

Integrated Usage of the SERVQUAL and Quality Function Deployment Techniques in the Assessment of Public Service Quality: The Case of Ardahan Municipality

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Abstract: Public services delivered by municipalities can be directly evaluated by citizens living within the border of the services presented. The purpose of this study is to introduce perception differences between the expectations and meeting these expectations of the citizens living in the service area of Ardahan Municipality and to present suggestions to the municipal authorities. Within the scope of this purpose, SERVQUAL (Service Quality) scale was used, perception about the municipality services was evaluated and service design was developed to increase the service quality of the Municipality through the Quality Function Deployment (QFD) technique. As a result of the survey applied to 382 citizens living in Ardahan centrum, the biggest difference between perception and expectation has found out in the reliability factor with 28.92%. Tangibles factor has been possessed the lowest importance percentage with 12.42%. Examining the technical requirements, the most important requirements have been found out as follows: height of service banks (8.17%), increasing landscaping works (7.07%), virtual support and private telephone line application (6.8%).

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1. Introduction

Quality concept has become highly important for customers especially since the beginning of 1990s. Previously, quality perception existed mostly for products, however, quality perception and expectations in terms of services have reached wide dimensions today. There are differences between product quality expectations and service quality expectations. The most important difference is that product quality expectations contain features such as ease of use, nature friendly, stability, reliability, prestige, etc., on the other hand, service quality expectations rather involve emotional and subjective characteristics.

Both manufacturing enterprises and service marketing companies (tourism, transportation, etc.), which operate within the private sector, conduct quality audits continuously and try to design the services they offer according to the expectations of the customers. In terms of service, the situation for the public sector is not different from private sector. Private sector organizations must continuously monitor and improve the quality in order to increase their profits and ensure continuity. Even though the public sector is

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nonprofit, public sector should keep the quality concept under constant control and make improvements just as private sector in order to maximize the benefit that can be provided to the citizen.

It is inevitable that the public sector, especially municipalities, remain up to date in terms of services. The main reason for this may be indicated as the election of mayors by citizens and the possibility of changing municipal administrators with the new elected mayor. Considering that the citizens are much more conscious and with clear expectations about the municipality, it has become a necessity for the municipalities to continuously monitor their service perceptions and improve their service quality accordingly.

The purpose of this study is to introduce an integrated technique to evaluate service perception about the municipality and design municipal services according to citizens' perception in terms of quality. For this purpose, at the first stage quality perception and expectation of the citizens were assessed with the SERVQUAL scale and at the second stage depending on perceptions and expectations quality design was made through QFD technique. Since there is no similar study found in literature related to the services of the municipality, Ardahan Municipality was been preferred for the model implementation.

In the first part of the study, the evaluation of public service perception with SERVQUAL scale, the use of quality function spread in public services and some of the related studies in the literature were summarized. In the second part, brief information was presented on service quality, public services, gap model that one of the service quality measurement models and SERVQUAL scale were addressed. In the following section, after brief information about KFG and house of quality issues, in the fourth section, data characteristics were referred for Ardahan Municipality where the sample application. And analyzes were made according to data characteristics. Finally, findings are interpreted and recommendations were presented.

2. Literature Review

In accordance with the purpose of the study, firstly studies in literature, in which SERVQUAL scale was used to measure public services, have been briefly introduced.

Munhurrun, Bhiwajee and Naidoo (2010) have aimed to determine the level of service quality provided by the public agency, which enforces the laws regulating road transport in Mauritius, from the point of customers and those working. They have used SERVQUAL scale in their study and have compared the perceptions regarding the services delivered and expectations for these services. The biggest difference has been in responsiveness according to citizens while it is tangibles for those working.

In the study carried out by Usta and Memiş (2010), it is aimed to identify the perception of voters regarding the service quality of the services delivered by the Giresun Municipality. As a result of the analysis of SERVQUAL scale applied on 293 voters in Giresun city centre, the service, most negatively perceived by the voters, is that sub and super structure of the city is not designed according to people with disability and elderly. The most positively perceived service is that the city's water requirement is met.

The purpose of the study carried out by Azizzadeh, Khalili and Soltani (2013) is to find out satisfaction and expectations regarding the postal services in Ilam province, which is the central of Ilam State in Iran, and to determine effective elements in these satisfaction and expectation and to improve the quality. To this end, SERVQUAL scale was administered on 180 people living in the province and it was concluded that improvement should be made on credibility, reliability and empathy factors.

Orhan (2016) tried to determine the quality level in Keçiören Municipality by comparing the quality expectations and perceptions. SERVQUAL scale was administered among 360 people in the study and collected data was analysed by using statistical methods. As a result, factors were prioritised as tangibles, reliance, empathy, responsiveness, credibility from higher to lower depending on SERVQUAL scores. SERVQUAL scores calculated showed service quality delivered was high.

Yıldırım and Şafaklı (2016) aimed to examine the personal perceptions on the service quality of Lefke Municipality by features such as gender, age, level of income, occupation, education etc. SERVQUAL scale was applied on 280 people living in the service area of Lefke Municipality. It was found out that the most

negatively perceived service was “Sub-structure services were not designed according to people with disability and old people”, whereas, the most positively perceived service is “Water need of the public is met”. In addition, it was indicated that service quality perceptions of the people generally showed similarities depending on their gender, age, level of income, occupation, education etc.

Ekiyor and Artıkbaev (2018) aimed to measure and evaluate the difference between expected service and perceived performance regarding elderly care service of municipalities among the people living in Kastamonu centrum through the service quality model (SERVQUAL) method. According to the results of the questionnaire administered on 64 participants, participants’ opinion did not differentiate in terms of tangibles, reliability and empathy aspects, while they significantly differentiated in terms of credibility and responsiveness.

Examining the literature, some of studies, in which QFD technique was used in the design of public services, were summarised below.

Kondrodaite (2012) aimed to measure the quality of education, health and social care systems services provided by Lithuanian municipalities and to propose a suitable model that can improve the quality of these services. In accordance with this purpose, he has applied surveys to 1542 citizens who gets service from six different municipalities (Joniskis, Akmene, Skuodas, Kretinga, Alytus, Klaipeda) in Lithuanian. At the end of the research, cooperation of various groups of different sectors, reconstruction and reorganization of infrastructure of social services institutions, the system of social services facilitated to people needs have been determined as the key elements of social services; disease prevention, healthy lifestyle, health education and preservation, network of health service institutions, implementation of long-term disease and addiction prevention programs, development of health service, promotion of public healthy lifestyle and rich recreational facilities, health education and strengthening programs, development and participation in various health care programs financed by EU structural funds have been determined as the key elements of health services and information systems network of educational institution, implementation of compulsory pre-school education, the services of pre-school age children education, decreased the differences between the city and village schools, modernized education and schools system, adapted to the needs of labour market, provided possibilities for any age people to come back into the education system have been determined as the key elements of education services. Besides, it has been emphasized that quality function deployment and mistake analysis models could applicable, as well as modifications of the SERVQUAL model.

Rao and Thakar (2013) aimed to increase service quality perception of public transport as a public service in their study. For this purpose, public’s opinion was received through questionnaire and interview and technical requirements were determined based on this opinion through brainstorming technique. According to the results obtained, the most important problems are waiting duration in the stations, lack of personnel and irregularity. They stated that the most important requirements were shortening the waiting duration for bus, assigning sufficient and required personnel and making strategic planning as a solution to the problems.

Moradi and Raissi (2015) made analysis through the QFD technique with the purpose of increasing public service quality in metro, public transportation, parking arrangements, traffic etc. in Tahrn Municipality. According to the results of the analysis, it is emphasised that tax pricing, informing and explaining legal situation constitute the most important requirements.

In the study conducted by Martins, Filho and Soares (2016), it was aimed to present improvement recommendations by assessing public service quality perception regarding public transportation in Maraba, Brazil. In accordance with this purpose, public opinion was collected and analysed with both graphics and QFD technique. As a result of both analyses, it was stated that satisfaction would be increased, if all transportation line would had a fixed charge, a central station would be built and the fleet would be increased at the rate of 15%.

Some of the studies on public and private sector service quality measurement and design by integrating SERVQUAL and QFD techniques are summarised below.

Ikiz and Masoudi (2008) aimed to introduce a conceptual model measuring service quality in hotels by using SERVQUAL scale at the beginning and then describing hotel guests and design requirements of the service provided with the QFD approach. They conducted a model application in a 5-star hotel and emphasised that cleaning, personnel behaviours and conveying recommendation, request and complaints etc. were the highest priority quality elements.

In the study conducted by Pakdil and Kurtulmuşoğlu (2014), it was aimed to use the Quality Function Deployment technique in order to improve the quality in the sector of road passenger transportation. Case studies were conducted on passengers of the road transportation companies operating in the Europe. SERVQUAL scale, focus group study and review of past academic studies were based on determining requests and requirements of customers. According to the analysis results, it was indicated that customers mostly attached importance to friendly behaviours by personnel, use of modern vehicles, perfect service and employment of competent staff.

Vorasaiharit and Thawesaengskulthai (2016) aimed at measuring service perception about the library of the Faculty of Engineering of the Chulalongkorn University in Thailand and determining quality-improving designs. For this purpose, the survey was administered on 375 students from the Faculty of Engineering and they used SERVQUAL scale and QFD method in an integrated way. The smallest negative differences in service perception were in tangibles, credibility and empathy factors, respectively. Online search for works and borrowing, WIFI aspect and fast service, providing online magazines and books were emphasised as the most important technical requirements in service design.

In the study conducted by Demirtaş and Köksal (2018), a new approach was developed by using SERVQUAL scale and QFD technique and it was applied in the bedded services of the Unit of General Surgery and Internal Diseases of Eskişehir State Hospital. SERVQUAL scores were calculated for the specified service quality dimensions and it was analysed whether perceived quality levels were significantly differentiated depending on demographic aspects and services. Recommendations were presented on how new approach, in which SERVQUAL scores obtained by ordinal scale were adapted and applied to ratio scale, could be used to determine high priority quality characteristics in the house of quality, and which quality characteristics were effective in determining targets and strategies to improve service quality was discussed.

In addition to these studies, there are more studies in the literature that integrate QFD and SERVQUAL techniques. Some of these studies can be listed as: Sahney, Banwet and Karunes (2004) used QFD and SERVQUAL techniques together to evaluate the quality of education in private school. Likewise, Akdağ et al. (2013) used these techniques together for measure and improve the service quality of private hospitals. Li, Xu and Wu (2009) used the QFD and SERVQUAL techniques in order to demonstrate the quality understanding of mobile telecommunication services in China. However, any studies were not encountered on public services in which these two techniques are used together. For this reason, within the scope of the study, SERVQUAL technique was used to measure the service quality of the municipality and QFD technique were used to provide quality improvement suggestions. In this way, it was possible to integrate two techniques in measuring the quality of public service.

3. Service Concept, Public Service and SERVQUAL Scale

Service concept is defined as economic activities, which do not have tangible outputs, are consumed after they are produced and create abstract effects such as comfort, ease, happiness and satisfaction in consumers (Quinn, Baruch, & Paquette, 1987: 53). On the other hand, public services which fall under the services depending on property within the approaches regarding service classification, are activities which are carried out by the institutions affiliated to the government or private institutions to operate under the supervision of these institutions, and aim to fulfil general-private public requirements, meet the needs and thus obtain public interest (Onar, 1966: 13). In order to mention public service, there should be a general need that is not met in the service region, this need should be permanent and there would be a possibility to disturb public order in the event that the need is not met (Özay, 1996: 235).

Public services have been considered as favour and not as the duty of the government in the years when public services were monopolised by the government (Saran & Göçerler, 1998: 247). Today, it is seen that this understanding has been changed, public services expectations have increased and citizens have been making quality assessment by comparing these services to the services provided by private sector (Sezer, 2008: 150). Administrators of the government have not remained unresponsive to the situation and attached more importance to sense of quality in public services.

It is seen that the first studies conducted with the purpose of assessing quality in public services generally assessed either demands or strategies. However, axis change happened in the studies carried out after the SERVQUAL service quality scale developed by Parasuraman et al., and new axis became customer expectations (Hsiao & Lin, 2008: 31).

There are many measurements in the assessment of service quality. SERVQUAL scale is the most used and whose effectiveness is accepted. The scale provides valid and reliable solutions to the service organisations as well as it is used in many service areas (Parasuraman, Zeithaml, & Berry, 1988: 30). One of the most important advantages of the scale is to determine and compare the expectation and perception levels of those benefitting from the service.

The study, which enabled the development of the scale, focused on the roots of problems occurred in services provision. In the model named as gap model, it enabled the clarification of quality sufficiency and the examination of both service provider and service user. In addition, it is defended regarding the service quality that it may show difference what service provider would like to do and what they actually did and what service user expected and what they had (Sütütemiz, 2015: 70-71).

The service quality scale first developed by Parasuraman, Zeithaml and Berry (1985) comprises of 10 factors such as credibility, responsiveness, competence, access, courtesy, communication, credibility, security, understanding the customer and tangible quality, consisting total of 97 questions. After the credibility and validity studies in 1988, they reduced the number of questions to 22 and identified the number factors constituting the scale as 5. They determined the factors as Tangibles, Credibility, Responsiveness, Reliability and Empathy (Parasuraman, Zeithaml, & Berry, 1988: 23).

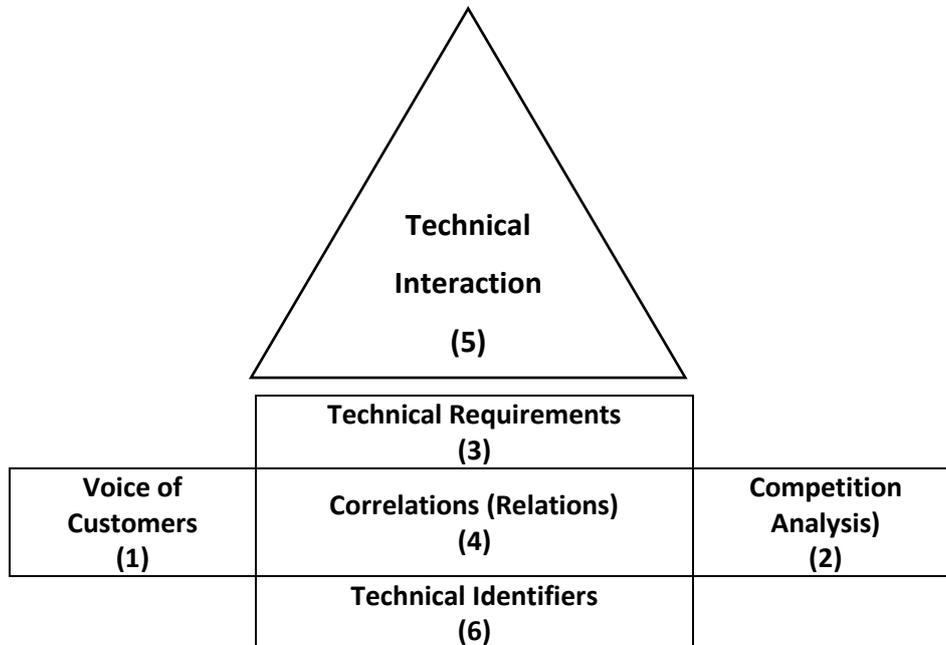
Even Parasuraman, Zeithaml and Berry stated that the SERVQUAL scale developed for the measurement of service quality was generally valid and reliable as a result of their studies, Brown, Churchill and Peter (1993) emphasised that this situation could differ depending on the elements such as sector, place and time. For instance, service perception of a customer living in the United States of America regarding any service may differ from the perception of a customer living in Turkey for the same service. Therefore, it can be said that time, place and service sector benefitted by the customer has become an important element in order to measure service quality (Usta & Memiş, 2010: 338). Also, it is possible to state that the difference between public service perception and private sector service perception regarding the service quality concept may show differences in terms of perceptions and expectations. The reason underlying this situation can be considered that public sector does not seek any profit in the delivery of services although private sector had profit in providing services. Thus, an adapted scale based on SERVQUAL scale developed by Parasuraman, Zeithaml and Berry is used in service quality measurement for public services.

4. Quality Function Deployment (QFD) and House of Quality

QFD is used for knowing customer, identifying their needs and defining how to realise these requests. QFD was first used by a group composed of those who were working in the marketing and production functions part of Toyota Motor Company in 1972 and results such as important achievements in the duration of building team and decreasing costs 60% were achieved. Following this achievement in Japan the interest against the topic increased in the USA day by day especially since 1980s (Gümüşoğlu, 2000: 145). QFD was first applied on the products in manufacturing sector. Then, it was used in service sector following successful results. In recent years, it has been also used to develop public services.

QFD consists of 4 phases in total. The first phase is to translate voice of customer, named as technical measurement, into product or service design quality. The second phase is to turn important technical measurements into part attribute or sub-parts of service; the third phase is to transfer important part attributes or sub parts of service to processes and the fourth phase is to convert basic processes into daily production or service requirement. The first phase of the QFD is fulfilled with the House of Quality application, which has essential and strategic importance (Chan & Wu, 2005: 119).

Figure 1. House of Quality



The House of Quality took this name as its shape resembles a house. Components of the House of Quality and basic concepts used in these components are briefly summarised below:

- **Voice of Customer:** Explanations regarding the demands and requirements of customer are given in this section. Data are collected and prepared for analysis with the help of these explanations. This is the section showing “WHAT” customers would demand.

Importance level: It contains importance level attached by the customers, who receive a service or use a product of an enterprise, to features defined for a service or a product. This section may be designated with the surveys, focus group, interview etc. with customers or examinations such as recommendations, complaints and feedback sent to the enterprise.

- **Competition Analysis:** To what extend every customer’s demand is met by the firm and its competitor or quality perception of the company and expected quality measurements depending on the answers from customers are placed on a matrix. The company examines the level of satisfaction for all customer requests and requirements, identifies quality scores which it is planning to realise and calculates the potential improvement rates depending on these scores. Later, it sets the sales points scores based on customer demands (Kurt & Yenilmez, 2017: 17).

Perception and Target: Perception section is composed of the level of satisfaction on the features identified for a product or service. Target section shows the targeted score set for the related feature by the company.

Improvement ratio: This is the measurement showing required effort by the company for the requirement of every customer in order to improve customer satisfaction performance. It is calculated by

dividing the value in the target column for the requirement of every customer to the value in the column of company's performance (Akbaba, 2006: 689).

$$\text{Improvement Ratio} = \frac{\text{Business Target Score (or Expectation)}}{\text{Perception}}$$

Sales points: It is the probability value indicating the position held by the company in the market. A high "sales points" rate (1.5) shows that customer requirements are assessed with smaller scores in the competing companies. A moderate "sales points" rate (1.2) means that competition opportunity is not very high and low "sales points" rate (1) indicates that there is no business opportunity (Ünal & Yıldız, 2017: 107).

Raw weight: Multiplication of importance level determined by the customer, improvement ratio and sales points scores gives significance weight for each proposition. The column of raw weight on the house of quality is formed by sorting raw weights of each customer requests by top and bottom (Öter & Tütüncü, 2001: 107).

$$\text{Raw Wight} = \text{Importance Level} \times \text{Improvement Ratio} \times \text{Sales Point}$$

Relative Weight Percentage: It is giving relative weight numbers in percentage in order to normalise raw weights of proposition or factors related to product or service qualities.

$$\text{Relative Raw Wight} = \left(\frac{\text{Raw Weight}}{\text{Total Raw Weight}} \right) \times 100$$

- **Technical Requirements:** Similarly, in the section where the voice of customer is gathered, the voice of company's business processes is collected in this section. This section is also called technical language or inner voice of the company. The basic idea is to include at least one technical specification which enables to meet customer's expectations into the matrix (Doğu & Özgürel, 2008: 35). This section is how "WHAT's" in the section of voice of customers could be met, in other words "HOW's" section.
- **Correlations (Relationships):** It is the section relating WHAT's in the section of the voice of customer with "HOW's" in the section of technical requirements. In this section, customer requests and requirements meeting level is determined with each technical requirement. Symbols and corresponding scores for meeting levels are as follows:

△: 1 –Weak Relationship ●: 3 –Medium Relationship ○: 9 –Strong Relationship

- **Technical Interaction:** In this section also referred as roof matrix, there is a correlation between technical requirements identified. Roof matrix enables to recognise technical features affecting each other either positively or negatively and helps the company to improve technical features having strong relationships (Kurt & Yenilmez, 2017: 19). Correlation symbols of roof matrix are as follows:

- : Negative Relationship + : Positive Relationship
 ⊖: Strong Negative Relationship ⊕: Strong Positive Relationship

- **Technical Identifiers:** This is the section in which importance levels of each requirements in the technical requirements are calculated (Curcic and Milunovic, 2007: 246).

Technical Weight: In this section, importance level of focus groups previously formed and identified technical requirements are calculated taking into consideration the correlations.

$$\text{Technical Weight} = \sum \text{Customer Needs and Technical Requirement Relationship Level} \times \text{Relative Weight}$$

Technical Relative Weight Percentage: As in the section of relative weight percentage, it is the section in which technical relative weight values are normalized. Calculation method is the same as the relative weight percentage.

$$\text{Technical Relative Weight} = \left(\frac{\text{Technical Importance of Related TechnicalWeight}}{\text{Total TechnicalWeight}} \right) \times 100$$

5. Methods

In this study, it is aimed at using SERVQUAL and QFD techniques in an integrated way to assess service quality of the Municipality and identify priority areas in order to increase quality. There are studies in literature, which separately use SERVQUAL and QFD techniques for public services. Also, it is possible to find integrated studies in which SERVQUAL and QFD techniques are used together. However, there is no integrated study to assess and improve municipal services within public services. Therefore, integrated method is used in the study aiming to identify and improve the Municipality's service quality. In accordance with this purpose, perception and expectation of citizens living in Ardahan city centre regarding the services provided by Ardahan Municipality were examined through survey. Within the scope of the study, adapted SERVQUAL scale also used in the studies conducted by Orhan (2016), Yıldırım and Şafaklı (2016) and Ekiyor and Artıkbaev (2018) in literature was applied.

5.1. Sampling Method and Sample Size

Convenience sampling method was used for the data collected with face-to-face survey method. With the selection of convenience sampling method, it was aimed to reach people with different education background and income level and living within Ardahan Municipality service area, and collect data with an unprejudiced sampling method in the field. The number of voters in Ardahan city centre in the last Local Election in 2014 was taken into consideration for the sampling volume. The number of registered voters in Ardahan centrum in 2014 was identified as 27106 according to the election data provided by the Supreme Election Council. In the light of this information, sample size for 95% confidence interval is calculated according to the formula to be applied when universe volume is known (Balci, 2016: 109).

$$n = \frac{Nt^2(pq)}{d^2(N - 1) + t^2(pq)}$$

n represents sample size; N for population size; t for table value of reliability level (e.g. 1.64; 1.96; 2.57); p for realisation possibility of the case examined; q for impossibility of the case examined and d for tolerance level (0.05 or 0.01) in the study. Accordingly, the lowest sampling volume is calculated as

$$n = \frac{27106*(1.96^2)*(0.5*0.5)}{(0.05)^2*(27106 - 1) + (1.96)^2*(0.5*0.5)} \approx 378.805$$

In the event that tolerance level is 0.05. Based on the result achieved, it was found out that at least 379 people should be surveyed within the study. However, total of 400 people were surveyed in case missing or wrong answers could be given in the questionnaires. 382 questionnaires were prepared for analysis after eliminating missing and wrong answered questionnaires. Thus, threshold necessary for sample size was exceeded.

5.2. Reliability and Validity Analysis

The technique previously applied in the study by Usta and Memiş (2010) was used for reliability and validity analysis of the scale. This is because whether perception or expectation section should be addressed is complex for explanatory factor analysis to be made for validity. Accordingly, "perception - expectation" values take maximum +4 and minimum -4 following the application of 5-point Likert scale on perception of municipal service quality. Remaining result are between these two values. All the values between +4 and -4 were re-coded between 0 and 8 so that analysis to be applied should not be affected by negative values, and

a single column was obtained. Following the required transformation operations, general reliability coefficient was found as 0.965. This result indicates that the scale is considerably reliable.

Explanatory factor analysis was applied for validity analysis. Calculated values and factor loads are presented on Table 1.

Table 1: Factor Analysis Results

Questions	Factor Load				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1	Service buildings of the Municipality have modern looking.	0.817			
2	Municipal personnel have clean and proper looking.	0.790			
3	Municipality designs the service buildings in a way that people with disability could access.	0.593			
7	Municipality solves the problems of citizens on time.		0.719		
4	Commitments given by the Municipality were redeemed on time.		0.665		
8	Municipality personnel are always willing to help citizens.		0.678		
9	Municipality personnel are friendly against citizens.		0.573		
6	The Municipality is fair in delivery of services for each citizen.		0.513		
5	The Municipality informs public regarding the works carried out.		0.459		
10	The Municipality organises social activities for citizens.			0.704	
11	The Municipality provides services facilitating students' life.			0.675	
12	The Municipality shows citizens how to benefit from the services.			0.620	
13	The Municipality is environmentally conscious.			0.588	
14	Complaints can easily be delivered to the relevant units in the Municipality.			0.516	
15	The Municipality attaches importance to cleaning services.				0.775
18	The Municipality does not allows housings, which will disrupt the city's appearance.				0.703
20	The Municipality pays attention to the storage and disposal of wastes.				0.613
19	The Municipality pays attention to the regulation of local traffic.				0.595
17	The Municipality conducts required inspections for public health.				0.549
16	The Municipality considers people with disability and elderly in infrastructure services.				0.524
23	Municipality personnel take cares of each citizen personally.				0.707
21	Municipality personnel take cares of each citizen individually.				0.686
22	Municipality personnel have knowledge to solve citizens' problems.				0.643
24	Municipality personnel place their interests before anyone.				0.623
25	Municipality personnel understand personal requests of citizens.				0.552

Factor 1: Tangibles; Factor 2: Credibility; Factor 3: Responsiveness; Factor 4: Reliability; Factor 5: Empathy

On the Table 1, Kaiser-Meyer-Olkin (KMO) value is 0.958 showing whether the data is appropriate for factor analysis and significance level is 0.000, which also shows the data is appropriate for factor analysis. Examining distributions and factor loads of questions by factors, 5 factors were obtained in accordance with literature. Factor loads of each factors being bigger than 0.45 indicates that related questions sufficiently explain the relevant factors.

6. Results

6.1. Descriptive Results

The descriptive statistics related to 382 participants who included in the research are summarized in the Table-2 below.

Table 2. Descriptive Statistics for Participants

Characteristic	Interval/ Characteristic	Number of People	Percentage (%)
Gender	Male	228	59.7
	Female	154	40.3
	TOTAL	382	100
Age	18-25	154	40.4
	26-30	61	16.0
	31-35	72	18.8
	36-40	41	10.7
	41-45	25	6.5
	Age 46 or older	29	7.6
	TOTAL	382	100
Education	Primary school	41	10.7
	Secondary School	59	15.4
	High School	67	17.5
	Associate Degree	35	9.2
	Bachelor's Degree	161	42.1
	Postgraduate	19	5.0
	TOTAL	382	100
Occupation	Public Servant	77	20.2
	Private Sector Personnel	49	12.8
	Self-Employed	90	23.6
	Student	145	38.0
	Retired	21	5.5
	TOTAL	382	100
Monthly Income	<1400 ₺	177	46.3
	1401-2400 ₺	92	24.1
	2401-3400 ₺	61	16.0
	3401-4400 ₺	18	4.7
	4401-5400 ₺	15	3.9
	5400 ₺ >	19	5.0
TOTAL	382	100	
General Satisfaction of Municipal Services	Yes	101	26.4
	No	281	73.6
	TOTAL	382	100

Survey participants are composed of 228 (59.7%) males and 154 females (40.3%). Examining the ages of participants, 154 of them (40.4%) are 18-25 ages; 61 of them (16%) are 26-30 ages; 72 of them (18.8%) are 31-35 ages; 41 of them (10.7%) are 36-40 ages; 25 of them (6.5%) are 41-45 and 29 of them (7.6%) are 46 and above. 41 participants (10.7%) are primary school graduate; 59 participants (15.4%) are secondary school graduate; 67 participants (17.5%) are high school graduate; 35 participants (9.2%) have associate degree, 161 participants (42.1%) are bachelor's degree graduate and 19 participants (5%) are postgraduate degree. Examining the distribution of occupation of the participants, 77 participants (20.2%) are public servant; 49 participants (12.8%) are private sector personnel; 90 participants (23.6%) are self-employed; 145 participants (38%) are students and 21 participants (5.5%) are retired. Examining the distribution by monthly income, 177 participants (46.3%) earn 1400 TL and below; 92 participants (24.1%) earn 1401-2400 TL income; 61 participants (16%) earn 2401-3400 TL income; 18 participants (4.7%) earn 3401-4400 TL; 15 participants (3.9%) earn 4401-5400 TL and 19 participants (5%) earn 5400 TL and above. Finally, when general satisfaction level with the municipal services is examined, 101 participants (26.4%) stated they were satisfied while 281 participants (73.6%) were not satisfied with the services.

6.2. Application of House of Quality

Following the examination of analyses on the scale and demographic features of participants, house of quality is applied based on the study purposes.

6.2.1. Voice of Customer

The section of the voice of customer which forms the left part of house of quality was determined with the SERVQUAL scale used in many studies measuring public service satisfaction in literature. According to the answers given by the participants living in Ardahan, importance level based on factors and answers to these factors were summarised in the Table 3. In the surveys conducted, average importance level by factors were calculated as the importance level for each requests by citizens is different. Thus, a single importance level was obtained.

6.2.2. Competition Analysis

The section "Current Situation of the Municipality", which shows the current situation of the municipal services from the point of view of citizens, includes answers by perception in SERVQUAL scale. "Targets of the Municipality" section is also formed with the answers assessed through SERVQUAL scale by expectations. Depending on the interview with the Municipality, it was decided to accept "Targets of the Municipality" as public expectations since it was stated by the Municipality that their target was to meet the expectations of public.

In this section of the house of quality, feed rate, sales points, raw weight and relative weight percentage were calculated. A board was formed with the participation of academicians and specialists. This board consisted of 6 people, including 3 of whom are academicians. The members of the board, other than academicians, were composed of Civil Works Director, Municipal Police Director and Technician who working in different municipalities as Erzurum, İstanbul. The academicians in the Board were persons who have studies in Numerical Methods and Management Sciences. And brainstorming technique was used to determine the values of sales points. Experiences, views and past scientific publications were benefitted in determining the values of sales points.

Table 3. Voice of Customer and Competition Analysis

Factors	Importance level	Perception	Expectation	Improvement ratio	Sales points	Raw weight	Relative weight %
Tangibles	7	2.30	4.54	1.97	1	13.79	12.42
Credibility	8	2.47	4.57	1.85	1.5	22.2	20.00
Responsiveness	9	2.36	4.59	1.94	1.2	20.95	18.88
Reliability	10	2.16	4.62	2.14	1.5	32.1	28.92
Empathy	8	2.50	4.57	1.83	1.5	21.96	19.78

The mathematical calculations of the improvement ratio, raw weight and relative weight values which are included in the second phase of the QFD and which are expressed in Table 3 are as follows (for Tangibles).

$$\text{Improvement Ratio}_{\text{Tangibles}} = \frac{\text{Expectation}}{\text{Perception}} = \frac{4.54}{2.3} = 1.97$$

$$\text{Raw Weight}_{\text{Tangibles}} = \text{Importance Level}_{\text{Tangibles}} \times \text{Improvement Ratio}_{\text{Tangibles}} \times \text{Sales Point}_{\text{Tangibles}}$$

$$\text{Raw Weight}_{\text{Tangibles}} = 7 \times 1.97 \times 1 = 13.79$$

$$\text{Relative Weight}_{\text{Tangibles}} = \left(\frac{\text{Raw Weight}}{\text{Total Raw Weight}} \right) \times 100 = \left(\frac{13.79}{111} \right) \times 100 = 12.42$$

Examining the Table 3, it can be indicated that tangibles factor of the Municipality according to the participants has the least importance level with 7, while reliability factor is the most significant factor with the importance level of 10. Importance level of responsiveness factor is 9, while credibility and empathy factors have importance level of 8. Perception average of reliability factor of Ardahan Municipality services is 2.16 and has the rate of lowest satisfaction. This factor is followed by tangibles factor with the average of 2.3; responsiveness factor with the average of 2.36; credibility factor with the average of 2.47 and empathy factor with the average of 2.5 respectively. Interviews with the Municipality were based on participants' expectations for targets. Accordingly, the highest target is reliability factor with the average of 4.62. Subsequently, it was followed by responsiveness factor with the average of 4.59; credibility and empathy with the average of 4.57 and tangibles factor with the average of 4.54. Improvement ratios are sorted as reliability with 2.14; tangibles with 1.97; responsiveness with 1.94; credibility with 1.85 and empathy with 1.83. Only the column of relative weight can be examined, since raw weights and importance level scores are related to each other. Accordingly, the most significant factor is reliability factor with 28.92%. This is followed by credibility factor with the importance level of 20% and empathy factor with 19.78% as the third most significant factor. Responsiveness factor is the fourth with 18.88% and tangibles factor is the last with 12.42%.

After the completion of voice of customers and competition analysis section, technical requirements were determined based on the request of citizens by the board formed in the competition analysis phase. A pool was created for technical requirements and 19 technical requirements were obtained by making eliminations in this pool. After technical requirements were identified, the same board worked on correlations. In the determination of the correlations; experiences of the board members, intuitive thoughts, opinions of the citizens, suggestions in the similar studies in the literature have been taken a very important place. Information on technical requirements and correlations identified are presented in Table 4.

Table 4. Technical Requirements and Relationships

	Reducing the height of service banks	Reporting complaints, recommendations and requests	Application of virtual support and private telephone line	Increasing the number of supervisions	Cooperation with the sister municipalities	Informing personnel	Increasing the use of signs and signboards	Organisation of events for people with disabilities and elderly in their special days	Cooperation with other institutions and organisations	Obtaining recycling containers	Extending the distribution area of the Municipality magazine	Identification and regulation of the bus stops	Providing access to activity reports	Studies on feedbacks	One on one interview with public	Pre-service studies	Identifying alternative transportation roads	Increasing landscaping works	Conducting personnel training	
Tangibles	●	△		●	△	●	●	●	△		△									
Credibility	●	△	●			●				○		○	○	○	●	○				●
Responsiveness	△	○	●					△	●	●	●	●	●	●	●	●				●
Reliability	○			○			○	●		○		○						●		○
Empathy	△	●	○			●		○						●	○	●				○

△ : 1 –Weak Relationship ● : 3 –Medium Relationship ○ : 9 –Strong Relationship

It is possible to state that technical requirements identified are mostly related to credibility and responsiveness factors in general. Reliability factor is relatively affected in terms of relationship power.

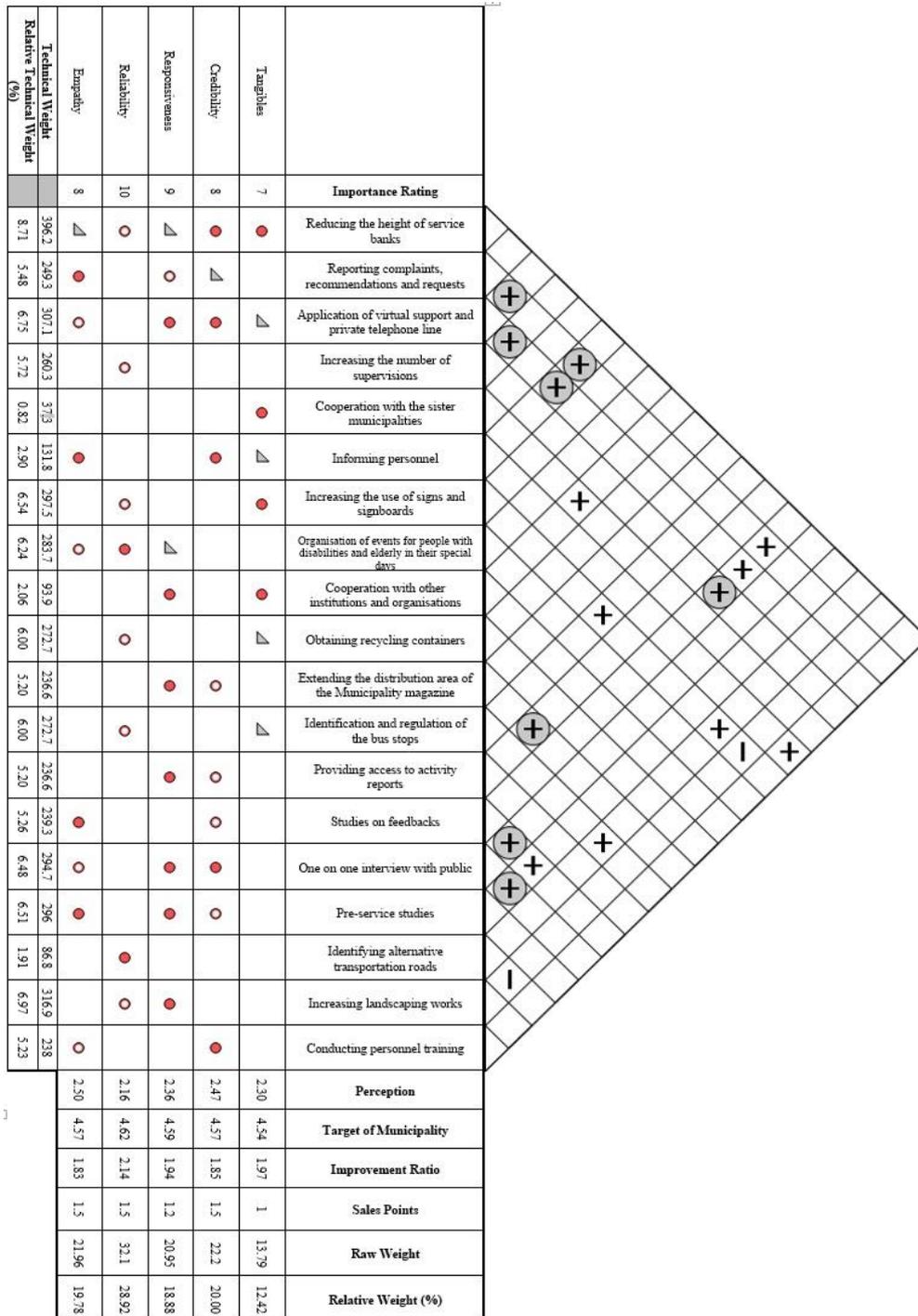
Following the identification of technical requirements and correlations, technical interaction and technical identifiers forming the roof of the house of quality were analysed. This section, as in the determination of correlations, it was analyzed by the board that consisting of six people by considering factors such as experiences, past studies and citizens' thoughts. Results of the analysis are given in the house of quality application showed on the Figure 2. The formulas used in the calculation of the technical weight and relative technical weight parts in the last two rows of Fig. 2 have already been mentioned. The calculation method and result of these values for tangibles is as follows.

$$\begin{aligned}
 \text{Technical Weight} &= \sum \text{Customer Needs and Technical Requirement Relationship Level} \times \text{Relative Weight} \\
 &= (12.42 \times 3) + (20 \times 3) + (18.88 \times 1) + (28.92 \times 9) + (19.78 \times 1) \\
 &= 396.2
 \end{aligned}$$

$$\begin{aligned}
 \text{Technical Relative Weight} &= \left(\frac{\text{Technical Importance of Related Technical Weight}}{\text{Total TechnicalWeight}} \right) \times 100 \\
 &= \left(\frac{396.2}{4547.3} \right) \times 100 = 8.71
 \end{aligned}$$

Examining the house of quality, it is possible to indicate that the most significant requirement is “reducing the height of service banks” with 8.71% based on the technical relative weight section. This is followed by “increasing landscaping works” with 6.97%. These technical requirements are followed by “application of virtual support and private telephone line with” 6.75%, “increasing the use of signs and signboards” with 6.54%, “one on one interviews with public” with 6.48% and “pre-service studies” with 6.51%. Technical requirement which has the lowest relative weight is cooperation with the sister municipalities with 0.82%. All technical requirements except increasing the number of supervisions are included in at least two factors when the house of quality is examined. This situation shows that all technical requirements directly affect more than one technique in different ways.

Figure 2. House of Quality for Ardahan Municipality



7. Conclusion

Municipalities as the unit of local government are the public organisations where citizens can directly follow and participate in governmental activities and convey their demands and complaints. These organisations pay attention to the demands of citizens in providing services based on participative management understanding as a result of developments occurred in management phenomenon. In a changing and developing world, citizens demand quality as well as services from the municipality. Therefore, Ardahan Municipality was addressed in this study, which aimed to make required design in order to improve perceptions on the quality of municipal services and quality of the services. There is no other similar study regarding.

The first technical requirement to be improved regarding the services of Ardahan Municipality is “reducing the height of service banks”. Reducing the height of service banks may show that more transparent understanding is adopted in the operations carried out. In addition, it may be possible for elderly and people with disability to have their operations done and easily communicate with the personnel with the reduction of height. Positive development can be shown in all factors through these activities.

Technical requirement of “increasing landscaping works” directly influencing reliability and responsiveness factors will ensure that the city have better appearance, areas within the border of the Municipality are more attractive and the Municipality fulfils its duties in a willing way. However, it is necessary to pay attention to “identify alternative transportation roads”, which will affect the appearance of the city, and “increase the use of signs and signboards” during landscaping works. These technical requirements and requirement of “increasing landscaping works” may negatively affect each other. Because the matrix on the roof of the house of quality has the “-” sign in the boxes where the relevant characteristics intersect.

It is also important for Ardahan Municipality to adopt “the application of virtual support and private telephone line” already used by many municipalities. A free and catchy support line may be established so that citizens can easily deliver their problems, recommendations and questions. Also, virtual representative application may be developed so that those who browse the website of the Municipality receive support. These adjustments may increase citizens’ trust against municipality personnel, and show that the Municipality is willingly working and has a citizen-oriented understanding in the provision of services.

Since providing services for citizens is the primary goal, getting together with citizens, receiving feedback after a service provided and cooperating with citizens in the planning of services are also important for Ardahan Municipality as well as the others, and these elements are integrated. Governance phenomenon is becoming more important with the developments particularly in the field of administration. Public institutions and organisations prefer to act in accordance with the demands of citizens in the identification and implementation of service provision. Therefore, they can periodically organise events which citizens can take part in the management, visit different neighbourhoods and conduct activities to listen the demands of citizens. Improvements in empathy, credibility and responsiveness factors may be achieved with the fulfilment of these activities.

Finally, it is necessary to deliver regular trainings and check municipality personnel on the topics such as communication, stress management, time management and public relations. Also, informing personnel on the developments in laws, regulations and legislations on a regular basis will have a trust enhancing effect on citizens. Thus, relation between personnel and citizens will be strengthened and the Municipality will become integrated with citizens. In addition, as an advanced human resources policy within the framework of personnel strengthening, personnel’s communication with the municipalities shown as an example in the field of quality, supporting activities such as fair, congress, symposium etc. to follow up up-to-date developments regarding local administrations and promotion of graduate degree will contribute to increase service quality.

In the event that above mentioned requirements are realised, Ardahan Municipality will show service provision understanding on an expected quality axis to a great extent.

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