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## DETERMINANTS OF THE QUALITY OF SERVICE ON THE ROAD FREIGHT MARKET – AN INTERDISCIPLINARY APPROACH

### Abstract

This article aims to identify determinants which influence the quality of service on the road freight market. In doing so it focuses on five aspects of carrier activity within the said market, namely the processes leading to the internationalization of operations, innovative mechanisms and technological solutions dedicated to this branch, as well as the formal, legal, economical, and ecological conditions involved. During the course of study the above mentioned factors were subjected to the evaluation of the carriers. The article presents the results of the said study and identifies the most important aspects which, according to the respondents, play a vital role in influencing the quality of services they offer. The study was conducted by way of both in-person and telephone interviews.

**Keywords:** road transport, quality of service, road freight transport

### Introduction

Quality, defined as compliance with expectations, (P.B. Crosby) stands for either the fulfilment of the expectations of the market at the lowest cost (W.E. Deming) or fitness for use (J.M. Juran) (Zimon, 2013). It is compared to the unachievable state of perfection (philosophical perspective), which in the economical scope is conditioned by variable consumption, demand, and society's needs. The economic dimension of quality includes two planes: strategic plans and economical transformations (Bugdol, 2006). The optimisation of production that takes these planes into account requires that production volumes that meet the quality

requirements of the receivers be established, whilst at the same time accounting for social and economic changes, inclusive of transformations in terms of regulation. The use of production processes as the basis for defining notions of quality involves providing details on technical standards and norms, such as technical quality.

Functional quality here is of a complimentary character and depends on the level of customer service (at all its stages) measured in subjective categories which are difficult to grasp (Gronroos, 1984). It excludes, however, the participation of the consumer in the creation of goods designated for market exchange (Bielawa, 2011).

The definitions mentioned are of universal character and refer to both products and services. In road freight transport quality of service is mostly connected with the promptness and security of delivery as well as the fulfilment of customer expectations and carriage claims. The quality of road freight transport, due to the specificity of the service and its technology, remains under the influence of factors both from within and beyond the immediate environment of carriers, whilst the market aspect of their activity assumes active participation on the part of those representing supply and demand as well as the minimum (necessary) participation of the State.

This research aimed at establishing the determinants of quality in road freight transport. It was conducted in the year 2014 on a research sample of 134 businesses involved in transporting goods and registered in the Warmia and Mazury Voivodeship. The respondents provided carriage services nationwide and internationally (these were mostly connected). A survey in the form of a questionnaire (in-person and telephone) constituted the fundamental method of study.

Variable factors which influence the quality of service of road freight transport were evaluated and analyzed. They were classified into five research areas (sets) that were connected with the following:

- the process of internationalization as a factor determining road freight transport (6 factors);
- the economy of enterprise (17);
- regulation of the road freight transport market (9);
- innovative technologies and mechanisms in transport processes (7);
- sustainable development of transport, with a particular focus on the desired direction of transformation and on the way the branch operates (6).

The respondents evaluated the influence on quality of service of each given determinant on a scale of 1–6 (1 – no influence, 6 – strong influence). A score of 4 or higher was considered to be a determinant of quality. The respondents were given the opportunity to select individual propositions from a list of factors determining quality. No responder, however, chose to do so. It should also be emphasized that in the research area of the sustainable development of transport none of the proposed determinants were considered to constitute a determinant of quality. Within this area the following determinants were proposed: eco-friendliness of companies, modern rolling stock, as determined on the basis of emissions (EURO), traceable fuel usage, intermodal service option, lanes designated for heavy goods vehicles and eco-driving training. The result is most surprising taking into account the growing eco-awareness of society as well as formal recommendations regarding

restrictions on the detrimental effect of road transport on the environment. It seems respondents did not take sustainable development and pro green road transport initiatives into account on the level of their business activity.

## 1. Determinants of quality of service within the research area of the internationalization of operations

More than half of the variables in the set connected to the internationalization of operations were deemed as determinants of quality. Their composition is presented in Table 1. According to the respondents the factor which influenced the quality of service most were the intellectual resources of employees – the drivers, dispatchers, or customer service assistants. The mobility of employees resulting from, among others, the processes of integration of economies within the EU and the possibility of access to them, determine the capability of qualitative development. Driver experience in the field of international business activity as well as the skills sets of transport managers attained from international competitors further increase the quality of transport services.

Table 1. Determinants of service quality in the field of research internationalization of business

No.	Determinants	Average rating
1.	Qualified and educated staff	5.31
2.	Processes of competition in foreign markets	4.57
3.	Processes of competition in domestic market	4.51
4.	The activity of international concerns	4.04

Source: (own elaboration)

Road freight transport within the international market provides possibilities for the development of competitive capacity based on the criterion of quality. Competition for customers, usually among large carriers operating on foreign markets, requires carriers to change their competitive strategy. Shaping offers based on assets other than those connected to price value is seemingly an indispensable part of their strategy. The situation is similar on the national market. Around 80% of carriers in Poland are entities that can be described as belonging to the micro or small companies sector. The respondents emphasised that the qualitative development of service is restrained by price competition. Moreover, business operations of large international companies (also TLS) influence significantly the quality aspects of operations of smaller companies. Cooperation with a larger operator is conditioned by meeting the requirements of specific procedures. The necessity to introduce new solutions, usually connected with quality of service, allows carriers to verify their strategy to-date.

## 2. Determinants of quality within the research area of economic factors

The set of economic variables is determined by the improvement of the quality of services in road freight transport which is itself the result of additional investment. Human resources were deemed as the most important variable, similarly to the previously mentioned set of the internationalization of operations. The educational background of high ranking employees was deemed by the respondents to determine the qualitative development (Table 2). The respondents pointed to the interdependence between the quality of service, style of management, and the level of education of managers.

Table 2. Determinants of service quality in the area of research of economic factors

No.	Determinants	Average rating
1.	Educated executives	5.55
2.	Technical condition of the means of transport	4.57
3.	Condition of road surfaces	4.55
4.	Transport security at the enterprise level	4.54
5.	Crime in road transport	4.46
6.	Information technology	4.28
7.	Certified management systems	4.24
8.	Creating new services	4.18

Source: (own elaboration)

The managers who took part in the survey claimed that the safety and promptness of service is supported by a modern rolling stock of high quality as well as the condition of the roads. The respondents who carry freights were using mostly toll roads and roads whose surfaces remain in good condition as compared to roads of lower categories (roads managed by local authorities), however, at the same time, the costs granting access to the modern infrastructure were deemed to be too high.

The determinants of quality in road freight transport were also seen to be in the attention companies put to the safety of carriage as well as criminal incidents. It follows from the opinions given, that the preventive actions taken by the carriers, namely verification of customers, freight forwarders, subcontractors, and drivers create favourable conditions for the safety of carriage. The data provided by the Polish International Freight Forwarders Association (PIFFA) seems to support the significance of this factor. A study conducted by PIFFA in 2015 revealed that 84% of the respondents admitted to being victims of crime, 25% of which more than 5 times, and nearly 40% more than once (Polska Izba Spedycji i Logistyki, 2015). On most occasions this was connected with theft of goods or goods and vehicle (Figure 1). The report drew attention to the unfavourable developments in the nature of such crimes. The number of crimes which pose a direct threat to the life or health of the drivers was seen to have increased in the course of a few years.

The existence of organized crime groups which specialize in the robbery of goods and/or vehicles is grounds for forming special police units designated

to counteract crime within road freight transport. The specificity of stolen goods has also undergone transformation. Robbery of low value mass consumer goods, the sources of origin of which are hard to identify and trace, is becoming more frequent. Electrical goods, such as radio and visual equipment, white goods, etc., are being stolen less frequently than in the past. Dealing in stolen goods of this nature is more difficult these days due to the ease with which the source of these goods can be traced as well as due to increased consumer awareness.

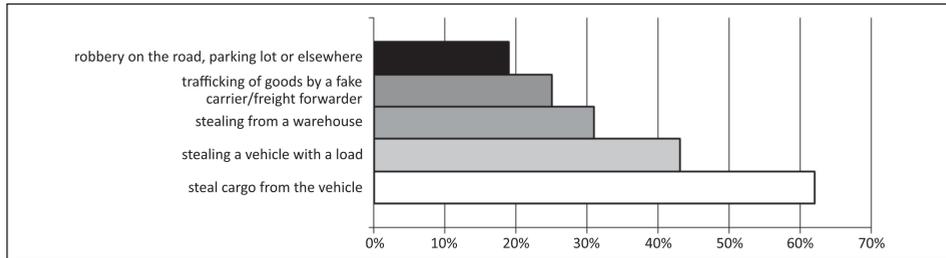


Figure 1. Crime in the road freight transport

Source: (Polska Izba Spedycji i Logistyki, 2015)

Positions 6 and 7 of this set, presented in Table 2, are of particular interest. The respondents pointed to a relationship between the development of the quality of new services and the utilization of information technologies as a means to facilitate operations, find new contacts, and sustain proper customer relations. Certified management systems were also deemed to be a significant determinant of quality. The majority of managers who took part in the study emphasised the marketing quality of ISO certificates. Only a few entities taking part in the survey introduced the management system compliant with ISO 9001 (4 carriers). Those respondents claimed that the certification system organised their business activity and brought notable economic benefits, strengthening their position in market negotiations.

The possibility of offering new services constituted another quality determinant within the above mentioned research area. 'New services' were defined as propositions to provide services on new routes or the specialization of services inclusive of the carriage of oversized and liquid freights, as well as often providing services within the construction market. The tendency to introduce new services should be viewed in a positive light. It has to be assumed that the eagerness to introduce changes or widen the existing offer results from the increase in demand for this type of service and results in carriers focusing on the quality of their services.

### 3. Determinants of quality of service within the research area of formal and legal conditions

Formal and legal conditions constituted further variables evaluated by the respondents. Table 3 presents the set of determinants of quality evaluated according to this aspect. The safety and security of the drivers, vehicles, and cargo

was the determinant which was deemed to be the most important. Attacks on drivers and vehicles in transit or during stops (including robberies at gun point) are increasingly more frequent. In the face of increasing danger the respondents pointed to the need of strengthened cooperation between the carriers and uniformed services, especially the police. They also expect a swift reaction to problems and assistance during incidents which may threaten the safety of carriage.

Table 3. Determinants of service quality in the area of research of formal and legal conditions

No.	Determinants	Average rating
1.	Protection of drivers, vehicles and cargo	4.63
2.	Technical condition of roads	4.42
3.	Quality of road infrastructure	4.39
4.	Uniformity of the rules of carrying out transport	4.13

Source: (own elaboration)

The condition of the roads constituted another determinant of quality in road freight transport. As the network of public roads, including state roads and motorways, undergoes steady development it is imperative, according to the respondents, for an institution to supervise the quality of maintenance works and repairs performed. Freight carriers who pay tolls in order to access roads expect them to be in good condition, enabling them to provide prompt service and ensuring the safety of the services they provide. A developed linear and nodal infrastructure, which is adjusted to freight flows, allows carriers to provide their services swiftly and safely. The quality of the road infrastructure in Poland is determined by, among others, the following determinants: clear sign posting, lack of pedestrian crossings on express roads, and a well-developed network of safe rest areas (parking) for lorries. The development of the infrastructure of roads which are a part of the TEN-T axis seem to be of particular importance with regards to the quality of provision of services. Its growth will allow for swift and safe services on an international scale.

Agreements and conventions regulating the activity of road freight transport are another determinant of quality in the above mentioned research area. Services within the European Union and to or from other countries require knowledge of this area of the law. The possibility to provide services on particular routes and the conditions under which these may be provided are the lowest common denominator with regards to the shaping of the quality of service. They also decide the harmonization of conditions of competition in on an international scale.

The Act, inclusive of clauses present in the European Agreement concerning the Work of Crews of Vehicles Engaged in International Road Transport, which regulates the hours of work of drivers, is a significant element of the rules governing business activity within the branch. The Act outlines the regulations concerning 24 hour and weekly norms of transit, stop, and rest times of drivers, the maximum number of working hours, the duties of drivers and the necessity to monitor and register their hours of work. The unification of regulations allowed for the rational planning of deliveries that take into account legal requirements within the EU market.

#### 4. Determinants of quality within the research area of innovative technologies and mechanisms

Innovation plays an important part in the development of economies and societies. A large number of them are applied within the road freight transport industry. Table 4 presents three determinants of quality within the above mentioned research area defined by the respondents. The possibility to prioritize parcels was deemed as the most important. Customers await information on the location of their parcel and planned delivery date. Carriers should be able to pass on important information regarding parcels in real-time; however the development of the road freight transport market also requires adjustments on their part in order for their operations and quality of service to meet the constantly changing expectations of customers.

Table 4. Determinants of service quality in the area of research of technological and technological innovations

No.	Determinants	Average rating
1.	Informing the customer about the route, the location of the shipment and the delivery date	4.94
2.	Intelligent transport systems	4.11
3.	Systems that improve vehicle driving	4.10

Source: (own elaboration)

Intelligent transport systems were another determinant of quality of road freight transport. The respondents identified these as, among others, automatic road incident notification systems and satellite navigation. They believe that such systems influence the quality of service as they enable a fast response to any hazards that may occur and threaten the safety of deliveries in transit.

The safety of carriage is also dependant on whether a vehicle's equipment is up to date. Driver assistance systems were mentioned among the identified determinants. Modern vehicles are fitted with an abundance of innovative solutions which aim to prevent incidents on the road and mitigate the negative effects of road accidents. The following are among such solutions available for lorries ([www.volvotrucks.pl](http://www.volvotrucks.pl), Polska Gazeta Transportowa, 2016):

- blind spot monitor which warns the driver should a mobile or immobile object find itself within the monitored area;
- Driver Alert Support System which monitors the way in which the vehicle is driven and its position within the lane;
- Lane Keeping Aid System which decreases the risk of an unintentional lane change.

Road safety is amongst the basic elements of safe freight carriage. Vehicles and infrastructure equipped with up to date systems improve the comfort of driving. They also play a part in shaping safe and prompt deliveries free of driver errors, whilst real-time information on traffic volumes enables drivers to choose optimal routes on their journey.

## Conclusion

Research findings confirm the interdisciplinary character of the quality factor within the road freight transport market. The determinants influencing the quality of services provided may be defined as connected with:

- processes of internationalization of business activity and the possibility of employing highly skilled staff as well as competition with large, international operators;
- the development of innovative technologies and mechanisms within the branch which facilitate carriage, including positively influencing its promptness and safety;
- conditions appropriate to a manufacturing environment created by the State and other organisations, understood as high quality road infrastructure and appropriate and friendly legal regulations governing the process of setting up a business in order to provide services within the transport branch;
- the financial assets which favour investments in roads, the purchase of rolling stock, and staff training and through this, improvement of the quality of service.

The lack of response on the part of the respondents with regards to the eco-friendliness of transport justifiably arouses anxiety. EU policy on sustainable development identifies the ways in which road transport should develop. Through means of increasingly strict emissions norms member states have been obliged to take action in order to restrict road freight transport for lorries and encouraged to use intermodal technologies. The growing social awareness in this regard is likely to determine that in the near future the eco-friendliness of a company will constitute an important element in its development and dictate the quality of its service and competitiveness on the market.

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