The evaluation of the service quality performed by the rail passenger transport carriers on the Prague – Ostrava region route: primary marketing research

J. Chocholáč[1], M. Trpišovský[2], N. Kudláčková[3]

[1]*University of Pardubice, Faculty of Transport Engineering, Studentská 95, 53210, Pardubice 2, Czech Republic, E-mail: jan.chocholac@upce.cz*
[2]*University of Pardubice, Faculty of Transport Engineering, Studentská 95, 53210, Pardubice 2, Czech Republic, E-mail: martin.trpisovsky@student.upce.cz*
[3]*University of Pardubice, Faculty of Transport Engineering, Studentská 95, 53210, Pardubice 2, Czech Republic, E-mail: nina.kudlackova@upce.cz*

Abstract

The article is focused on the presentation of the outcomes from the primary marketing research concerning the service quality performed by the rail passenger transport carriers on the Prague – Ostrava region route, which is main long distance rail line with in market competition in the Czech Republic. Historically it was operated by the Czech national carrier, former incumbent České dráhy (Czech Railways Company). Since 2011 it is opened to the competition of two competitors as RegioJet entered the market, soon afterwards in 2012 third competitor joined the passenger railway market on this route – LEO Express. The research aims to analyze the quality as perceived by the passengers comparing the service experience during the journey with all three aforementioned carriers. The primary marketing research was carried out in the form of structured personal questioning, where the analyzed criterions were ticket prices, carriage convenience, customer service and the train staff behavior during the journey, tidiness of carriage interiors, frequency of offered connections and the refreshment offer during the journey. The evaluation and discussion of the outcomes are included in the article.
KEY WORDS: *quality of service, public transport, railway passenger transport, marketing research*

1. Introduction

Ever since it was introduced the railway transport became an essential part of many country economics thanks to its dynamical development. This phenomenon didn't pass the Czech Republic, respectively all states in the area of the present time Czech Republic. The railway transport is indeed not only the circulation system of the economics, but the railway system itself is a specific industrial branch. Like in the other industrial branches the railway transport performance is also confronted with growing competition, customer behavior and requirement changes and with challenges of company delimitation in the market environment [1, 2].

The aim of European railway transport policy is to create unified railway area and thus to open this industrial branch to the competition. Above stated is supported by four railway legislation packages that subsequently open the market of railway transport to competition. The Czech opened market of railway transport operated on commercial basis was entered by several carriers in recent years.

Until 2011 the passenger railway transport on the route from Prague to Ostrava region was provided only by the Czech Railways company (České dráhy, a.s.). With respect to the fact, that the RegioJet company announced the interest in entering the passenger railway market on this route the Ministry of Transport of the Czech Republic gradually excluded the connections on this route from the state order of public transport services provided in general economic interest in order to provide non-discriminatory competitive environment on the market of this route. The competition was started in September 2011 when RegioJet started to operate their trains on the Prague – Ostrava region route. One year later another company of LEO Express entered this route too. Since 2012 the passengers on this route of Prague – Ostrava region can choose from services provided by three different companies – newcomers RegioJet and LEO Express and the incumbent of Czech Railways Company who lost its dominant position here and was forced to react.

The quality of public transport services in passenger transport is a set of intangible variables. The quality of public transport services in passenger transport can be assessed by four different approaches [3, 4]:

1. The user's point of view – the quality perceived by passenger, according to the research the passengers mostly appreciate total time, comfort and cleanliness, accessibility of the service, accessibility of the information, service organization, safety, the behavior of transport company employees and conductors and their costs, i.e. the fare [5-9].
2. The operational efficiency – the assessment of technical-economic indicators describing the transport processes including the assessment of indicators describing the labor's work [3].
3. The operation economics – business point of view performed by the carrier responsible for operation [10].

4. The efficiency of usage of allocated resources by the public competent authorities in charge of public transportation services – in the Czech Republic it is the point of view of the territorial administrative organs (municipalities, regions, Ministry of Transport) [4, 11].

This article aims to the evaluation of the service quality of provided railway transport services by the carriers on the route Prague – Ostrava region from the service users' point of view, i.e. the passengers' point of view. The research form is primary marketing research among passengers on this route.

1. Problematics statement

Scientist as well as public transport carrier's management focuses more on the quality management of provided services recently [12]. They monitor the quality regularly, evaluate it and provide relevant managers decisions that are supposed to reflect the outcomes of the service quality evaluation carried by the customers as documented [13, 14].

Sánchez Pérez et al. and Tsami and Nathanail proved the direct dependence between the quality of provided services and the customers shopping behavior in public transport services sector [15, 16]. This premise was confirmed by Tsami and Nathanail who added a fact that passengers formulate their optimal strategy for a particular journey before its very realization and in case of possible choice between more transport modes or more carriers providing the same transportation from A to B they asses which service they use considering the service quality of different carriers as the most important factor [17]. A study of Henser and Houghton referred to the quality level of service demanded by the competent authorities specified in the public transport contract concluded with carriers, very often they demand regular assessment of the quality level of public transport services provided in general interest [18]. The growing emphasis on quality monitoring and assessment in the form of customer satisfaction surveys is confirmed by Hensher and Stanley in their scientific article [13]. Dell'Olio, Ibeas and Cecín identified another carriers' interest that is the continual growth of quality of their transportation services besides the quality monitoring and the effort of maximal saturation of customer needs [19]. Becker and Albers claim that the carriers in passenger public transport focus more on quality improving as it directly leads to their economical outcome [12]. Hensher and Stanley introduced another important reason leading to more intense carriers' effort to provide the higher quality services, they analyzed the contractual conditions in public transport services contracts and found out that the carriers are in risk of financial sanction in case of not meeting the demanded service quality [20]. It can also lead to the exclusion from the next bidding competition and thus to losing the possibility to get another public transport services contract.

Tsami and Nathanail emphasize that the issue of public transport services quality was studied from the marketing and management point of view as well as from the social science point of view [17]. Among the other one the GAP model is well-known and mostly used public transportation services quality assessment models designed by Parasuraman, Zaithaml and Berry, the GAP model uses the combination of customer and provider point of views, i.e. the passengers and carriers marketing specialists point of view [21]. It identifies gaps in five defined areas: the gap between the customers' expectations and the perception of customers' expectations by the company's management, the gap between the customers' expectations and the perception of customers' expectations by the company's management and the quality specification of offered service, the gap between the quality specification of offered service and the actual service quality provided, the gap between the offered service quality and the communication of this quality towards customers, the gap between the service quality expected by the customer and the provided service quality perceived by customer [21].

European Committee for Standardization (CEN) issued the norm of EN 13816, this norm was transposed into the Czech norm ČSN EN 13816. This norm specifies the requirements on defining, aims and measurement of passenger public transportation services. The main aim of this norm is, according to the EN 13816, to support the qualitative approach in public transportation services and to focus on the needs and expectations of the customers by using defined procedure specification. EN 13816 defines a set of recommended criterions to measure the public transport services quality; these are divided into eight categories: Availability – the extent of provided services in means of geography, time and frequency; Accessibility – the access to the public transportation system including the connection between different transport modes; Information – systematic presenting of information and observations about the passenger public transportation system that help to plan and realize the journeys; Time – all time aspects important for planning and realizing journeys; Customer care – the service elements introduced in order to harmonize individual customer requirements and provided service standard; Comfort – the service elements introduced in order to make the public transport services usage comfortable and pleasant to passengers; Safety – the feel of personal safety truly perceived by passengers that come up from the actual established measures and activities dedicated to the customers realization of these measures; Ecological impact – the minimization of negative influence to the environment. [22]

Eboli and Mazzulla defined criterions that characterize the quality of services provided in public transportation, they included: the availability of services, the reliability of services, comfort, cleanliness, safety, availability of information, customer care and ecological impact [23]. Vuchic added the criterions of accessibility of services and transport time [24]. Dell´Olio, Ibeas and Cecín analyzed also the criterions of vehicle occupancy and waiting time at public transport stops as a part of their research [19]. Paulley et al. focused on the issue of public transport services demand, they confirmed that there is a direct relation between transport fares and the quality of provided services [25].

Tsami and Nathanail investigated different public transportation services quality indicators, they focused on routing, amount of stops, their location and distance, the frequency of transport connections, daily operation times,

reliability and punctuality, comfort, air-conditioning of transport means, the noise and vibrations level, the availability of benches at stops, the cleanliness of the interior and outer surface of transport vehicles, the availability of information about the route in vehicles, at stops etc., the availability of information accessible from the mobile phone, online etc., the safety, professionality and look of the stuff, the process of complains handling, the usage of ecofriendly vehicles and the simplicity of ticket purchasing [17].

The quality of public transportation services was historically in the Czech Republic and in former Czechoslovakia fully missed out. The quality accent appeared in last decade when the competent authorities (Ministry of Transport, regions and municipalities) realized their role and significance in the system and they require quality standards. These standards shall be met by the railway carriers as they concluded the public transportation services contracts that include this obligation [26]. The default of meeting the requirements lead to the financial sanction.

Competent authorities require certain quality level which they state in the public transportation services contract. This article focuses on the Czech specific case of open access competition on the route of Prague – Ostrava region where no contracts defining quality are concluded. The insufficient public transportation quality at this route can lead to more negative impact on the carrier than only to financial sanction. Jade, Molková and Kvizda introduced the concept of customer empowerment when the change from Czech Railways' monopolistic position on the transport market only feebly considering customer needs and wishes to the highly competitive market with three carriers led to the revolutionary change of roles, passengers become empowered to dictate the quality requirements and the carriers must meet them if they wish to survive [1]. The meeting of customer needs and wishes is crucial to build a relation between the carrier and customers. The quality growth connected to the beginning of the competitive environment leads to total change on this market.

2. Methods

The method of primary marketing research was chosen for the evaluation of the service quality performed by the rail passenger transport carriers on the Prague – Ostrava region route. The primary marketing research was realized as structured personal questioning, while respondents were chosen in quotas in order to reach the representative sample.

Kozel et al. define the marketing research formula to set the right extend of selective sample. In this formula n is the minimum amount of respondents, z is the coefficient of reliability (when set as 1 the statement probability is at least 68.3%, when set as 2 the probability of 95.4% is ensured and when z set as 3 then the probability reaches at least 99.7%); p and q are the amounts of respondents that are familiar with the issue (expressed in percent). When the values of p and q aren't known exactly the maximum product is used, i.e. $p = 0{,}5$ and $q = 0{,}5$; Δ is the set maximum acceptable incorrectness (5% corresponds to $\Delta = 0{,}05$). [27]

$$n \geq \frac{z^2 \times p \times q}{\Delta^2} \tag{1}$$

$$n \geq \frac{2^2 \times 0{,}5 \times 0{,}5}{0{,}05^2} \geq 400 \tag{2}$$

After substitution in the equation no. 1 the minimum amount of respondents $n \geq 400$ (equation no. 2) is counted, with that amount the structured questioning sessions were realized. The calculation reflects the probability of statements of 95,4% ($z = 2$) and the maximum acceptable incorrectness of 5% ($\Delta = 0{,}05$).

The marketing research was realized from 1st April 2017 until 30th April 2017, while all the included respondents shall meet the condition that they used all three carriers services on at least a part of the Prague – Ostrava route since 2012 until now.

The respondents evaluated carriers according to six following criteria (*A*-*F*). The criteria were defined on the base of literature background research as following: *A* criterion – fare; *B* criterion – carriage (train) comfort; *C* criterion – customer service and staff behavior during the journey; *D* criterion – cleanliness of the carriages interior; *E* criterion – frequency of offered connections; *F* criterion – refreshment offer during the journey. [17, 19, 22-25]

Each criterion was evaluated on the quantitative scale from 1 to 9, when 1 responds to the worst evaluation, 5 responds to the average one and 9 responds to the best evaluation. With the use of formulas no. 3-5, where $n = 400$ and *A*, *B* and *C* refers to the carriers Czech Railways (*A*), RegioJet (*B*) and LEO Express (*C*), the provided service quality for each carriers and particular criteria is counted.

$$\bar{x}_A = \frac{1}{n}(x_{1A} + x_{2A} + x_{3A} + \cdots + x_{nA}) \tag{3}$$

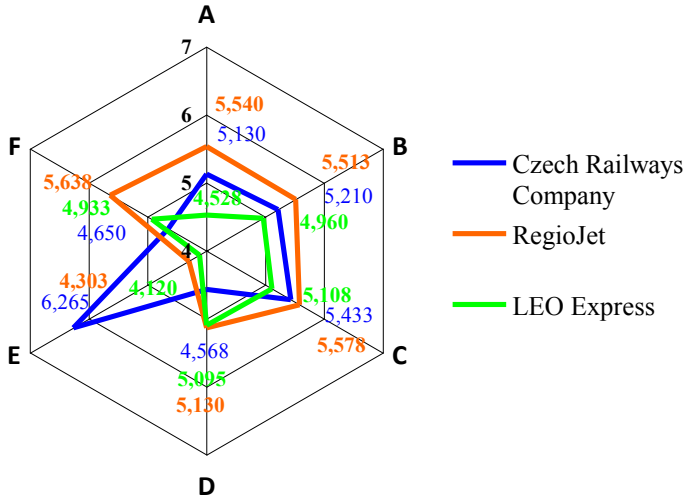
$$\bar{x}_B = \frac{1}{n}(x_{1B} + x_{2B} + x_{3B} + \cdots + x_{nB}) \tag{4}$$

$$\bar{x}_C = \frac{1}{n}(x_{1C} + x_{2C} + x_{3C} + \cdots + x_{nC}) \tag{5}$$

The following step included the second grade sorting according to sex and age of the respondents.

3. The analysis

The Figure 1 depicts the spider-chart with the outcomes from the provided services quality on the Prague – Ostrava region route evaluation according to the certain criteria for the analyzed carriers.



Criterion	Criterion description
A	Fare
B	Carriage (train) comfort
C	Customer service and staff behavior during the journey
D	Cleanliness of the carriages (train) interior
E	Frequency of offered connections
F	Refreshment offer during the journey

Fig. 1 The provided services quality evaluation outcomes according to particular criteria reached by the carrier of Czech Railways Company, RegioJet and LEO Express [authors]

The evaluation of Czech Railways Company clearly shows that the respondents evaluated four criteria (A, B, C and E) above the average with the arithmetic average of achieved evaluation of given criterion higher than the value of 5.000 while the criterion of frequency of offered connections (E criterion) achieved best evaluation of 6.265. The other above-average-evaluated criteria are the fare (5.130), comfort of the carriage, respectively of the train (5.210) and the customer service and staff behavior during the journey (5.433). The D criterion (cleanliness of the carriages, respectively train interior) and F criterion (refreshment offer during the journey) ranked as below-average-evaluated criteria (the criteria that achieved the arithmetic average of evaluated value of less than 5,000). The worst evaluation by the Czech Railways was reached by the D criterion (cleanliness of the carriages, respectively train interior), where the final evaluation reached the value 4,568.

Five out of six evaluated criteria ranked as above-average-evaluated criteria by the RegioJet carrier, these were the criteria A, B, C, D and F. Only the E criterion (frequency of offered connections) ranked as the below-average-evaluated criterion with the value of 4.303. At the same time it was the criterion with worst evaluation reached by RegioJet carrier. The best evaluated criterion by this carrier was the F criterion (refreshment offer during the journey) with total evaluation value of 5.638.

The provided services quality on the Prague – Ostrava region route evaluation outcomes according to particular criteria reached by the carrier of LEO Express are as follows. The respondents evaluated only two of the criteria as slightly above-average-evaluated criteria; it was the C (customer service and staff behavior during the journey – 5.108) and D (cleanliness of the carriages, respectively train interior – 5.095) criterion. The other four criteria (A, B, E, F) were evaluated as the below-average-evaluated ones. The worst evaluation was reached by the E criterion (frequency of offered connections) with the final evaluation value of 4.120.

Table 1 shows the particular outcomes of the service quality evaluation provided by the carriers according to particular criteria and the total outcomes of the provided service quality. The red color distinguishes the worst evaluation in terms of that particular criterion, in contrary green color highlights the best one. Table 1 shows clearly that the RegioJet company reached the best evaluation in terms of all criteria except the E criterion (frequency of offered connections). The Czech Railways company was evaluated best among the others in terms of the criterion of the frequency of offered connection. LEO Express carrier didn't reach any of the best evaluation in terms of particular criterion. Czech Railways reached the worst evaluation value in two criteria in comparison with the other carriers; these were the D criterion (cleanliness of the carriages, respectively train interior) and F criterion (refreshment offer during the journey). The RegioJet carrier didn't reach any of the worst evaluation unlike LEO Express that reached the worst evaluation in four remaining criteria – A, B, C and E.

The total evaluation of the provided services quality is dominated by the RegioJet carrier (5.283), and then second best is the company of Czech Railways (5.209), both cariers reached the total above-average-evaluation. The worst evaluation was reached by the LEO Express carrier, who was the last one as well as the only below-average-evaluated carrier, total evaluation reached 4.790. The best evaluated criterion among the other criteria in terms of all three carriers was the C criterion (customer service and staff behavior during the journey – 5.373). In contrary the worst evaluated criterion among the others in terms of all evaluated carriers was the E criterion (frequency of offered connections – 4.896). This is the subsequence of the fact that Czech Railways company offers highest amount of connections which leads to their best evaluation unlike the other two carriers RegioJet and LEO Express

who offer less connections than Czech Railways, that led to their bad evaluation in their criterion and thus to the overall bad evaluation in terms of all three carriers.

Table 1 Final outcomes of the provided service quality evaluation for the carriers

Criterion	A	B	C	D	E	F	Total
Czech Railways	5.130	5.210	5.433	4.568	6.265	4.650	5.209
RegioJet	5.540	5.513	5.578	5.130	4.303	5.638	5.283
LEO Express	4.528	4.960	5.108	5.095	4.120	4.933	4.790
Average	5.066	5.228	5.373	4.931	4.896	5.073	5.094

Based on the second class sorting according to the sex and age of the respondents as summarized in the Table 2 there is a conclusion that the Czech Railways company reached higher evaluation by men (5.300) than by women (5.121). The RegioJet carrier in contrary reached better evaluation by women (5.302) in comparison with only 5.264 by men. LEO Express reached better evaluation by male respondents (4.801) than by female ones (4.780).

Table 2 Final outcomes of the provided service quality evaluation according to the respondent's sex and age

Criterion	Czech Railways	RegioJet	LEO Express
Sex – women	5.121	5.302	4.780
Sex – men	5.300	5.264	4.801
Respondents with the age of less than 24 years	5.090	5.623	4.842
Respondents with the age from 25 to 34 years	5.538	5.384	4.929
Respondents with the age from 35 to 44 years	5.225	4.844	4.433
Respondents with the age from 45 to 54 years	4.818	5.339	4.615
Respondents with the age of 55 and more years	5.420	5.096	5.120

From the age categories point of view is the Czech Railways company best evaluated by the respondents in the age from 25 to 4 years (5.538), in contrary the worst evaluation is reached by the respondents of the age from 45 to 54 years (4.818). The RegioJet carrier reached the best respondents' evaluation in the age group less than 24 years old, in contrary to the age group from 35 to 44 years. The LEO Express Company reached the best evaluation by respondents older than 55 years (5.120). In contrary it reached the worst evaluation by respondents with the age from 35 to 44 years, i.e. the same as by RegioJet carrier.

Discussion

The primary marketing research itself is only one of the whole set of researches that need to be done to reach higher level of understanding the customer priorities and behavior not only on this rather specific railway route, but also in general understanding of the process of perceiving quality by passengers in the long distance railway transport in the Czech Republic. The secondary steps following the primary research should focus on particular aspect of provided services perceived quality. The other important task for researchers is to maintain continuous run of the primary research and following the development of its outcomes in time as the carriers react to provided quality perception by their customers as well as the competitive market evolution runs.

A comparison with the outcomes of similar research realized on other routes or on the same route in past, i.e. before the highly competitive market was started there, would be beneficial. In the Czech Republic the passenger railway transport market is slowly opening and new carriers enter other routes than only Prague – Ostrava region too. It is possible to follow the real time changes in provided railway services quality perceiving by passengers and also to verify the theories about quality changes on different routes caused by the market opening. At this time the competitive connections of more carriers on the same route are run also at the Prague – Brno – Vienna / Bratislava route. In the suburban transport a competitive market exists on the Prague – Benešov u Prahy route.

Conclusion

The research conclusion shows to significant differences between the quality offered by different carriers. The best evaluated carrier is RegioJet that beats the former monopolistic carrier of Czech Railways in all measured criteria except the criterion of offered amount of connections. Objectively the highest amount of offered connections is provided by Czech Railways that is given among others by its former monopolistic position on the railway transport market and by their status of national carrier. That enables the company of Czech Railways to offer a wide fleet and frequent operation of trains on this route with the efficient connection to other railways in the Czech Republic and abroad. The outcomes show that Czech Railways Company is evaluated significantly better by the older passengers, while in the age group below 24 years RegioJet gains much better evaluation. This fact can be explained by the RegioJet's intense marketing campaign aimed mainly on youth and students, the clarification of this theory is a question of subsequent research though.

Acknowledgment
This article is published within the solution of project no. SGS_2018_023 „Traffic Engineering, Technology and Management".

Reference

1. **Jade, R.; Molková, T.; Kvizda, M.** 2015. Role of railways in empowering travelers: A case study from the Czech Republic. Journal of Rail Transport Planning and Management, 5(2), 31-49.
2. **Betancourt, R.; Gautschi, D.A.** 1986. The evolution of retailing. A suggested economic interpretation. International Journal of Research in Marketing, 3(4), 217-232.
3. **Silaghi, S.** 2010. Quality of Public Transportation Services in Urban Area of Oradea. The Journal of the Faculty of Economics – Economic, 1(2), 469-474.
4. **Cruz, L.; Barata, E.; Ferreira, J.-P.** 2012. Performance in urban public transport systems: a critical analysis of the Portuguese case. International Journal of Productivity and Performance Management, 61(7), 730-751.
5. **D'Ovidio, F.D.; Leogrande, D.; Mancarella, R.; Schinzano, A.; Viola, D.** 2014. A multivariate analysis of the quality of public transport services. Procedia Economics and Finance, 17, 238-247.
6. **Shiftan, Y.; Sharaby, N.** 2012. The Impact of Fare Integration on Travel Behavior and Transit Ridership. Transport Policy, 21, 63-70.
7. **Dell'Olio, L.; Ibeas, A.; Cecín, P.** 2011. The Quality of Service desired by Public Transport Users. Transport Policy, 18(1), 217-227.
8. **Chen, C.-F.; Lai, W.-T.** 2011. Behavioral Intentions of Public Transit Passengers – The Roles of Service Quality, Perceived value, Satisfaction and Involvement. Transport Policy, 18(2), 318-325.
9. **Friman, M.** 2010. Affective Dimensions of the Waiting Experience. Transportation Research Part F: Traffic Psychology and Behaviour, 13(3), 197-205.
10. **Hilmola, O.P.** 2011. Benchmarking efficiency of public passenger transport in larger cities. Benchmarking, 18(1), 23-41.
11. **Ministerstvo dopravy ČR.** 2015. Bílá kniha: Koncepce veřejné dopravy 2015 – 2020 s výhledem do roku 2030. [online cit.: 2017-07-22]. Available from: https://www.mdcr.cz/getattachment/Dokumenty/Verejna-doprava/Pravni-predpisy/Zelena-a-bila-kniha-koncepce-verejne-dopravy/Bila-kniha-koncepce-verejne-dopravy.pdf.aspx
12. **Becker, J.U.; Albers, S.** 2015. The limits of analyzing service quality data in public transport. Transportation, 43(5), 823-842.
13. **Hensher, D.A.; Stanley, J.** 2003. Performance-based quality contracts in bus service provision. Transportation Research Part A, 37(6), 519-538.
14. **Hensher, D.A.; Stopher, P.; Bullock, P.** 2003. Service quality-developing a service quality index in the provision of commercial bus contracts. Transportation Research Part A, 37(6), 499-517.
15. **Sánchez Pérez, M.; Gázquez Abad, J.C.; Marín Carrillo, G.M.; Sánchez Fernández, R.** 2007. Effects of service quality dimensions on behavioural purchase intentions: a study in public-sector transport. Managing Service Quality, 17(2), 134-151.
16. **Tsami, M.; Nathanail, E.** 2014. Examining travelers' "Optimal strategies" in transit trip choice, applying a classification tree approach on transit quality of Service Indicators. Kos: Springer International Publishing, 507 p.
17. **Tsami, M.; Nathanail, E.** 2017. Guidance Provision for Increasing Quality of Service of Public Transport. Riga: Procedia Engineering, 614 p.
18. **Hensher, D.A.; Houghton, E.** 2004. Performance-based quality contracts for the bus sector: delivering social and commercial value for money. Transportation Research Part B, 38(2), 123-146.
19. **Dell'Olio, L.; Ibeas, A.; Cecín, P.** 2010. Modelling user perception of bus transit quality. Transport Policy, 17(6), 388-397.
20. **Hensher, D.A.; Stanley, J.** 2008. Transacting under a performance-based contract: the role of negotiation and competitive tendering. Transportation Research Part A, 42(9), 1143-1151.
21. **Parasuraman, A.; Zeithaml, V.A.; Berry, L. L.** 1985. A Conceptual Model of Service Quality and Its Implications for Future Research. The Journal of Marketing, 49(4), 41-50.
22. **EN 13816.** 2002. Transportation – Logistics and services – Public passenger transport – Service quality definition, targeting and measurement. Brusel: CEN, 40 p.
23. **Eboli, L.; Mazzulla, G.** 2011. Performance Indicators for an Objective Measure of Public Transport Service Quality. European Transport, 51(3), 1-21.
24. **Vuchic, V.R.** 2005. Urban Transit: Operations, Planning, and Economics. New Jersey: John Willey & Sons, 664 p.
25. **Paulley, N.; Balcombe, R.; Mackett, R.; Titheridge, H.; Preston, J.; Wardman, M.; Shires, J.; White, P.** 2006. The demand for public transport: The effects of fares, quality of service, income and car ownership. Transport policy, 13(4), 295-306.
26. **Ministerstvo dopravy ČR.** 2017. Smlouva o závazku veřejné služby v drážní osobní dopravě ve veřejném zájmu na zajištění dopravních potřeb státu na období od 1.1.2010 do konce platnosti jízdního řádu pro období 2018/2019. [online cit.: 2017-08-01]. Available from: https://www.mdcr.cz/Dokumenty/Verejna-doprava/Zverejneni-smluv-na-vlaky-dalkove-dopravy-v-obdobi/Velka-smlouva-o-ZVS-na-obdobi-2010-2019
27. **Kozel, R., et al.** 2006. Moderní marketingový výzkum. Praha: Grada Publishing, 277 p.