Journal of Transportation Technologies, 2022, 12, 258-285
https://www.scirp.org/journal/jtts
ISSN Online: 2160-0481
ISSN Print: 2160-0473

Gap Analysis between Women Passengers' Perception and Expectations about Bus Service: A Case Study on Bangladesh

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How to cite this paper: Umme, A., Aya, K. and Hisashi, K. (2022) Gap Analysis between Women Passengers' Perception and Expectations about Bus Service: A Case Study on Bangladesh. *Journal of Transportation Technologies*, **12**, 258-285.
https://doi.org/10.4236/jtts.2022.122016

Received: March 18, 2022
Accepted: April 24, 2022
Published: April 27, 2022

Abstract

Since public bus service is frequently available and reasonably priced in major cities of Bangladesh including Dhaka, the capital city, a significant number of economically active women regularly commute to work utilizing public buses. Since female commuters experience unique challenges compared to their male counterparts, a gap analysis on the perception of men and women, as well as the difference between the female commuters' perceptions and expectations, could help to pinpoint the issues. The aim of this paper is to determine the gap between female commuters' perceptions and expectations of bus service quality in Bangladesh, as well as the current perception of both male and female passengers. In this paper, the data obtained is studied to determine the service quality needs which should be improved by analyzing the perception and expectation gaps for female passengers. SERVQUAL models were used to examine the disparities between perceptions and aspirations in Bangladesh's major cities. Tangibility, reliability, responsiveness, assurance, and empathy are the five dimensions of SERVQUAL. The data for this study was collected from 1500 commuters in Bangladesh's largest cities, including Dhaka, Gazipur, and Narayanganj. Primary data was gathered using a purpose-built questionnaire survey. The Gap values are negative in all dimensions, according to the findings of the study. In the data analysis, a negative gap value indicates that the expectation exceeds the perception. According to the gap analysis, the quality of bus service for passengers is insufficient. Bus service quality is seen and expected to be quite varied. It is vital to improve bus service to meet the needs of women. The findings could be valuable in planning future transportation policies that take female commuters' needs into account.

Keywords

Public Bus, Public Transport, Women Commuters, Service Quality,

SERVQUAL, Bangladesh, Perceptions, Expectations

1. Introduction

Dhaka is one of the fastest growing and highly dense cities in the world and the city holds a population of about 12 million people within its 1529 sq·km land area [1]. People migrate to Dhaka from various parts of Bangladesh in search of a better life, education, work, etc. Rural-urban migration contributes to this high population growth in Dhaka [1] [2]. Unlike most other cities in Asia, the male to female ratio in Dhaka is around 1:1 [2]. Being the main commercial hub of Bangladesh, Dhaka is the hub of employment opportunities and all essential amenities, such as health, education, etc. In densely populated metropolitan areas, public transport (PT) is the most efficient means of transportation for meeting travel demands. People in cities must move on a regular basis to participate in economic activities, which enables the formation of social networks and makes family life easier. PT is the vein of any nation, because it permits the free movement of people, goods, and information, thereby allowing progress on the most efficient deployment of economic resources. In other words, PT has a direct impact on any nation's economic progress. Public transportation has the potential to reduce the number of private vehicles in cities while simultaneously providing mobility to an enormous number of people who do not own any car and cannot afford to pay the ever-changing paratransit or taxi fares [3]. Globalization, motorization, urbanization, and socio-demographic shifts have had a significant impact on the transportation of both men and women globally. For the past two decades, policymakers and transportation planners have focused on gender issues in the public transportation sector, recognizing the differences in the travel modes and transportation routes and the related pattern of activities for both men and women globally [4] [5].

The issue of women empowerment is positively gaining traction around the world as more women join the workforce, hence contributing positively to the economic progress of their nation [6]. Although this has made a great impact, their mobility and access to their workplace are becoming a challenging requirement [6]. As a result of the increasing female workforce, more travel times have to be met and higher demand for PT. Also, in both developing and developed nations where women have substantially less freedom than males, they make remarkable impact on the economy. They generate a significant number of journeys on a regular basis. Also, due to a greater variety of social classes, cultural backgrounds, and economic situations in the urban context of developing countries, travel patterns between male and female members of the same household are different [5]. Since most working women are low-wage earners, they do not have the financial means to pay for private or shared transportation. Therefore, public bus service is more convenient because it is more economical and cost-

effective for commuters. Nowadays, the public bus service demand is increasing rapidly with the increase of female commuters. Researchers also have been studying the relationship between the quality of transport services and people's accessibility in recent decades [5] [6] [7]. Several studies on the quality of public bus services have been undertaken, but none have taken gender into account [8] [9]. Most of the existing research focused on the service quality of public bus service in Bangladesh in terms of perception, expectations, and passengers' satisfaction [10] [11]. However, there is less research on the quality of public bus services that consider gender issues in developing countries like Bangladesh [5]. In addition, the effects of society and culture in developing nations like Bangladesh, quite differ on the travel patterns of both the male and female commuters [12] [13]. Female commuters must relocate to gain access to services and job possibilities [14]. Therefore, the female passenger's safety, security, comfort level, reserved seat, boarding, alighting facilities, handicap facilities, accessibility of bus, etc., are the more important factors while traveling in public bus service. Using Bangladesh as a case study, it was observed that very few previous studies on bus service considered these issues regarding female commuters, hence the need for this study.

The aim of this research is to determine the level of perception of men and women commuters about public bus service and measure the gap between the expectations and perception of women commuters. From the analyzed gap value, the authors made some decisions about the improvement of the level of service quality of the bus according to the female commuter's expectation. Also, the discussions on the findings were made on the attributes which significantly influenced the service quality of buses regarding the women passengers. This paper is structured with an introduction in Section 1, and a literature review to stress the research need with the unique contribution of this study is undertaken in Section 2. The data collection is presented in Section 3. Following that, the research approach is comprehensively presented in Section 4, while the methodology is presented in Section 5. The study's findings are then presented and discussed in Section 6, and finally used to draw conclusions in Section 7. Also, the policy ramifications are examined as some recommendations and action plans were presented.

2. Literature Review

2.1. Gender Issues in Public Transport Services

Most women in Bangladesh are active in social-cultural, economic, and political activities for which they need PT to meet up their daily necessities. However, the employed population has a significant discrepancy concerning gender. Even though both men and women are contributing to the country's economic development, there is serious inequity in the availability of efficient and safe transport for female commuters. Women are more dependent on PT than men, especially when they are lower income. The bus is the only mode of mass public transit

available in Dhaka City for middle-income and low-income classes. In recent years, the number of female commuters is increasing rapidly for education, jobs, business, etc. Therefore, the public bus service quality is an important issue for the passengers, especially female passengers. The dwellers of Dhaka city faced various problems related to transportation in their day-to-day life [15]. A substantial part of this population, 49.4%, is women. According to the 2018 UNESCO report (Bangladesh's literacy rate rises; https://countryeconomy.com/demography/literacy-rate/bangladesh) the female literacy rate of Bangladesh is 71.18%. Unfortunately, Bangladeshi women had to deal with a variety of transportation issues. However, there is a paucity of studies on women's transportation pleasure, with most female passengers opting for public transit due to its accessibility and affordability. There have been some studies on the quality of public bus service and passenger satisfaction, with the majority of respondents being male or male and female. According to prior research, the environment of bus service is quite inadequate and barely meets the needs of passengers [16].

Passengers are unsatisfied for three reasons: unsafe driving, improper boarding and alighting, and lack of law enforcement surveillance [16], several studies, including the one by Rouf *et al.* [14], have focused on the safety of female riders on public buses. On public buses, they are harassed by male passengers or by the crew. Transportation planning does not take gender into account [5]. Other than the risk of accident and sexual harassment, according to K.A. Rouf *et al.* [14], safety is the most critical problem for female passengers riding the public bus. According to the existing research, the passengers of public buses face some difficulty to travel, especially women commuters like harassment, poor boarding, and alighting facilities, etc. M.S. Rahman *et al.* 2012 [17] are also worth mentioning. Passenger's boarding the bus have been waiting for an unknown amount of time, with no indication of when the bus will arrive. According to prior research, female passengers face serious issues such as safety, security, and bus personnel behavior. Because of distinct economic and cultural duties, obligations, and activities in the issue of gender inequality, men and women have varied travel patterns [3] [18]. Because of their dual obligations, they travel more frequently than working men to perform various household tasks such as childcare and transporting parents to doctors or health care facilities, shopping, visiting relatives, and so on [19] [20]. In developing countries, women have less access to private motorized vehicles than men due to societal norms about women's appropriate travel behavior [19]; women are more concerned about their safety issues while using public transportation than men. Tarigan *et al.*, 2010 [21], women are frequently targets of sexual harassment when walking or using public transportation, according to Anand & Tiwari, 2006 [20], and this scenario may be exacerbated by low lighting and small lonely routes connecting homes to bus stations. M.S. Rahman *et al.* 2012 [17] while commuting in Dhaka City's public transportation, women suffer a variety of physical harassment and issues. In most cases, women in public transportation are unable to protect themselves

against physical touching and other forms of abuse. They are restless and insecure in the majority of Dhaka City's public transportation facilities. On the other hand, male travellers have never had such a problem with public transportation. As a result, the most pressing topic for further inquiry is the perception of women passengers and what is the expectation level of public bus service. Since female passengers face problems while traveling public buses, so the mitigation of these problems is essential.

2.2. SERVAQUAL

SERVQUAL could be a multidimensional research instrument designed to capture consumer expectations and perceptions of a service along five dimensions that are believed to represent service quality. SERVQUAL is made on the expectancy-disconfirmation paradigm, which, in simple terms, implies that service quality is known because of the extent to which consumers' perception expectations of quality are confirmed or disconfirmed by passengers' actual perceptions of the service experience. When the SERVQUAL questionnaire was first published in 1985 by a team of educational researchers, to live quality within the service sector. In most cases, the authors tweaked these models to suit their study context. The subsequent may be a summary of varied research findings. Mikhaylov *et al.* [22] presented one of the foremost, widely used and scientifically recognized methods of measuring service quality within the service sector, including the general public transportation industry, called the SERVQUAL (*i.e.* Service Quality) instruments [23] [24] [25] described SERVQUAL dimensions—tangibles, reliability, responsiveness, assurance, and empathy, as "a basic skeleton underlying service quality" [25]. The SERVQUAL, being a humanistic and customer-centric measurement instrument, is qualitatively different from the mechanistic, technical, and objective measures commonly utilized in the general PT industry [23]. Using SERVQUAL instrument enables the researchers to spot additionally measure the weather of customers' expectations in such some way that a condition and views a few services are often captured, analyzed, and understood.

The SERVQUAL paradigm was used in the [26] study, which included five criteria: service, access, availability, time, and environment. They discovered that the service dimension had an impact on customer service using the multiple regression method. In a case study with a national highway passenger transportation firm in Europe, [27] employed the SERVQUAL scale, which includes qualities like tangibles, reliability, responsiveness, assurance, and empathy. Customers demand knowledgeable and compassionate staff, error-free services, and technological transportation specifications, according to the authors' analysis. By using Quality Function Deployment, this study offered various enhancements to the quality of highway passenger transportation services. To design a quality evaluation tool for transport operators to validate the offered service, [28] used a customized variant of the SERVQUAL technique that complied with a European standard on service quality in public transportation. The survey took done in the

Italian city of Cagliari, and it indicated that on-board security, bus reliability, cleanliness, and regularity are all highly valued qualities of public transportation. Mikhaylov *et al.* [22] evaluate the quality of public transportation from the customer perspective, in the form of a unified SERVQUAL survey mode, and capture the personality traits, cultural peculiarities, and contextual factors that may influence customers' perception of quality.

3. Research Hypotheses

A p-value is used in hypothesis testing to help support or reject the null hypothesis. The p value is the evidence against a null hypothesis. The smaller the p-value, the stronger the evidence that you should reject the null hypothesis. The significant level of p-value is 1%, 5% and 10% and also consider less than 1% is highly significant [29] [30].

In this research, a SERVAQUAL model was used to analysis the collected data. The SERVAQUAL model is consist of five dimensions which is tangibility, reliability, responsiveness, assurance, and empathy shown in **Table 1** which is explained briefly in the 6.2 section.

H1: Hypothesis (H1) revealed that there is a significant gap in female passengers' and male passengers' perceptions of bus service quality in Bangladesh. It also showed the possibility of also realizing the opposite genders' perception about the bus service in Bangladesh. This hypothesis predicts that some similarity or dissimilarity of perception by both the males and female passengers on the bus service quality may arise under different attributes.

The p-values of most of the dimensions are lower than 0.01, which is the proposed alternative hypothesis is accepted, meaning that there is a significant difference between female and male passengers' perception of bus service quality in Bangladesh. The results of this study are like to the existing study [31] and concluded that there is a significant difference between male and female passengers' satisfaction levels regarding bus service quality. The reasons behind these are variations in travel pattern [4] [6] [9] [13] [15] and safety & security [2] [32].

H2: The second hypothesis is that there is a large disparity in the perceptions and expectations of female bus passengers on bus service quality in Bangladesh. The outcomes of the study are more important and more significant than the gap in alternative hypothesis between perceptions and expectations. From the gap analysis, it would be possible to predict the best attribute that would be improved, by either increasing or reducing the attributive factors.

The results of **Table 2** showed that the p-values of all dimensions are lower than 0.01 that is the proposed alternative hypothesis is accepted meaning that there is a significant difference between women Passengers' Perceptions and expectations about the Bus Service quality in Bangladesh. The results of this study are like the previous study of [33] [34].

4. Data Collection

In Dhaka city, the specific locations were selected where generated more trips by

Table 1. Variables used in the present study.

Factors	symbol of attributes	Statements
Tangibility	T1	The bus stand is attractive.
	T2	Bus service providers have up-to-date technology.
	T3	The bus stand has sufficient resources as well as capacity.
	T4	Bus service providers have a professional appearance.
	T5	The bus staffs are smart and wear neat and clean dresses.
Reliability	R1	The bus always arrives at the destination within a convenient time.
	R2	The bus breaks down on the road unnecessarily and wastes time
	R3	The prevailing ticket booking system is convenient for passengers.
	R4	Staffs always meet the passengers' requirements right the first time.
	R5	Bus service providers insist on error-free service.
Responsiveness	RP1	Bus staffs always inform passengers of the exact timetable and fees.
	RP2	Bus service providers provide timely and efficient service.
	RP3	Good communication always exists between passengers and staff.
	RP4	Bus staffs are always willing to co-operate passengers.
	RP5	Bus service providers are always ready to respond to requests.
Assurance	A1	Passengers feel safe in dealing with transactions at the ticket counters.
	A2	Passengers feel secure when dealing with transactions with staff.
	A3	Bus staffs are always polite.
	A4	Bus staffs have enough knowledge about their jobs.
	A5	Bus staffs inspire passengers to develop their confidence.
Empathy	E1	Staffs always concentrate on the best interests of their passengers.
	E2	Service hours are convenient to the bus passengers.
	E3	Passengers get information about bus services easily.
	E4	Bus passengers find and access the bus stand easily.
	E5	Bus staffs always give individual attention to each passenger.

Table 2. Differences between female and male passengers' perceptions about bus service in Bangladesh.

Factors	Statements	Perception (Average)		Difference	p-value
		Female	Male		
Tangibility	T1	3.03	4.13	−1.1	0.000
	T2	4.19	4.17	0.02	0.137
	T3	4.21	3.52	0.68	0.000
	T4	3.79	3.87	−0.08	0.000
	T5	4.19	4.34	−0.14	0.000
Reliability	R1	4.34	4.29	0.06	0.000
	R2	3.48	3.13	0.35	0.000
	R3	3.46	3.47	−0.01	0.84
	R4	3.51	3.64	−0.13	0.000
	R5	4.1	4.27	−0.16	0.000
Responsiveness	RP1	3.86	3.76	0.1	0.000
	RP2	3.95	4.02	−0.07	0.000
	RP3	3.83	3.79	0.05	0.001
	RP4	3	2.7	0.3	0.000
	RP5	3.42	3.64	−0.22	0.000
Assurance	A1	3.82	3.4	0.42	0.000
	A2	3.61	3.36	0.25	0.000
	A3	3.63	3.84	−0.21	0.000
	A4	3.8	3.62	0.19	0.000
	A5	3.78	3.93	−0.15	0.000
Empathy	E1	3.76	3.65	0.11	0.000
	E2	3.4	3.51	−0.11	0.000
	E3	3.86	3.83	0.04	0.01
	E4	3.8	3.79	0.01	0.472
	E5	4.02	4	0.02	0.089

bus than other locations like Farmgate, Mohammadpur, Motijhil, Shahbagh, Kallayanpur, Dhanmondi, Mohakhali, Green Road, and Mirpur. In this study, the sample size was restricted to 1500 (male respondents-750 and female respondents-750) and a hypothesis was required for this sample data. Twenty-five questions were used to assess expectations and perceptions. The questionnaires were divided into three parts. The first part of the questionnaire consisted of eight demographic information. The second part was designed to measure the respondent's perceptions regarding service quality provided by public bus service. The third part of the questionnaire was designed to measure the respon-

dent's expectations of service quality. It was observed that both male and female passengers faced similar challenges on PT. These challenges experienced on public buses include sexual harassment, particularly physical touching, and verbal abuses. However, these challenges are considered a greater problem for female passengers compared to male passengers. In Bangladesh, a large number of female passengers travel together in the bus with men, such as husband and wife, father and daughter, mother and son, brethren and sisters. In this case, the problems of female passengers (which are not faced by men) are similar to the perceptions of men in terms of whether they are actually perceived by women or not. However, there is a challenge towards understanding how women perceive the problems faced by men in PT. These men related-PT problems include the control of men, standing up for women that are harassed in public and defending the honour of women in PT. Hence, some men take pride in their masculinity by being men of integrity and honour in that regard. Contrarily, there may be some similarities with the female's perceptions of men as gathered in this study. A female respondent took her time to treat or perceive herself as a male respondent and at another time she perceived herself as a female respondent. Also on the same case, a male respondent took his time to treat or perceive himself as a female respondent and at another time treated as a male respondent.

In this study, the five-point Likert scale is the most widely used form of scaled items where the respondent chooses a point on a scale that best represents his/her view. Scoring for the scale was as follows: 1) highly agreed, 2) agreed, 3) neutral, 4) disagreed, and 5) highly disagreed. By comparing each value difference between all 25 expectations and perceptions, the level of quality can be concluded by SQ = $P - E$, where P and E are perception and expectation respectively. If the perceived value is higher than the expected value, it can be concluded that the service is satisfactory or ideal. However, if the expected value is higher than the perceived value, the service quality level can be regarded as unsatisfactory or even unacceptable.

5. Methodology

The service quality was assessed using the SERVQUAL instrument [35]. The instrument is widely applied by numerous studies to assess service quality in several fields [36]. To be able to SERVAQUAL instrument measuring the service quality of public bus service and the passenger's perception and expectation in Bangladesh, we developed a questioner formwork according to SERVAQUAL model, where the SERVAQUAL dimension is tangibility, reliability, responsiveness, assurance, and empathy. Tangibles are defined as the appearance of physical facilities, equipment, personnel, and communication materials. Reliability simply refers to the ability of the service provider to perform the promised service dependably and accurately. Assurance, which is referred to the knowledge, courtesy, skills, and trustworthiness of the employees, as well as freedom from danger, risk, or doubt. It also includes the ability of the employee to convey trust and confidence. Responsiveness is expressed as the willingness of the service provid-

er to help customers, *i.e.*, passengers and to provide prompt service. An empathy that deals with the caring and individualized attention that the bus service provides for passengers.

According to the handling of the SERVAQUAL dimension, 25 questions were developed and categorized as shown in Table 1. According to Mikhaylov *et al.* [22] respondents were offered to evaluate questions on a scale from 1—strongly agree to 5—strongly disagree. Additional questions asked were related to demographic information are essential in connecting to the evaluation of service quality.

To determine the sample size of the popularly we have adopted the following equation [22] [37]

$$\text{Sample Size} = 2500 * N * (1.96)^2 \Big/ \left[25 * (N-1) + 2500 * (1.96)^2 \right] \quad (1)$$

where N is Total Population of the desired study area (N = 24,950,381 person).

Confidence coefficient: Z-score = (1.96) for 95% confidence level.

The desired sample size is 385 persons, which is below the entire 1500 respondents who participated in this survey. The respondents are current users and customers of the general public bus companies based within the city, which is ensured by the respective questions.

From the response of respondents, it has been able to determine the extent of perceived service quality in each dimension and a private item and their expectations of the SERVQUAL model. This enabled the authors to spot and distinguish areas of the service process that are looked as if it would be the most important bottleneck of the service quality. The difference between the service performance (*i.e.*, perceived quality) and therefore the highest possible rating of a service (customers' expectations) is that the number of quality improvements the customer still expects from the corporate particular areas of service. According to the dealing of SERVAQUAL dimension, 25 questions were developed and categorized as shown in Table 1. In step with Mikhaylov *et al.* [22] respondents were offered to judge questions on the dimensions from 1—strongly agree to five—strongly disagree. Additional questions asked to relate to demographic information are essential in connecting to the evaluation of service quality. To analyze the gap between women passengers' perceptions and expectations about bus service quality in Bangladesh, the following variables have been used (shown in Table 1) by reviewing the previous related literature. Each dimension has five attributes which are shown in Table 1.

6. Results and Discussions

6.1. Demographic Analysis

Demographic survey data of respondents is that such as gender, age, and education background are shown in Table 3 where the equal percentage of male and female, approximate 63% respondents age in between 20 - 30 and 57.07% respondents are graduates. One thousand and five hundred respondents participated

Table 3. Demographic information of respond.

Variables	Classes	Frequency	Percentage
Gender	Male	750	50%
	Female	750	50%
	Total=	1500	100%
Respondent's Age ((Years))	10 to 20	437	29.13%
	20 to 30	943	62.87%
	30 to 40	110	7.33%
	40 t0 50	8	0.53%
	50 to 60	2	0.13%
	Total=	1500	100%
Educational Background	Below SSC	95	6.33%
	SSC	124	8.27%
	HSC	385	25.67%
	Graduate	856	57.07%
	Postgraduate	40	2.67%
	Total=	1500	100%
Occupation	Students	655	43.67%
	Service holder	790	52.67%
	Businessmen	46	3.07%
The main mode chosen by respondents	Bus	1458	97.20%
	Rickshaw	9	0.60%
	Para Transit	23	1.53%
	Motor/Bicycle	5	0.33%
	Car	5	0.33%

in this research work. The respondents were consisting of students, service holders, businessmen, and others, where 43.67% are students and 52.67% are service holders (as shown in Table 3). Within 1500 sample sizes comprised of 750 males and 750 females, the data on the passengers' perceptions for both genders are represented in Figures 1-25. These data were obtained from the respondents using the questionnaire of the survey. The female passengers consider their problems due to bus service quality only as their own problems or do they consider those problems as problems of male passengers and the same and opposite for male passengers.

Both male and female passengers are equally transported on public buses. Male and female passengers on public transportation may have similar or dissimilar feelings and perceptions about bus service quality. In this research, there is the

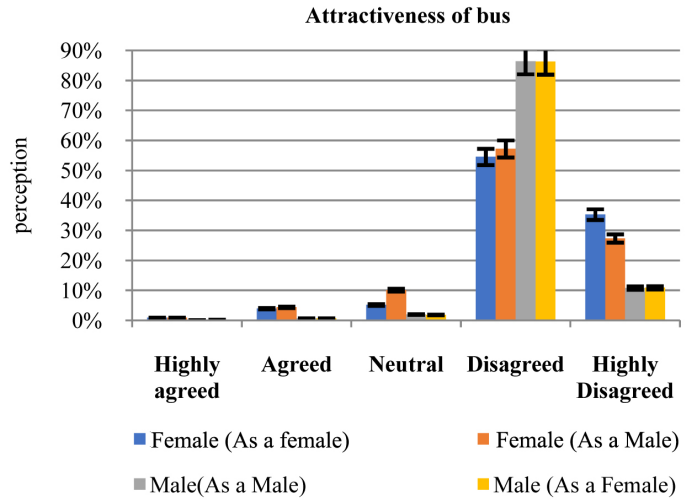

Figure 1. Perception of male and female.

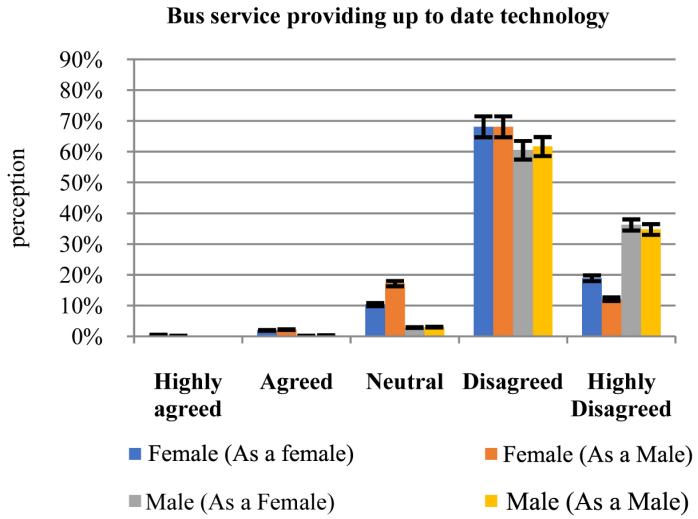

Figure 2. Perception of male and female.

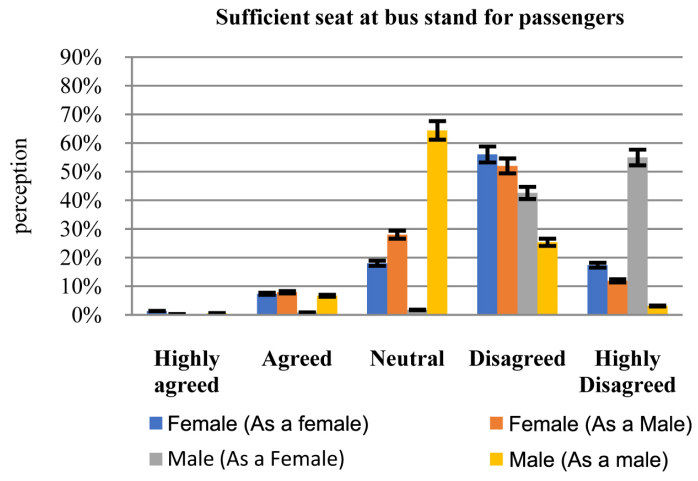

Figure 3. Perception of male and female.

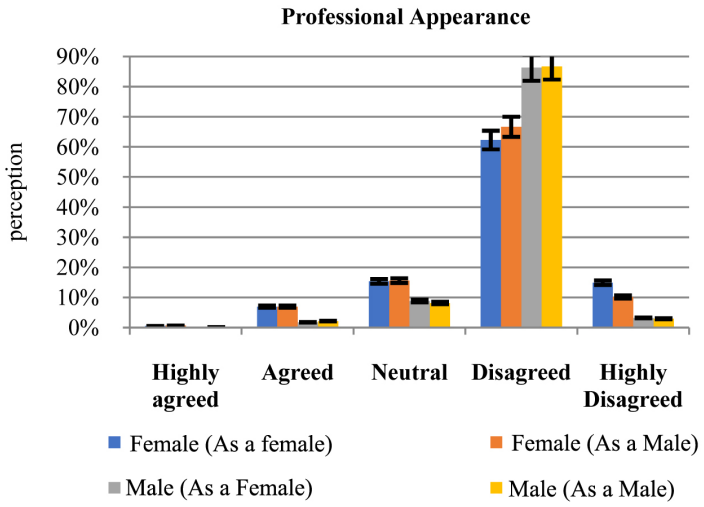

Figure 4. Perception of male and female.

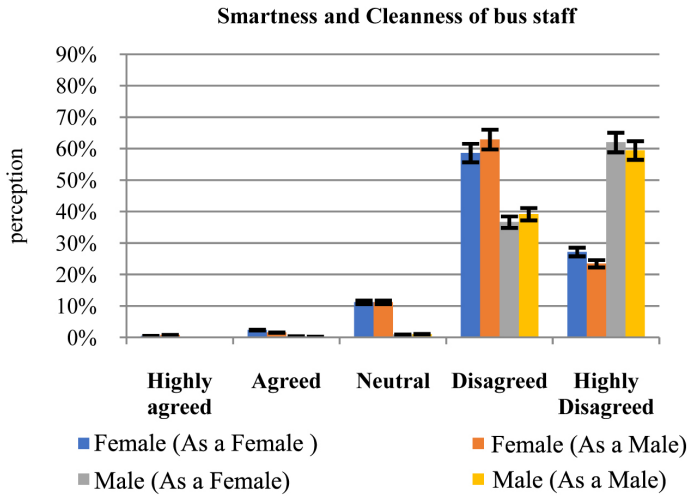

Figure 5. Perception of male and female.

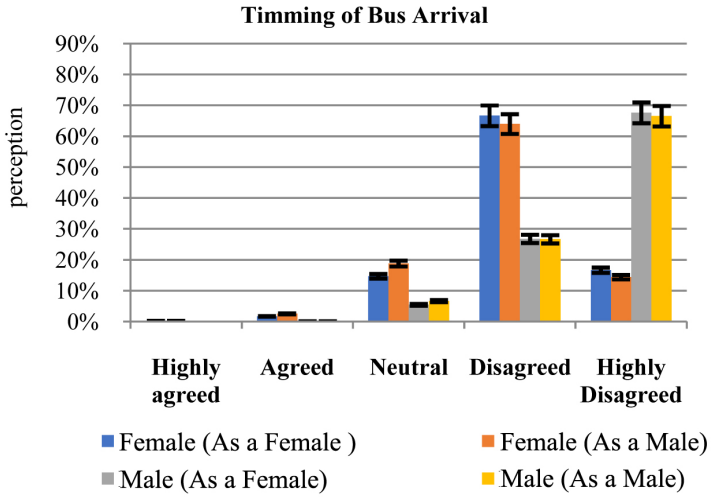

Figure 6. Perception of male and female.

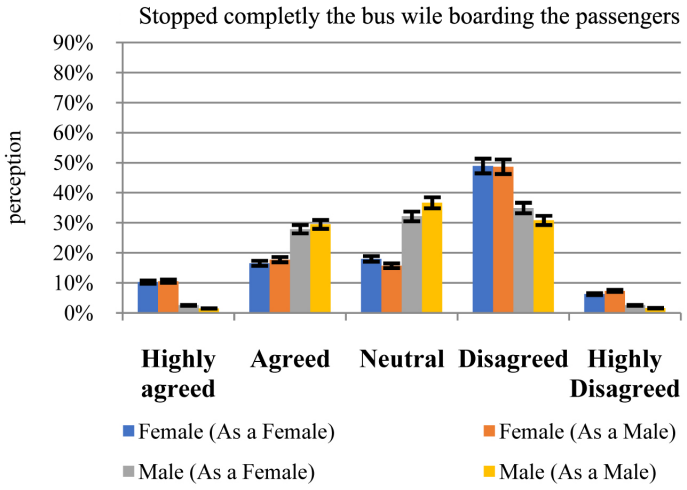

Figure 7. Perception of male and female.

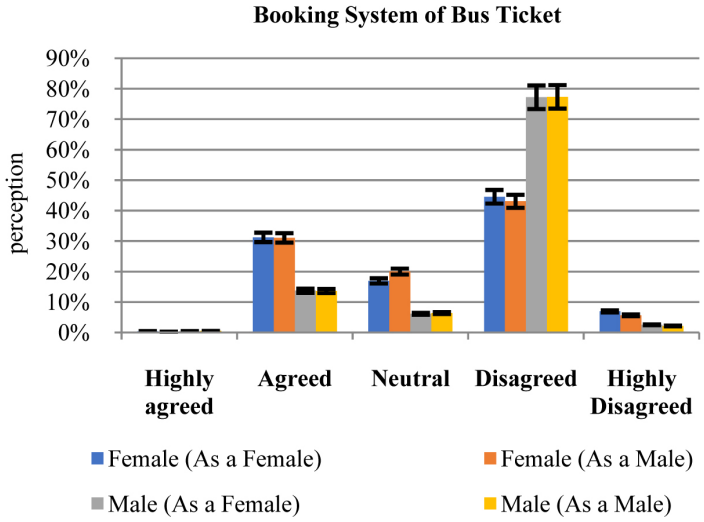

Figure 8. Perception of male and female.

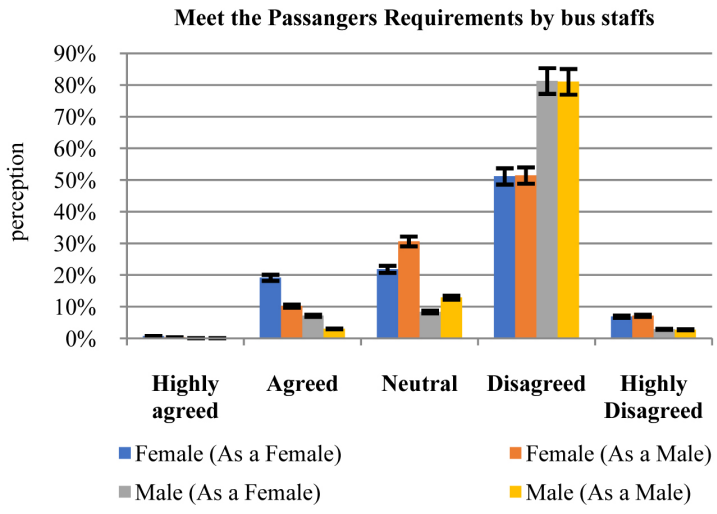

Figure 9. Perception of male and female.

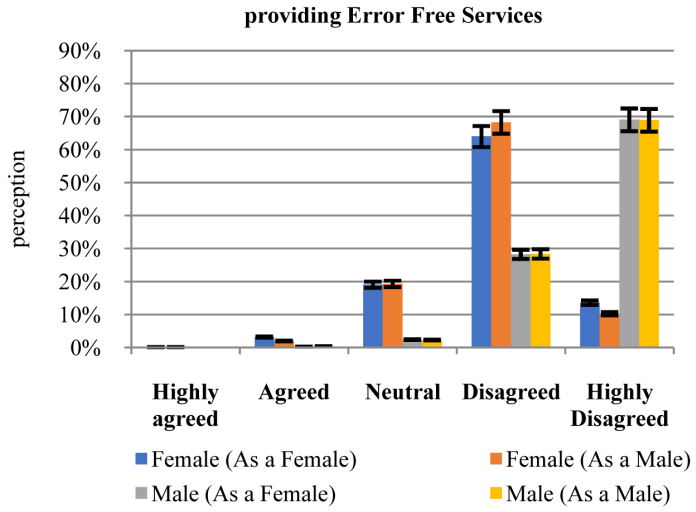

Figure 10. Perception of male and female.

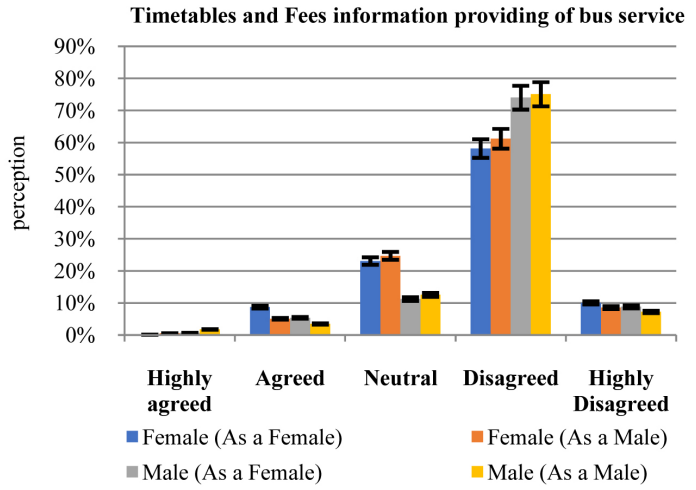

Figure 11. Perception of male and female.

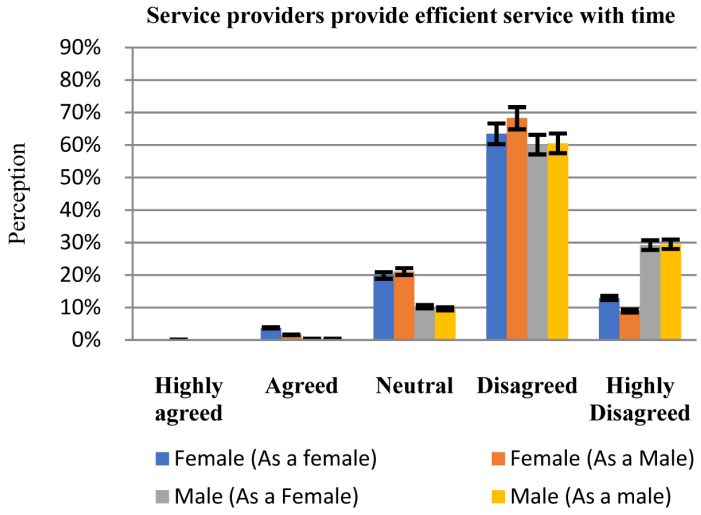

Figure 12. Perception of male and female.

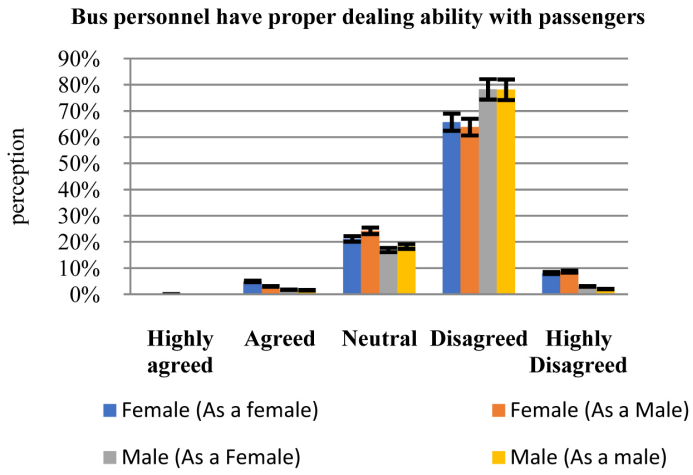

Figure 13. Perception of male and female.

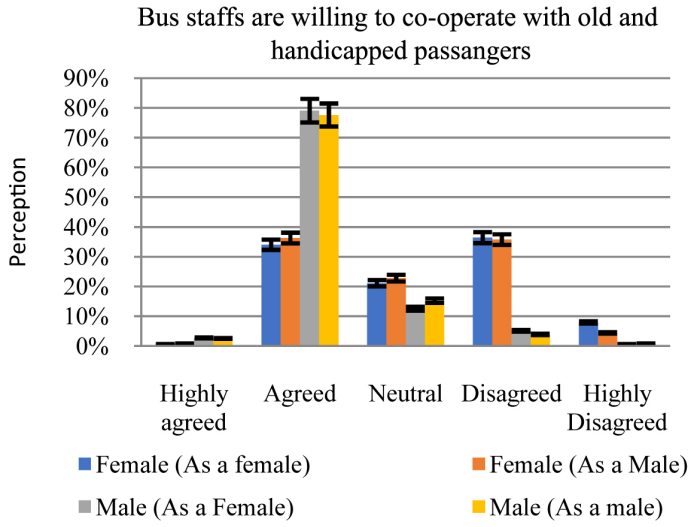

Figure 14. Perception of male and female.

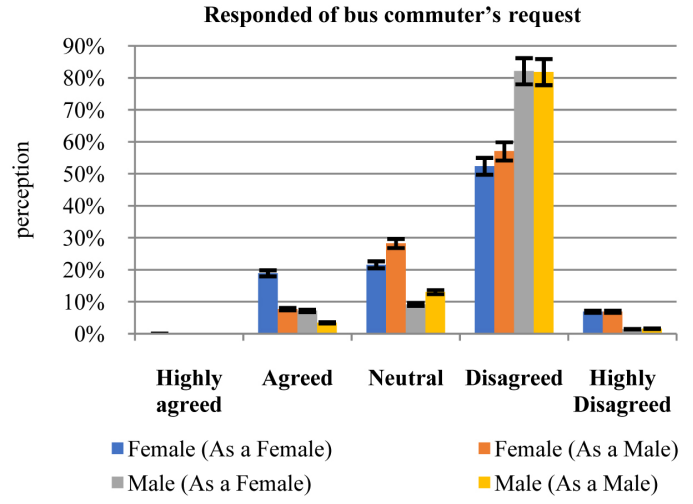

Figure 15. Perception of male and female.

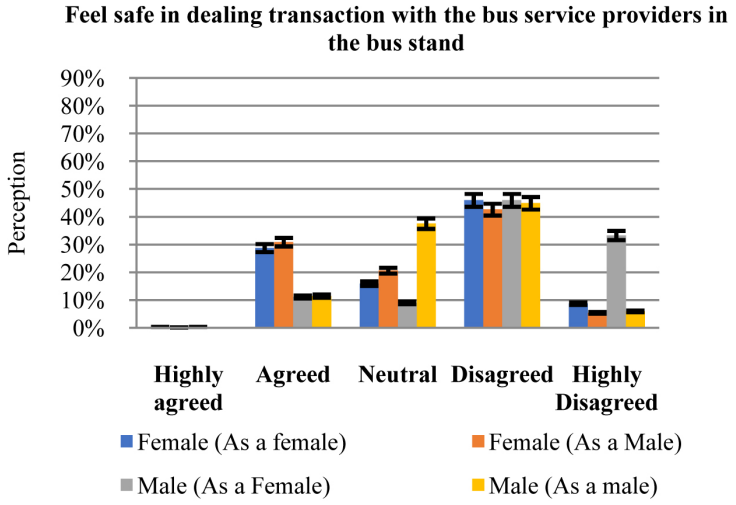

Figure 16. Perception of male and female.

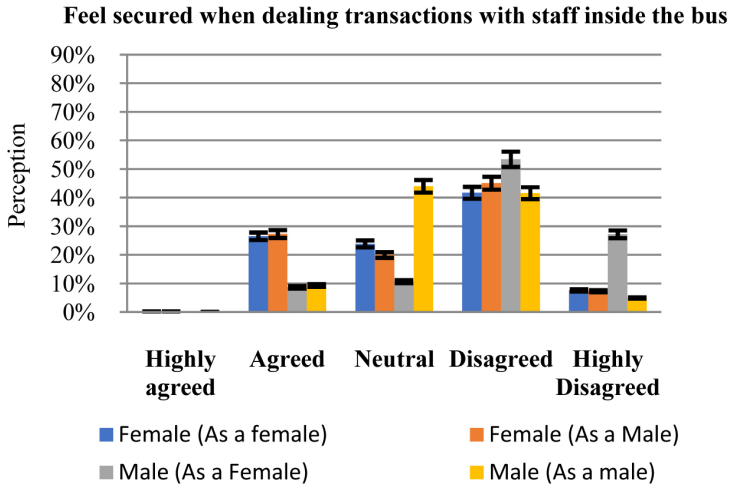

Figure 17. Perception of male and female.

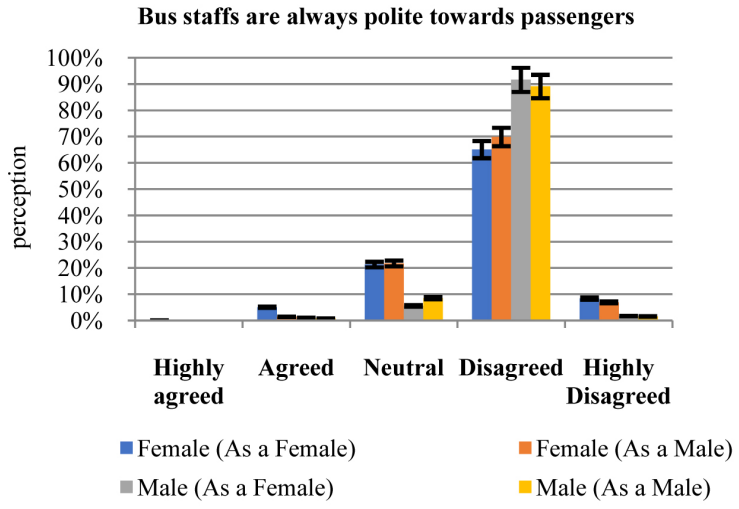

Figure 18. Perception of male and female.

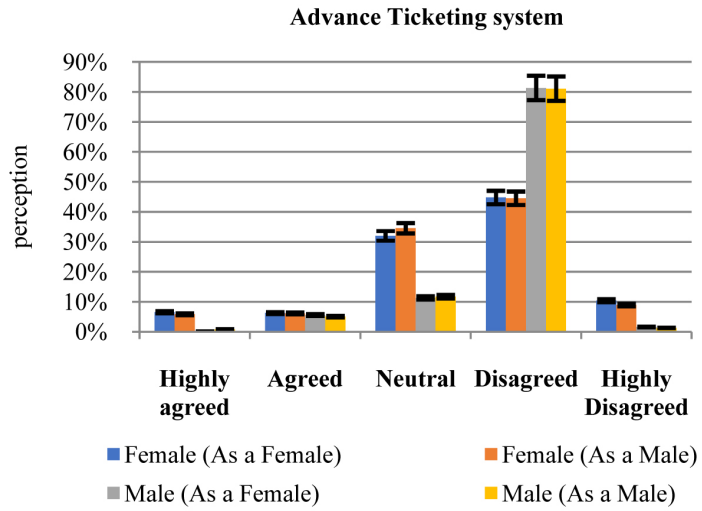

Figure 19. Perception of male and female.

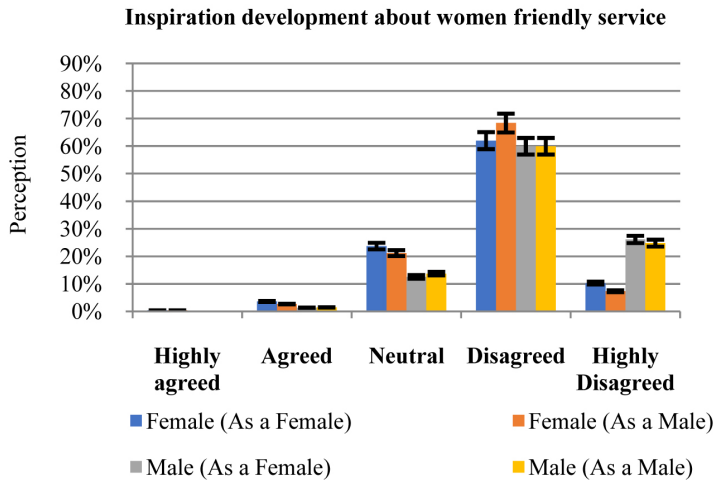

Figure 20. Perception of male and female.

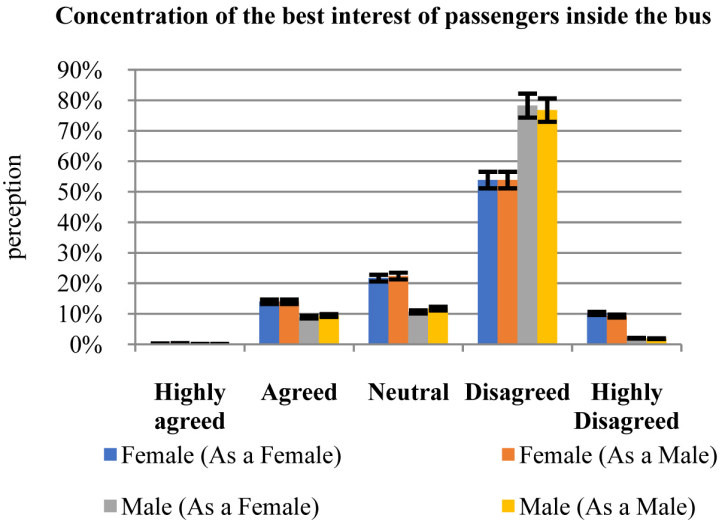

Figure 21. Perception of male and female.

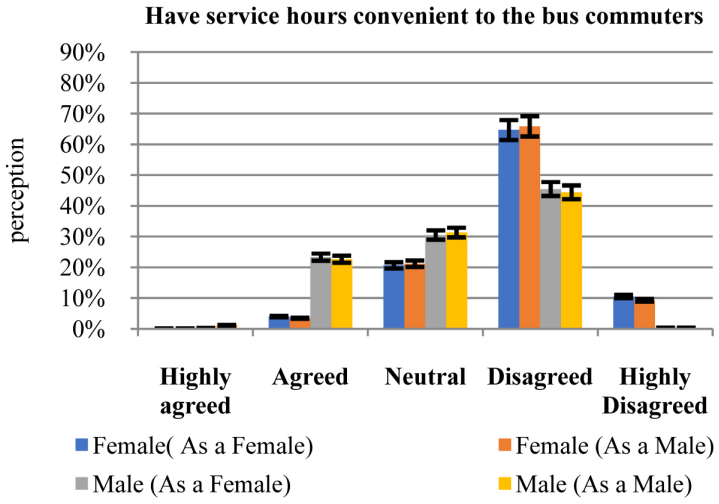

Figure 22. Perception of male and female.

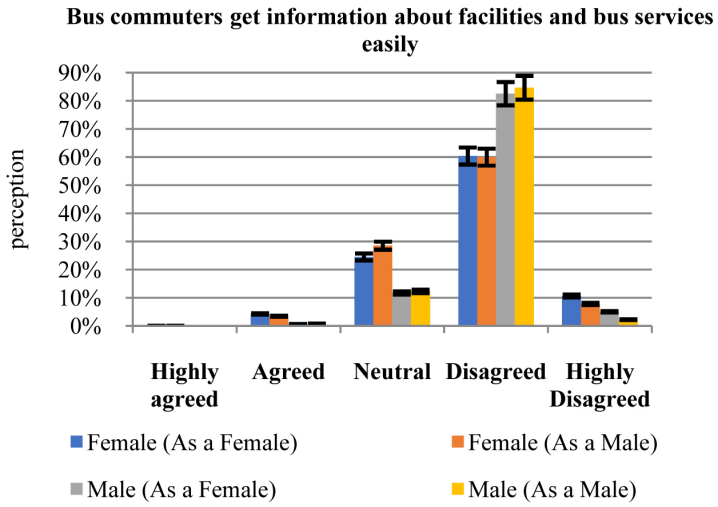

Figure 23. Perception of male and female.

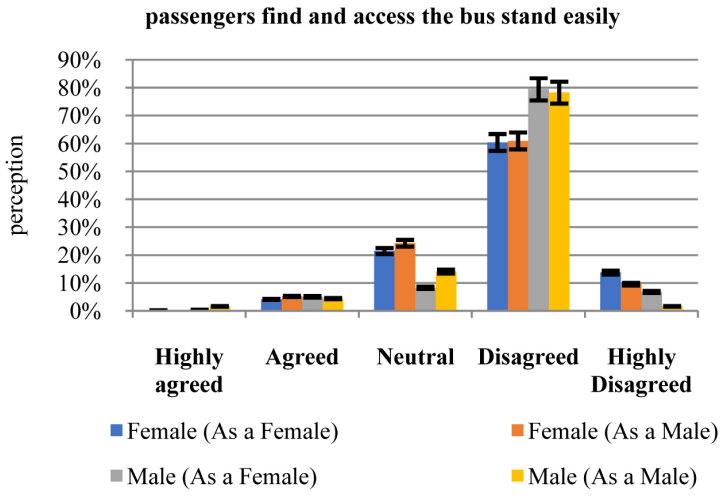

Figure 24. Perception of male and female.

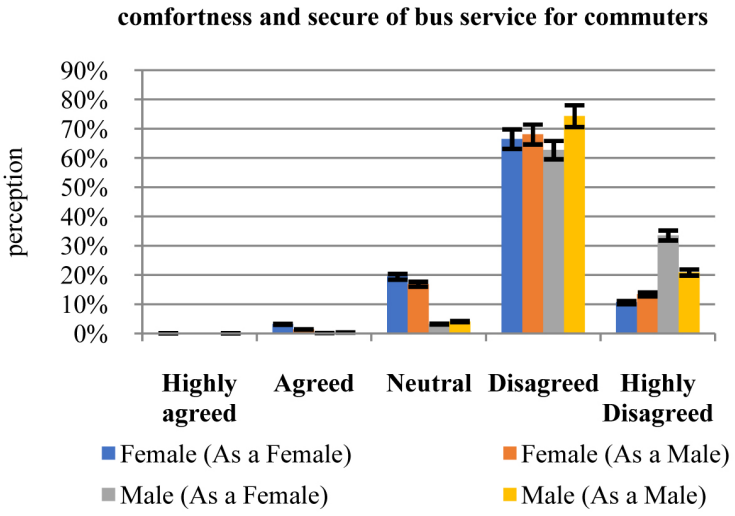

Figure 25. Perception of male and female.

consideration that a male passenger acts as both a female and a male passenger simultaneously. This assumption is taken to ascertain the opposite gender's perceptions of the bus service's quality, for example, whether a female passenger's perceptions are identical to those of a male passenger or not. The same situation also holds true for a male passenger. If a male passenger is only concerned with his own opinion of the bus service's quality, he will, in opinion, respond only to the opinions of other male passengers. However, if an interview is conducted with a male subject in which he acts as both a man and a woman, he will have the opportunity to consider the situation from both a male and female passenger's perspective simultaneously. Likewise, female travelers face the same challenges. Hence the decision to accept male passengers who responded as females and men, as well as male passengers who responded as males and females.

This respondent's duo pass is also justified in this research by the use of the same questionnaire whereby a male person who plays a role as a male passenger, at a time also acts as a female. That is also the same case but opposite for female passengers. A female person's perception almost disagrees when playing a role as a female passenger and the same person acting as a male the perception has almost disagreed. That means the female considers the bus service quality problem which attributes faced by female passengers that also are a problem for male passengers except for the attribute of "sufficient seats at the bus stand for passengers", "bus staffs are willing to co-operate with old and handicapped passengers", "feel safe in dealing transactions with the bus service provider in the bus stand", "feel secure when dealing transaction with staff inside the bus". The same case is for a male person, who acts as a male and at a time acts like a female. Here the all-female and male passengers' perceptions are disagreed according to all variants of this survey shown in **Figures 1-25** (except **Figure 3**, **Figure 14**, **Figure 16** and **Figure 17**). Like the variant "the bus stand is attractive" when a female acts as a female passenger the perception is 60.4% and when she acts as a

male the perception is 60.93% that's almost the same. Again, for the same variant a male person acting as a male passenger the perception is 78.3% and when he is acting as female the perception is 79.5%, and so on. That's also the same result. In another variant remains the same scenario. However, the four variants ("sufficient seats at the bus stand for passengers", "bus staffs are willing to co-operate with old and handicapped passengers", "feel safe in dealing transactions with the bus service provider in the bus stand", "feel secure when dealing the transaction with staff inside the bus") different scenarios. In the case of the attribute "sufficient seat at the bus stand for passengers", 56% of female passenger's responded as disagreeing when responding as a female, and when acting as a male 42% responded as disagreed but having a difference in male passengers, 64.4 % male passenger neutral, and when acting as a female 54.93% responded as highly disagreed (see **Figure 3**). The passenger's response about the perception of service quality attribute "bus staffs are willing to co-operate with old and handicapped passengers" is that the female passenger as a female respondent 36.4% response disagreed but when she acts as a male passenger, 36.27% respondents responded as agreed. For the male passengers in both situations, the respondents that agreed as a male passenger were 77.6% while the respondents that agreed as female were 79.07%, as shown in **Figure 14**.

Regarding the safety at the bus stand of passengers while a transaction with service providers, 46% of male passengers responded as disagreeing and 33.33% responded as highly disagreed while acting as a female passenger and 44.93% disagreed and 37.60% neutral while a male passenger response with a male respondent. For the same service feature, 46% of female passengers responded as disagreeing and 28.80% responded as agreed while responding as a female passenger and 42.67% disagreed and 30.93% agreed while male passengers responded male respondents shown in **Figure 16**. The service quality attribute of "feeling secured when dealing transactions with staff inside the bus", 53.47% of male passengers responded disagreeing and 27.20% responded as highly disagreed while acting as a female passenger and 41.60% disagreed and 44.00% neutral while a male passenger responded with a male respondent. In addition, 41.73% of female passengers responded as disagreeing and 26.53% responded agreed while responding as a female passenger and 45% disagreed and 27.33% agreed while male passengers responded male respondents as shown in **Figure 17**. This implies that the precipitation gap analysis of male and female passengers regarding the bus service quality supports the first hypothesis (H1).

6.2. Gap Analysis between Female and Male Passengers' Perception about Bus Service Quality in Bangladesh

This hypothesis was examined by a t-test and a significant value was found ($p = 0.000$, two-tailed). The results demonstrate that significant differences in passengers' perceptions and expectations of public bus service are found. In this study, the p-values (**Table 2**) of the dimensions of service quality except for E4,

E5, T2, R3 are lower than 0.01 (1% significance level). Therefore, the t-test (hypothesis) is accepted meaning that there is a significant difference between female and male passengers' perception about bus service quality in Bangladesh.

The gap analysis has been conducted based on the women commuters' demographic characteristics. The results showed that the expected gap score is lower than the perceived gap score, and all p values are lower than 0.01 meaning that there is also a significant difference between passengers' expectations and perception based on their demographic profile.

This section is related to the discussion of findings of the present study in the light of the hypotheses already formulated. The following results were found from analyzing the collected data using different tools applied to the present study.

Analyze the gap of perception and expectation of female passengers according to tangibility. There were five attributes and each attribute was denoted by T1, T2, T3, T4, and T5 as per Table 1. The average expectation value on this dimension is 3.484 that is very high. Many female passengers complain about the up-to-date technology, sufficient resources as well as capacity, professional appearance, and cleanliness of the bus, as well as the appearance of the staff, resulting in the average value of perception with only 2.39. The gap of tangible T1, T2, T3, T4, and T5 is 0.24, −1.63, −1.55, −1.2, and −1.33 which are shown in Figure 26. Here all attributes of the tangibility dimension represent the minus value except the attribute T1 (The bus stand is attractive). Therefore, improvement is to be required.

Represent the gap of perception and expectation of female passengers according to the dimension of reliability, which is denoted with the attributes as R1, R2, R3, R4 and R5. As per Table 1, the average value expectation of reliability is 3.6 and the perception value 2.42. The expectation value is higher than perception. The gap of perception and expectation in reliability R1, R2, R3, R4 and R5 is −1.61, −1.54, −0.85, −0.84, and −1.06 respectively. All attributes of reliability of bus service perception and expectation's gap represent negative values shown in Figure 27. That means the female passenger expectations are high about bus services in Dhaka city.

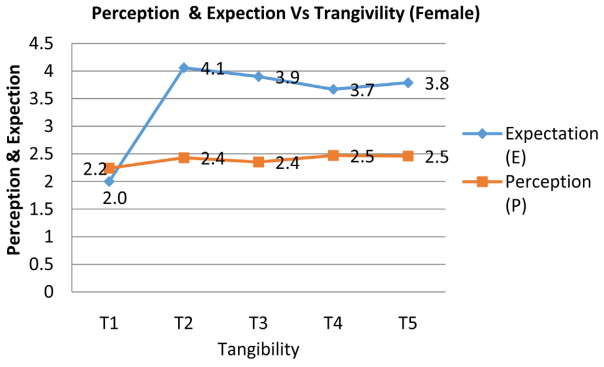

Figure 26. Perception and expectation of tangibility.

Responsiveness is the most important dimension to exhibit the expectations and perception of female passengers and analyze the gap. The average expectation of responsiveness is 3.09 and the perception value 2.81. The expatiation value is higher than perception. The gap of perception and expectation in responsiveness RP1, RP2, RP3, RP4, and RP5 is −1.48, −1.28, 1.31, 0.72, and −0.67 respectively. All attributes of responsiveness of bus service perception and expectation's gap represent negative values which are shown in Figure 28 except RP3 (Good communication always exists between passengers and staff.) and RP4 (Bus staffs are always willing to co-operate passengers.) That means the female passenger expectations are high about bus services in Dhaka city.

The dimension of assurance, which is denoted the attributes as A1, A2, A3, A4, and A5. The average value expectation of assurance is 3.49 and the perception value 2.42. The expectation value is higher than perception. The gap of perception and expectation in assurance A1, A2, A3, A4, and A5 is −1.21, −0.82, −0.87, −1.39, and −1.05 respectively. All attributes of assurance of bus service perception and expectation's gap represent negative values shown in Figure 29. That means the female passenger expectations are high about bus services in Dhaka city.

The dimension of Empathy is denoted by the attributes as E1, E2, E3, E4, and E5. The average value expectation of empathy is 3.73 and the perception value 2.40. The expectation value is higher than perception. The gap of perception and expectation in Empathy E1, E2, E3, E4 and E5 is −1.39, −1.18, −1.42, −1.23 and −1.4 respectively. The present cases also have the same scenario on the gap of perception and expectation which shows the negative values seen in Figure 30.

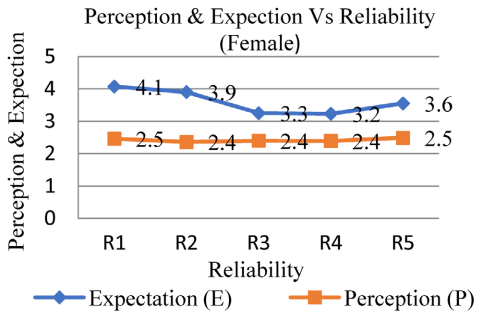

Figure 27. Perception and expectation of reliability.

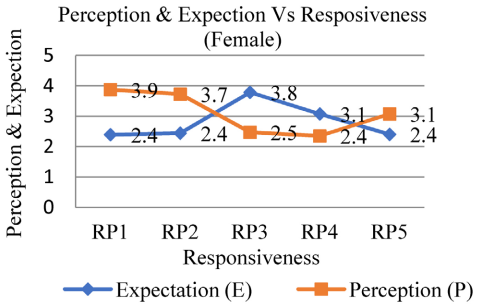

Figure 28. Perception and expectation of responsiveness.

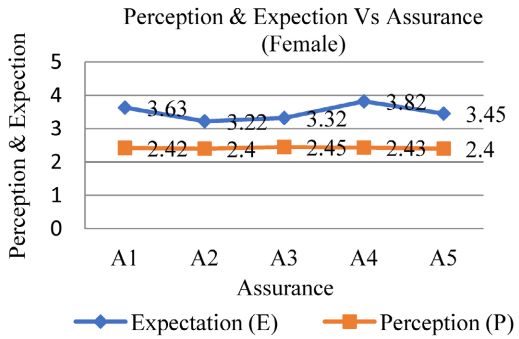

Figure 29. Perception and expectation of assurance.

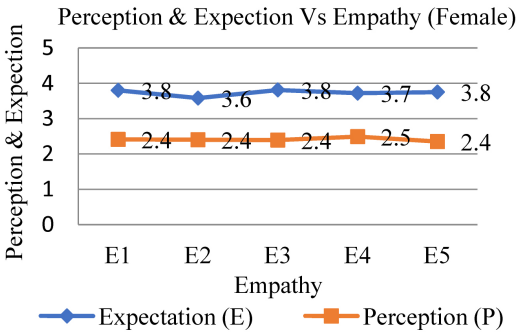

Figure 30. Perception and expectation of empathy.

This implies that the results of the gap analysis between perception and expectation of female passengers support the hypothesis (H2). However, there are some recommended improvements to be required, presented in Section 7.

7. Conclusions

Customer happiness is crucial nowadays, as it authenticates and confirms any service's success. The current study investigated the perception of male and female passengers for the service quality attribute of bus service with both thinking's of male and female and investigated the difference between current service quality and expected service quality to improve bus service quality. A gap analysis of female passengers' perceptions and expectations was conducted using SERVQUAL questionnaires. The gap was depicted using five dimensions: reliability, tangibility, responsiveness, assurance, and empathy. Using the SERVQUAL approach to investigate the gaps was a promising first step toward potential solutions because the researchers felt it was critical to address the difficulties of public transportation specifically for women in Bangladesh urban areas. Analysis of the perception of male and female passengers during this study represents that the service quality of bus service is not fulfilling the passenger's satisfaction. The service quality problem, which attributes faced by female passengers and they think that is also a problem for male passengers as well as which problems are faced by male passengers and they also feel that is also a difficulty for female passengers while traveling in the public bus except for a few attributes like fe-

male passenger safety and security. In the requirement of sufficient seats at the bus stand, female passengers say it is essential for females and the same person when acting as a male, the response is the same but the male passengers are neutral here, and when he is acting as a female, the sufficient seat is more essential in the bus stand that means it is more essential for female passengers than male.

In the service quality feature "bus staffs are willing to co-operate with old and handicapped passengers" the male passengers are almost satisfied when he responded as both female and male characters, but the female passengers in both playing roles say this is a poor condition in public bus service quality. In this case, the willingness to co-operate with old and handicapped passengers' facilities should be improved. About the bus safety and security in dealing transactions with bus service providers in the bus stand and inside the bus female passengers feel that mostly insecure and unsafe for both male and female but the male passengers think, that it is more unsafe and insecure for female than male passengers. Therefore, safety and security are more important for female passengers than males. All other attributes of service quality features are more essential to improve for both males and females.

In this study, the bulk of the dimension gap value is negative. In this situation, all dimension gap lines are below zero level. When the gap value is negative, it indicates that the expectation exceeds the perception. According to this survey, female passengers' perceptions are quite low because of the issues. From the findings, the bus's passenger service is substandard in Bangladesh. Both the perceived and expected quality of bus service were vastly different. Given that poor service quality in one area leads to negative opinions in others, gaps should be bridged by implementing appropriate solutions based on the passengers' goals. As a result, the bus system should be updated to accommodate women's requirements. The findings indicate that the assessment offers numerous potential benefits for the service provider. Identifying passengers' views of service quality performance for a certain attribute (and dimensions) may enable management to better adapt and validate that female commuters' expectations are met. This entails identifying, prioritizing, and improving areas of service deficiency to guarantee that valuable resources are directed to the most effective locations.

Due to the data being acquired from primary sources, the findings of this study are reliable and valid. Furthermore, it is best matched to the research's stated aims. Regulators, service providers, passengers, researchers, and other transportation and environmental agencies are likely to benefit from this study. This information may be valuable to transportation businesses in improving their services and to regulators in developing recommendations and policies. In the future, researchers may conduct similar studies considering other valuable cities in Bangladesh with a larger sample size, allowing for better generalization of findings. Further study is recommended in the variables to be considered in the model as given in Table 1 to include distance of the bus stop from home/office, willingness of passengers to use bus service, time elapse between the arrival of two buses at the bus stop, etc.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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