STUDY ON EXISTING BUS TERMINAL FACILITIES IN BARISHAL CITY

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ABSTRACT

The passenger transport service in Barishal is often criticized as poor in quality. The quality depends on a large variety of service components and relevant characteristics. The development of bus terminal facilities, which are essential components of bus transportation services and it will improve the transportation network and enhance the economy of the country. The aim of this study is to identify the strengths and weaknesses of the current facilities and suggest possible improvements to enhance the passenger experience. The entirety of the bus passengers in Barishal made up the population study. 285 respondents were included in this study, which was done through a simple random selection method. Firstly, a questionnaire survey was prepared to collect primary data and secondly, SPSS was used to analyse the data. A variety of statistical techniques were employed to analyse the gathered data, including factor analysis, descriptive statistics, cross-tabulation, cronbach's alpha test and hypothesis test. Based on 38 variables, including information, security and safety, accessibility features, amenities, quickly accessible resources, infrastructure, the study's results indicate that factors influence passenger satisfaction at bus terminal facilities. The majority of the sample's passengers, according to the study, were not content with Barishal City's bus terminal amenities. According to the study, a significant number of the sample's passengers were dissatisfied with Barishal City's bus terminal amenities. The study recommends the implementation of a comprehensive passenger facility improvement plan, including the provision of additional seating, improved restroom facilities, an increase in the number of waiting areas, the installation of clean and accessible toilets and the establishment of proper waste management systems. This study will offer the governments, academics and researchers for future improvement of bus terminal facilities, which are essential for the transport system of Barishal city, an important economic hub in the southern region of Bangladesh.

Keywords: Bus terminal, Transportation, Barishal city, Information facility, Accessibility.

1. INTRODUCTION

Bus transportation serves an important purpose for moving a sizable number of people in developing cities where the need for mobility is rising to rapid urbanization. A focus on the road transportation system, for which the fulfillment of all these requirements requires not only the existence of physical links between different destinations but also the availability of these links to traffic (Berdica, 2002). Even though bus transit is essential for moving a sizeable portion of the population in developing cities, it frequently falls short of demand. A current concern in the literature on transport modelling is the need for a modern transportation system that offers high-quality services (Ali, 2010; Cullinane, 2002; dell'Olio, 2010; Randheer, 2011). Public buses accommodate users to meet their mobility needs, but there are issues with delays and dissatisfaction that originate with them (Davidson, 2006; Aidoo, 2013). Large cities in developing countries are usually heavily dependent on road transportation, and there will always be new transportation-related problems in cities. A carefully constructed and reliable transportation system is essential for a sustainable city, even though transit infrastructure is essential for transportation systems and should be developed in order to improve the passenger experience (Fernando et al., 2019). Barishal is one of the largest city located in south-central Bangladesh on the banks of the Kirtankhola River. With a population density of 27260 persons per square mile, it is the biggest city and serves as the administrative center for both Barishal District and Barishal Division (Demographia, 2011). Although other modes of transportation, like air and water, exist in this metropolis, they are not suitable for internal transportation (Islam, 2018). The transportation network of Barishal is made up of many modalities, with both motorized transport (MT) and non-motorized transport (NMT) sharing the same carriageway (Rahman, 2009). Most of the people using road transport system (Hossain, 2006). However, the bus terminals in the Barishal district lack of sufficient amenities for passengers and are inadequate to handle large numbers of buses (Fernando et al., 2019). Barishal city is an important economic hub in the southern region of Bangladesh, so the bus facilities and bus services of this city must be improved for a reliable transport system. The main aim of this research is to improve the bus terminal facilities in Barishal city.

The objectives of this study are:

- > To evaluate the factors that affect the level of passenger satisfaction with the amenities at bus terminal.
- > To ensure the improvement of terminal facilities in Barishal city.
- To offer suitable guidelines for enhancing bus terminal conditions in the future so as to guarantee safety, security and all required amenities.
- > To identify the level of passenger satisfaction on bus terminal facilities in Barishal city.
- > To identify the characteristics of bus terminal facilities in Barishal city.

1.1 Literature review

Facilities are a broad term for the amenities and physical resources that are provided to support various activities or functions within a particular environment. A facility can be anything from a workplace or a manufacturing facility to a recreation area or a transportation hub. Facilities come in a variety of shapes and sizes, depending on the needs of the users as well as their intended use. Akbardin (2020) provides while the number of services or facilities required to serve the transportation of people or goods from a location or region is referred to as demand in the context of transportation. A variety of amenities and services are provided at bus terminals to accommodate passengers and ensure that bus transportation runs smoothly. Other important and major aspect is safety (Eboli, 2007; Fellesson, 2008). These facilities frequently have bus platforms for arrivals and departures, covered waiting areas, ticket booths, restrooms, information boards, security personnel, food and retail establishments, parking facilities, accessibility features, baggage handling services, vehicle maintenance areas, information desks, Wi-Fi and charging stations, safety measures, green spaces and connections to other modes of transportation, ensuring traveler's comfort and convenience while additionally keeping them safe (Munzilah Rohani, 2013).

Satisfaction is a sentiment of contentment or fulfillment that comes from achieving an intention, aim or anticipation. As per Parasuraman et al. (1988), several factors, including service and product quality, cost, status and personal characteristics may influence how satisfied one feels. It is a feeling of joy or satisfaction brought on by having one's wishes come true or having a need or expectation meet. According to Fernando et al. (2019), "Achievements of necessity, popularity, requirement and ambition" is an expression of satisfaction. The evaluation of a customer's satisfaction with the goods, services, or overall experience is referred to as customer satisfaction. It indicates how well an organization fulfills or exceeds the needs and expectations of its customers, ensuring their loyalty and satisfaction. Surveys, comments, and reviews are frequently used for evaluating customer satisfaction. Oliver (1980) provides an informative conceptual structure for understanding the level of passenger satisfaction. Passenger satisfaction is the concept used to describe the label of contentment and happiness people have after utilizing a service, usually one related to transportation, such as a plane, train, bus, or ride-sharing service. On-time performance, comfort, tidiness, customer service, safety and the overall quality of the passenger experience are sum the metrics used to access it. For companies and organizations in the transportation sector a high passenger satisfaction rate is essential since it can result in repeat business, positive ratings and customer loyalty. In imitation of Siskos (2010), passenger satisfaction measurement is currently considered to be the best method to obtain opinions, even though it provides the customer's satisfaction and expectations in a successful, direct, significant and scientific way. Bus delays, inadequate customer service, losing luggage or unpleasant sitting are just a few causes of passenger dissatisfaction (LaBarbera, 1983). For transportation firms to increase consumer satisfaction and loyalty, these problems must be resolved. In the context of safety and security, there are three main factors that contribute to passenger dissatisfaction: unsafe driving habits, inadequate boarding and alighting facilities and a lack of law enforcement agency surveillance. These factors make the service unsatisfactory and include bus service is inconsistent, there is frequently crowding, there aren't enough high-quality buses and an absence of cleanliness. As per Rahman et al. (2017), despite these unfavorable opinions, user had a positive outlook on buses, which have low transportation costs.

2. METHODOLOGY

All of the passengers who use the bus terminal amenities in the Barishal city area have been provided with an account for this research. In Barishal city, most people use bus terminal facilities. Notullabad and Rupatali are two bus terminals in Barishal city. Among these two terminals, Notullabad is the main bus terminal in this city. For the purpose of collecting data for this study, a random sample of 285 passengers has been chosen from all of the participants. Simple random sampling is preferable to non-random sampling as a method of inspection. The cleanest and simplest probability sampling technique is this one. Simultaneously, there exists a corresponding probability that a randomly chosen individual from the population will be included in the sample. Comparable to other cities in Bangladesh, Barishal has an extensive population for this study, so we must select respondents at random.

2.1 Data Collection Method

2.1.1 Primary Data

The present investigation involves the use of primary data that was acquired through the distribution of a survey questionnaire to users of bus terminal facilities in the Barishal city location. Among the 285 users who were chosen at random to be used as the study's sample, they received questionnaires.

2.1.2 Secondary Data

Academic publications, journals, reports and websites related to bus terminal amenities and passenger satisfaction were used to collect secondary data for this study. The data analysis was done using SPSS. The gathered data was investigated using factor analysis, cross-tabulation, cronbach's alpha test, descriptive statistics and hypothesis testing.

3. Illustrations

3.1 Descriptive Statistics

Descriptive statistics can be used to calculate, describe and summarize collected research data in a logical, meaningful and efficient way. When it's describing a study variable, it provides three major essential characteristics of that variables. The distribution-frequency of occurrence of a variable. The central tendency an estimate of the center of the distribution. Mostly expressed in mean, median and mode. The dispersion-how the values are spread around the central tendency. Often expressed in the range and the standard deviation.

Different types of descriptive statistics are:

- Scale of measurement (SOM)
- Descriptive statistics
- Analysis
- Chart

After the nominal data analysis, it provides the frequency distribution, frequency percentage and Bar or Pie charts. From the descriptive statistics analysis, the following values are obtained: mean, median, mode, standard deviation, minimum and maximum.

3.2 Parameter Descriptions





restaurants

According to the survey report, the majority 79% of respondents' answers indicate they use bus terminals every day, while 21% replied they use them more than twice a week but not every day. Figure 1 shows the frequency of bus terminal facilities. Figure 2 shows that the majority of respondents say that the terminals have sufficient waiting space for passengers. Figure 3 illustrates that the waiting room conditions at the bus terminal are average. The maximum number of respondents feeling comfortable in the bus terminal is shown in Figure 4. Figure 5 indicates the quality of food that is available near the bus terminal. The majority of respondents believe that food quality is average. Sufficient cafeterias and restaurants are available near the bus terminal, as shown in Figure 6. The maximum respondents said that the toilet conditions at the bus terminal are average, which is shown in Figure 7. Figure 8 shows the frequency of bus conditions.



Figure 9 indicates the drinking water that is available near the bus terminal. In figure 10, the majority of respondents believe that water quality is average. According to the majority of respondents, the ticketing systems in the bus terminal are adequate, as illustrated in Figure 11. The frequency of the bus schedule, which is shown in Figure 12. The majority of respondents think that the terminals are safe for them, as shown in figure 13. Figure 14 demonstrates that the ticket sales systems at this terminal are standard. The bus terminal's lighting system is adequate, as illustrated in Figure 15. The majority of respondents claimed that information systems operate online, which is apparent in figure 16.



According to Figure 17, the ticket price is reasonable. Figure 18 illustrates how common accessibility is among people with disabilities. The bus terminal's entrance and exit, depicted in Figure 19, were mentioned by the most respondents. Figure 20 presents the bus terminal's cleanliness. Figure 21 illustrates how effective the bus terminal's security system is. The number of sign boards that are available at the bus terminal for guidance is shown in figure 22. Figure 23 illustrates that there is sufficient protection from inclement weather. The frequency of bus cancellations and delays is depicted in figure 24.





Fig29: Charging outlets Fig30: Communication method Fig31: ATM booth Fig 32: Available public transport

The frequency of lost and found services is displayed in Figure 25. As seen in figure 26, the majority of respondents believe that there is not enough room for kids at the terminals. There is ample space for prayer in the terminal, as seen in Figure 27. Figure 28 illustrates that the vast majority said that the rules and regulations of this terminal are good. As viewed in Figure 29, the majority of respondents believe that the terminals' charging outlets were average. Figure 30 shows that this terminal's communication methods are standard. There are sufficient ATM near the bus terminal, as Figure 31 shows. Figure 32 illustrates that the majority of respondents said the terminal have enough buses.



Figure 33 illustrates how there is enough space at the terminal for people to park their own cars. The frequency of workshop and fueling facilities appears in Figure 34. Figure 35 demonstrates that the terminal's public announcement system is operating normally. Figure 36 presents a terminal with

insufficient passenger waiting space. The fire extinguisher facilities are represented in Figure 37. There is sufficient space at the terminal for bus parking, as Figure 38 illustrates.

3.3 Data Analysis and Result

3.3.1 Descriptive Test

Table 1: Descriptive Test

		Descrip	tive Stati	istics				
								Std.
	Ν	Min.	Max.	Sum	Mean	Median	Mode	Deviation
Do the terminals are well facilitated	100	1	3	190	1.90	2.00	2.00	0.659
Are passenger's waiting room well condition	100	1	3	185	1.85	2.00	2.00	0.626
Are there sufficient waiting place for heavy passengers	100	1	2	137	1.37	1.00	1.00	0.485
Do you feel comfortable in this bus terminal	100	1	2	116	1.16	1.00	1.00	0.368
Are there available cafeterias, restaurants in this bus terminal	100	1	2	123	1.23	1.00	1.00	0.423
Is the food quality good	100	1	3	193	1.93	2.00	2.00	0.655
Are there available drinking water	100	1	2	118	1.18	1.00	1.00	0.386
What do you think about the water quality	100	1	3	190	1.90	2.00	2.00	0.718
Are there toilets available and well- conditioned	100	1	3	197	1.97	2.00	2.00	0.643
Are there well condition available buses in this terminal	100	1	3	167	1.67	2.00	2.00	0.620
What do you think about the ticketing system condition	100	1	3	160	1.60	1.00	1.00	0.725
Are those buses on scheduled	100	1	2	117	1.17	1.00	1.00	0.378
Do you feel the terminals are safe	100	1	2	126	1.26	1.00	1.00	0.441
Ticket selling system	100	1	3	190	1.90	2.00	2.00	0.718
Is ticket price fair	100	1	2	111	1.11	1.00	1.00	0.314
Waiting Rooms	100	1	2	155	1.55	2.00	2.00	0.500
Information system	100	1	4	279	2.79	3.00	3.00	1.085
Is there sufficient space for bus parking facilities	100	1	2	121	1.21	1.00	1.00	0.409
Is there isolated space for workshops, fueling facilities and longtime stay	100	1	2	140	1.40	1.00	1.00	0.492
Is there sign board direction for the guidelines	100	1	2	141	1.41	1.00	1.00	0.494
Are there public telephones or other means of communication available at the bus terminals	100	1	2	135	1.35	1.00	1.00	0.479
Are there available ATM booth	100	1	2	146	1.46	1.00	1.00	0.501
Is there enough shelter to give protection from the bad weather at the terminals	100	1	2	130	1.30	1.00	1.00	0.461

Descriptive Statistics								
								Std.
	Ν	Min.	Max.	Sum	Mean	Median	Mode	Deviation
Is there a system in place to keep passengers informed about bus delays or cancellation	100	1	2	127	1.27	1.00	1.00	0.446
Are there sufficient charging outlets for electronic device at the terminals	100	1	3	216	2.16	2.00	2.00	0.631
How would you rate the available of public transportation connections at the bus terminals	100	1	2	120	1.20	1.00	1.00	0.402
Is there a lost and found service available at the terminals	100	1	2	146	1.46	1.00	1.00	0.501
Is there a designated area for parents with small children at the bus terminals	100	1	2	176	1.76	2.00	2.00	0.429
Are there public announcement system available at the bus terminals	100	1	2	147	1.47	1.00	1.00	0.502
How would you rate the accessibility of the bus terminal for individual with disabilities	100	1	3	192	1.92	2.00	2.00	0.646
Are there prayer room for passenger	100	1	2	115	1.15	1.00	1.00	0.359
What do you think rules and regulations maintained by passenger and driver in terminal	100	1	2	124	1.24	1.00	1.00	0.429
Is there sufficient space for passenger's personal vehicles parking	100	1	2	129	1.29	1.00	1.00	0.456
Is there sufficient Fire Extinguisher	100	1	2	139	1.39	1.00	1.00	0.490
Is there enough lighting System in this terminal	100	1	2	133	1.33	1.00	1.00	0.473
Is there separate Entry and Exit away for Bus operating	100	1	2	128	1.28	1.00	1.00	0.451
What do you think about terminal cleanliness	100	1	3	206	2.06	2.00	2.00	0.617
What do think about the security system	100	1	2	121	1.21	1.00	1.00	0.409

3.3.2 Reliability Test

Table 2: Reliability Test				
Reliability Statistics				
Cronbach's Alpha	No of Items			
0.987	38			

Cronbach's alpha is a way of showing the reliability of an instrument by comparing the total variance with the variance distributed among the individual variables. A Cronbach's alpha value of 0.987 is presented for the entire data set in Table 2. Considering the value is greater than 0.7, a survey of 285 people was used to obtain this value.

3.3.3 Hypothesis Test

Chi-square analysis was used to test the hypothesis. Its primary purpose is to evaluate the independence of two variables. The P value indicates whether the two variables possess a statistically significant correlation.

H0: Passenger satisfaction on bus terminal facilities is independent from the ith factor.

H1: Passenger satisfaction on bus terminal facilities is dependent on ith factor.

ith factor = {terminal facilities, cafeteria & restaurants, drinking water, water quality, available buses, ticketing system, bus schedule, ticket selling system, ticket price, information system, bus parking facilities, workshop & fueling, personal car parking , safety, lighting, shelter, designate waiting area, entry & exit way, guideline system, cleanliness, sign board, waiting room, charging outlets, food quality, ATM booth, communication system, prayer room and rules & regulations}

Variable	Test statistic	P-value
Delay and cancellation	10.959	0.002
Available public transportation	9.125	0.003
Shelter	7.143	0.008
Cleanliness	6.671	0.01
Personal vehicle parking	6.18	0.013
Security system	5.739	0.017
Lighting	5.512	0.019
Rules & regulations	4.903	0.027
Sufficient waiting place	4.854	0.028
Accessibility for disabilities	4.609	0.032
Sign board	4.609	0.032
Bus scheduled	4.529	0.033
Feel comfortable	4.341	0.037
Ticket price	4.121	0.042
Cafeterias & restaurants	3.039	0.081
Entry & exist way	0.677	0.102
Drinking water	2.302	0.129
Waiting room condition	3.697	0.157
Prayer room	1.761	0.184
Public announcement	1.486	0.223
Communication method	1.429	0.232
Fire extinguisher	1.406	0.236
Food quality	2.82	0.244
Sufficient charging outlets	2.568	0.277
Workshop & fueling	1.07	0.301
Designated waiting area	1.057	0.304
ATM booth	0.975	0.323
Waiting lounge	0.957	0.328
Bus parking	0.626	0.429
Terminal facilities	1.574	0.455
Toilet condition	1.227	0.542
Information system	1.899	0.594
Ticket selling system	0.984	0.611
Bus condition	0.887	0.642
Safety	0.162	0.688
Lost and found	0.034	0.854
Ticketing system	0.301	0.86
Water quality	0.276	0.871

Table 3: Hypothesis Testing Factor

In this table, delay & cancellation, available public transportation, shelter, cleanlines, personal vehicle parking, security system, lighting, rules & regulations, sufficient waiting place, accessibility for disabilities, sign board, bus scheduled, feel comfortable and ticket price have a P- value less than 0.05, it proves passenger satisfaction depends on these variables and indicates that the null hypothesis can be rejected and the alternative hypothesis accepted. Other variables with P-values greater than 0.05 include

the cafeterias & restaurants, entry and exit way, drinking water, waiting room condition, prayer room, public announcement, communication method, fire extinguisher, food quality, sufficient charging outlets, workshop & fueling, designated waiting area, ATM booth, waiting lounge, bus parkuing, terminal facilities, toilet condition, information system, ticket selling system, bus condition, safety, lost & found, ticketing system and water quality which aren't affecting passenger satisfaction and accept the null hypothesis. First, the average respondents were calculated according to their satisfaction and dissatisfaction values and then using SPSS software. Consequently, the software showed the P value as the result, and where the P value was less than 0.05, it rejected the null hypothesis and accepted the alternative hypothesis. On the other hand, if the P value is greater than 0.05, it accepts the null hypothesis.

3.3.4 KMO and Bartlett's Test

Table 4: KMO and Bartlett's Test					
KMO and Bartlett's Test					
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.961			
Bartlett's Test of Sphericity	Approx. Chi-Square	7508.712			
	df	561			
	Sig.	.000			

Table 4 demonstrates that a corresponding correlation between the variables is an essential requirement for factor analysis. The intercorrelation between the variables can be determined by Bartlett's test. A P-value of less than 0.05 represents a strong enough association for factor analysis. The test is not significant if the variables are not appropriate for the factor analysis method. Therefore, we must satisfy the P-value requirement in order to achieve the factor analysis. H0= Proposed alternative. The matrix that correlates is the same matrix. H1= The correlation matrix is distinctive from the original matrix in particular ways. The alternative hypothesis can be accepted because when the null hypothesis can be rejected. Because the significant level is 0.000. This indicates that there is an impact between the correlation matrix and the other matrices, which gives more identification for completing the remaining steps of the factor analysis. The sample data set shows that the variables were appropriate for factor analysis, with the Bartlett's test p value of 0.000 and the KMO test value of 0.961. Usually, this is done to verify that the sample is sufficient for the test. If the typical scenario to obtain the KMO test measurement is greater than 0.6, then the sample size might be considered appropriate. The variables were appropriate because the p-value was 0.000 and the KMO was greater than 0.60. Therefore, the sampling is appropriate.

4. CONCLUSIONS

The initial stage of data analysis included an investigation of the respondents' demographic factors. According to data analysis, there are 71% men and 29% women among bus passengers. The majority of respondents in the city of Barishal- roughly 92%-said that they travel primarily by bus. 80% of them respond that the bus is less expensive, which is the reason why they use it. According to the data gathered, 78% of the passengers use the terminal facilities and take buses to get to work. A cross-tabulation demonstrates that most of the time, passengers in the Barishal city area aren't pleased with the amenities provided by the bus terminal. Factor analysis has been used to achieve the main objective of this research, which is to assess the factors influencing passenger satisfaction are grouped and reduced to six factors in this study: facilities, information, safety and security, accessibility features, infrastructure, and quickly accessible resources. The study's secondary objective is to evaluate the way passenger satisfaction affects bus terminal amenities in Barishal City. A hypothesis test was performed to determine whether passenger satisfaction with bus terminal amenities is independent of the variables in the study. The objective of the person's chi-square test is to test whether two variables are independent of one another. Illustrations of such variables are shelter, sufficient waiting spaces,

charging outlets, delays and cancellations, lighting, sign boards, cleanliness, security systems, rules and regulations, accessibility for disabilities, ticket prices, bus scheduled, seating arrangements and private vehicle parking. P-value less than 0.05 indicates that these variables are essentially responsible for passenger satisfaction. This study is based on primary data that was gathered by giving out questionnaires to respondents in the Barishal city area. Peak hours were busy times for passengers, making it challenging to get respondents to provide honest answers. However, because of language barriers and a fear of disclosing information, the majority of respondents failed to fully understand the topic or the questionnaires.

Therefore, the responses might not be perfect for the study. It is highly recommended that future studies take a large sample size in order to produce more accurate results on terminal facilities and passenger satisfaction. On the other hand, based on bus terminal guidelines, additional research can take into account more factors besides those covered in this study. A regression model, which wasn't developed for this study, can be used in future research to determine the impact of bus terminal amenities on passenger satisfaction.

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