

# Consumer Evaluation in the Transit Industry

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Over the last few years, the service companies have progressively focused on the service quality and the consumer satisfaction. This strategy is very beneficial for both providers and consumers, especially for transit organizations and passengers. An improvement of the supplied service quality can attract further users. In the service industries, the evaluation of the service quality is challenging primarily because of the intangible nature of the services. We review the consumer satisfaction literature and focus on the examination of the satisfaction in the public transport. This paper examines three specific questions: How is the overall satisfaction level of users in the urban public transport? What are the factors that constitute the passengers' evaluation with the bus service in the urban public transport? Do these factors effect on the passengers' overall satisfaction? The public transport service analyzed is the bus service habitually used by the people of one of the western towns in Hungary. The source of a survey was described, and found support for the research questions. The results highlight the medium level of passengers' average satisfaction with the bus service. This paper applied factorial analysis to reveal three meaningful factors for evaluation of transit users. Additionally, we used multiple regressions to the examination of the connection between the service quality attributes and the overall satisfaction. The results show that travel time, travel comfortableness, and consumer relationship are significant factors affecting riders' perceptions of the overall satisfaction. According to the findings there can propose the development tasks in the service attributes, the bus service can become attractive, if it is cheap, speed and reliable. The main limitation of our study is the sampling method, in order to the generalisation of the results needs to extend for other Hungarian cities. The summary and conclusions highlight the findings and the future research.

*Keywords:* consumer satisfaction, urban public transport, service quality attributes, factorial analysis, multiple regressions

## Introduction

The well-known problems in urban areas were induced by traffic congestion, environmental pollution, and safety. In point of the public transport mode, the bus is generally the most affordable and flexible solution. In general, local transit providers supply the urban transit services due to the efficiency. The public transport service analyzed is the bus service habitually used by the people of one of the western towns in Hungary. In this century, there are two changes in connection with the travel demand. First is the conversion of the population' life style, behaviour and place of residence. The aggregation of inhabitants decreases by suburbanization, the distances

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between the terminal points increase, hereby the efficiency of the public transport declines, together with the frequency of service. Second is to increase of the transportation demand in several urban routes, excessive pressure on the bus service has emerged. Nevertheless, with increasing demand of the bus service, no betterment initiative has been performed simultaneously. However, in most cases the existing service quality has not observed at satisfactory provision. Although large amount of passengers of different income have dependency on this sector, so it need further improvement of this service so that more passengers may attract to used this service. At the same time, it is to aspire to the mobility issues in more speed, and the consumers able to pay for it (Papp, 2003). The purpose of this study is to examine the user's evaluation of the bus service within urban public transport. The main objective of this paper is how the expectation and perception of the bus service quality influence to consumers' satisfaction. Previous studies provide the methodological support to conduct current study to estimate the interrelated relationship of the variables. Specifically multivariate techniques, factor analysis, and regression analysis were used to reveal the relationship between the services attributes. This study explores the relation between the bus service quality attributes and the consumer satisfaction based on passengers' perception. Based on a sample of 160 respondents, we carried out an empirical study and found assistance for the research questions. The summary and conclusions highlight the findings and the future research.

### **Theoretical Background**

#### **Consumer Satisfaction**

A review of the literature showed lack of consensus regarding the definition of consumer satisfaction. Past studies have examined satisfaction from the different standpoint. According to the outcome-oriented definitions, the satisfaction can be appreciated as a summation of satisfactions with various attributes (Stauss & Seidel, 1995). However, Tse and Wilson (1988) found that the evaluation, perception, and psychological process contribute to the satisfaction. It is important that the nature of process at servicing the consumer is involved in the significant part of actions he/she passes through the service episode. During the evaluation process the consumer compares his/her expected and experienced fulfilment in reference to public transport service. In case of the transport activities: satisfaction/dissatisfaction is a cognitive, emotive response based on the subjective evaluation process (Oliver, 1997). Focus of satisfaction: attributes of public transport, physical facilities, and personnel. Researchers about consumer satisfaction agree that satisfaction is an essential component for economic success (Stauss & Neuhaus, 1997; Muffatto & Panizzolo, 1995). The consumer will be satisfied if the service gives value for him/her (Dumond, 2000). This value is one of the most important connections between the cognitive components of perceived quality, the experienced performance, and future behaviour directed towards the company (Patterson & Spreng, 1997). From the literature, it is evident that the satisfaction not only depends on the service attributes fulfilment, but on the expectations. The expectation is knowledge collected about service quality (Ercsey & Józsa, 2009) and this expectation can affect positive consumer satisfaction (Anderson, Fornell, & Lehmann, 1994). Mittal, Kumar, and Tsiros (1999) pointed to dynamics of satisfaction, so the importance of factors that determine the total consumer satisfaction changes from time to time. According to Muffatto and Panizzolo (1995), the analyses about satisfaction examination concentrate output and are not in connection with inside processes of company, so the researchers have to make the process oriented satisfaction examination. The attributes level of satisfaction has much advantage. The consumer often evaluates his/her experiences on

attributes level (Ercsey & Józsa, 2009) and does not evaluate it on product/service level after purchase. The consumer may be satisfied and dissatisfied with the same service in different aspects. The attribute stage approach gives higher-level specification and diagnostic tool as the service stage or total approach. Managers rather examine satisfaction on attribute level than total stage, too.

In the literature, in addition there are also other models. The qualitative satisfaction model (Stauss & Neuhaus, 1997) shows that certain combinations of emotional, cognitive, and intentional components lead to qualitatively different satisfaction types. The consumer behaviour models (Voss, Parasuraman, & Grewal, 1998) say that the evaluation of advantages and victim in connection with service using presents satisfaction and dissatisfaction. We have to consider an important aspect at examination of factors determined consumer satisfaction. On basis of Mittal, Ross, and Baldasare's (1998) theory, we can differentiate transaction oriented and cumulative satisfaction. The transaction oriented consumer satisfaction is an evaluation after service delivery in a fixed transaction situation. The cumulative satisfaction represents the total evaluation that is based on the service delivery in fixed time (Anderson, Fornell, & Lehmann, 1994). The cumulative satisfaction reflects the past, the present, and the future achievement of company and it inspires the company to invest to consumer satisfaction. Satisfaction generally sets during service process but it time-varied one. After complaint situation, or rather handling of complaint situation furthermore in the time of satisfaction examination it evolves different level of consumer satisfaction. In a complaint situation the hitherto relatively stable impression about service quality is temporarily transformed, the value judgment of the user moves to a lower level, then the previous value judgement is restored—or not (Veres, 2009). Consumer dissatisfaction is described as the bipolar opposite of satisfaction on the basis of client' response in connection of service attributes. In case of public transport, the purchase decision is routine (Józsa, 2005), the majority of passengers regularly use the bus routes. It is evident that public transit provider has to pay attention to the unsatisfied commuters because of the negative word-of-mouth communication, the complaining, and the switching. The last studies (Roos, Edvardsson, & Gustafsson, 2004) examine the consumer switching patterns to know the role of various factors of the different competition and non-competition industries.

### **Satisfaction in the Urban Public Transport**

The European Standard (CEN EN 13816-2002E) specifies the requirements to define, and measure the service quality in public passenger transport. It is based on eight criteria: availability, accessibility, information, time, customer care, comfort, security, and environmental impact. This European Standard applies to passenger transport service providers; airlines, trains, subways, buses, water vessels and do not exclude individual passenger vehicles such as taxis. Based on the criteria-principles, a transport organization is required to identify the quality targets from a range of criteria listed in the standard. EN 13816 provides transportation with benchmark criteria to structure an approach to improving public services in transport sector. Jen and Hu (2001) developed a service quality scale for the public transportation system, which applies a three-stage scale and dimension simplification procedure. This scale includes four dimensions, "interaction with passengers" with six questions, "tangible service equipment" with six questions, "convenience of service" with six questions and "operating management support" with three questions. In a recent research (Eboli & Mazzulla, 2007), a structural equation model was formulated to explore the impact of the relationship between global customer satisfaction

and the service quality attributes. Some authors proposed SEM applications in public transport; specifically SEM was adopted for describing customer satisfaction in public transport services (Andreassen, 1995; Karlaftis, Golias, & Papadimitrou, 2001). The observed variables were the 16 service quality attributes evaluated by the user sample. By factor analysis, four factors were identified. The first factor, service planning and reliability, related to the variables of frequency, reliability, information, promotion, personnel, and complaints. The second factor, comfort and other factors, related to bus stop furniture, overcrowding, cost, environmental protection, and bus stop maintenance. The third factor, safety and cleanliness, related to cleanliness, safety on board, and personal security. The fourth factor, network design, related to bus stop availability and route characteristics. The first factor has a major effect on average consumer satisfaction. The results of the proposed model can be used for improvement of the transit service. The literature seems to suggest (Krizek & El-Geneidy, 2007) examining the travel market to determine the service attributes have the role of the travel habits and behaviours. They have found the frequency and location of service, besides the travel time and cost. Their research first articulates eight different market segments of transit users and non-users using factor and cluster analysis. The explored factors can contribute to understand attitude and preferences of transit users and potential transit users, and give opportunity to retain the existing passengers, to increase the number of choice riders. Further, Levinson (1985) established a model to estimate the prospective transit demand of bus routes using important components (population, employees, travel time, distance to the bus stop, numbers of car owner, demand elasticity coefficient). Transport companies have shown an increasing interest in understanding what determines individual travel mode choices, preferences, and expectations about urban transport. Their questions are following. Is the level of the consumer satisfaction changed over time? Which factors might explain these differences? To these goals, authors propose and estimate dynamic LISREL models on pseudo panel data conducted in Rimini from 2000 to 2005 (Bernini & Lubisco, 2006). The application of the average cohort techniques on independent repeated surveys data leads to the so-called pseudo-panel (Deaton, 1985). They compare two different generalization of LISREL static model, the Simplex Model (Jöreskog, 2001) and the Dynamic Structural Equation Model with latent variables (Cziraky, 2004). These studies provide the methodological assistance to conduct current study to determine the relationship between the bus passengers' satisfaction and the service attributes. Specifically multivariate technique, factor analysis, regression analysis, and analysis of variance were used to estimate the interrelated dependency of the variables. In current study, factor analysis and regression analysis used to draw the relationship between the satisfaction with service and the service quality attributes of the bus users.

### **Research Design**

We introduce our research is divided into three parts. First, we look over the topical questions, next, there come methodology of empirical study, and finally our results.

#### **Research Questions**

Our research aims to examine the consumers' evaluation of the urban bus service. Our questions are following:

- How is the overall satisfaction level of users in the urban public transport?
- What are the factors that constitute the passengers' evaluation of the bus service in the urban public

transport?

- Do these factors effect on the passengers' overall satisfaction?

### Methodology of Our Research

There are developed different frameworks examining for the common and unique components of consumer satisfaction. In the middle of the most often, applied method is to evaluate the attribution performance of service (Mittal, Kumar, & Tsiros, 1999). In this case, the consumer takes a subjective satisfaction judgment that is from attribution performance. The researches generally apply the expectation—disconfirmation paradigm in the case of attributes oriented satisfaction (Spreng, MacKenzie, & Olshavsky, 1996; Oliver, 1997). The consumer compares the experienced performance with his/her expectations in the disconfirmation model. Therefore, the primary dominant of satisfaction is the gap between the expectations of the service attributes and the actual performance (Sharma, Grewal, & Levy, 1995). Model has developed by Zeithaml, Parasuraman, and Berry (1990) for measurement of service quality to fit for the definition and measurement of the gap. The satisfaction components can be aggregate how much contribute to the level of the satisfaction (Bohnné, 2005). The components of the satisfaction by the local urban transport:

- Basic components: reliability, accessibility, expertise (frequency of the services, spatial and temporal accessibility, number of buses, safety of the transport, physical evidences, comfort and physical condition of buses;
- High-level components: sensibility, courtesy, communication, confidence, knowledge level of consumer needs, and behaviours.

The nature of the competition influences that services attributes belong to the basic or high-level components (Chowdhary & Prakash, 2005).

In this period, we developed a battery of 12 items, selected through literature review, previous issues, European standard, and interview to the passenger. The primarily selected service quality attributes are listed as below (see Table 1)

Table 1

#### *Quality Attributes of Bus Service*

Attribute	Attribute
1. Frequency of the local bus service	7. Travel safety
2. Speed	8. Travel comfort
3. Correctness	9. Attitude of the employees
4. Distance between bus stops	10. Information
5. Connection	11. Purchase opportunity of the tickets
6. Modernity of the buses	12. Price

For evaluating the satisfaction with the bus service at a global level on five-point scale was used (Hetesi, 2006). The passengers were asked to give satisfaction level regarding their perception of the existing service condition. Besides, we applied SERVIMPERF method (Zeithaml, Parasuraman, & Berry, 1990) for evaluation of the importance and the satisfaction of the service attributes.

The target population was public transport passengers in a city of the western part of Hungary. The sample survey was addressed to the bus passengers considering the urban routes that are very important for the citizen of

the city. This questionnaire survey conducted to a sample of 160 bus passengers. The sampling method was the combination of the quota sampling and non-random selection. Based on the quota criteria we divided four groups of the sample: ticket users (20 persons), passengers with monthly tickets (50 persons), with student tickets (70 persons), and with senior tickets (20 persons). They were asked about their socioeconomic characteristics considering their origin, the purpose of their trips and about the overall satisfaction. To evaluate the bus service quality, the passenger was asked about 12 service attributes, on a scale from one to five denote the satisfaction level from very poor to very good, and the expectations level from not at all important to extremely important. The places of the personal interview are three final bus stops of the routes and one bus stop next to the town hall. At the beginning of 2008, we conducted survey in the different hours of days. The questionnaire followed the objectives of the survey. In the questionnaire there are closed questions in majority. The processing and the evaluation of the questionnaires applied with SPSS statistical program.

### **Sample**

The number of ticket passengers is 18 persons and the number of the monthly ticket passengers is 52 persons. These numbers are more than we planned. The 60% of the respondents are women and 40% male. Fifty percent of the respondents are students, 32.5% employees, two of them managers, six persons enterprise, and 15 % pensioner. Age categories of the population: 0-18 age (26.15%), 19-25 age (24.2%), 26-45 age (10%), 46-55 age (13%), 55-65 (10%) and over 65 age. The travel frequency of respondents: daily (73%), weekly (10%), less frequently (16%) used the local public transport. According to the results of the cross table analysis is relationship between the frequency of travel and the segments in medium level (Cramers'  $V = 0.548$ , sig. = 0.000). The most common travel motivation is education, work, shopping, entertainment, health care, and administration.

### **Analysis of the Results**

We present the overall satisfaction with bus service in the first part of the evaluation. In the second part of the analysis will be introduced the factors to the assessment of the bus service quality. Finally, it will discuss the relation between the overall satisfaction and the factors

#### **Satisfaction With Bus Service**

The average satisfaction of the respondents was 2.74 on a five points scale with a little standard deviation. Otherwise, the overall satisfaction index was 3.02 by using the consumers' evaluation of the service attributes (on a five level scale) and standard deviation was 0.616.

#### **Identifying Factors Used in the Evaluation of the Bus Service**

We processed the collected data from field survey to conduct the factor analysis. Factor analysis is useful to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables. The researchers may attempt to define a relationship among sets of many interrelated variables are examined and represented in terms of a few underlying factors (Malhotra, 2008). In the current study, we used this technique to determine the factor those influence the quality of the bus service. Through factor analysis, the service quality attributes which determine the satisfaction of bus service extracted. Table 2 shows the results of factor analysis. It can explain that the number of factors that needs to extract are three that have Eigen values greater than one. Table 2 shows the results obtain from the factor analysis after rotation of factor matrix. We applied varimax method for rotation of factors. In this way, it can identify three factors considering the high correlation with the

factors. Therefore, extracted three factors from the analysis are travel time, travel comfortableness, and consumer relationship.

Table 2

*Results of Factor Analysis of Variables Related to Bus Service Quality*

Factor	Eigen value	Variable	Factor loading	Cronbach's alpha
F 1: Travel time	5.32	Frequency	0.72	0.82
		Number of bus stops	0.70	
		Punctuality	0.67	
		Speed	0.57	
		Connection	0.45	
F 2: Travel comfortableness	1.60	Buses are reliable	0.75	0.79
		Travel safety	0.71	
		Comfort	0.68	
F 3: Consumer relationship	1.22	Behaviour of personnel	0.77	0.73
		Price	0.76	
		Information	0.73	
		Selling of the tickets	0.65	

The decision to include a variable in a factor was based on factor loadings ( $\geq 0.45$ ), and its meaning within the factor (Tabachnick & Fidell, 1989). The factorial analysis on 12 variables yielded three-factor solution accounting for 65.3 percent of explained variance. The structure of the factors appears clearly and shows that variables included in each factor seem concordant with its meaning. In addition, the results of Bartlett's test (1,265.42;  $P < 0.05$ ) and of KMO (0.84) confirm the appropriateness of data used in the factorial analysis. Concerning the reliability of measures, the coefficients of Cronbach's alpha varying between 0.73 and 0.82 are considered acceptable. The three factors identified in Table 2 can be described as follows: F 1, travel time, accounts for 42.6 percent of variance and is constituted of five variables related to the frequency, number of bus stops, punctuality, speed, and connection. F 2, travel comfortableness, explains 15.4 percent of variance and consists of three variables representing the reliable of buses, the travel safety, and comfort. Finally, F 3, consumer relationship, accounts for 7.3 percent of variance and is composed of four variables expressing the behaviours of staff, information, the selling of tickets and the price.

### Assessing the Effect of Factors on the Satisfaction

The overall bus service is interdependent on the service attributes. The quality of the service attributes lead to the passengers' satisfaction with bus service and this relationship can be described through a linear model stating overall satisfaction as dependent and the service attributes as independent variable. The regression model is found as most familiar option to draw the relationship between overall satisfaction and the service attributes of the bus service. Dependent variable is the overall satisfaction on existing bus service. Results presented in Table 3 reveal that the influence of those three factors on the satisfaction is statistically significant. The coefficient of determinant ( $R^2$ ) value describes that three factors contribution to explain the overall satisfaction 57%. Table 3 shows the value of constant and coefficient value of each factor for our analysis.

The satisfaction of bus service depends on three distinct factors. Moreover, the travel time ( $\beta = 0.42$ , Table 3) is the most important factor in the perception of the satisfaction with the bus service. This result corresponds with our expectation that the consumers' evaluation of the bus service is based on the several aspects of the travel time. The empirical results confirm the crucial role of the frequency, the speed, and the punctuality in

the consumers' evaluation toward an urban public transport. The travel comfortableness constitutes the second most important element in the perception of the satisfaction, with  $\beta = 0.31$  (see Table 3). Concerning consumer relationship, users consider it as a third-order factor in their perception of the passengers' satisfaction with lower values of regression coefficient ( $\beta = 0.25$ ). This result inconsistent with the literature that contact personnel should be a major dimension of service quality as found in numerous studies previously (Lovelock & Wright, 2002; Mohr & Bitner, 1995).

Table 3

*Results of Regression Analysis on Factors*

Independent variable (factor)	Standardized $\beta$	<i>t</i> -value	<i>P</i> -value
Dependent variable: overall satisfaction of bus service			
Travel time (F1)	0.42	9.52	0.000
Travel comfortableness (F2)	0.31	7.87	0.008
Consumer relationship (F3)	0.25	6.50	0.019
$F = 27.80$ ( $P < 0.05$ ); $R^2 = 0.57$			

## Conclusion

### Summary

Four research questions were stated at the beginning of this research. We re-examine these questions in light of the results from our survey.

(1) How is the overall satisfaction level of users in the urban public transport? The results highlight the medium level of passengers' overall satisfaction with the bus service. This result is consistent to the consumer evaluation in EU. The average satisfaction of the urban public transport services has the least qualification within public utility services and the Hungarian respondents found less poor level of the urban public transport, than the EU citizens did;

(2) What are the factors that constitute the passengers' evaluation of the bus service in the urban public transport? Factor analysis was conducted with the 12 service attributes, which resulted in three factors. Factor 1 appeared to reflect the travel time. Factor 2 is representing the travel comfortableness. Finally, factor 3 is labelled the consumer relationship. The content and the order of our factors partly agree the findings of previous research partly disagree to be due to the numbers and types of the service attributes;

(3) Do these factors effect on the passengers' overall satisfaction? To evaluate the effect of the factors identified in the perception of the users' satisfaction, a regression analysis using an overall image as the dependent variable and three factors described previously as independent variables was conducted for each set of data. The coefficient of the travel time got high value, which implies the service satisfaction is mostly dominated by the quality of this factor. Consumer relationship found with low coefficient value than others which implies that this have less domination in overall service satisfaction. This phenomenon might result from a specific characteristic of the public transportation, namely the low level of contact between staff and passengers, making it difficult to build interpersonal relationships. Besides travel comfortableness found better coefficient value than the consumer relationship but worse than travel time.



### Managerial Implications

This study presents some insights on the satisfaction in urban public transport organizations and offers an assessment of the role of the service attributes used by bus service users in their evaluation. The empirical results seem consistent with the literature and show the strong influence of travel time on users' perceptions of satisfaction. Besides, our results indicate that dimensions related to the contact personnel and physical environment where the service is produced and consumed are determinants of the satisfaction. Travel time is found as important service attributes to define the overall satisfaction of the bus service because most of the passengers want to get their destination in least time. We think to determine the overall service satisfaction is much problematic one because the elements of the travel time varied much. Our results will be helpful to determine the overall satisfaction to the existing bus service in different circumstances that provide the guidelines in further assessment and improvement process. It will provide a means of measuring the passenger perception in terms of bus service quality, which helps to assess the efficiency of supply side of the service. However, the consumer evaluation process is highly complex, and fully explaining it using a small number of latent variables is difficult. In fact, some service attributes of the bus service are not included in the present research, such as bus stop furniture, environmental protection, bus stop maintenance, and cleanliness and so on. Future study can identify these variables to help increase understanding of consumer satisfaction with the bus service. Finally, this paper only investigates the urban bus routes in countryside of Hungary in consideration of lack of the primary research.

### Limits of This Research, and Implications for Further Research

Our research gave answers to the research questions, but we must to mention its limitations and further research tasks. These limitations are the sampling method and the numbers of sample. In order to the generalisation of the results needs to primer research to extend for other Hungarian cities, with the using Simple Random Sampling method and conducting with representative sample. It will be interesting to examine the transport motivation and the segmentation of the passengers can be carried out based on the attitudes, the preferences with connection of the urban public transport. Future studies could analyze the switching barriers for alternative transportation modes, including the different types of the individual transport, to understand how these modes influence the passenger behaviour intentions.

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