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The Assessment of Importance of the Factors that Predetermine the Quality of a Service of Transportation by Road Vehicles

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Abstract

Striving for satisfaction of the needs of clients is the principal task in any sector of economy, including transportation by road vehicles. In course of the grow of the demand for transportation services, the number of enterprises offering the transportation services grows increasingly in national and international markets of European states. To survive in the competition struggle upon the high level of supply of such services in the international market, Lithuanian carriers should ensure their competitive advantage over carriers from other countries. The purpose of the paper is to analyze what criteria of the quality of a transportation service predetermine a competitiveness of such services and what factors mostly impact the key service quality criteria. The object of the research includes the factors that may affect the criteria of the quality of a transportation service.

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Keywords: quality of a transportation service; road transport sector; competitiveness; quality predetermining factors.

1. Introduction

Striving for satisfaction of the needs of clients is the principal task in any sector of economy, including transportation by road vehicles. In course of the grow of the demand for transportation services, the number of enterprises offering the transportation services grows increasingly in national and international markets of European

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states. To survive in the competition struggle upon the high level of supply of such services in the international market, Lithuanian carriers should ensure their competitive advantage over carriers from other countries. So, transport organizations try to provide services that satisfy the needs of consumers. It should be noted that a majority of enterprises involved in cargo transportation services in international markets confront abundant challenges, such as more complicated control of the transportation process, increased costs and higher competition. Upon a surplus of similar or the identical services in the market, the enterprises involved in cargo transportation services should improve the quality of the provided service.

The purpose of the paper is to analyze what criteria of the quality of a transportation service predetermine a competitiveness of such services and what factors mostly impact the key service quality criteria. The object of the research includes the factors that may affect the criteria of the quality of a transportation service. In the first chapter of the paper, the range of problems bound with ensuring a competitiveness of transportation services in international markets is discussed upon. In the next chapter, the criteria of the quality of a transportation service are identified on the base of an analysis of theoretical sources. In the third chapter of the paper, the results of the research that disclose the factors identified as the ones mostly impacting the quality of a transportation service are presented. In the fourth chapter, the extent of the impact of individual identified factors on the criteria of the quality of a transportation service is assessed. In the end of the paper, the summarizing conclusions are provided.

2. The range of the problems bound with ensuring a competitiveness of a transportation service in international markets

As compared to other modes of transport, road transport may be described as well-accessible for a user, flexible, effective, reliable and rapid. In a majority of states, road transport plays a dominating role in the national sectors (Zak et al. 2011). Ensuring the efficiency and competitiveness of the transport sector as well as high quality of transportation services is one of the key tasks of development of national economy. Transport sector is the activity important for tackling the problem of mobility of the community. Mobility of commodities and persons is a crucial component of competitiveness of European industry and services.

It is too hard to provide an unambiguous definition of transportation services; usually, in a definition of a transportation service, description of the properties of such a service predominates. While defining specific transportation services, their typical properties that single out them from other services should be taken into account. According to N. Langvinienė and G. Sližienė (2012), the key property of transportation services is that a provider of transportation services transports worldly goods of a user or the user (as a passenger) from one location to another upon applying the available means and know-how. According to Godlevskaja et al. (2011), the concept of benefit of transportation services is oriented towards the circumstance that users have no means (in this case, no vehicle) for cargo transportation to the point of destination. The key property of provision of a transportation service is that its necessity is ensured by absence or lack of knowledge or available means of the client for accomplishment of transportation process. However, the international road transport market in EU is large. Upon the increasing grow of the number of enterprises that offer their transportation services to foreign states, the competitiveness in the sector grows as well. So, the carriers should assess their services and the process of their provision and to find ways for improving their quality.

The activities in the transportation sector of the European Union are liberalized. Laws of a majority of Member States provide favorable conditions for development of free transportation market. However, such regulation of transportation activities may cause negative consequences as well. Upon striving for benefit at the minimum expenditure (such as lower vehicle-related taxes, lower maintenance costs and lower profit tax), carriers try to displace their activities to financially attractive countries. This circumstance causes abundant problems as a disbalance in respect of other organizations of West Europe appears because of inequality of applicable taxes, so carriers from West Europe cannot compete with carriers from, for example, East Europe. Therefore, upon striving to minimize such negative influence of carriers from East Europe, countries of West Europe stiffen the technical standards set for vehicles.

Enterprises involved in cargo transportation in international markets confront abundant competitive challenges. The growing competition is affected by enterprises having already their segments in the market and by the increasingly growing number of new participants. It is particularly important at present, when a majority of European states are

involved in the mutual European Union (EU) economic space – a free trade zone that facilitates a trade dialogue between countries. It enables free trade in industrial commodities, free movement of capital, and free movement of persons according to the mutual rules as well as introduction of mutual EU regulations for selling services.

The appeared access to markets of West Europe gingered up the competition between carriers; in addition, simultaneously growing costs of provision of transportation services in international markets forces the organizations to search for new ways to ensure a competitiveness both in the local and the EU market (Zinovjevaitė, Lazauskas 2012).

3. The factors that predetermine a competitiveness of transportation service

In scientific literature, competition is defined as a struggle where both manufacturers and consumers are involved upon striving to satisfy their economic interests. An ability to win the struggle thus ensuring long-lasting domination in the market is referred to as a competitive advantage. The most important value of competition is a benefit caused to the consumer and the enterprises. Competition stimulates enterprises to create innovative services, so the quality of the offered services is improved. Because of competition in the market, consumers have an opportunity to acquire services of higher quality and to choose them from a large assortment at prices acceptable for them (Coelho, Henseler 2012).

Competitiveness of international organizations is defined as a totality of various variables, such as technological changes, quality and accessibility of services, relevance and efficiency of equipment and facilities, technological development, innovative solutions, information sharing, management solutions and so on. It is the degree that assesses how a certain national industry produces goods or provide services in free market conditions (that conform to the standards set for international markets) upon maintaining and increasing the financial benefit for organizations of the industry for a long period (Kaziliūnas 2010).

Competitiveness of an organization involved in provision of such a service is the most important factor of survival in international market. Competition between organizations involved in provision of similar or identical services is practically a competitive struggle between the said services – between the added values provided by them to a customer (Stanikūnas 2009). Competitiveness may be considered a set of factors that affect the position of a transport organization in the competitive struggle.

The competitive advantage of a provider of a service (an organization) depends on the service itself: for daily services, the most important factors are the price and accessibility, whereas for more rarely usable services – the most important factors include exclusive quality of the services, attention to a client and so on (Langvinienė, Sližienė 2012). J. Dicova and J. Andruš (2010) emphasize managerial skills of employees of an enterprise as an important competitive advantage and state that a commercial success of transport organizations depends on abundant managerial abilities and factors, i.e. a totality of managerial skills, accumulated knowledge and the technologies applied in the working process.

Transport enterprises always do their best to acquire a competitive advantage over other organization involved in provision of similar or identical services. Each organization searches for a way to a competitive advantage, sets its goals & tasks and passes strategic decisions. So, upon striving for a competitive advantage in the dynamic business environment, heads of organizations should perceive an importance of strategic decisions of enterprises and single out the most important ones usable as a basis of their activities. Choice of a proper competitive strategy and creating a competitive advantage depend on complicated analysis of the factors of external and internal environment of organizations (Meidutė, Raudeliūnienė 2011).

Strategic and qualitative development of transport organizations is an important factor for survival in the competitive struggle between abundant national and international providers of transportation services. Competitiveness of transport organizations is a complicated set of factors that predetermine in any way a competitive advantage of enterprises in provision of transportation services to a certain extent. Being aware of its position in the market, an enterprise may pass relevant strategic decisions and choose competitiveness-improving elements that will be helpful in strengthening its position, as compared to other enterprises. A majority of transport enterprise are involved in provision of similar or identical services, so the organizations should focus on improvement of the quality of the offered services to survive in the competitive struggle. Prior to definition of its competitive strategy, an enterprise should clear up what enterprises compete in the market of road transportation services and to assess the conditions of the market. Most

frequently, the quality of services becomes a key condition in strive for a competitive advantage (Beniušienė, Petukienė 2012).

The key factors that increase competitiveness of a transport enterprise include (Zinovjevaitė, Lazauskas 2012):

- price of transportation;
- security of services;
- duration of delivery;
- reliability;
- opportunities;
- safety;
- specialization of services that provides an opportunity to satisfy new or special needs of a client for a higher price agreed with the client.

Low price and high quality of services are most frequently identified by scientists as the key criteria of competitiveness of transportation services as a standard of a competitive service (Boicov 2012). However, a low price not always predetermines high quality and a high quality service not always is provided for a low price in practice. To increase their competitiveness, organizations should improve the quality of the services and to cut the costs of provision of the services.

4. The research on the factors affecting a transportation service quality criteria

Upon strive to clear up the opportunities of increasing the competitiveness of a transportation service, it is purposeful to identify the key factors affecting the quality of the transportation service. To ensure more accurate results of the research, semi structured in depth interviews with heads of Lithuanian and foreign transport organizations were arranged. Two Lithuanian transport organizations (enterprises involved in cargo transportation and forwarding) and two enterprises of EU Member States (France and Italy) (one involved in cargo forwarding and one involved in cargo transportation) were chosen. The tasks of the research included:

1. To clear up the most important criteria of the quality of a transportation service;
2. To identify the factors mostly affecting a transportation service quality criteria on the base of the data obtained in the interviews.

For accomplishing the first task, interviewing was arranged. For this purpose, a common questionnaire was developed. However, upon taking into account the specificity of the interviewed organizations, the questions were specially adapted for each of them. In such a way, the semi structured in depth interview was arranged.

The results of the performed research were helpful in singling out the criteria that predetermine the quality of a cargo transportation service. They are shown in Fig. 1 below.



Fig. 1. Cargo transportation service quality criteria (developed by the authors of the paper).

The singled out criteria of the quality of a transportation service are interpreted as follows:

1. Price of transportation – the costs of provision of a transportation service.
2. Safety – safety of the vehicle and the cargo during transportation.
3. Reliability – permanent maintenance of transport networks (security of provision of a service).
4. Accessibility of services – provision of the required transportation service at the right time and in the right place.
5. Duration of delivery – minimization of number of delays.

After identification of the key criteria of the quality of a transportation service, accomplishment of the second task was started, i.e. the questions for detailed definition of the factors affecting the criteria identified in the phase I

were formulated. Each respondent was asked to describe the own perception of the key factors affecting the criteria of the quality of a transportation service. The results of semi structured in depth interviews are summarized in the Table 1 below where detailed descriptions of the factors are provided.

5. The importance of the factors that affect the criteria of the quality of a transportation service

After summarization of the results of research, the key factors that affect the criteria of the quality of a transportation service were identified. Most frequently repeating answers were used to assess their importance (the degree of impact). The results were presented in the table of criteria (Table 2 below) and assessed according to their impact in the scale from 0 (*no impact*) to 5 (*strong impact*). The assessment was carried out by four experts, shown by the numbers from 1 to 4 in the Table 2.

The obtained results were generalized and their arithmetic mean was provided according to the following formula:

The average number of scores provided by the experts

$$\frac{\sum_{i=1}^4 E_i}{4}, \quad (1)$$

E_{1-4} – the score for assessing a criterion provided by an expert.

Table 1. The descriptions of the factors affecting the criteria of the quality of a transportation service (developed by the authors of the paper).

A criterion	A description of an affecting factor
Price of transportation	<i>High repair costs</i> , according to the interviewed persons, affect the costs of services provided by carriers, especially in cases when vehicles are permanently used in the territory of another state. If a fault of a vehicle takes place, its repair is unavoidable. The carriers from Lithuania told that the repair costs of vehicles in the territory of foreign states usually are higher, as compared to the costs of repairs of the same character in Lithuania. This factor is important when a fault of a vehicle is serious.
	<i>Supplemental taxes and laws</i> . This group of factors includes laws of certain states that provide applying of someone or another restriction policy and road taxes. Ignorance of such laws causes considerable fines for carriers. Avoidance of high fines is not a complicated task, when provisions of laws are observed. However, search for a hotel and booking rooms at it for drivers cause growing of the costs of the service provision.
	<i>Changes of prices of fuel</i> strongly affect the transportation business, because expenses related to fuel form a considerable share of the costs of provision of the services, especially when large fleets of vehicles are managed. When fuel prices grow, large transport enterprises usually do not increase the unit prices of the services immediately to avoid a reduction of cargo flows from suppliers, because increased transportation prices may cause growing of prices of products and cut the demand.
Safety	<i>Vehicle tracing</i> . In the opinion of the respondents, a higher degree of cargo safety is ensured, when the location of the vehicle, its itinerary and its condition are known. In a trip, especially on poorly known itineraries in foreign states, dangers of various types (such as dangerous itineraries, roads that are not fit for cargo-carrying vehicles and so on) may be met.
	<i>Thefts</i> . Representatives of enterprises state that high risk regions where attempts on cleaning-out a vehicle or stealing a cargo are frequent phenomena in a majority of countries. Not always drivers choose the safest parking spot for night; sometimes, such unsafe parking is predetermined by a circumstance that their work time comes to end in a dimly lit location. Partial or total loss of cargo causes increased expenses both for the enterprise involved in provision of transportation services and for the forwarders and the clients. The said expenses include those related to elimination of consequences of the event; the insurance premiums increase as well. In addition to the above-mentioned expenses, the image of the enterprise involved in provision of transportation services and the quality of such services become worse, if such events take place frequently and no measures to reimburse the damage are taken. So, this factor, in the opinion of respondents, strongly affects the quality of the service and the competitiveness of the enterprise.
	<i>Training of drivers</i> . A driver and a vehicle for cargo transportation are inseparable factors. Drivers of haulage trucks directly control the condition and the safety level of the cargo and the vehicle. There are abundant actions for ensuring safety of cargo transportation and a driver should be properly trained to be able carry out any of them (such training includes safety induction at the enterprises, instructions of managers and so on). The interviewed head of enterprises assessed this factor as very important that considerably impacts safety of transportation.

End of Table 1

A criterion	A description of an affecting factor
Reliability	<p><i>Cargo loading control.</i> After summarization of the results of the interviewing, the quality of cargo loading was assessed as a factor that considerably impacts the quality of transportation. Incorrect cargo loading or fixing may cause worsening of its quality. Such violations may be of various types - from the minimum damage of the packaging to serious deformations or damage of the cargo that cause changes of the transported product and makes impossible its using according to its purpose. Most frequently, the latter case is equalized to loss of the cargo. Another important factor is the axial load of the vehicle. If the cargo is loaded unevenly in the semitrailer, it causes different loads in different points of the semitrailer. If the permissible drive axle weight is exceeded, a risk of technical faults of the vehicle increases. In addition, legislation of a majority of European states includes expressed provisions on the permissible drive axle weight. If the established norm is exceeded, the penalties are imposed according to the national laws of the country where the inspection of the cargo took place.</p> <p><i>Well-timed arrival.</i> The respondents assessed this factor as the key one for ensuring the quality of the service. On provision of an order for cargo transportation, transport enterprises usually are provided certain terms for cargo loading and unloading. If cargo loading or delivery is delayed, the activities of a warehouse, a terminal or another enterprise are disturbed. If drivers come to the point of destination with delay, they often are imposed fines; in addition, they are forced to wait for another time for servicing the vehicle. Similar consequences take place, if drivers come to the point of destination prior to the agreed time; they are forced to wait for it, as the resources required for the servicing are not accessible yet. Fines may be imposed even in case of early arrival, because it causes disturbance of the activities of loading/unloading sites. Violation of terms worsens the quality and the competitiveness of services provided by the carriers, because the reliability of the services becomes worse.</p> <p><i>Precise and reliable information systems.</i> In the opinion of the heads of the transport organizations, reliable information systems are an important factor for improving the quality of the service. They include systems for search for orders, their processing and transfer as well as means of communication between vehicle dispatchers and drivers. Inexact, unilateral or poorly interpreted information reduces a reliability of transportation. According to the respondents, the information transfer networks should be well-developed and precise to ensure correctness of information transferred between participants of the transportation process as well as rapid reception of it and an opportunity of a rapid specification of the information.</p> <p><i>Great effectiveness of transport managers.</i> Transport managers present a link that unites a transport enterprise with clients; in addition, they are the first who obtain the data on the transportation process from drivers. So, they considerably impact the effectiveness and reliability of transportation. Great effectiveness of transport managers is an important factor in planning of orders.</p>
Accessibility of services	<p><i>Accessibility of different types of vehicles.</i> In cargo transportation business, various cargoes are involved: some of them may be transported in standard semitrailers; however, other part of cargoes requires special conditions for transportation. If a cargo requires special conditions for its transportation, the client looks for a carrier that has vehicles for transporting such a cargo. So, carriers are motivated to use vehicles of various types in itineraries serviced by them. Upon striving to ensure financial benefit of such decision, such transportation usually is started after a prior market research. After supply of the needed technical means, the carrier extends the opportunities of the enterprise to provide services to various organizations and transport cargoes of various types.</p> <p><i>Effective management of vehicle fleet.</i> According to the opinion of representatives of transport organizations, this criterion is very important for ensuring the required quality of transportations. Upon striving for higher profits, enterprises acquire a larger number of vehicles for cargo transportation. Forwarders, in their turn, are more interested to hire carriers that manage abundant vehicles because they are sure that such carriers will provide better services to their clients. So, to provide better services to their clients, the enterprises should ensure effective management of their vehicles.</p> <p><i>Measures for ensuring the effective planning of transportations.</i> Effective planning ensures a delivery of a required vehicle to the right place at the right time. For effective implementation of all planning processes, good planning systems are required.</p>
Duration of delivery	<p>In the opinion of the respondents, <u>downtime</u> periods highly impact the duration of cargo delivery. Appearance of such periods is caused by various factors, such as voluntary stopping of employees for various causes not related to their activities, willful shortening the work time by them and various adversities or <i>force majeure circumstances</i>. Long duration of delivery reduces the attractiveness of carriers, so the competitive advantage of such carriers becomes less.</p> <p><i>Qualification of drivers.</i> Drivers and their knowledge & skills are the key element for ensuring high efficiency of deliveries. An ability of drivers to come well-timely to loading/unloading site, to fill in the required documents as well as their awareness of the work and rest schedule and good skills in haul truck driving predetermine shortening of the duration of deliveries. Duly qualification of a driver is ensured by screening of employees carried out by the Staff Department of the transport enterprise and by special instructions.</p> <p><i>Unknown itineraries.</i> In the opinion of the respondents, unknown itineraries inconsiderably impact the duration of deliveries. New and unknown itineraries rarely turn into a serious obstacle for experienced driving professionals. Less efficiency and velocity usually are typical for less experienced drivers.</p>

After establishment of the average values of scores provided by the experts, a weighing coefficient for each criterion is found:

$$\text{The weighing coefficient of a criterion} = \frac{a}{5}, \quad (2)$$

a – the arithmetic mean of expert's criterion.

As it may be seen from the data provided in Table 2, the degrees of impact of the factors that predetermine the competitiveness of the service are different.

Table 2. The analysis of the service and the criteria that predetermine its quality as well as the degree of their impact (developed by the authors of the paper).

A criterion	Affecting factors	Degree of impact				Arithmetic mean	Weighted assessment
		1	2	3	4		
1. Price of transportation	High repair costs	2	1	3	4	2.5	0.5
	Supplemental taxes and laws	2	2	1	3	2	0.4
	Changes of prices of fuel	4	3	4	4	3.75	0.75
2. Safety	Vehicle tracing	3	2	4	4	3.25	0.65
	Thefts	5	4	5	4	4.5	0.9
	Training of drivers	3	3	4	5	3.75	0.75
	Cargo loading control	5	5	5	5	5	1
3. Reliability	Well-timed arrival	5	5	5	5	5	1
	Precise and reliable information systems	3	4	4	5	4	0.8
	Great effectiveness of transport managers	4	5	4	3	4	0.8
4. Accessibility of services	Accessibility of different types of vehicles	4	4	3	4	3.75	0.75
	Effective management of vehicle fleet	5	5	5	5	5	1
	Measures for ensuring the effective planning	4	4	4	5	4.25	0.85
5. Duration of delivery	Downtime periods	3	4	4	5	4	0.8
	Qualification of drivers	4	3	5	5	4.25	0.85
	Unknown itineraries	3	2	4	5	3.5	0.7

It may be seen from the results of assessing the importance of factors that the safety criterion is assessed as particularly important for ensuring high quality and competitiveness of a service. Cargo loading control and theft prevention are identified as the key factors that affect the safety criterion. The second and the third (according to importance) are the criterion of reliability of services and the criterion of accessibility of services. Reliability of services is highly impacted by well-timed delivery of vehicles. By the way, effective management of the fleet of vehicles was unanimously assessed as the most important factor for the criterion of accessibility of services. The fourth was the criterion of duration of delivery that is mostly impacted by the qualification of the drivers.

6. Conclusions

1. It should be concluded from the analysis of the specificity of a service of international cargo transportation by road vehicles that competitiveness of the service is predetermined by high quality of the provided service.
2. The quality of a transportation service is a factor that consists of the key criteria and satisfaction of the said criteria, in addition to financial benefit, ensures a favorable position of the service provider in the market of transportation services.

3. In course of the research, it was found that the key criteria for ensuring high quality of a service of cargo transportation by road vehicles include the price of transportation, safety, reliability, accessibility of the service and duration of delivery. Each of the above-listed criteria is affected by a set of factors with different degrees of impact.
4. The safety criterion was assessed as the most important for ensuring high quality and competitiveness of a service. Cargo loading control and theft prevention were identified as the key factors affecting the safety criterion.
5. In course of the research, it was disclosed that reliability of a cargo transportation service is highly impacted by well-timed delivery of vehicles. Some less impact is caused by the factors related to precise information systems and great effectiveness of transport managers.
6. Effective management of the fleet of vehicles was unanimously assessed as the most important factor for the criterion of accessibility of a service. Whereas the criterion of duration of delivery is mostly impacted by the qualification of the drivers and minimization of downtime periods.

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