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SERVICE QUALITY PERCEPTION COMPARISON IN TRANSPORT SYSTEMS WITHIN THE CONTEXT OF USERS OF ISTANBUL CITY'S METRO AND METROBUS PUBLIC TRANSPORTATION SYSTEMS

Ulaşım Sitemlerinde Hizmet Kalitesi Algısının İstanbul İli Toplu Taşıma Sistemlerinden Olan Metro ve Metrobüs Kullanıcıları Bağlamında Karşılaştırılması

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ABSTRACT

The quality of service is defined as the degree of conformity of the service offered for the intended purpose. The SERVQUAL Model, which has been developed on the basis of the difficulty in definition and performance measurement of the quality of service, is the most frequently used model for service quality measurement.This study aims to measure the users' perceptions of service quality of metro and metrobus, which are among the most frequently used transportation systems in Istanbul, and to investigate differences in service quality perceptions in terms of the demographic characteristics of the participants (age, gender, income level, education status, employment status, marital status), intended use of the these transportation systems and the type of tickets used.Within the scope of the research, service quality perceptions of metro and metrobus users were analyzed using the SERVQUAL scale adapted to transportation services, and the results were evaluated in this regard.

Keywords: Servqual, Service Quality, Transportation Service.

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Servıce Qualıty Perceptıon Comparıson In Transport Systems Wıthın The Context Of Users Of Istanbul Cıty's Metro And Metrobus Publıc Transportatıon Systems

ÖZ

Hizmet kalitesi, üretilen hizmetin amaca uygunluk derecesi olarak tanımlanır. Hizmet kalitesinin tanımlanmasının ve performans ölçümünün güçlüğünden yola çıkılarak geliştirilen SERVQUAL Modeli, hizmet kalitesi ölçümünde en sık kullanılan modeldir.Bu çalışmada, İstanbul' da en sık kullanılan ulaşım sistemlerinden olan metro ve metrobüs kullanıcılarının hizmet kalitesi algılarının ölçülmesi ve katılımcıların demografik özelliklerinin (yaş, cinsiyet, gelir düzeyi, eğitim durumu, çalışma durumu, medeni durum), söz konusu ulaşım sistemlerini kullanma amaçlarının ve kullandıkları bilet türünün hizmet kalitesi algıları açısından farklılıklarının araştırılması amaçlanmıştır.Araştırma kapsamında, metro ve metrobüs sistemlerinden hizmet alan kullanıcıların hizmet kalitesi algıları, ulaşım hizmetlerine uyarlanmış bir SERVQUAL ölçeği kullanılarak analiz edilmiş ve sonuçlar bu doğrultuda değerlendirilmiştir.

Anahtar kelimeler: SERVQUAL, Hizmet Kalitesi, Ulaşım Hizmeti

1. Introduction

Transportation has a very important role in the socioeconomic development of the countries. Reaching a population of 15 million (TSI) as of 2017, Istanbul's urban transportation problem is getting more and more critical every day. As in other metropolises, administrators focus on public transport systems for the solution of transportation problems in Istanbul.

The Istanbul Electric Tramway and Tunnel Establishments (IETT) Directorate, which carries out the mission of organizing, supervising, coordinating and managing the public transportation services and managing the sectoral knowhow in a holistic way as well as meeting the unspoken needs, aims to facilitate city life by making public transportation systems attractive (İETT, 2018). Achieving this goal will be possible with the determination and improvement of the quality of the transportation service provided.

In this regard, the perceived service quality of metro and metrobus transportation systems, which are used extensively in Istanbul, was compared in this study in terms of the demographic factors, intended use and ticket type. It is believed that the results obtained from the analysis will be beneficial for decision makers.

2. The Concept of Service Quality

Adam Smith defines service as "All activities that do not result in a tangible product" (Öztürk, 1998:2). According to Kotler, a service has four distinctive characteristics. These are:

- **Intangibility:** Unlike physical products, service can not be seen, tasted, felt, heard or smelled before being purchased. In order to reduce this uncertainty, service providers try to embody the concept of service, which is an intangible concept, through physical appearance, team and equipment.

- **Inseparability:** Due to the nature of the service, the moment of production and consumption is the same.
- **Variability:** The quality of service varies depending on who, where, and when the service is offered.
- **Perishability:** Due to the inability to stocking up the services, it is difficult to meet requests during peak periods. For example, in public transport systems, much more equipment may be needed to meet demand at peak hours than other times of the day (Kotler and Keller, 2012: 358-362).

While there are many tangible elements for consumers' evaluation of product quality, it is difficult to find any tangible element in evaluating service quality.

It is difficult to measure the quality characteristics of a service since the quality of the service is often determined by the consumer's assessment of the service at the moment of purchase (Kobu, 2014).

Parasuraman, Zeithaml and Berry summarized the literature on quality of service in their 1985 study as follows:

- Assessment of service quality in terms of consumers is much more difficult than evaluation of product quality.
- Quality of service is related to the difference between consumers' perceived quality of current service and their expectation about this quality.
- Quality assessment does not only deals with the outputs of the service. Assessments also include the service delivery process (Parasuraman, Zeithaml and Berry, 1985: 42).

In this context, it is possible to make a definition for the concept of service quality as the degree of conformity of the service offered.

A number of models have been developed, due to the difficulty in definition and performance measurement of service quality as an abstract concept. The best known among these models are the Grönroos Model developed by Grönroos in 1984, SERVQUAL Model, which was developed by Parasuraman et al. in 1985, and the SERVPERF model developed by Cronin and Taylor in 1992. In addition, methods such as Service Barometer (Linjefly Barometer), Critical Events Method, Benchmarking, Total Quality Index, Group Interview Method can also be considered as other methods used in the measurement of service quality (Yücel, 2013: 87).

3.SERVQUAL Model

The SERVQUAL model, which was developed in 1985 and 1988 by Parasaruman et al., is the most known among the models used in the measurement of service quality. In the study carried out to develop SERVQUAL model, it has been determined that service quality has 10 dimensions including reliability, responsiveness, ability, accessibility, courtesy, communication, credibility, safety, customer relations and tangibility (Parasuraman, Zeithaml and Berry, 1985: 41-50). These 10 decisive factors that were determined in the study in 1985 form the basis of the SERVQUAL model's dimensions. Considering the connections between these 10 dimensions, dimensions considered to be correlated were combined and five dimensions have been proposed for the SERVQUAL model in order to obtain a wider scope. These sub-scales and definitions are given below (Parasuraman, Zeithaml and Berry, 1988: 12-40).

Tangibles: Physical facilities, equipment and personnel appearance.

Reliability: The ability to provide the promised service reliably and precisely.

Responsiveness: Willingness to help the customer and provide fast service.

Assurance: Includes employees' knowledge, courtesy and confidence-building skills.

Empathy: Includes personal attention and sensitivity to customers.

After this process, the 5 dimensions determined have been accepted and widely used in the literature as the dimensions of service quality.

Increasing the quality of service provided by public transport systems and encouraging passengers to use these systems is an important concern for city administrators, almost all over the world. The key factor in the quality of service in public transportation means is people's willingness to use public transport systems instead of their own private vehicles (Liou, Hsu and Chen, 2014: 225-239).

When the service quality studies in the field of transportation are examined, it is seen that studies mainly adopt these five dimensions (Table 1).

Table 1: Overview of transport sector quality of service research

Authors	Year	Mode	Approach	Dimensions
Fick and Ritchie	1991	Airline	SERVQUAL	Tangibles, Reliability, Responsiveness, Assurance and Empathy
Luke, Heyns	2006	Public Transport Service	Modified SERVQUAL Model	Reliability, Comfort, Extent of Service, Safety, Affordability

Pakdil and Aydın	2007	Airline	Modified SERVQUAL Model	Employees, Tangibles, Responsiveness, Reliability and assurance, Flight patterns, Availability, Image, Empathy
Awasthi, Chauhan,Omrani and Panahi	2011	Public Transport Service	A Hybrid Approach Based on SERVQUAL and Fuzzy TOPSIS	Tangibles, Reliability, Responsiveness, Assurance and Empathy
Randheer, Motowa, Vijay	2011	Public Transport Service	SERVQUAL	Tangibles, Reliability, Responsiveness, Assurance and Empathy, Culture
Barabino, Deiana	2013	Public Transport Service	Modified SERVQUAL Model and Multiple Linear Regression	Tangibles, Reliability, Responsiveness, Assurance and Empathy
Barabino, Deiana and Tilocca	2012	Public Bus Service	Modified SERVQUAL Model	Tangibles, Reliability, Responsiveness, Assurance and Empathy
Muthupandian and Kumar	2012	Public Transport Service	Modified SERVQUAL Model	Tangibles, Reliability, Responsiveness, Assurance and Empathy
Mikhaylev, Gumenuk, Mikhaylova	2015	Public Transport Service	SERVQUAL	Tangibles, Reliability, Responsiveness, Assurance and Empathy
Başfırıncı and Mitra	2015	Airline	SERVQUAL and Kano Model	Tangibles, Reliability, Responsiveness, Assurance and Empathy
Sam, Hamidu, Daniels	2017	Public Transport Service	SERVQUAL	Tangibles, Reliability, Responsiveness, Assurance and Empathy

Based on the studies conducted on this field, it is believed investigating the service quality perceptions of users of urban public transport systems in Istanbul will

be beneficial in terms reorganizations and improvements. In this regard, metro and metrobus systems which are frequently used in urban transportation were compared in terms of perceived service quality. The research question of this study was determined as "What is the level of service quality perceived by metro and metrobus users, and is there a difference between the two perceptions? In other words, is there a difference between these two means of transportation in terms of service quality perceived by the users?"

4.Methodology

In this study, it was aimed to measure Istanbul metro and metrobus users' perceptions of service quality, and to investigate differences in service quality perceptions in terms of the demographic characteristics of the participants, intended use of the these transportation systems and the type of tickets used. The research hypotheses formed for this purpose are as follows:

Main hypothesis:

H_1: The perceived service quality level of metro users is different from the perceived service quality level of metrobus users.

Hypotheses about demographic variables:

H_{1a}: The perceived level of service quality of metro users differs according to the demographic variables.

H_{1b}: The perceived level of service quality of metrobus users differs according to the demographic variables.

Hypotheses about control variables:

H_{1a}: The perceived service quality level of metro users differs according to the intended use.

H_{1b}: The perceived service quality level of metrobus users differs according to the intended use.

H_{1c}: The perceived service quality level of metro users differs according to the ticket type used.

H_{1d}: The perceived service quality level of metrobus users differs according to the ticket type used.

Measures

In line with the hypotheses formed, this study uses the SERVQUAL scale,

which has been developed by Luke and Heyns in 2017 and adapted to public transport systems in Johannesburg city, namely the metrobus and PUTCO. The SERVQUAL scale adapted from Luke and Heyns consists of five sub-scales: reliability, comfort, extend of service, safety and affordability. The questionnaire was first translated into Turkish. The questionnaire form, which was translated into Turkish, was revised in line with the expert opinion, and one of the items was divided into two since it will be more meaningful due to its translation. In this regard, the final form of the scale has 26 items instead of 25. Five-point Likert-type scale is used for measuring the scale items (5=Strongly Agree, 4=Agree, 3=Neither agree nor disagree, 2=Disagree, 1=Strongly Disagree).

The questionnaire, which included demographic questions, the intended use of vehicles and the type of tickets used, was handed to 250 users, answers from 193 participants were included in the research. Those who did not use both vehicles tools at all were excluded from the sample, and use of each transportation system at least once was considered as a prerequisite.

Research hypotheses were analyzed using data obtained using the convenience sampling method and IBM SPSS Statistics 21 package program.

Participants

With the data from 193 participants, frequency analysis of demographic variables and control variables was performed first, then descriptive analyses were performed separately for both vehicle types, respectively, regarding perceived service quality. After the descriptive analysis, Cronbach's alpha values were examined to test the reliability of the scale, and difference analyses were performed to test the perceived service quality difference between the vehicles in our main hypothesis, in terms of total scale and each sub-scale separately. Finally, the difference between service quality was investigated for both transportation means in terms of demographic variables and control variables, separately.

5.Results

It is observed that the majority of the participants consisted of female participants by 61 percent. The majority of respondents was in the 29-38 age group, 61% was married, the majority had a bachelor's degree and full-time employee with an income level in range of 2001-3000 TL. The percentage and frequency values of the variables are shown in Table 2.

As a result of the reliability test conducted to test the reliability of the measurement, the Cronbach's alpha values for the scales were found to be 0.922 and 0.925 for metro and metrobus transport systems, respectively. After confirming the reliability of the obtained data, research hypotheses were tested.

Table 2: Demographic findings for the participants

N = 193	*n*	*%*	*N = 193*	*n*	*%*
Gender			Marital Status		
Female	118	61,1	Married	115	59,6
Male	75	38,9	Single	78	40,4
Age			Level of Income		
Below 18 years	4	2,1	Below 100 tl	16	8,3
19-28 years	68	35,2	1001-2000 tl	50	25,9
29-38 years	74	38,3	2001-3000 tl	58	30,1
39-48 years	27	14,0	3001-4000 tl	29	15,0
49-58 years	16	8,3	4001-5000 tl	22	11,4
Above 59 years	4	2,1	Above 5001 tl	18	9,3
Occupation			Educational Status		
Student	16	8,3	Primary School	13	6,7
Housewife	6	3,1	Elementary School	35	18,1
Unemployed	11	5,7	Associate Degree	18	9,3
Part time employed	9	4,7	Bachelor's Degree	87	45,1
Full time employed	151	78,2	Postgraduate	40	20,7

The paired sample t test was performed to determine whether the perceived quality of service differs in terms of metro and metrobus public transport means. The difference test was significant in terms of perceived quality of service variable for each sub-scale. Our main hypothesis "The perceived service quality level of metro users is different than the perceived service quality level of metrobus users" was accepted. In addition, the reliability, comfort, coverage, safety and fee dimensions of perceived service quality vary between metro and metrobus systems. The mean, standard deviation and t test results of the variables are shown in Table 3.

Table 3: Perceived service quality, standard deviation and values of paired sample t test

	METRO		METROBUS			
N=193	M	SD	M	SD	T	P
Perceived Service Quality	3,2205	0,68283	2,9354	0,69611	8,786	0,000*
Reliability	3,4063	0,76194	3,0144	0,796 1	7,986	0,000*
Comfort	3,2463	0,92336	2,9218	0,92561	6,905	0,000*
Extent of Service	2,9982	0,81679	2,8927	0,79158	3,379	0,001*
Safety	3,0848	0,75624	2,6921	0,84259	8,474	0,000*
Affordability	2,7691	0,94685	2,6317	0,95575	3,806	0,000*

*p < 0.05

For both means of transportation, difference analysis was conducted for testing the hypotheses that the level of service quality perceived by the users differs according to demographic variables and control variables. Independent sample t-test was used for gender and marital status, and one-way ANOVA was used for age, employment status, income status, education status, type of ticket used and intended use of the means of transportation. Difference analysis was performed separately for metro and metrobus transportation means (Table 4).

Table 4: Gap analysis findings for demographic variables and control variables

	Perceived Service Quality (METRO)		Perceived Service Quality (METROBUS)	
	t	p	t	p
Gender	-3,067	0,002*	-1,755	0,081
Marital Status	4,911	0,28	1,492	0,223
	F	p	F	p
Age	1,412	0,222	1,441	0,211
Occupation	,258	0,904	,064	0,992
Level of Income	2,929	0,14	3,277	0,007*
Educational Status	4,222	0,003*	2,395	0,052
Ticket Type	2,390	0,023*	2,798	0,009*
Intended Purpose	,760	0,469	,501	0,606

*p < 0.05

As a result of the analysis, it was concluded that the level of perceived service quality of metro was higher in males compared to females. Due to the difference between the perceptions of users with income levels of 2001-3000 TL and 3001-4000 TL, there was a significant difference in the perceived service quality of metrobus in terms of income. Although there was a difference in the perceived service quality of metro in terms of perceptions of primary school graduates and secondary school graduates, associate degree and bachelor's degree, there was no difference in the perceived service quality of metrobus in terms of education status. The perceived level of service quality of both vehicles varies according to the type of ticket used.

As a result of the analysis, our main hypothesis "The perceived service quality level of metro users is different from the perceived service quality level of metrobus users" was accepted, and the differences hypotheses tested in relation to demographic and control variables were partially accepted.

Conclusion and Evaluation

It is believed that the conclusions drawn in this study, which compares the service quality of Istanbul city's metro and metrobus public transportation systems perceived by the users in terms of demographic factors, intended use and ticket type variables, will contribute to decision makers and the literature.

As a result of the research, it was found that the service quality perceived by the users of the metro transportation system is higher than the users of metrobus. The same difference is also evident in the sub-scales of the quality of service. In this context, metro transport systems are considered high-quality compared to metrobus transport systems in terms of factors that determine quality such as meeting promised service, the quality level of the physical conditions provided by the vehicles and the waiting areas, the distribution of service in terms of time and location, the adequacy of the service, safety of physical conditions, measures taken against accidents, crimes, etc., and the affordability of the ticket prices.

In the light of another research hypothesis, varying results were obtained by analyzing the perceived service quality in terms of the participants' demographic variables such as age, gender, income level, education status, employment status, and marital status. The perceived service quality levels of metro and metrobus variables were analyzed separately for each demographic variable and each transport system. While there was no difference in terms of many demographic features, it was observed that metro transport systems are perceived by female users to be of better quality than male users. In addition, although there was a difference in the perceived service quality level of metrobus transportation systems in accordance with the income levels, there was no difference in terms of metro use. When the level of perceived service quality of metro transportation systems was examined in terms of educational status of the participants, it was revealed that the perceptions of primary school graduates were higher than those of secondary school graduates and

participants with associate degree and bachelor's degree. It is considered that the increase in the level of education may lead to this increase in expectation about the quality level of the service offered.

Finally, the difference in the perceived service quality of public transport systems was investigated in terms of intended use and the type of ticket used, and no difference was found in terms of intended use. The perceived quality of service does not differ in accordance with the intended use of the vehicles. In addition, the perceived service quality level of both vehicles varies according to the ticket type used. It is believed that the increase in the expectation of the quality level increases depending on the fare paid, according to the ticket types, by the metro and metrobus users, which in turn causes this difference.

In summary, it was observed that the quality levels of both means of transportation should be increased, and the efforts in this direction should be more for the metrobus transportation systems in the light of the research findings. In addition to the works to be done to close the gap in perceived service quality between the transportation systems, it is necessary to carry out studies to improve the quality of both transportation systems in a holistic manner. It would be useful to concentrate on arrangements such as ensuring in-vehicle comfort and comfort in waiting areas, ensuring the promised scheme in terms of operation, increasing the level of safety, spreading the transportation network and establishing a benefit/cost balance for the ticket prices.

It is not possible to make generalizations since this study was conducted on the basis of the perceptions of a certain number of users. Expansion of the coverage with the participation of more users would be beneficial in reaching generalized judgments. The research findings are valuable for decision makers since they reflect the perceptions of the participants who frequently use these vehicles. In future studies, it will be possible to make more comprehensive comparisons by studying other systems such as buses, minibuses and trams, which are the urban public transport systems used in Istanbul.

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