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Customers' Satisfaction and Intentions with Public Transportation in Faisalabad, Pakistan: Implications for a Bus Rapid Transit Service

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ABSTRACT: The public transport system in Faisalabad is underdeveloped and inefficient to meet the travel demands of the people. It mainly consists of a multitude of Para-transit modes such as auto-rickshaws, Qingqi (motorcycle rickshaws), and wagons, etc. These modes do not meet the mobility needs of the low-income group or captive riders. This research tends to assess customers' satisfaction with the current public transport system and their preferences towards the introduction of Bus Rapid Transit (BRT) in Faisalabad. A questionnaire was designed in this study to gather travelers' perceptions about public transport in Faisalabad. The questionnaire consisted of personal and travel information of the travelers, satisfaction with service quality attributes, important attributes in traveling, and behavioral intentions with the BRT service. This survey was conducted physically and a total of 225 samples were collected. Results showed that the customers' satisfaction level with existing public transport modes is quite low. Most of the respondents showed positive intent to use the BRT service as they perceived it as a safe, comfortable, convenient, and economical mode of transport. Results revealed that most travelers want to shift to an improved transportation system. Results of factor analysis and structural equation modeling revealed that low satisfaction with transit modes has a negative impact on customers' behavioral intentions. Most of the respondents said that cost, travel time, air conditioning, travel time reliability, comfort, and ability to make stops on the way are very important attributes of the BRT service. Most of the users believed that it will reduce air pollution, provide better accessibility, and would be safe for female travelers. Also, customers' perceived level of importance significantly and positively influences their intentions towards BRT service. This study recommends the provision of a BRT-like bus transport service in Faisalabad to meet the mobility needs of the masses.

KEYWORDS: Urban Mobility Perceptions; Transit Service Assessment; Commuter Behaviour Analysis; Commuter Satisfaction; Public Transport

1. INTRODUCTION

The quality of public transportation significantly influences people's choice of travel mode and private vehicle ownership and its usage. Cities with rapid urbanization trends need sustainable public transportation systems which should justify the travel needs of various economic groups. It is believed that citizen-oriented approaches can help to formulate policies for urban public transport development for healthy and equitable cities in the developing world (Thondoo, Marquet, Márquez, & Nieuwenhuijsen, 2020). An integrated public transport system of conventional transit modes and rapid transit modes is helpful to transform small and medium size cities into sustainable cities. Also, an improved intermediate public transport system can meet the mobility needs of 20-30 % of the population in small cities (Tiwari & Phillip, 2021).

Faisalabad is one of the industrialized cities of Pakistan which is located in Punjab province. It is surrounded by many small- and large-scale cotton industries which generate high travel demand on urban arteries. The current population of Faisalabad city is about 3.7 million (PopulationStat, 2023). Today, Faisalabad has become a sprawling city, very rapidly expanding, characterized by large un-serviced and under-serviced areas. By 2050, the population of Faisalabad would be 72% greater than the current population (Macrotrends, 2023). This increase in population will cause a lot of travel problems. To cope with that situation, the government should plan future strategies for the transportation infrastructure so that traffic and traveling problems can be minimized. Public transportation is a shared passenger transport service that is available for use by the general public. The quality of urban public transportation plays a vital role in the economic and social development of a city. The mobility of middle and low-income people and their accessibility to various activity places is dependent on the service quality of public transport facilities. However, the present public transport system is a combination of various modes which is inefficient and poorly managed. It is necessary to analyze the current situation of Faisalabad's urban public transport and provide some policy measures for improvement in transit facilities to meet the mobility needs of various economic and social groups of the society. The objective of this research is to identify the problems of existing public transportation systems in the city considering customer satisfaction. Further, this study also attempts to predict intentions towards a bus rapid transit service considering satisfaction and important attributes. A perceptions-based questionnaire survey was conducted related to satisfaction with existing transit facilities, importance level, and intentions with a better mode of public transport. The collected data have been analyzed using factor analysis and structural equation modelling.

The remaining paper has been organized in the following manner. The relevant literature and public transport characteristics of Faisalabad city are presented in Sections 2 and 3, respectively. The questionnaire design and data collection

methods are presented in Section 4. The survey and analysis results have been discussed in Section 5. The last section summarizes the key findings and policy implications.

2. LITERATURE REVIEW

2.1 Satisfaction attributes

It is reported that dependability, compassion, and stimulation have a huge impact on consumer loyalty to the service (Mani & Zainuddin, 2022). The service reliability, frequency, speed, accessibility, price, information provision, ease of transfer, and vehicle condition are the physical attributes that affect the quality of public transport (Redman, Friman, Gärling, & Hartig, 2013). Users' deep stimulation about influencing variables can help in changing their perceptions (Dell'Olio, Ibeas, & Cecín, 2010). Further, service quality attributes such as cleanliness, comfort, level of occupancy, journey time, and waiting time seem to be the most valued attributes by users and the degree of valuation varies across different users' categories (Ali, 2021; Dell'Olio, Ibeas, & Cecín, 2011).

A study reveals that service attributes such as vehicle safety, service cleanliness, and grievance handling had a substantial effect on public transportation passengers (Das et al., 2018). Public transport availability, safety, and security attributes have a positive relationship with users' satisfaction, and satisfaction is positively related to passengers' loyalty to public transportation (Chan, Ibrahim, Lo, Suaidi, & Ha, 2021). A satisfaction study across different clusters of customer suggest that customer interface, operation, network, and length of trip time are important to service attributes and more frequent users of transit facilities are more satisfied across various segments of the travel market (Abenoza, Cats, & Susilo, 2017; Ali, Nakayama, & Yamaguchi, 2023). It is reported that biased opinions of previous travelers have an adverse influence on perceived satisfaction and value. Temporal and spatial coverage, journey time and bus stop waiting and fare level trade-off have a positive correlation with satisfaction (Hasan, Whyte, & Jassmi, 2021). Similarly, perceived value and quality have a significant influence on users' satisfaction and loyalty to public transport modes (Hakimi Ibrahim & Borhan, 2020; Hussein & Hapsari, 2014). Path analysis results confirmed the relationship between service quality features with customer satisfaction, which is also significantly related to behavioral intentions. The effect of reliability, assurance, empathy, and responsiveness on intentions was mediated by customer satisfaction (Ismail, Rose, Tudin, & Dawi, 2017).

It is reported that the specific attributes of service quality exert a total effect on passengers' intentions or loyalty, which is superior to the satisfaction effect (De Oña, 2021). Also, the inter-modality of the transit system in large cities in conjunction with speed, punctuality, and frequency attributes contributes to the appraisal of service quality (De Oña, 2021). A study in the United States over 8 years reports that the customer satisfaction dimensions include waiting and travel time, customer service, cost, cleanliness, crowdedness, comfort, safety, transfer easiness, accessibility, and aesthetics (Gao, Yu, & Liang, 2016). Arriving on time, feeling safe, scheduled timetable, comfort, and maintenance have a strong correlation in customer satisfaction analysis (El Zein, 2019). The attitudes, satisfaction, and behavioral intentions of passengers differ across captive and non-captive riders of the travel market (De Oña, R., MacHado, & De Oña, J., 2015). A significant relationship exists between service quality and customer satisfaction, and late hours have a significant and negative effect on the overall satisfaction index. (Amponsah & Adams, 2016). Pricing, reliability, and empathy have a significant influence on customer satisfaction, and pricing is the most important factor that influences customer satisfaction

with BRT (Mani & Zainuddin, 2022). Customer satisfaction is significantly influenced by perceived safety, travel cost, and system performance (Githui, Okamura, & Nakamura, 2010). The variable of reliability and complaint handling is found to play a significant role in estimating the overall service quality, and overall service quality significantly contribute towards overall satisfaction (Aniley & Negi, 2010).

2.2 Intentions toward public transport modes

Cultural values such as safety and security have a significant role in influencing the travel behavior and attitudes of travelers (Syam, 2014). The perceived service quality level changes across different segments of the travel market (Dell'Olio et al., 2010). Service reliability and frequency are important attributes of service quality, and car users' attraction toward transit is largely linked to individual perceptions, satisfaction, and motivations (Abou-Zeid & Fujii, 2016). People's satisfaction is influenced by quality improvements only up to a certain extent (Friman, 2004). Further, soft policy measures such as reduced fare marketing, and transport policy interventions focusing on attitude modification can help in encouraging car users to use public transport (Redman et al., 2013). It is reported that vehicle safety, cleanliness, and complaints management are significant attributes to influence passengers' intentions (Das et al., 2018). Among several transit accessibility dimensions, the time accessibility criteria are found to be the most significant that has an impact on passengers' decision to use public transport (Olivková, 2016). Safety and privacy, perceived freedom, and flexibility in traveling are significant attributes of service quality that influence travelers' intentions in mode choice (Javid & Al-Kasbi, 2021). It is reported that functionality and travel safety perceptions should be key attributes while planning for sustainable transport (Friman, Lättman, & Olsson, 2020).

2.3 Research gap and hypothesis

Various factors influence the customers' satisfaction with the service quality of transit facilities. The reviewed literature dictates that the passengers' intentions towards public transport modes are significantly influenced by their perceived satisfaction with offered service quality. Also, the level of importance of each individual related to service quality attributes has a significant impact on customers' public transport intentions. Paying attention to the customer's voice is a normal and powerful technique for deciding their necessities and how to meet them. The public transport transportation authority needs to pay attention to the perceptions of their customer in decision-making. If not, disappointed existing customers will shift to private transportation. It is pertinent to explore the satisfaction with the existing service quality and relate it with the behavioral intentions of the customers in evaluating the feasibility of mass transit modes.

2.4 Faisalabad public transport characteristics

The intracity public transport of Faisalabad consists of government and private operators around the city. Most of the public bus services have been closed and only two bus routes and one para-transit route are operational which cover only a few areas of the city. The Faisalabad Urban Transport System Service (FUTS) is the main bus operator within the city. It was launched in 1994 and operates several large CNG buses and smaller Toyota Hiace vans or wagons connecting the major parts of the city. There is another private bus operator, Brothers Metro, which is a consortium between the Government of Punjab and a private firm on a Public-Private Partnership that operates a fleet of air-conditioned CNG buses. The present urban transport facility Faisalabad Urban Transport System (FUTS) is grossly inadequate for a huge population of 3.7 million. There are a total of 17 planned routes in Faisalabad city.

26 buses are operated only on one route. On some routes, wagons are running in place of buses. Some routes are not operational. These conditions show the insufficiency and inefficiency of the public transport system in the city. There are other paratransit modes such as motorcycle rickshaw which is operated parallel to the wagon and bus services. These intracity are connected to the intercity transport services; however, this connectively does not fulfill the needs of the people to satisfy their convenience and other requirements. Some of the pertinent research studies on the topics conducted in different parts of the world are summarized as follows in Table 1.

Paper	Country	Findings
(Ali et al., 2023)	Japan	Investigated the affect of travel cost consciousness and access by public transport on commuter's traveling behavior using theoretical backgrounds of the Theory of Planned Behavior.
(Ng & Phung, 2021)	Vietnam	Investigated the effects of attitude, social norm, and perceived behavioral control and service satisfaction towards commuter's intention to ride the public transport.
(Lo, van Breukelen, Peters, & Kok, 2016)	Netherlands	Investigated that travel distance is one of the important predictors in selecting the mode choice among commuters.
(Chen and Tung, 2014)	Taiwan	The private vehicle ownership is the main hinderance towards using public transportation system.
(Zailani, Iranmanesh, Masron, & Chan, 2016)	Malaysia	Investigated the commuter's intentions to ride public transport with work or study, sopping and leisure purposes.
(Zhang, Schmöcker, Fujii, & Yang, 2016)	China	It was inferred that social norm and personal norm are one of the important predictors which affect the use of public transport.
This study	Pakistan	Travel cost, travel time and female safety and ability to stop are one of the factors which affect commuter's intention to ride public transport system.

Table 1: Summary of research studies which explored commuter's behavior towards public transport.

There is a need to bring a large fleet of public transport into operation. The private sector is encouraged to deploy more vehicles. Some private services such as wagons, rickshaws, and Qingqi (motorcycle rickshaws) cover the major roads of the city and provide access to many areas. These operators provide services to different institutions, commercial centers, industrial zones, and public areas across the city. The transport services being provided are inefficient and the majority of the people use public transport due to its affordability. However, it has been observed that they are willing to pay more for a better transport service than existing ones, which shows that there is a good demand for a better and more efficient public transportation system.

Many of the wagons and mini-busses are operated by private organizations which also include a large number of unlicensed wagons. These services are not very efficient and have unplanned routes. Although they provide services to satellite towns and other urban areas, they do not follow a proper

schedule and sometimes, the routes are not even covered entirely. Qingqi and rickshaws are also a favorite mode of public transportation in Faisalabad, as these services provide door-to-door service and hence are more convenient for the riders. These modes are operated along designated routes and provide shared services. It is observed that the present public transport facilities are insufficient and inefficient to meet the mobility needs of specific segments of the travel market such as low- and middle-income people. These deficiencies are pushing people to own and use private transport. It is a dire need to develop state-of-the-art transit systems to ensure the mobility choices of the public.

3. RESEARCH METHODS

3.1 Questionnaire design

This section presents the research approach used in this study, research design, sample selection methods, data collection methods, and data analysis methods.

Data was collected through a self-reported questionnaire that consisted of three parts. A questionnaire was designed in this study to achieve the objectives. This questionnaire consisted of personal and trip characteristics, perceived satisfaction with service quality attributes of existing public transportation, and intentions to use a bus rapid transit service under given scenarios. The first part of the questionnaire survey consisted of the personal and trip characteristics of the travelers e.g., age, gender, income, education level, and profession. This part also included questions related to present mode choice, trip frequency, vehicle ownership, reasons for current mode choice, and perceptions about the BRT service.

In the second part of the questionnaire, some of the attributes of service quality of public transport were chosen to know the perceived satisfaction of the travelers with the existing public transport system which includes all kinds of modes. The selected attributes included vehicle condition and maintenance, waiting time, drivers' compliance with traffic rules, sitting comfort, air-conditioned facility, crew attitude, vehicle internal environment, travel time reliability, timetable availability at stop/terminal, fare level, vehicle crowding, safety and security, facilities for handicapped passengers, fare collection system, vehicle cleanliness, separate seats for female, and ease of boarding and alighting. The statements were evaluated using the five Likert type scale i.e. (1) not at all satisfied, (2) slightly satisfied, (3) moderately satisfied, (4) satisfied, and (5) totally satisfied.

In part 3, respondents were asked to rate the level of importance of the selected attributes of service quality. These statements were designed as i.e., how important it is to save travel time, travel cost-saving, living closer to school/office to save travel time, the availability of travel route to save travel time, and the reliability of travel schedule to save travel time. The level of importance was evaluated using a five-point Likert scale i.e. (1) not at all important, (2) slightly important, (3) moderately important, (4) important, (5) very important. In the last section, the respondents were asked to show their level of agreement with their intentions to use BRT service considering various situations. The selected scenarios or situations included safe and secure transportation, reduction in pollution, use of BRT while traveling alone to office/school when it provides direct access to many destinations when parking is not available at the destination when it saves travel time, and preferring BRT over the current mode of transport. The intentions were asked using the five-point scale of level of agreement i.e. (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree. These five-point Likert-type ordinary scales were chosen considering the reliability and normality of the data.

3.2 Survey locations and sampling

The selected locations for the survey included GTS Chowk, Masjid Ismail Road (Daewoo Road), Sargodha Road (bus terminal), and Dhobi Gat Narwala as shown in Figure 1. Initially, a pilot survey was conducted to check the correctness of the designed questionnaire. The feedback from the pilot survey was incorporated to improve the understanding of the questionnaire items. Around 10 samples were collected in the pilot survey. Target respondents were selected randomly at each selected location to obtain a sufficient sample size. A convenience-based random sampling strategy was adopted in this survey. The sample size was decided considering the requirements of multivariate analysis. A sample size of 250 respondents was targeted at the start of the survey. Due to the poor response rate, only 225 usable samples were collected and used in further analysis.

3.3. Analysis methods

Conventional frequency distribution and multivariate analysis were conducted on collected data. The customers' satisfaction index was estimated for all the attributes of service quality. Initially, exploratory factor analyses were conducted on respondents' satisfaction, level of importance, and intention responses. Average responses were also estimated along with calculations of factor loadings. The reliability of the extracted factors was determined using Cronbach's alpha values. An alpha value of more than 0.7 indicates acceptable reliability of the data (Peterson & Kim, 2013; Taber, 2018; Tavakol & Dennick, 2011), and a value of above 0.5 shows a moderate level of reliability (Field, 2013; Hinton & Isabella McMurray, 2014; Taber, 2018). The extracted factors were used to construct the measurement model using SPSS AMOS software. The measurement models confirm the correlations between the observed and latent variables. The measurement models were combined to construct the causal relationship of customer preferences with BRT service considering satisfaction and importance variables as influencing factors. The reliability of the structural model was developed using permissible values of the goodness of fit parameters. It is recommended that for a reliable structural model, the value of the chi-sq ratio to the degree of freedom should be between 2 and 5, the values of CFI and AGFI need to be more than 0.9 and RMSEA should be less than 0.08 (Bentler & Bonett, 1980; Hinton & Isabella McMurray, 2014; Hooper, Coughlan, & Mullen., 2008; Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003).

4. ANALYSIS OF SURVEY RESULTS

4.1 Descriptive statistics

Table 2 shows the descriptive statistics of the respondents' personal information. The share of male respondents is high in comparison to female respondents in the sample. This distribution is almost consistent with previous studies conducted in other cities of Pakistan as the share of working women is quite less in Pakistan (Javid, Okamura, & Nakamura, 2014; Javid, Okamura, Nakamura, Tanaka, & Wang, 2015). The share of young respondents is high which is due to the presence of students in the sample. As most of the respondents are young and students; therefore, only 30% of them own a vehicle.

Figure 2(a) shows that the majority of young respondents use public transport such as bus, wagon, and motorcycle modes for traveling. The use of motorcycle and para-transit modes is quite common among low- and middle-income groups. Figure 2(b) shows the trip frequency of respondents with the travel mode of Figure 2(a). Figure 2 (c) shows that cost-saving and time-saving are the main reasons for choosing a transport service. It depicts that an affordable transport service with attributes of time saving and comfort will attract commuters in Faisalabad city, and a BRT service with these attributes has the potential in this context. Results show that almost 88 % of the respondents are found in favor of BRT service, and 12 % are against BRT. Almost 84 % of respondents agreed that they will use the BRT service if it exists. Figure 3 shows the original modal split and modal shift trend with the existence of the BRT service. Most of the respondents in all groups have shown a positive attitude toward using the BRT service. Respondents were also asked about their willingness to pay the average fare between the subsequent stations of a BRT service. Almost 57% of respondents said Rs. 30, 48 % said Rs. 40, and 33 % said that the fare should be less than Rs. 20.

Figure 1: Map of survey locations (source: Google map).

Characteristics	Distribution (%)
Gender	Male (74), female (26)
Age (years)	Under 20 (14), 21-30 (46), 31-45 (25), 46-60 (12), above 60 (3)
Education	Primary (5), high school (19), college (25), bachelor (40), master or above (11)
Profession	Student (38), private employees (29), civil employees (24), business (5), others (4)
Income (PKR)	Under 30,000 (44), 30,000-50,000 (23), 50,001-100,000 (26), above 100,000 (7)
Vehicle ownership	Yes (30), no (70)

Table 2: Descriptive statistics of the respondents.

(a) travel mode

(b) trip frequency with travel mode

(c) The main reasons for choosing the mode
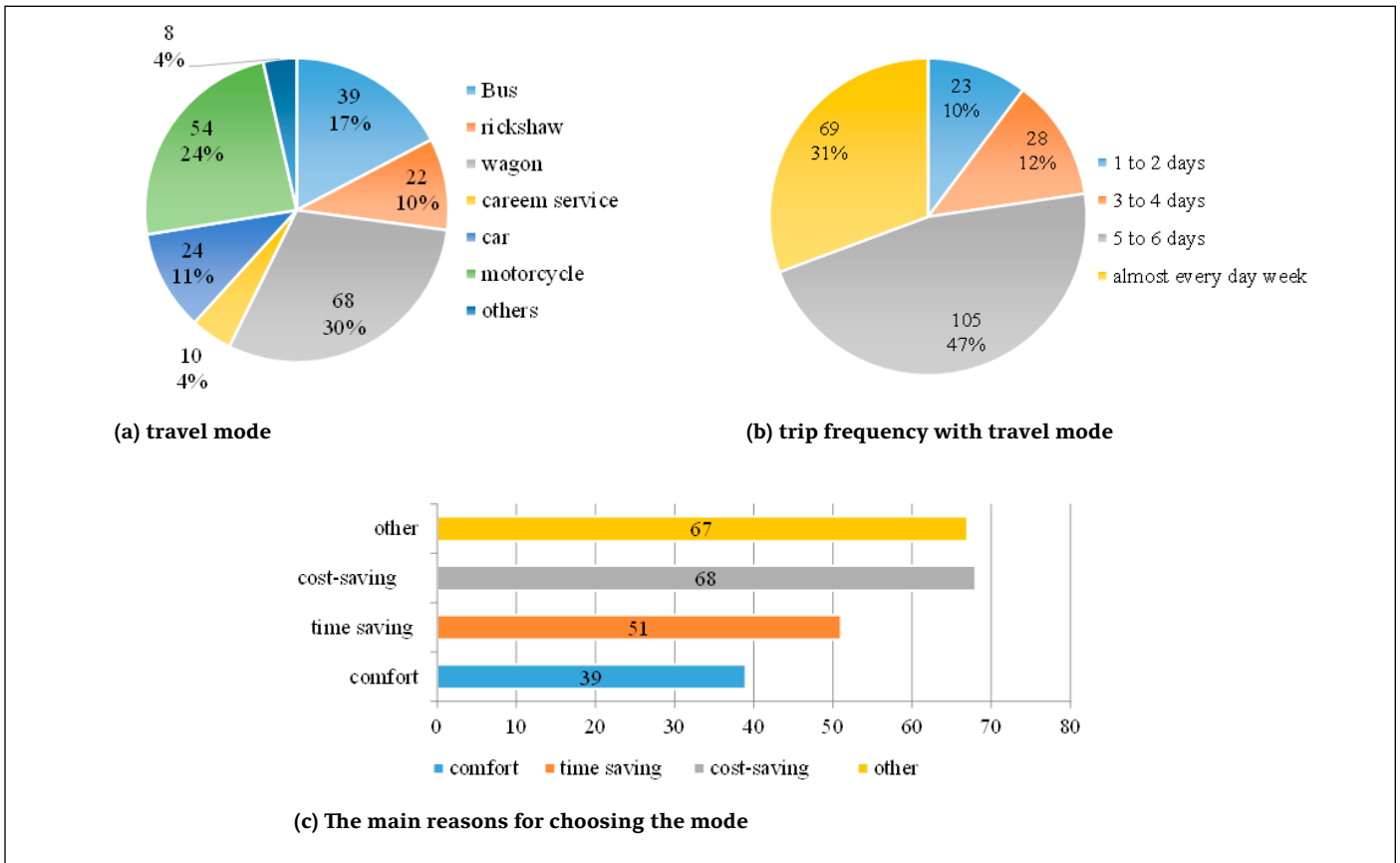
Figure 2: Modal split, trip frequency, and reasons for traveling.
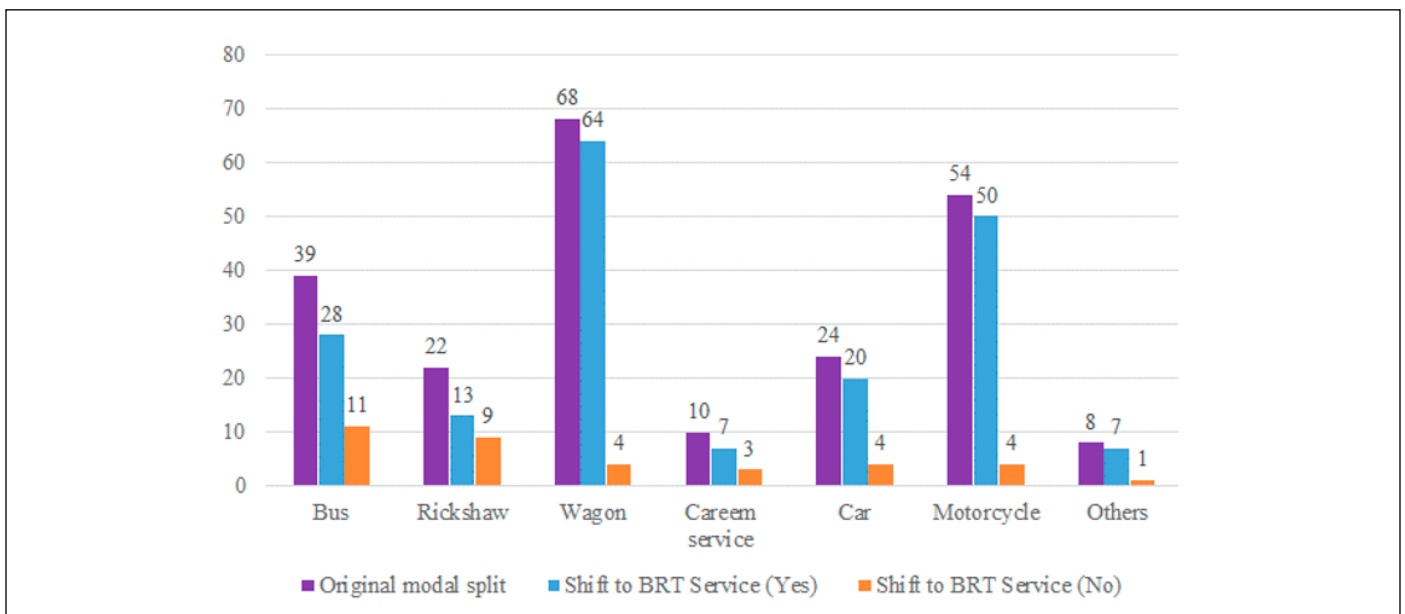

Figure 3: Original modal split and shift to BRT service.

4.2 Distribution of respondents' satisfaction with service quality attributes

Figure 4 shows the public opinions about their satisfaction with the existing public transport system in Faisalabad city. In general, respondents looked unsatisfied with most of the service quality dimensions of transit modes. The customers' satisfaction index was estimated using Eq. 1. The security and safety, facilities for handicapped passengers, bus stop condition, the fare for a small distance, fare level, schedule availability, vehicle internal environment, air-conditioning of bus, vehicle condition, and driver's compliance with traffic rule attributes received very low satisfaction from the respondents. Travel time reliability of modes received the highest satisfaction among all attributes.

$$(1) \quad CSI = \frac{total\ number\ of\ 4th\ and\ 5th\ level\ responses}{total\ responses}\ x\ 100$$

4.3 Respondents' level of importance with attributes for traveling

Figure 5 shows that most of the respondents stated a 'very important' level for all selected attributes. Among all attributes, comfort and safety, cost saving and travel time reliability obtained the highest importance from the respondents. The ability to make stops on the way is perceived as less important among the attributes.

4.4 Respondents' intentions toward BRT service

Figure 6 shows the respondents' level of agreement with their stated intentions for BRT service considering various scenarios. Most of the users say that they will prefer BRT service on their transportation mode. Also, many respondents agreed that the BRT service would be safe and secure for the riders. They agreed that it will provide better accessibility to the destination. The availability of parking or parking restrictions at the destination would have a significant impact on riders' choice of BRT service.
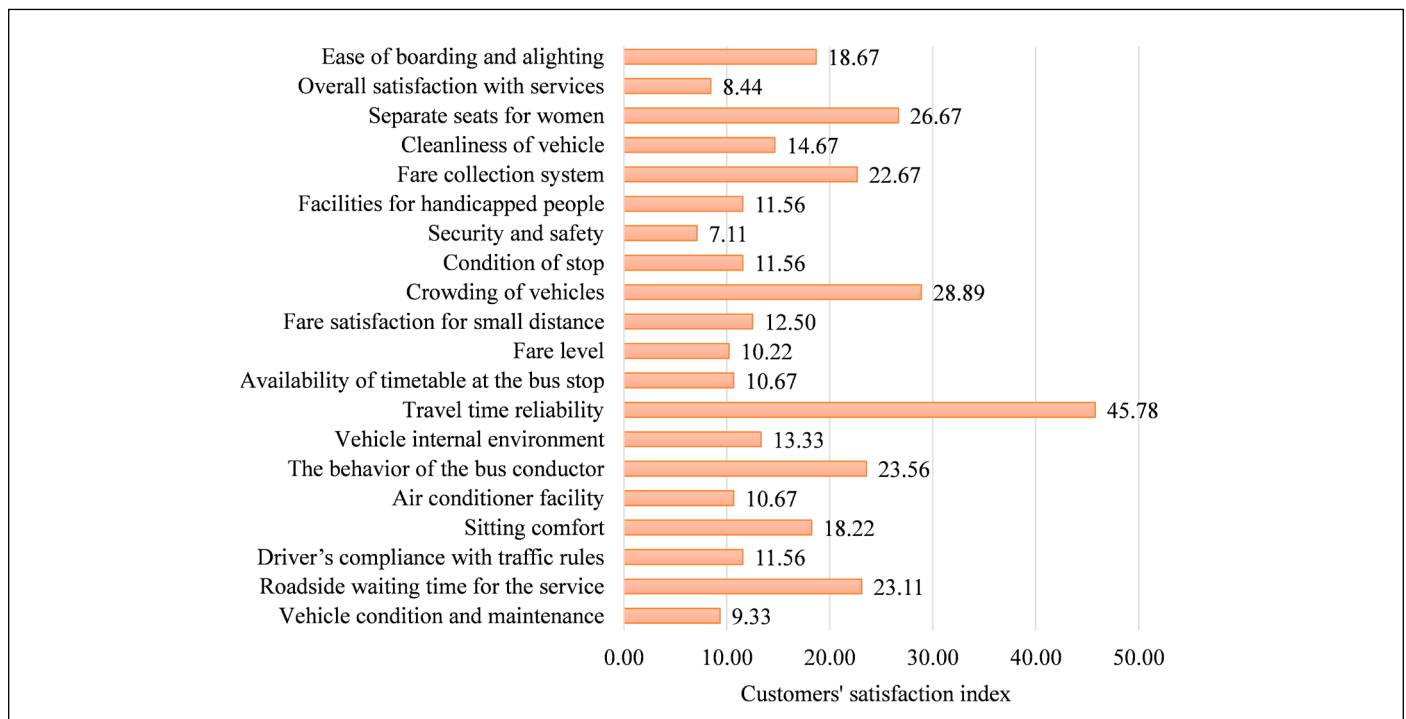

Figure 4: Customers' satisfaction index with public transport attributes.
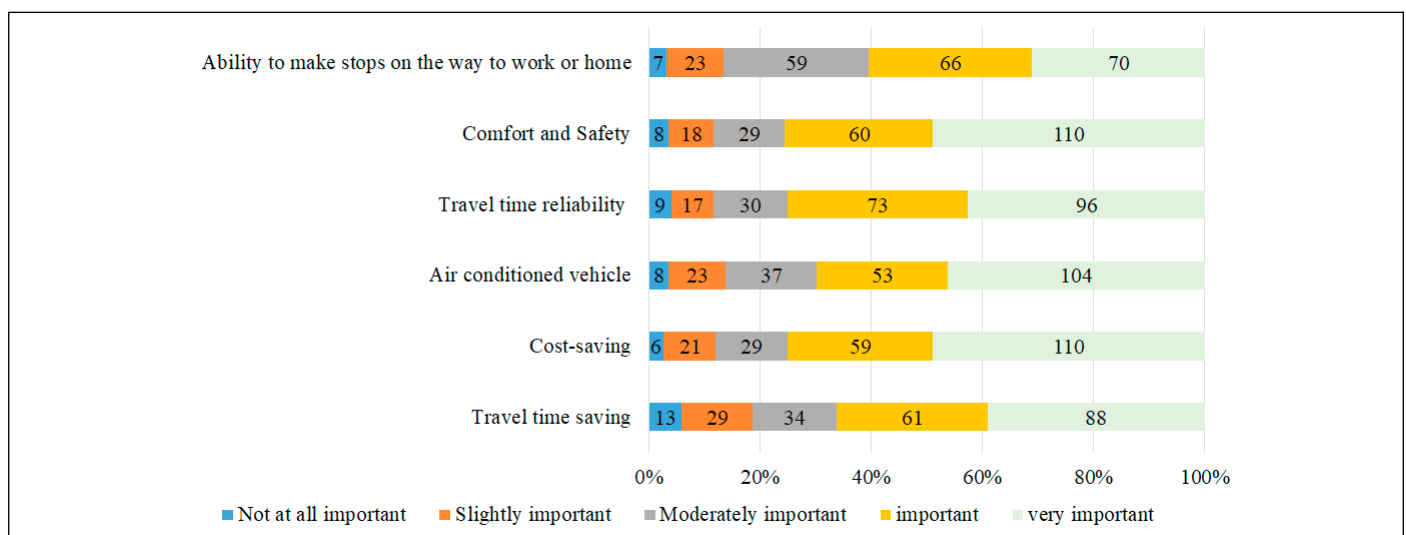

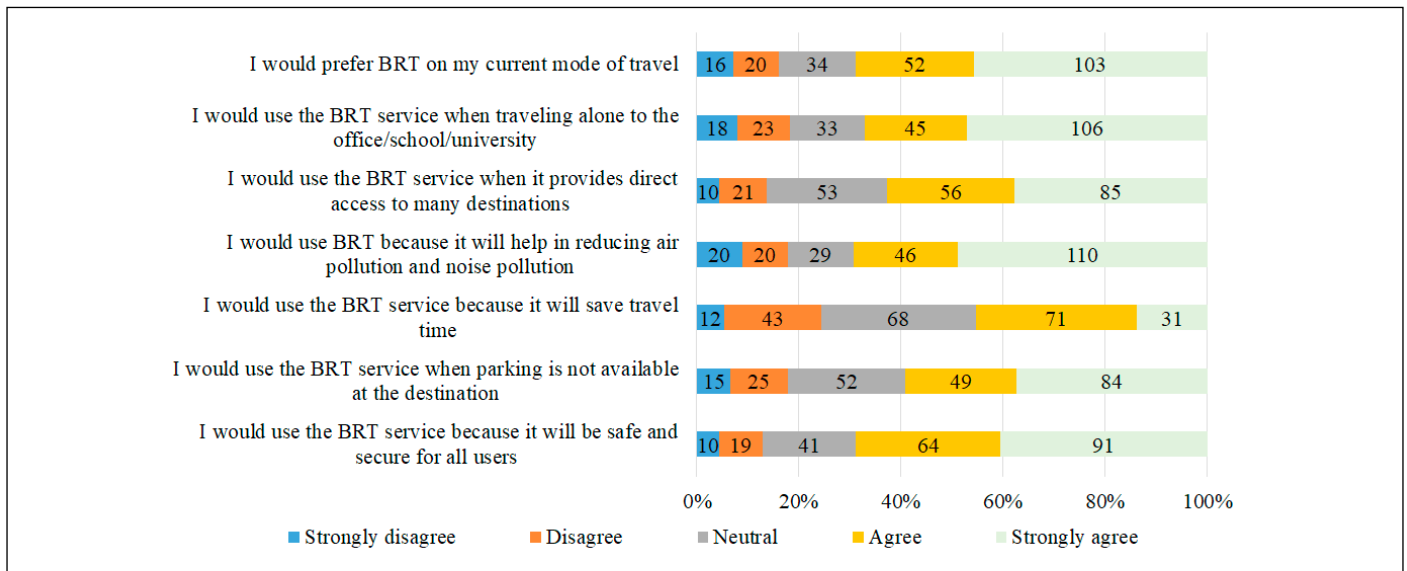Figure 5: Distribution of respondent's level of importance for attributes.

Figure 6: Distribution of respondent's level of agreement with BRT service intentions.

Observed varia bles	Mean	Factors			
		Facility Design Attributes (FDA)	**Vehicle Environment Attributes (VEA)**	**Service Attributes (SA)**	**Comfort Attributes (CA)**
Availability of timetable at the stop (FDA-1)	1.982	0.759			
Facilities for handicapped people (FDA-2)	1.711	0.737			
Security and safety (FDA-3)	1.764	0.723			
Air-conditioned facility (FDA-4)	1.764	0.707			
The condition of the station or stop (provisions of seats and shelter) (FDA-5)	1.871	0.640			
Vehicle internal environment (VEA-1)	2.387		0.604		
Cleanliness of vehicle (VEA-2)	2.320		0.520		
Separate seats for women (VEA-3)	2.604		0.503		
Roadside waiting time for the service (SA-1)	2.858			0.724	
The behavior of the bus conductor (SA-2)	2.844			0.504	
Fare collection system (SA-3)	2.782			0.500	
Sitting comfort (CA-1)	2.458				0.549
Vehicle condition and maintenance (CA-2)	2.044				0.524
% of variance explained		17.754	11.297	8.801	7.443
Factor Mean		1.818	2.437	2.828	2.251
Cronbach' alpha		0.862	0.670	0.591	0.542
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.					0.826

Table 3: Rotated factor loadings of customers' satisfaction with service quality.

4.5 Exploratory factor analysis (EFA)
EFA for satisfaction with service quality
An exploratory factor analysis was conducted on respondents' perceptions about service quality attributes of the existing public transport system. The maximum likelihood (ML) method was used to run exploratory factor analysis and the rotation of factors was done using the varimax rotation method. This method is preferred as it provides better results of extracted factors by maximizing the factor loadings. This method provides factors that are more interpretable and logical. Further, the same method is available in AMOS software which is used for the development of structural equation modelling. This analysis yielded four factors of satisfaction as shown in Table 3. This extraction was done using a cut-of-point factor loading of 0.5 (Field, 2013; Guadagnoli & Velicer, 1988; Hair, Black, Babin, & Anderson, 2009). Variables with a factor loading less than 0.5 were excluded from the

analysis. These factors were named facility design attributes (FDA), vehicle environment attributes (VEA), service attributes (SA), and comfort attributes (CA). The value of the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy is 0.826 which is more than 0.8 (Shrestha, 2021). It shows that the collected sample size is adequate to run the factor analysis. Further, the factor analysis results were validated using Cronbach's alpha value. The estimated values are more than 0.5 which shows a moderate level of reliability of the factors and internal consistency among respondents in the evaluation (Taber, 2018). The first factor of the FDA included observed variables related to bus station design, facilities for handicapped passengers, safety and security, and air-conditioned facility. Most of the respondents have mutual consent over dissatisfaction with facility design attributes of service quality. This low satisfaction with existing services may lead to poor intentions to use a BRT service. The VEA fac-

tor included variables related to vehicle internal conditions, cleanliness, and priority treatment with female passengers. The service attributes factor consisted of variables concerning waiting time, crew behavior, and fare collection service. The last factor included variables of sitting comfort and the vehicle's internal environment which yields comfort for the passengers in riding a service.

EFA for the level of importance with attributes

This factor analysis was conducted on the perceived level of importance of the selected attributes as shown in Table 4. The factor loadings and average responses show that the respondent has shown high importance of travel time saving, air-conditioned vehicles, cost saving, travel time reliability, and comfort and safety. The Cronbach's alpha value is more than 0.7 and KMO is more than 0.8 which predicts significant reliability and adequacy of the collected data.

EFA for intentions toward BRT service

This factor analysis provided only one factor over intentions with BRT service as shown in Table 4. The factor loadings and Cronbach's alpha value are more than 0.7 which depicts good consistency among respondents in the evaluation. These results also predict high intentions of respondents to use BRT service for the stated scenarios. The target segments of the travel market would prefer to use BRT service because they believe that it will save travel time, be comfortable, and be safe. The parking management policies with BRT implementation will help to promote a modal shift from the private vehicle and reduce traffic congestion and pollution (Christiansen, Engebretsen, Fearnley, & Usterud Hanssen, 2017; Hess, 2001).

4.6 Structural equation modeling of satisfaction, importance, and intentions

A structural model was developed to assess the influence of satisfaction attributes and perceived importance on cus-

tomers' intentions. The following hypothesis was stated to develop the causal model. (1) The extracted factors of satisfaction attributes related to the existing public transport system have a significant influence on behavioral intentions, (2) The customers' level of importance for selected attributes of service quality influences their intentions with metro-bus service. The path diagram of the structural model is shown in Figure 7. All the measurement equations were significant at a 1% level of significance. The FDA, SA, CA, and VEA latent variables have a positive association with each other which predicts a significant correlation among them. The structural estimate between VEA and intentions was insignificant. The FDA has a significant but negative structural relationship with intentions. It predicts that a low satisfaction level with facility design attributes tends to push customers towards a better public transport system for efficient commuting. It is evident that once a better transit mode exists, people will tend to shift to it as they perceived it as efficient and convenient in using (Javid, Okamura, Nakamura, Tanaka, & Wang, 2016; Redman et al., 2013). A BRT-like transit service with properly designed features such as station facilities, safety and security, and facilities for disabled passengers would help to attract commuters. The improvement in these attributes is highly important to enhance transit ridership as reported by other researchers (Chan et al., 2021; Joewono & Kubota, 2006; Şimşekoğlu, Nordfjærn, & Rundmo, 2015). The structural estimate of SA with intentions is positive and significant at a 5% level of significance. It shows that despite low satisfaction with service attributes, there are respondents who have positive intentions towards intended BRT service. It means that the improvements in the fare process, reduction in waiting time, and good crew behavior would help to improve the satisfaction of the users as well as their intentions. It is well known that public transport use incentives for non-users are encouraging interventions to promote sustainable travel behaviour (Abou-Zeid & Fujii, 2016). These

Observed variables of importance factor	Mean	Factor loadings
Travel time saving (Imp-1)	3.809	0.883
Air-conditioned vehicle (Imp-2)	3.987	0.872
Cost saving (Imp-3)	4.093	0.850
Comfort and safety (Imp-4)	4.093	0.839
Travel time reliability (Imp-5)	4.022	0.836
Ability to make stops on the way to work or home (Imp-6)	3.751	0.639
% of variance explained		67.903
Factor Mean		3.959
Cronbach' alpha		**0.903**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.900
Observed variables of intentions factor		
I would use BRT because it will help in reducing air pollution and noise pollution. (Int-1)	3.916	0.816
I would use the BRT service because it will be safe and secure for all users. (Int-2)	3.920	0.811
I would use BRT service when traveling alone to the office/school/university. (Int-3)	3.880	0.792
I would use the BRT service when it provides direct access to many destinations. (Int-4)	3.880	0.783
I would use the BRT service when parking is not available at the destination. (Int-5)	3.720	0.755
I would use the BRT service because it will save travel time. (Int-6)	3.822	0.747
I would prefer BRT on my current mode of travel. (Int-7)	3.916	0.732
% of variance explained		60.407
Factor Mean		3.864
Cronbach's alpha		**0.890**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.888

Table 4: Rotated factor loadings for the level of importance and intentions with BRT service.
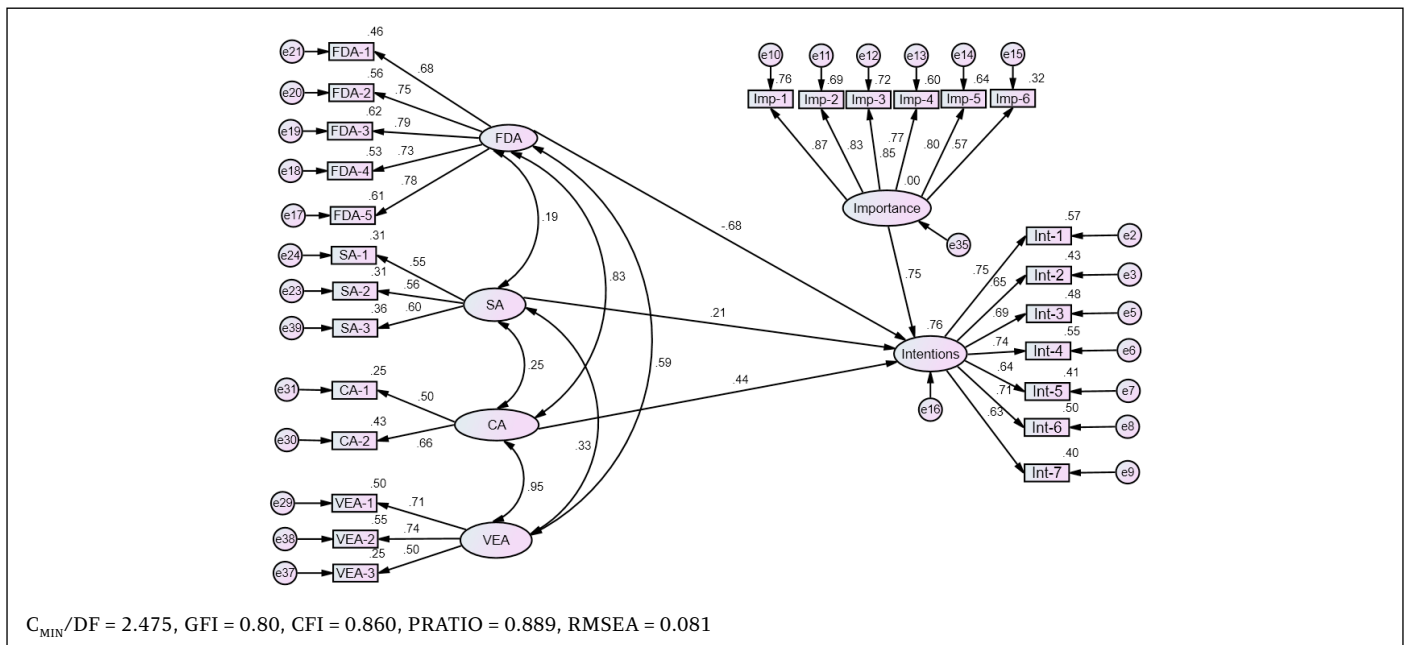
Figure 7: Structural model of satisfaction and intentions.

interventions include the improvement in specific service quality attributes which also affects the satisfaction level of customers with public transport. The structural relationship between CA and intentions was significant at a 1% level of significance. It predicts that the improvement in perceived satisfaction with comfort dimensions of service quality will enhance users' intentions. The respondents who have shown a higher level of importance with selected attributes would have high intentions to use BRT service once it exists as the structural relationship between importance and intention variables is positive. The provision of BRT will help to save travel time. This service will be more reliable, comfortable, and safe for the rides. A bus service with improved attributes will help to improve the ridership of public transport (Collins & MacFarlane, 2018; Heath & Gifford, 2002; Sánchez-Atondo, García, Calderón-Ramírez, Gutiérrez-Moreno, & Mungaray-Moctezuma, 2020; Sharaby & Shiftan, 2012).

5. CONCLUSIONS AND IMPLICATIONS

The perceived quality of public transportation influences users' intentions with existing and proposed transit facilities. In this research, customers' satisfaction and preferences were evaluated using the results of questionnaire survey data. It is found that most of the people who use public transport in Faisalabad city are from the age group of 21-30 years old. Most of the people who use public transport don't have a car, but most of them have access to a motorcycle. Travel attitudes are inclined towards private transport seeking travel time-saving and flexibility in traveling. Most people are looking for a better public transport service and want to shift to an improved public transport system such as BRT service. The CSI results revealed that the perceived satisfaction is quite poor with most of the service quality attributes and there is a sheer need to improve the quality of the transit system including the implementation of a BRT service. It is concluded that most of the wagons, motorcycles, and rickshaw users will prefer BRT service on their current mode of transport.

Service quality attributes such as comfort, safety, cost saving, reliability, and travel time saving are important characteristics of the BRT service. It is found that parking management and availability of parking spaces at the destination and spatial coverage of BRT service will influence the behavioral intentions of people to consider improved public transport for use

in the future. There is a significant potential for a modal shift among commuters. This modal shift potential would help in sustainably shaping the transport system. It is only possible with proper improvement in the existing transit modes and with the introduction of a state-of-the-art BRT service in Faisalabad. The improved public transport service should help to save travel time, reduce the number of transfers in a single trip, provide better comfort to the passengers through well-maintained vehicle condition, air-conditioned facility, setting a suitable fare level, providing security and shelter facility at the station, and provision of facilities for handicapped people. To make a proper modal shift and effective BRT service. It is necessary to integrate it with parking management policies in the designated areas. It is highly important to improve the service quality and hence satisfaction to ensure significant ridership for the new proposed BRT service. Also, the integration of the existing transit modes with the new BRT service is highly important for better connectivity and enhanced users' experience of the public transportation system as a whole. Therefore, the improvements in the existing modes will help to promote a better image of transit modes among people which in turn will affect the effectiveness of the BRT service.

This work will be useful for policymakers to identify major problems in urban transport and suggest improved transport services that will be adequate for Faisalabad. The presented results may not be a true representation of the perceptions of the whole population in Faisalabad; therefore, the extracted findings and recommendations have limitations in their implications. It is recommended for future research to assess the economic, social, and traffic congestion aspects of the BRT service. Specific attitudes and cultural and social values may influence people's choice of travel mode and modal shift. The evaluation of these values' influence through a qualitative study can provide useful information to policymakers about these policy variables. Future research should also focus on assessing the planning and operational aspects of a BRT service.

APPENDIX

Part 1: Kindly answer the following personal and travel information.

Q.1	Gender	(1) Male (2) Female
Q.2	Age (years)	(1) Under 20 (2) 21-30 (3) 31-45 (4) 45-60 (5) above 60
Q.3	Education Level	(1) Primary (2) High school (3) College (4) Bachelor (5) Master or above
Q.4	Profession	(1) Student (2) Private Employee (3) Civil Employee (4) Business (5) Others
Q.5	Monthly income (PKR)	(1) Under 30,000 (2) 30,000-50,000 (3) 50,001-100,000 (4) above 100,000
Q.6	Which mode of transport are you using at present?	(1) Bus (2) rickshaw (3) wagon (4) Careem service (5) car (6) motorcycle
Q.7	How many times do you use a service a week?	(1) 1 to 2 days (2) 3 to 4 days (3) 5 to 6 days
Q.8	What is the main reason for using the above transport?	(1) comfort (2) time saving (3) cost-saving (4) other
Q.9	For how many years are you using the above service	(1) rarely (2) less than 1 year (3) 1-3 years (4)3-5 years (5) more than 5 years
Q.10	Do you have your vehicle?	(1) yes (2) No
Q.11	Do you think that there should be a BRT service	(1) yes (2) No
Q.12	Alternate mode of travel if the vehicle is not present.	(1) Qingqi rickshaw (2) car (3) Careem service (4) bus (5) other
Q.13	If a bus rapid transport is available, would you use it?	(1) yes (2) No
Q.14	What do you think about using public transport?	(1) expensive (2) safety (3) cleanliness (4) too many transfers
Q.15	What will be the average fare that you are willing to pay for your daily trip?	(1) less than 20 Rs (2) 30 Rs (3) 40 Rs (4) other

Part 2: Please rate your satisfaction level with Faisalabad urban transportation system

Statements		Evaluation scale
Vehicle condition and maintenance Roadside waiting time for the service Driver's compliance with traffic rules Sitting comfort Air-conditioned facility The behavior of the bus conductor Vehicle internal environment Travel time reliability Availability of timetable at the bus stop Fare level Fare satisfaction for small distance	Crowding of vehicle The condition of the station or stop Security and safety Facilities for handicapped people Fare collection system Cleanliness of vehicle Separate seats for women Overall satisfaction with services Ease of boarding and alighting	Totally satisfied, Satisfied, Moderately satisfied, Slightly satisfied, Not at all satisfied

Part 3: Questions based on the introduction of bus rapid transit in Faisalabad

What is the most important thing that you want in a public transport mode?	Travel time saving Cost-saving Air conditioning Travel time reliability Comfort and Safety Ability to make stops on the way to work or home	Not at all important, slightly important, important, fairly important, very important
• I would use BRT because it will help in reducing air pollution and noise pollution. • I would use the BRT service because it will be safe and secure for all users. • I would use BRT service when traveling alone to the office/school/university. • I would use the BRT service when it provides direct access to many destinations. • I would use the BRT service when parking is not available at the destination. • I would use the BRT service because it will save travel time. • I would prefer BRT on my current mode of travel.		Strongly disagree, disagree, neutral, agree, strongly agree

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