

Passenger's Satisfaction on Long Distance Terminals: Case Study City of Zagreb

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RESEARCH ARTICLE

Received 17 March 2016; accepted 30 May 2016

Abstract

Every city has one or more long distance terminals for domestic or international transport. Usually, long distance terminal are connected to the city transport network (metro, tramway, buses, car or bike sharing, and private car) and can be unimodal or multimodal terminals. From the passengers' perspective multimodal terminals are much more convenient and preferred. In the last decade terminals across Europe have developed not only in transport function, but also in hospitality management (bars, restaurants, accommodation...). Today, terminals have also developed into shopping areas, so they are attracting more and more people. Nevertheless, we must not neglect the primary function of a terminal: transport start/stop point for passengers. The focus group of a terminal is passengers. For day-to-day operation, but also for the development of terminal it's crucial to make regularly surveys about passenger satisfaction. This paper will present the results of passenger satisfaction survey in the long distance terminal in the City of Zagreb. The City of Zagreb is the capital of the Republic of Croatia, one of the 28 member states of the European Union. It is interesting that Zagreb has two unimodal long distance terminals, one for railways and the second one for buses. Therefore, the transfer passengers have practical problems when they change modes of transport for long distance travel. Passengers in both terminals have been interviewed. The survey for both terminals has the same question, so a comparative analysis could be done.

Keywords

terminal, railway, buses, survey, passengers

1 Introduction

A long distance terminal is the enter/exit point into the city. Some terminals are domestic, some are international, but most of them serve both purposes. Every long distance terminal is connected with the city transport network, meaning to the public transport system (metro, tramway, buses, etc.). From the passengers' perspective multimodal terminals are preferred as they are much more convenient to use. Today's terminals have primary and secondary functions. The primary function is transport and the secondary function is hospitality management (bars, restaurants, accommodation...) and shopping area. The latest modern European terminal is Wien Hauptbahnhof (Vienna Main Station) in Austria. The success of the terminal must be assessed through the prism of passengers. Therefore, it is necessary to undertake a satisfaction survey of a passenger terminal.

A comprehensive approach to conducting surveys for the purposes of transport planning is presented in the book Survey Methods for Transport Planning by Richardson et al. (1995). Authors Dell'Olio et al. (2011) conducted research on how to use surveys to determine the desired level of service quality for users of public transport. Then authors Chang and Yeh (2002) conducted a very interesting research project, using surveys, in the field of air transport about service quality on domestic flights. Also Dolinayova, A. (2011) investigates factors and determinants of modal split in passenger transport. The Rail-4SEE study, co-funded by the European Commission within the program South East Europe, has enabled research on the multimodal integration of local/city transport networks, regional transport systems and transnational transport axes. Also the project tries to improve rail transport in 11 major hub cities and their respective regions. 28 partners from 10 countries cooperate in the program. Then in the field of railway passenger traffic De Oña et al. (2014), again using surveys, conducted research in the area of northern Italy, and with the help of a decision tree approach, also performed the analysis of the data collected. In addition, authors Nedeliaková et al. (2014) proposed a methodology for identification level of service quality in railway transport and Abramović, B. (2015) conducted research on the mobility of railway passenger transport in small

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urban areas and also Abramović, B. et al. (2015) performed a survey and comparative analysis in IC trains in Slovakia and Croatia. Skačkauskienė, I. et al. (2015) establish the model for measuring passenger loyalty based on a behavioural concept and miscellaneous content. Domokos Esztergár-Kiss, D. et al. (2016) research mobility mapping based on survey.

Zagreb is the capital and the largest city of the Republic of Croatia (European Union). It is located in the northwest of the Croatia, along the Sava river and lies on the southern slopes of the Medvednica mountain. In the last official census of 2011 the population of the City of Zagreb was 790,017 and with area of 641,355 km². GDP per capita is 17,814 € which is 70.4% more than the average Croatian GDP per capita.

Zagreb has two long distance terminals within the city: the railway and the bus station. There is also an international airport about 20 km south of the city in a neighbouring county. Railway and bus station are situated in the city centre, but there are dislocated from each other. The shortest distance between them is 1.4 km and the walking time is 17 minutes. Both stations are connected with tramway lines number 2 and 6. Of course, there is also a taxi connection.

2 Survey methodology

2.1 Focus of the survey

The survey was conducted in the long distance terminals in the City of Zagreb: at the Zagreb GK train station and at the main bus station in Zagreb. The Zagreb GK train station and the Zagreb Bus Station agreed to the survey. The Zagreb International Airport did not allow the survey to be conducted at their premises.

The survey was carried out over the course of two days: Thursday, March 13th and Friday, March 14th, between 6:30 and 21:30. Thursday was chosen as the day of the week that has the most stable traffic flows, while naturally, Friday is the day with the highest traffic flows.

The method of conducting the survey was via personal interviews with transport users and the technical process involved electronic devices operating on the Android operating system (droid Survey).

2.2 Survey procedure

The participation in the survey was entirely voluntary. Therefore, the interviewers asked the respondents for permission before starting the survey.

The interviewers underwent training involving methods and procedures of conducting a survey, rights of the respondents, and rights and obligations of the interviewers. A special focus was put on vulnerable groups of respondents. A supervisor was present during the survey.

The supervisor's responsibilities are:

1. Preparing and organizing the course of the survey,
2. Getting familiarized with changes in the questionnaire,
3. Choice of interviewer,
4. Collaborating with interviewers during the survey, at an agreed location or via a mobile device,
5. Solving all problems the interviewers face in the field,
6. Verifying that the time of conducting the survey and other data are accurately inserted by the interviewer,
7. Making sure that the survey is conducted in all the selected locations, and
8. Safekeeping and archiving the questionnaires.

The interviewer's responsibilities and rules of conduct, i.e. the interviewer is obliged to:

1. Perform all assigned tasks responsibly and in a timely manner,
2. Arrive prepared at the location of the survey,
3. Master the questionnaire,
4. Return the completed questionnaires to the supervisor after the survey (upload),
5. Address the supervisor, who will be available at all times, in case of any unclarities regarding procedures or in case of unexpected situations in the field,
6. Explain the neutral question to the respondent in case of any unclarities - this will improve the quality of the survey, and
7. Not alter any information given by the respondent.

2.3 Questionnaire

The questionnaire had 23 questions. There were 4 types of questions: 5 with free text input, 15 with single choice, 2 with numeric answers, and one multiple choice. All questionnaires were completed during the survey. Four test questionnaires were erased for analysis. For the purpose of this research we will concentrate only on question relevant to the topic.

The average duration of the survey was 3 minutes and the average response time was 27 seconds.

The survey involved 1,163 passengers out of which 662 (59.9%) were at the train station and 501 (43.1%) at the bus station.

2.4 Survey stability

Survey stability was checked by determining the sample size and the confidence interval. In determining the sample size, three terms should be known: (1) Confidence level, (2) Confidence interval, and (3) Population size. Based on ASA (American Statistical Association) guidelines, the confidence level was set at 95%, the confidence interval at 5, and the population size was 100,000. The population size estimate was based on the available statistical data. The sample was three times larger than

the minimum sample size required. Results of the process of determining the sample size in theory is 383 and in the survey it was 1,163.

To determine the confidence interval we need to know four terms (1) Confidence level, (2) Sample size, (3) Population size, and (4) Accuracy percentage. Based on ASA guidelines, the confidence level was set at 95%, the sample size was determined empirically at 1,163, the population size was set at 100,000 and the accuracy percentage was set at 50%. Based on the parameters entered, the confidence interval was 2.86. Although the standard confidence interval is 5, a smaller number is better because it implies a larger sample size.

3 Survey analysis

The first four questions were text type questions and asking place and station origin and destination. By political division, 98.3 % of respondents start their trip in the Republic of Croatia, and only 1.7 % started in some other part of Europe. From all international passengers 0.9 % of respondents started their trip in countries of the European Union (Slovenia, Germany, Italy, Sweden, Great Britain and the Netherlands) and the remaining portion travelled from Serbia, Bosnia and Herzegovina, Switzerland, Kosovo and Montenegro. When we look at end of the trip 91.0 % of respondents ended their trip within the Republic of Croatia, while the remaining 9.0 % ended it in other parts of Europe. Of those ending their trips outside the republic of Croatia, 4.6 % of respondents ended their trip in the European Union (Slovenia, Austria, Hungary, Germany, the Czech Republic, Denmark, Greece and Ireland) and the remaining part ended their trips in Bosnia and Herzegovina, Serbia, Montenegro and Switzerland.

The question “purpose of your journey” was a single choice question. For 497 respondents the purpose was traveling to/from school/college, for 201 respondents to/from work, for 48 business (business trip), 8 for shopping, 294 for private reasons (bank, hospital, etc.), 108 for leisure (theatre, gym, etc.), 7 for other travel purposes. Figure 1 shows the proportion of the purpose of the journey according to the place of survey.

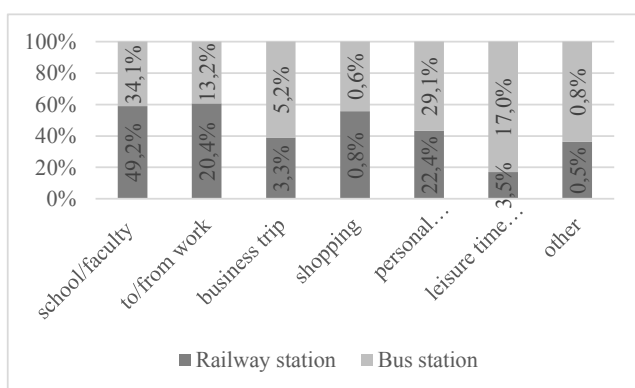


Fig. 1 Proportion of the purpose of the journey according to the place of survey

The devastating fact is that 43% of respondents cited as the purpose of the journey going to/returning from school or college, while 17% stated arriving to/going to work. Simply put public passenger transport mainly deals with the transport of pupils and students who have largely subsidized transport, and certain groups of pupils and students even travel completely free. The use for private reasons (bank, hospital, etc.) and leisure (theater, gym, etc.) is positive.

For evaluating passenger satisfaction, it is interesting to see how many and where the passengers have a connection. This was a single choice question, 193 (17 %) respondents answered „YES”, and 970 (83 %) respondents answered „NO”. The proportion of connections according to the place of survey is that 17.4 % have connection at the railway station and 15.6 % at the bus station. The fact that only 17 % of respondents had a connection tells about the relatively small importance of long distance bus and railway stations as transit places, with the bus station being a somewhat weaker transit point than the railway station.

For transfer passengers the logical question was that they rate satisfaction with the place of connection. This question was a single choice with the scale from 1 (poor) to 5 (excellent). The place of connection was rated poor by 15 (8 %) respondents, satisfactory by 16 (8 %), good by 59 (30 %), very good by 67 (35 %) and excellent by 36 (19 %). Figure 2 shows the satisfaction with the place of connection according to the place of survey. The bus station has received an average rating of 3.88, while the railway station received an average rating of 3.21. 19.2% of respondents gave a rating of excellent to the bus station, while 38.3% of respondents gave a good assessment of the railway station, 3.8% of the respondents gave an unsatisfactory grade to the bus station, while 10.4% of respondents gave an unsatisfactory grade to the railway station.

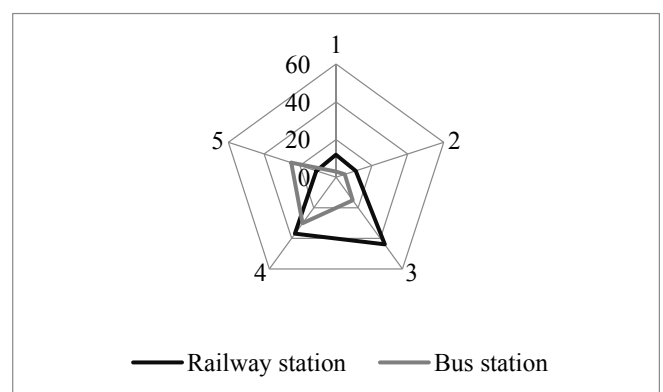


Fig. 2 Satisfaction with the place of connection according to the survey location

In addition, we asked transfer passengers how long was connection. The question was of a single choice with the scale less than 5 minutes, between 6 and 10 minutes, between 11 and 15 minutes and more than 16 minutes. 17 respondents (9 %) had the connection that lasted less than five minutes,

26 respondents (13%) from 6 to 10 minutes, 35 respondents (18 %) from 11 to 15 minutes, and 115 respondents (60 %) over 16 minutes. Figure 3 shows the duration of connection according to the survey location. The duration of the connection is too high because for 60% of respondents it lasts longer than 16 minutes, 54.8% relating to the respondents at the railway station, and 66.7% at the bus station. These data show large discrepancies between the timetables of individual carriers and transport modes.

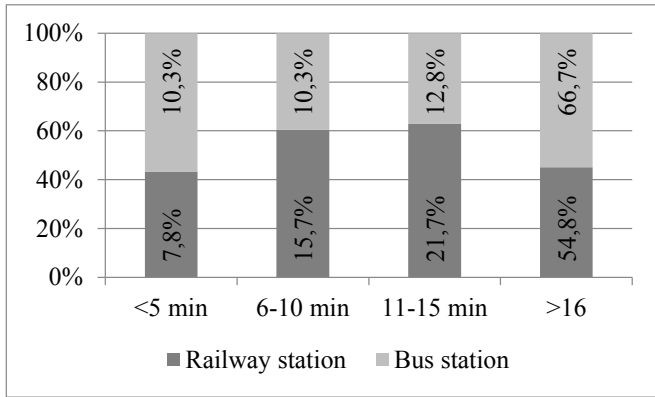


Fig. 3 Duration of connection according to the survey location

Then was a question about satisfaction with the timetable of trains or buses. This question was a single choice with the scale from 1 (poor) to 5 (excellent). 69 respondents gave grade 1 (6%), 138 sufficient (12%), 346 good (30%), 347 very good (30%) and 263 excellent (22%). Figure 4 shows the satisfaction with timetables according to the survey location.

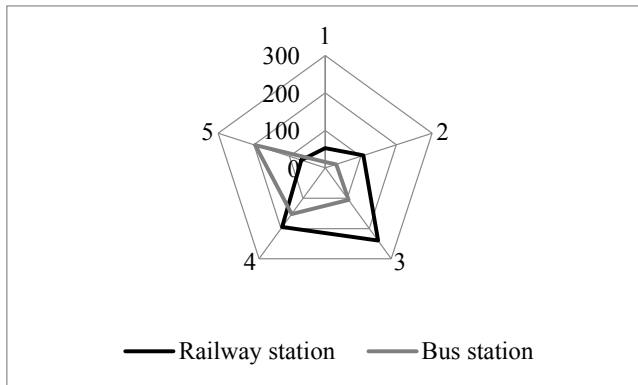


Fig. 4 Satisfaction with timetables according to the survey location

The average score of satisfaction with timetables at the railway station is 3.18, while at the bus station it is 3.96. 21.2% of respondents gave a rating of excellent to the bus station, while 36.3% of respondents gave a good assessment of the railway station, 3.2% of the respondents gave an unsatisfactory grade to the bus station, while 8.0% of respondents gave an unsatisfactory grade to the railway station.

After that follow, the question about satisfaction with the accompanying staff on the train or on the bus. This question

was a single choice with the scale from 1 (poor) to 5 (excellent). 12 respondents gave grade 1 (1%), 55 sufficient (5%), 175 good (15%), 426 very good (37%) and 495 excellent (42%). Figure 5 shows the satisfaction with the accompanying train/bus staff according to the survey location.

The average satisfaction with the accompanying train/bus staff at the railway station is 4.06, while at the bus station it is 4.26. 13.6% of respondents gave a rating of good to the bus station, while 16.2% of respondents gave a good assessment of the railway station, 0.6% of the respondents gave an unsatisfactory grade to the bus station, while 1.4% of respondents gave an unsatisfactory grade to the railway station.

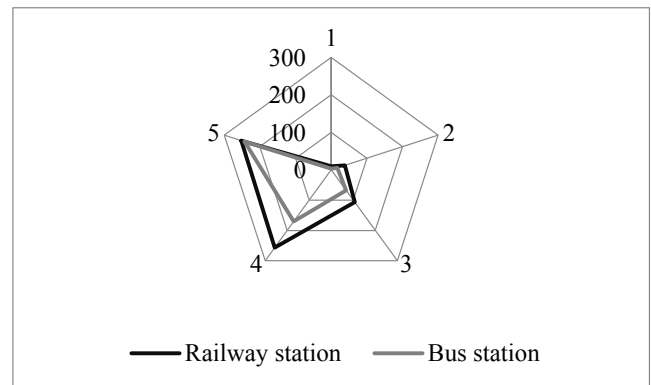


Fig. 5 Satisfaction with the accompanying train/bus staff according to the survey location

Next question was on satisfaction with the station staff (railway or bus). This question was a single choice with the scale from 1 (poor) to 5 (excellent). 41 respondents gave grade 1 (4%), 93 sufficient (8%), 236 good (20%), 378 very good (32%) and 415 excellent (36%). Figure 6 shows the satisfaction with staff on stations according to the survey location.

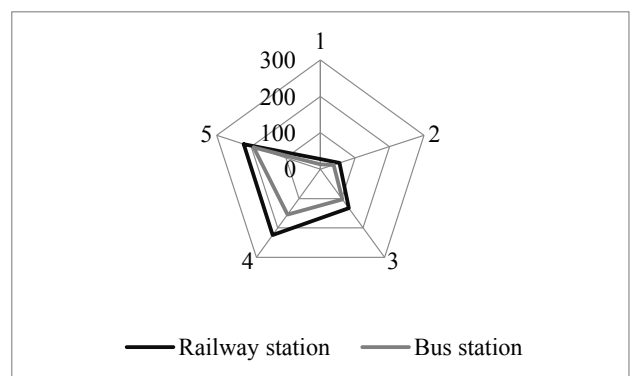


Fig. 6 Satisfaction with staff on stations according to the survey location

The average satisfaction with station staff at the railway station is 3.84, while at the bus station it is 3.95. 20.6% of respondents gave a rating of good to the bus station, while 20.1% of respondents gave a good assessment of the railway station, 2.6% of the respondents gave an unsatisfactory grade

to the bus station, while 4.2% of respondents gave an unsatisfactory grade to the railway station.

The following question was on satisfaction with the public transport system. This question was a single choice with the scale from 1 (poor) to 5 (excellent). 41 respondents gave grade 1 (5%), 93 sufficient (8%), 236 good (20%), 378 very good (32%) and 415 excellent (36%). Figure 7 shows the satisfaction with the public transport system according to the survey location.

The average satisfaction with the public transport system at the railway station is 3.18, while at the bus station it is 3.51. 36.5% of respondents gave a rating of good to the bus station, while 40.5% of respondents gave a good assessment of the railway station, 2.6% of the respondents gave an unsatisfactory grade to the bus station, while 6.3% of respondents gave an unsatisfactory grade to the railway station.

Also there were two demographic questions, first on age structure and the second on the highest level of education. The question on age structure was a single choice with a scale less than 18 years, between 18 and 24 years, between 25 and 34 years, between 35 and 44 years, between 45 and 54 years, between 55 and 64 years and more than 65. 70 respondents (6%) were less than 18 years old, 546 respondents (47%) were aged between 18 and 24, 221 respondents (19%) between 25 and 34, 114 respondents (10%) between 35 and 44, 82 (7%) between 45 and 54, 73 respondents (6%) between 55 and 64 and 57 (5%) more than 65.

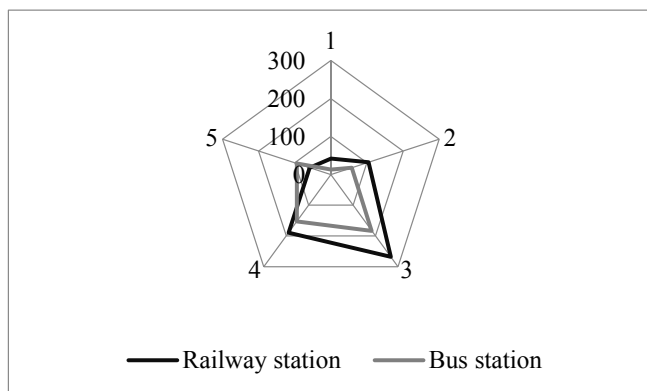


Fig. 7 Satisfaction with the public transport system according to the survey location

The age structure of the respondents indicates that the largest number of users is between 18 and 24 years of age, students or relatively new employees, which means they do not have a personal car and use public transport. A significant decline in customers by age indicates owning a car and the development of travel comfort.

The question on the highest level of education was a single choice with offered responses: completed primary school (ZOŠ), completed high school (SSS), completed college (VŠS), a university degree (VSS), a Master degree of Science (mr. sc.) and completed PhD (dr. sc.). 115 respondents had completed primary school, 681 respondents had completed high

school (SSS), 179 respondents had completed college (VŠS), 151 respondents had completed university (VSS), 28 respondents had completed a Master of Science degree (MSc) and 9 respondents completed a doctoral degree (PhD).

The structure of education coincides with the level of education at the national level with significant deviation towards higher educational attainment and higher levels of education. The completed education degree is in proportion to the level of income that actually represents passengers who use the public transport system for financial reasons.

4 Conclusion

Long distance terminals are important points of city mobility. They represent the enter/exit point to the city and connect different types of passengers in the city transport network. Today long distance terminals have two functions: primary and secondary. The primary function is transport, but also in time the secondary function is becoming more and more important. In addition, it is necessary to bear in mind that the terminals are there primarily for passengers, so next the logical step is to determine passenger's satisfaction with the terminal. Conducting a survey is a very useful tool.

The survey was conducted over the course of two days, Thursday, March 13th and Friday, March 14th, from 6:30 to 21:30. In 68% of cases Zagreb was listed as the place of beginning of the journey, and in 21% Zagreb was listed as the place of arrival. The most commonly used means of transport is the train with 35%, then the bus with 27%. It is interesting that the purpose for the journey in 43% of cases was education (school or college). The average duration of the journey amounted to 151.67 minutes. The average number of journeys per week was 2.02. Even 76% of respondents used more than one mode of transport. In total, only 17% of respondents had connections. 60% of respondents had the connection which lasted longer than 15 minutes, places of connection were evaluated with an average score of 3.48. The timetable is evaluated with an average score of 3.51. The accompanying staff on the train or on the bus received an average score of 4.15, while staff at stations (railway or bus) received an average rating of 3.89. Public passenger transport received an average rating of 3.52. 58.6% of respondents had completed high school (SSS).

Overall results of survey are good and the passengers were very interested to answer the question from the survey. In work process with people (service industry) there is always additional room for improving the level of service. We can conclude that there is need for the following: (1) shorter transit time, (2) integration in the public transport system on timetable and tariff system, and (3) accessible (educated) staff for interaction with passengers.

The proposed conclusion can be implemented in phases and, for easier implementation, can be organized into a project. After each phase, there will be new survey that represents a milestone

in the project. When the whole process of implementation is finished there is a need for a closing survey. Globally, surveys are an excellent tool for determining the passengers' satisfaction, not only at the terminals, but also in the entire transport system.

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