

The Financial Implications of Non-Compliance in the Transportation Business

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Abstract

The research interest in this study stems from the idea that “good business practices” in road transportation, concerned with increased care for staff safety, as well as regulatory compliance, may have profound social and economic implications. The institutional and political actors involved in transport have developed a common policy for rail, road, inland waterway, sea and air transportation, focusing in particular on: the development of common rules for transport within the European Union; the establishment and development of trans-European infrastructure networks; the provision of transport services and relations with countries outside the European Union; transport safety; relations with international bodies and organizations. This paper contributes to an empirical analysis in the field of transport, by conducting a quantitative analysis of the nonconformities found in the transport activity in the Romanian coastal area, complemented by an analysis of the interdependencies between these nonconformities and the profitability of transport companies. The analysis of nonconformities consisted in the investigation of noncompliance or deviations from the transport regulations in force in the coastal area of Romania during the years 2016-2020. The study investigated the structure and volume of the contraventions found and of the sanctions applied by the authorities to the entities operating in the field of transport in Constanta County. Our research continues to explore the social inflections of transportation nonconformities and economic incidents. The research used the Principal Component Analysis (PCA) method, which helped to analyze the relationships and the associations between the numerical variables introduced in the study.

Keywords

financial implications of non-compliance; transportation business; transportation sanctions; transportation non-compliance.

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Introduction

According to the latest statistics, transport industry currently accounts for over 6% of the European Union's (EU) gross domestic product (GDP), over 6% of the labor force, 40% of Member States' investments and 30% of EU's energy consumption. This sector has grown steadily over the last two decades, with 2.3% per year for goods transport and 3.1% for passenger transport. At the same time, the pressure exerted by the transport sector on the environment and society has increased. The correlation between the increase in road traffic and in health risks is not impossible to change. However, the issue cannot be solved by a single measure or policy, an integrated approach being needed in order to reduce the negative effects of both emissions and noise (IER, 2005). The municipalities can adopt transport management strategies that promote alternatives to car use. Reducing the number of cars in traffic, respectively using public transport modes, cycling or walking, can dramatically reduce the levels of pollution and noise (Stan, 2022). Based on the "polluter pays" principle, all transport users (transport companies, drivers, passengers) must be financially responsible for travel costs, including for the damage resulted from their actions to their natural and built environment, to the society and economy (IER, 2005). Taxation for infrastructure use, environmental or traffic congestion taxes would reduce traffic, respectively the impact of transport on health and the environment; this would also ensure that investment funds for this purpose are available.

Studies show that transport policies that start from the premise of having as little impact on the environment as possible will not only improve the quality of life and the state of health of the population, but they will also lead to a higher employment rate (Filip, Stan and Vintilă, 2016). Simple strategies can help reduce the damage caused by transportation to human health: even the strict implementation of speed limits and parking regulations can lead in many cities to the limitation of emissions, an increase in safety and in public transportation use. The institutional and political actors involved in this activity, in their concerns related to the development of a common policy for rail, road, inland waterway, sea and air transport have focused in particular on: drafting common rules applicable to transportation within the European Union; establishing and developing trans-European networks in the field of transport infrastructure; providing transport services and relations with countries outside the European Union; transport safety; relations with international bodies and organizations in the field of transport (IER, 2005).

The research interest in this study is derived from the idea that a good conduct of road transportation businesses, manifested in the care for the safety of the transport operator job, as well as in the observance of the rules specific to this activity, can have profound social and economic implications. This paper contributes to the increase of empirical studies in the field of transport, by conducting a quantitative analysis of the nonconformities found in the transport activity in the Romanian coastal area, supplemented by an analysis of the interdependencies between these nonconformities and the profitability of transport companies.

1. Review of the scientific literature

The human component involved in the actual coordination or implementation of transport has key specificities in the field of transport, ensuring the mobility of people and goods in a way that promotes the social and economic development of present and future generations and limits the negative impact on the environment (UN, 2016). Transport can help the economic and social environment as a whole face modern challenges, provided it receives support from all the entities involved in transforming and reducing its negative externalities, which include traffic accidents affecting human life and health, air and noise pollution, the time wasted in the vehicle and greenhouse gases, emissions which contribute to climate change (UN, 2015). The beneficial effects of the mobility of goods and people must be in line with the efforts generated by the social, environmental and economic costs. Undoubtedly, in a social context, transport offers access to jobs and a whole range of social opportunities. In addition to this, efficient transport helps minimize the loss of time, ensure the safety of all people, improve the state of health of the society and, finally, raise the quality of life. Sustainable social development is not directly guaranteed by economic growth. Other authors, concerned with capturing social sustainability (Sueyoshi and Yuan, 2017; Zhang, Li and Gao, 2018) or social efficiency (Fukuyama, Yoshida and Managi, 2011; Ha, Yoshida and Zhang, 2011; Oum, Pathomsiri and Yoshida, 2013), defined it mainly as an economic growth conditioned by environmental protection, using as indicators: the GDP, the number of transported passengers and the indicators for CO₂ emissions.

Recognizing the importance of the social dimension in the sustainability of regional transport, Stefaniec et al. (2021), using Shannon-DEA techniques (Soleimani-Damaneh and Zarepisheh, 2009) determined the social sustainability performance of road transport in EU Member States in a multi-output scenario, incorporating both the desirable and the undesirable results. This study seems to have been a first attempt to assess the regional social sustainability of transport, which explicitly used multi-results performance measurement. Although the indicators proposed by all these studies are adequate measures of mobility, access and safety, they do not cover all the social issues of transport's complexity. The impact of transport on society is wider and it extends to social factors derived from economic and environmental conditions. Even if it involves an overlap with other dimensions of sustainability, an extended definition is preferred so as to avoid ignoring the factors which could be of a social nature (Geurs, Boon and van Wee, 2009).

The inclusion of human health issues can be useful in explaining the impact of the environment on the human habitat, which has been observed by various researchers. The sociocultural sustainability component, presented in the study of Jeon, Amekudzi and Guensler (2013), in addition to taking into consideration accessibility and safety-security, also covers equity and public health. While public health was measured by the exposure to emissions and noise, equity referred to the changes in wellbeing and to the population exposed to the emissions and noise. In the studies of Miller et al. (2016) and Smith, Axon and Darton (2013), the impact of transport on human health was marked by the burden of the disease related to transport pollutants or noise levels. Similarly, Reisi et al. (2014) added mortality due to air pollution as one of the social indicators. Zheng et al. (2013) simply represented the aspect of human health through air quality and, in addition to this, through the modal share of walking and cycling.

Investigating the issues related to compliance with or non-compliance of the conduct of transporters with the specific legislation or the impact of the deviations from regulations on the economic aspects of transportation businesses are not yet sufficiently developed.

2. Research methodology

Our research continues by exploring the social inflections of nonconformities in the field of transport and by exploring some economic incidents. The statistical method of analysis chosen was PCA. The Principal Component Analysis is a descriptive method of multidimensional analysis of the data, with the help of which the relationships, the associations between the numerical variables are analyzed, which, in view of conducting the analysis, are standardized (centered and reduced). Starting from a large-scale table, the method highlights a system of factorial axes that concentrates the information contained in the original table for a better visualization. The factorial axes, also called principal components, represent a linear combination of those variables which are correlated with each other. In PCA, each factorial axis is associated with some of the information contained in the original data table. This part is called inertia or explained variance. Each of these axes (F_i) can also be interpreted in terms of correlation with the initial variables, and are ranked in descending order, depending on their discriminatory power.

The objectives pursued in applying ACP are the following:

- highlighting the statistical relationships between the considered variables
- highlighting the similarities / differences between the statistical units analyzed according to all the registered variables.

The investigation pursued the existence of relationships or interdependencies both between the values of the penalties imposed and between the values of the penalties and the financial result indicators of the companies operating in the transport sector in the Romanian coastal area. Our study has shown the increased relevance of the analyzed variables, as can be seen in the correlation matrix in Table no. 1 and it has also allowed "anchoring" in a quantitative analysis of phenomena specific to the goods and passenger transport sector. Of interest to our research was the investigation of the scope of deviation from the regulations in force found among the transporters operating in the Romanian coastal area throughout the 2016-2020 period. Thus, an analysis was carried out of the structure and volume of the contraventions found and of the penalties imposed by the control bodies on the entities operating in the field of transport in Constanța County.

Seen from a structural point of view, the contraventions were related to the provisions of 3 significant regulations:

1. Government Decision/HG no. 69/2012 on the establishment of infringements of a contraventional nature of the provisions of Regulation (EC) no. 1071 / 2009 establishing common rules on the conditions to be met to pursue the occupation of road transport operator (Marked as HG 69);
2. Government Ordinance no. 37/2007 on establishing the framework for the application of the rules on driving periods, breaks and rest periods for drivers and the use of their activity recording equipment (Marked as OG no. 37);
3. Government Ordinance no. 43 of August 28, 1997 regarding the regime of roads, exceeding the maximum masses and / or dimensions allowed by the legislation gradually classifies contraventions, depending on the gravity of the contravention, into minor, serious and very serious contraventions (Marked as OG. 43).

Each of these 3 regulations establishes criteria for classifying non-conformities into 3 areas of seriousness of the contraventions, respectively very serious, serious or minor contraventions. Stating each deviation from the legal norms, undertaken by the economic operators carrying out road transport or related activities is made by structures of the public authority with control responsibilities, such as the State Inspectorate for Control of Road Transport, by the personnel with control responsibilities within the Labor Inspectorate, the National Sanitary Veterinary and Food Safety Authority, the traffic police or the staff of the Romanian Company of Motorway and National Roads, the National Environmental Protection Agency, at the state border crossing points.

We are presenting below, as an example, the way of classifying according to the three categories of severity of the contraventions under examination, according to each regulation analyzed:

1. HG. 69 determines the classification of the contraventions according to the following scale of severity:
 - 1.1. Very serious/VS: carrying out road transport or road transport-related activities without a transport license or the mandatory documents required by law, carrying out other transport services than those listed in the working timetable, using drivers without valid legal documents, exceeding substantially the maximum total authorized mass for vehicles, etc. (Marked as HG.69.VS)
 - 1.2. Serious/S: carrying out road transport on the basis of documents reported lost, non-compliance with the regulations on completing the roadmap, non-compliance related to carrying out international road transport, non-possession at the headquarters/premises mentioned in the road transport certificate of the documents listed in the regulations, errors in reporting to state's authorities, etc. (Marked as HG.69.S)
 - 1.3. Minor/M: Failure of the driver to present the documents necessary for traffic control, road transport of goods with a minor exceeding the maximum total authorized mass for vehicles, non-compliance with deadlines for reporting road transport, etc. (Marked as HG.69.M)
2. OG.37 provides the following classification of the severity of the deviations from the norms:
 - 2.1. Very serious: exceeding by long periods (for example more than 2 hours a day) of the driving time, reducing the compulsory rest period laid down in the driving schedule by long periods, imposing remuneration criteria that could jeopardize driving safety (such as the speed of delivery, the quantity transported or the distance traveled), non-preparation or poor preparation of tachograph charts, refusal to allow the verification of the driving period records, use of uninspected tachographs, etc. (Marked as OG.37.VS)
 - 2.2. Serious: exceeding driving time by an average period (e.g., between 1 hour and 2 hours a day), reducing, by an average period, the mandatory rest period laid down in the driving schedule, not having a sufficient number of tachograph charts on board the vehicle or the use of unapproved tachograph charts, non-conformities in the organization of the activity or in the training of the drivers, etc. (Marked as OG.37.S)
 - 2.3. Minor: Exceeding driving time by a minor period (for example, less than one hour per day), reducing, by a minor period, the mandatory rest period laid down in the driving schedule, not having on board the vehicle enough paper to print reports with the help of the equipment for recording errors in completing the tachograph diagram, etc. (Marked as OG.37.M)
3. OG. 43 classifies the irregularities gradually, according to the severity of the contravention, into minor (OG.43.M), serious (OG.43.S) and very serious (OG.43.VS) contraventions regarding exceeding the maximum masses and / or dimensions allowed by the transport legislation.

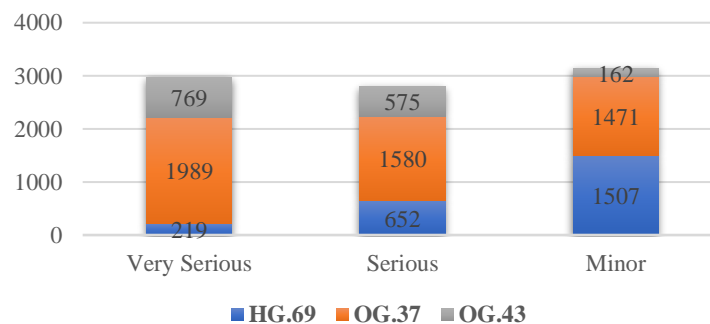


Figure no. 1. Number of penalties applied in the 2016-2020 period by the public authorities to the companies operating in the field of transport in Constanța County

Figure 1 presents the numerical situation of the penalties applied by the Romanian public authorities to the companies operating in the field of transport in Constanta, during the years 2016-2020, with a representation of both the classification of the penalties according to the severity of the deed and the classification according to the three analyzed regulations. According to the graph, there is a comparable number of penalties applied according to the 3 classes of severity, with significantly more minor penalties being found than very serious and serious violations. Regarding the classification of the deeds according to the 3 regulations, one can see from Figure 1 that the highest number of penalties was applied in the analyzed period with reference to OG.37, most of which were established as being very serious. The situation shows

a significant level of non-compliance, in particular with regard to non-compliance with drivers' driving times, breaks and rest periods, as well as deficiencies in the use of recording equipment for their activities. The implications of such a finding suggest significant social implications for the activity of transporting goods or persons, as drivers' rest and safety have a direct impact on the quality of their work, i.e., delivery times, increased or slowed goods supply flows, or road safety.

3. Findings

The correlation matrix, presented in Table no. 1, indicates significant statistical relationships between the analyzed indicators, marked in black in the table above. A strong statistical relationship can be observed between HG.69.VS and the variables OG.37.VS (0.869), respectively OG.37.M (0.840). This suggests that punishing very serious deviation from the compliance with the legislation specific to the occupation of road transport operator or non-compliance with the legal functioning formalities is very likely to lead to the finding of very serious contraventions related to the fulfillment of drivers' safety and rest conditions. The legal norms in the field of transport establish clear and rigorous obligations for the authorization and operation of land transport operators, and deviations from these rules have an effect not only on the non-fulfillment of bureaucratic obligations, but also on the safety of transport and the safety of the human factors involved. Strict adherence to the driving times, breaks and rest periods of the drivers, as well as the use of approved and efficient equipment for monitoring working hours are key prerequisites for supporting occupational safety and security in the transport sector.

Table no. 1. The Correlation matrix

	HG.69. VS	HG.69. S	HG.69. M	OG.37. VS	OG.37. S	OG.37. M	OG.43. VS	OG.43. S	OG.43. M	CA	PR
HG.69.VS	1.00	0.60	0.32	0.86	0.43	0.84	0.40	0.06	0.67	0.48	0.46
HG.69.S	-	1.00	-0.25	0.57	0.52	0.17	0.87	0.47	0.32	0.52	0.84
HG.69.M	-	-	1.00	0.01	-0.53	0.56	-0.28	0.32	0.71	-0.34	-0.64
OG.37.VS	-	-	-	1.00	0.80	0.81	0.56	-0.12	0.23	0.83	0.53
OG.37.S	-	-	-	-	1.00	0.35	0.64	-0.27	-0.35	0.96	0.68
OG.37.M	-	-	-	-	-	1.00	0.16	-0.08	0.50	0.48	-0.00
OG.43.VS	-	-	-	-	-	-	1.00	0.54	0.01	0.72	0.65
OG.43.S	-	-	-	-	-	-	-	1.00	0.41	-0.10	-0.01
OG.43.M	-	-	-	-	-	-	-	-	1.00	-0.27	0.00
CA	-	-	-	-	-	-	-	-	-	1.00	0.54
PR	-	-	-	-	-	-	-	-	-	-	1.00

At the same time, strong statistical relationships can be observed between the specific indicators HG.69 and OG.43.VS (0.874) and OG.43.M (0.719). These probably indicate a directly proportional increase trend in the penalized deviations regarding the exercise of the occupation of road transport operator, at the same time with an increase in the deviations consisting in exceeding the maximum masses and/or dimensions allowed by the legislation. Failure to comply with the formalities for the authorization of the activity of transport operators is often complementary to attempts to fraudulently accelerate the quantities or volumes of the delivered goods, as well as the delivery of other goods than those stated in the transport documents.

The next stage of the analysis focused on the existing relationships between the value of the penalties applied by the authorities with control responsibilities based on the three analyzed normative documents and the financial indicators of the companies operating on the territory of the same area, respectively the Romanian coastal area. Following repeated attempts, we have chosen as significant the relationship with the financial indicators: turnover (CA) and gross profit (PR) declared by the transport companies in the 2016-2020 period.

Our study shows that there is a significant statistical relationship between the turnover reported by the analyzed companies (CA) and the value of the penalties applied against very serious OG.37.VS (0.839) and serious (OG.37.M) deviations. The situation can be explained by the fact that many deviations regarding the non-observance of the driving schedule, of the rest periods by the drivers or the precarious use of the monitoring equipment of the driving hours are found in the companies with an extended economic activity.

Increasing deviations that can affect the safety and security of drivers' work is a significant indicator for the improvement of managerial control systems at the level of the transport entities with an intense economic

activity, as well as the improvement of activity verification procedures. Allocating increased resources for monitoring and improving the quality of drivers' work can generate long-term economic and social benefits.

The conclusions are also supported by the significant relationship between CA and OG.43.VS (0.725), suggesting a strong relationship between reporting a large turnover in the field of transport and the predilection for violating the regulations on maximum masses allowed by law in order to illegally increase the quantities of transported goods and speed up delivery times.

In terms of profitability (PR), the strongest statistical relationship is recorded in relation to HG.69.S (0.842), which indicates an increased probability of serious deviations among the companies with an increased profitability in the field of transport. Such deviations are: carrying out road transport activities based on documents reported lost, non-compliance with regulations on completing the roadmap, non-compliance in carrying out international road transport activities, non-possession at the headquarters/premises mentioned in the road transport certificate of the documents listed in the regulations, errors in reporting to state's authorities, etc. The analysis indicates increases in value of the deviations in terms of working conditions as the economic performance of companies increases, as shown by the relationship between PR and OG.37.S (0.684) and between PR and OG.43.VS (0.650). An interesting relationship exists between PR and HG.69.M (-0.641), as this suggests that as the profitability of a transport company increases, its risk of committing minor deviations from regulations decreases, such as the driver's failure to present the documents necessary for traffic control, carrying out road transport of goods with minor exceeding of the maximum total authorized mass for vehicles, non-compliance with deadlines for reporting road transport.

Table no. 2. Communalities - Extraction Method: Principal Component Analysis

	Initial	Extraction
HG.69.VS	1.000	.923
HG.69.S	1.000	.680
HG.69.M	1.000	.942
OG.37.VS	1.000	.887
OG.37.S	1.000	.904
OG.37.M	1.000	.731
OG.43.VS	1.000	.674
OG.43.S	1.000	.136
OG.43.M	1.000	.833
CA	1.000	.824
PR	1.000	.723

The Communalities matrix presented in Table no. 2 supports the existence of significant statistical relationships between the analyzed indicators, the smallest contribution being made by the violation of the provisions of OG.43.S regarding exceeding the maximum masses and / or dimensions allowed by transport legislation.

The eigenvalues of the Correlation matrix and the variance explained by each factorial axis are presented in Table no. 3. One can observe that the most important differences between the types of nonconformities are highlighted by the first two factorial axes: the first factorial axis explains 47.692% of the total variance and the second axis factorial explains 27.376%.

Table no. 3. Total Variance Explained - Extraction Method: Principal Component Analysis

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.246	47.692	47.692	5.246	47.692	47.692
2	3.011	27.376	75.068	3.011	27.376	75.068
....				

The graphical representation of the position of the variables on the first two factorial axes is presented in a suggestive manner in Figure 2. The interpretation of the position of the variables on these factorial axes shows that the first factorial axis highlights a significant difference between HG 692014M on the one hand and financial indicators (turnover and gross profit) on the other hand. The second factorial axis highlights a significant difference between OG431999M on the one hand and the financial indicators on the other hand.

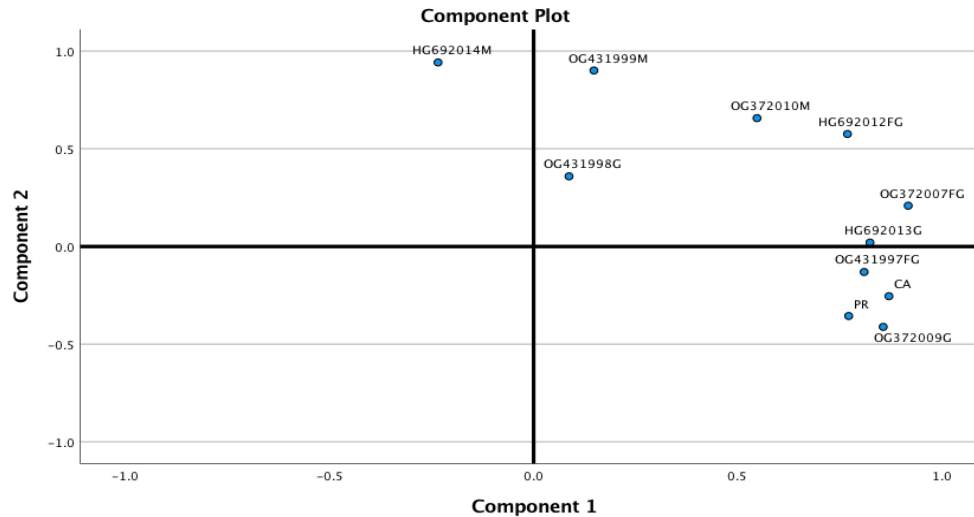


Figure no. 2. Representation of variables in the system of the first two factorial axes

Conclusions

The general objective of the European transport policy is to strike a balance between economic development on the one hand, and the quality and safety requirements of society, on the other hand, in order to develop a modern and sustainable transport system. The European Commission has proposed a large number of regulatory measures to develop a transport system capable of changing the share of transport modes, revitalizing rail transport, promoting maritime and river transport and controlling the growth of air transport. The objective of the EU's freight and passenger policy is to create the optimal conditions for the efficient provision of transport services; promoting an efficient common road transport system; contributing to the harmonization of competition between transport operators; encouraging compliance with the rules on working conditions in this sector. In order to achieve the established objectives, at the level of the EU member states regulations have been implemented in order to ensure the observance of the conditions for optimization, safety and efficiency of transport. The analysis of the incidence of deviations from these regulations brings new data to the sphere of research in the field of transport. At the same time, our study analyzes the interdependencies between the deviations from the specific transport regulations and the profitability and the growth prospects of the businesses operating in this field. The obtained results are interesting and suggest a significant relationship between the predilection for deviation from human safety norms in the field of transport with the analyzed financial indicators. The current transport system of the European Union is not sustainable and, in many respects, it is moving further away from sustainability. Frequent requests for action address the issue of the transport volume. These requests came from expert groups, but also from high political levels in the EU. According to the implemented integration strategy, the Transport Council states: "*It is necessary to ensure continuous economic growth without necessarily implying an increase in traffic and, respectively, its negative effects*". In this context, it is important to note that certain aspects of transport policy need to be further developed, such as: common rules for market and profession access; fair competition conditions; social aspects (working hours, working and rest periods, tachograph policies); road transport taxation (taxes and fees); constraints and penalties; promoting international agreements (Interbus, transit agreements); traffic restrictions.

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