becomes the subject of long-lasting lawsuits (compensation for moral damage can be claimed only in court, because the presentation of such a requirement does not belong to insurance companies' duties);

- loss of production: this is the loss of income that the victim could have received if he had not been involved in a traffic accident (lost profit, which is also established during legal proceedings on the relevant case by analogy with compensation for moral damage). It can also be losses for enterprises that depend on transportation;

- insurance costs: these are motor insurance costs that shall be paid to insurers to compensate for losses incurred resulting from a traffic accident (paid voluntarily or under recourse claims to the perpetrators of an accident);

– cost of investigation and justice: these are the costs of investigation and justice in cases when a traffic accident is associated with a breach of the law by road users (including a sufficiently high cost of automotive forensic examination – expert studies, in order to establish the mechanism and circumstances of a traffic accident, the technical condition of vehicles, reasons for the breakdown of their parts, as well as circumstances that were instrumental or could be instrumental in the occurrence of a traffic accident).

All these financial indicators can significantly influence the country's economy due to increased costs of health care, insurance, and road repairs, as well as loss of production and income of individual farms. Taking into account the above statistics of road accidents in Ukraine, these costs are multiplied by colossal figures and have a significant macroeconomic effect, triggering a heavy load on state and local budgets, incl. budgets of private law entities.

4. Economic means of road accident prevention

Considering the above, it is necessary to dwell separately on the analysis of economic means of prevention of road accidents. Here are a few of them:

– introduction of a flexible system of fines for violation of traffic rules (from minor penalties for the first violation to the maximum amount of fines for the recurrence of a similar offense): fines can be an effective means of changing the behavior of drivers and increasing their legal awareness, a conscious attitude to road safety (however, we should keep in mind that a significant increase in penalties often has a short-term effect because drivers adapt to the situation, consider the possibility of imposing a fine as a professional risk, and a psychological paradox can also be activated when a person deliberately violates traffic rules enjoying it, because, as you know, stolen fruit is sweetest. Therefore, the best option is to charge the driver with penalty points by authorized officials of the National Police for each violation of traffic rules – after gaining a specific number of points, the driver's license is withdrawn and they have to resit exams to obtain a new national driver's license, or to apply such alternative penalties as public or corrective works, the challenge of which has a greater impact on the legal awareness of drivers);

– improving vehicle safety: to reduce the risk of road accidents, it is advisable to use vehicles with safer technical characteristics and statutorily raise safety requirements (the critical situation with road safety in Ukraine requires legislators to take drastic measures: it refers to the renewal of mandatory annual technical inspection of vehicles, the ban on using second-hand cars older than 10 years, and the obligatory installation

of automatic speed limitation systems for new cars within settlements and automated alcohol testers involving the blocking of the ignition system in case of detection of alcohol intoxication in the driver, etc. – all options should be considered);

– increasing investments in infrastructure development: well-developed and safe infrastructure can essentially reduce the number of road accidents, which can be achieved, in particular, by building separate lanes without the technical ability to cross into the oncoming lane, installing "smart" traffic lights (adjusting the intervals of permitted and prohibited modes depending on the time of day, the number of pedestrians and cars, etc.), interactive pedestrian crossings with automatic blocking of traffic, and other means of traffic control;

– improving the transport system as a whole: an effective transport system with multiple alternative highways (including toll roads), multi-level transport interchanges, underground parking lots, ring roads can significantly reduce traffic congestion and the number of cars on roads, which in turn can reduce the number of traffic accidents;

– enhancement of the efficiency of public transport: increasing the level of safety and quality (comfort) of public transport and reducing its cost can contribute to its widespread public use and, accordingly, unload roads (it is equally important to popularize bicycle transport with the simultaneous development of appropriate road infrastructure – bicycle paths, parking lots, bicycle rental points, etc.);

– financial incentives to comply with traffic rules: for example, a person who has not committed any traffic violation during the year may receive certificates from the state for the purchase of motor vehicle parts, discounts on car maintenance from partner enterprises of the relevant programs, benefits when paying transport fees and taxes, etc. (similar measures are already being implemented in some Arab countries);

– investments in the development of artificial intelligence for creating unmanned vehicles and related infrastructure, when the driver's role will be minimized and computer programs will carry out general traffic management (given the rapid progress of innovative technologies, the prospect of expanding the fleet of unmanned vehicles looks quite realistic, and such innovations should be met with legislative support through the approval of pilot projects for the construction and development of "smart" cities, which will prohibit the passage of ordinary vehicles and traffic regulation will be conducted by a computer program without human participation).

In addition, a reasonable idea is the legislative regulation of the remuneration of road users who recorded traffic violations and voluntarily provided relevant records to law enforcement officers (the implementation of such an idea is rather

possible only after the cessation of martial law and the renewal of DVRs use).

Thus, according to T. Danylenko, at its meeting in October 2021, the Verkhovna Rada Committee on Digital Transformation considered two new draft laws: the draft law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine on Strengthening the Role of Society in Road Safety Control Measures and Compliance with the Rules of Vehicle Stopping and Parking" No. 5798 dated 16.07.2021 and the alternative draft law "On Amendments to Certain Legislative Acts of Ukraine on Strengthening the Role of Society in Road Safety Control Measures" No. 5798-1 dated 03.08.2021.

T. Danylenko believes that the relevance of these draft laws was enhanced after the introduction of automatic traffic violation recording on the roads of Ukraine and, hence, replenishment of the state budget at the expense of numerous violators.

By relying on the content of these draft laws, it is proposed to attract socially active citizens who have the desire and opportunity to maintain "public control" over safety on those road sections that are not directly controlled by officials of the National Police and are not subject to automatic traffic violation recording.

For example, a person who witnesses a traffic violation will be able to "work" as a law enforcement officer and record such violations via photography or video recording using special software and send the received information to the patrol police department, thus obtaining the status of a notifier. Such a mechanism will make it possible to prosecute offenders in a few clicks. All you need is a phone or tablet with a camera and a dedicated app. The mobile device will record a violation of the Traffic Rules, and using the Diia application the person will be able to send the relevant data to the police (Danylenko, 2021).

The realization of that kind of idea does not entail significant expenditures from the budget because notifiers will receive payments from the amounts of fines paid by traffic violators, which shall also be enshrined in the draft law.

5. Conclusions

The conducted study gives grounds to conclude that road safety is inextricably linked with economic processes taking place in a particular state. Moreover, as economic indicators significantly affect the number of accidents, the dynamics and

consequences of an accident significantly affect the national economy.

The biggest problem in Ukraine is the high road traffic mortality which is demonstrated by the statistics given in the publication. On the one hand, the state loses socially active citizens, on the other hand, drivers caused the accident obtain criminal experience – get a criminal record, which also negatively affects the development of society as a whole and the economy in particular, especially when for a person the car is a means of production, a tool for running a business, etc.

The analysis gives grounds to assert that to overcome the adverse impact of road accidents on the state's economy, the latter should make significant investments in the prevention of road accidents, introduce innovative technologies and foreign experience in preventing road traffic offenses. The priority should belong to automated traffic monitoring and the mechanism of bringing the guilty persons to administrative responsibility: stationary systems (cameras) for automatic traffic violation recording should cover all accident blackspots of roads, highways, and intersections in settlements; all new cars should be equipped with automatic speed limitation systems in settlements, as well as means of detecting signs of alcohol intoxication with an automated system of blocking the ignition system in the car; pedestrian crossings should also be equipped with traffic enforcement cameras with a facial recognition system.

The listed measures of automation of traffic safety control and accident prevention require considerable investments from the state. However, taking into account the potential effects of their implementation, i.e., reducing the number of road traffic deaths and injuries, such investments are reasonable enough as nothing is more valuable than human life. Moreover, the economic losses from the death of able-bodied citizens and children who make up the gene pool of the nation, are much greater that is confirmed by the statistics given in the publication.

The prospect of further research on the relevant topic is conditioned by the need to conduct a separate study of the mutual influence of the economy and road safety in order to elaborate effective administrative and technical means of preventing road accidents with an economic justification for the need for their implementation. Particular attention should be paid to the experience of foreign countries in public relations under consideration.

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