University Students' Perception on Public Transit in Dhaka City

Md. Mosabbir Pasha, Ijaj Mahmud Chowdhury, M. A. Afrahim Bhuiyan

Abstract—With the increasing population and intensive land use, huge traffic demand is generating worldwide both in developing and developed countries. As a developing country, Bangladesh is also facing the same problem in recent years by producing huge numbers of daily trips. As a matter of fact, extensive traffic demand is increasing day by day. Also, transport system in Dhaka is heterogeneous, reflecting the heterogeneity in the socio-economic and land use patterns. Trips produced here are for different purposes such as work, business, educational etc. Due to the significant concentration of educational institutions a large share of the trips are generated by educational purpose. And one of the major percentages of educational trips is produced by university going students and most of them are travelled by car, bus, train, taxi, rickshaw etc. The aim of the study was to find out the university students' perception on public transit ridership. A survey was conducted among 330 students from eight different universities. It was found out that 26% of the trips produced by university going students are travelled by public bus service and only 5% are by train. Percentage of car share is 16% and 12% of the trips are travelled by private taxi. It has been observed from the study, students those who prefer bus instead of other options, 42 percent of their family resides outside Dhaka. And those who prefer walking, of them, over 40 percent students' family reside outside of Dhaka and of them over 85 percent students have a tendency to live in a mess. On the contrary, students travelling by car represents, most of their family reside in Dhaka. The study also revealed that the most important reason that restricts students not to use public transit is poor service. Negative attitudes such as discomfort, uneasiness in using public transit also reduces the usage of public transit. The poor waiting area is another major cause of not using public transit. Insufficient security also plays a significant role in not using public transit. On the contrary, the fare is not a problem for students those who use public transit as a mode of transportation. Students also think stations are not far away from their home or institution and they do not need to wait long for the buses or trains. It was also found accessibility to public transit is moderate.

Keywords—Traffic demand, fare, poor service, public transit ridership.

I. INTRODUCTION

TRAVEL demand is one of the major challenge for transportation engineers now a days. To fulfill this huge demand numbers of traffics are increasing in an alarming rate. As a matter of fact, severe congestion, lack of safety, environment pollution etc. are very common phenomena now-a-days both in developing and developed countries. Dhaka, the capital city of Bangladesh has the population density

Md. Mosabbir Pasha (lecturer), Ijaj Mahmud Chowdhury (lecturer) and M. A. Afrahim Bhuiyan (M.Sc) are with the Islamic University of Technology serving as a lecturer, Gazipur-1704, Bangladesh (phone: +8801719158232, +8801911550853, +8801920880388; e-mail: mosabbir@iut-dhaka.edu, ijajcee@iut-dhaka.edu, sadidafrahim@gmail.com).

approximately 10 times higher than the overall population density of the country which is 8229 peoples per square km [1]. According to Dhaka Transport Coordination Authority (DTCA) (2013) at present in Dhaka city more than 15 million people are living and everyday this huge number of peoples causes around 25 million daily trips by using several modes of transport. To fulfill the demand huge amount of new vehicles are coming out into the road daily. According to Bangladesh Road Transport Authority (BRTA) everyday more than a hundred vehicles are being added to the total. In 2009, BRTA found an alarming statistics that shows that in the year 2003, the total no of vehicles in Dhaka city were 303215. But the number became 508212 at the end of July, 2009 in which private vehicles were 411297 [2]. As a result severe emissions from the transport sector are increasing day by day.

Transport system in Dhaka is diverse, reflecting the diversity in the socio-economic, demographic and land use patterns. Among many other important land uses, there is a significant concentration of educational institutions in Dhaka. According to the passenger ridership survey information of Strategic Transport Plan, the second highest number of trips made by each household per day is for educational purpose [3]. Therefore, this huge portion of daily trips made for educational purpose should be coped suitably. To manage this huge amount of trips, alternative ways need to be identified for the sustainable development and economic growth. Public transit promotion is obligatory in this very regard. Due to its numerous benefits public transit ridership is indispensable for the future generation to live in a healthy environment.

To endorse public transportation essential factors need to be investigated. Very few researches have been conducted in Dhaka city that incorporates the effect of fare, service, accessibility, bus bay etc. on public transit ridership. The aim of this paper is to find out the university students' perception on public transit in Dhaka city which will help policy makers to identify the factors that are causing negative sense on public transit.

II. LITERATURE REVIEW

Several studies have demonstrated that different factors as well as various adopted public transit friendly policies have significant impact to promote transit ridership. Public transportation is a gateway to sustainable accessibility system. Apart from that, an efficient public transportation services enhance personal economic opportunities, save fuel, provide economic opportunities, save money and reduces the environmental impacts [4].

Access to public transit plays an important role in selecting

travel mode. It has been observed from different studies that transit ridership increases with the increasing accessibility to public transit. If transit stops can be increased and distance between home and office to transit stations are reduced people will be more encouraged to use public transit. In Portland, Oregon, and Atlanta, Georgia a two-stage least squares regression was used to estimate the relationship of access to public transit with labor participation levels. The results suggest that access to public transit is a significant factor in determining average rates of labor participation within these two cities [5]. Fare and level of service have significant effect on public transit ridership. There have been a lot of studies that proved the relationship between cost and level of service with public transit ridership. There are many ways to develop public transport, especially, reducing the cost of bus travel, which is becoming one of the most important way. For example, since 2007, in Beijing, the municipal government reduced an ordinary bus ticket price to 0.4 yuan per trip, subway ticket price reduced to 2 yuan per trip. With other bus priority measures, in 2009, the proportion of public transport in Beijing increased by 10.7%, thus reached 38.9%, comparing with which in 2003. Furthermore, in 2010, in Guangzhou, a public transit pricing adjustment was executed, which was, in a natural month, when a passenger took bus or subway using the same Yang Cheng Tong card more than 15 times accumulatively (Metro and bus ride could be accumulated equivalently), from the 16th bus or subway ride, he could get a 40% discount each ride for the rest of that month [6]. In a study among the reasons respondents are not motivated to use public transport are inefficient services and expensive fares. However, the majority stated that the increase in petrol prices and tolls would be key factors to reduce car use and more provision of public transport would encourage them to use public transport [7]. As indicated by its name, potential transit users are regarded as the populations who are likely to change their mode choice behavior. Currently, there are only 5.48% of them using public transit as commuting mode. However, they express the willingness to use public transit in the future [8]. If the service is improved and fare can be reduced, these potential transit users may be attracted to use public transit. Since they negatively evaluate the bus service and safety/cost of public transit, it is possible that they will use it if the public transit quality is substantially improved [9].

III. PRESENT SCENARIO IN DHAKA CITY

Dhaka, the capital of Bangladesh is the tenth largest city of the world having a population more than 12 million. The STP (2005) stated that the modal share of trips on public transport in Dhaka is about 44% [3]. That indicates over 5 million people make trips on public transport in Dhaka city. The total number of university students in Dhaka is almost 0.8 million [2]. Since independence, Dhaka has seen the establishment of a large number of public and private colleges and universities that offer undergraduate and graduate degrees as well as a variety of doctoral programmes. In total there are 41 universities (public and private) in Dhaka metropolitan, highest than any other city in Bangladesh. Increased number

of university means more students are coming to Dhaka each year for pursuing higher studies. In many cases, the family along with the student migrates to Dhaka considering a better future.

A survey has been done in this study to estimate the percentage of mode of transport selected by university students. In total 330 students took part in the survey. They were asked their regular mode of transport and the results are shown in Fig. 1. This shows that majority students prefer public transport rather than other options. Certainly, this mode is more popular because public transport is relatively cheaper and more or less available in most of the time as well there is certain incentive in the student fare. All these make it a popular choice. Another reason to choose public transport is that most the student's family resides outside of Dhaka as a result most of the students choose the cheapest mode of transportation to minimize their monthly expenses. From this study it has been found that more than 42 percent student's family resides outside of Dhaka, eventually they prefer bus instead of other options. Again those who chose to walk most of the time, of them, over 40 percent students' family reside outside of Dhaka and of them over 85 percent students have a tendency to live in a mess. They generally choose a neighboring location to their respective university so that they can reach their destination by walk. On the other hand, those who travel by car 80 percent of their family reside inside Dhaka.
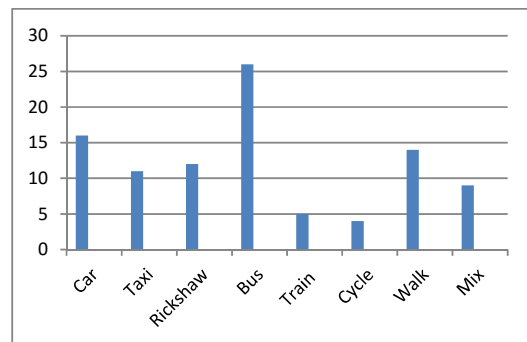

Fig. 1 Mode share percentage of university students

IV. METHODOLOGY

A. Data Collection and Respondent Profile

To analyze the situation why a significant percentage of students are not using public transit, a questionnaire survey was conducted among the students from different universities. Total 8 universities, i.e., BUET, MIST, NSU, IUT, AIUB, IUB, DU, and IUBAT were considered in the data collection. A number of 330 students were participated in the survey. Random sampling was done to get the representative sample from the population. The socio-economic and demographic profile of the students sample is shown in Table I.

TABLE I
PROFILE OF RESPONDENTS (%)

Factors	Percentage (%)
Gender	Male: 72
	Female: 28
Age	Below 20: 34.11
	20-23: 35.29
	23-25: 22.35
	25-28: 5.88
	Over 28: 2.35
Level of Education	Freshmen: 19.04
	Sophomore: 22.61
	Junior: 22.61
	Senior: 21.42
	Post Graduate: 14.28
Family Income (Monthly)	Below 25000: 1.19
	Below 35000: 3.57
	Below 50000: 22.61
	Below 100000: 69.51
	Over 100000: 3.10
Dwelling Condition	Personal: 32.14
	Rental: 22.61
	Slum: 0
	Office quarter: 19.04
	Mess: 10.71
	Residential hall: 15.47
Father's Occupation	Driving: 1.19
	Teaching: 16.66
	Business 35.71
	Service holder:45.23
	Others: 1.19
Daily Travelling Distance	Below 5 km: 50.0
	5-10 km: 16.66
	10-15 km: 13.09
	15-20 km: 5.95
	Over 20 km 14.28

TABLE II
VIEWS OF RESPONDENT

Possible causes of not using road crossing facilities	SA(%)	A(%)	N(%)	D(%)	SD(%)	Mean
1. I feel uneasy or discomfort to use public transit	33	51	15	1	-	1.84 (R=2)
2. It is more time consuming	38	29	9	18	6	2.25 (R=5)
3. Public transit service is very poor	51	46	3	-	-	1.52 (R=1)
4. Fare is too high	-	4	33	44	19	3.78 (R=9)
5. Poor accessibility to public transit stations	29	25	20	26	-	2.43 (R=6)
6. Insufficient security in public transit	29	36	26	9	-	2.15 (R=4)
7. Poor waiting area	32	40	22	6	-	2.02 (R=3)
8. Need to wait long for the public transit	17	23	34	26	-	2.69 (R=7)
9. Stations are far from the residence	12	19	28	25	16	3.14 (R=8)

Note: Mean calculated considering Strongly Disagree=5, Disagree=4, Neutral=3, Agree=2, Strongly Agree=1. "R" means "Rank"

A. Questionnaire

A questionnaire was designed to find out the reasons of not using the public transit as well as the perception towards public transit. For this purpose, possible 9 causes are identified from field investigation which discourages passengers to use public transit and promote using personalized vehicle, taxi etc. The possible reasons are shown in Table II. As shown in Table II, perception of using public transit was assessed by a 5 point Likert scale ranging from "Strongly Agree" to "Strongly Disagree".

For analyses, numerical scores 1 to 5 were assigned to indicate the factor that discourage public transit ridership. For an example, if a pedestrian answers "Strongly Agree" to the question 1 to question 9, then the minimum value will be 9 and if he answers "Strongly Disagree", then the maximum value will be 45. Based on the mean value for each statement, rank is to be determined to show which factors are the prime reasons that discourage public transit ridership and need to be improved (Table II).

V. RESULTS AND DISCUSSIONS

As we found earlier 26% of students are relied on private car or taxi. Our objective is to find out why 26% of students are not using the public transport. The questionnaire was made based on the scenario observed during the study as mentioned earlier.

The mean responses of all the questions vary from 1.84 to 3.78 which lie in between 'Disagree' and 'strongly agree'. The mean values are ranked from 1 to 9 to identify the most significant parameter that has been observed from the study. In general, this result implies that the respondents agree with the possible reasons of not using the public transit identified from the field observation.

Based on the survey it has been found that, public transit service (Mean= 1.52, Rank = 1) is the most significant factor among all the factors considered. Almost 51% students strongly agree with the statement that due to the poor level of service, they do not prefer using public transit. It has been seen in Dhaka city most of the public transit do not have adequate seats for the passengers. As a matter of fact, people do travel in public transit by standing whole the way. Moreover, almost all of the public transit does not provide any sort of air-conditions, seats in the public transit are so congested that passengers even can't sit properly. In addition, due to the broken windows and unrepaired ceiling, passengers face severe problem in rainy season as the rain water enters into the buses and trains. No public transit service provides facilities for disabled person, elderly people, children etc. Discomfort (Mean= 1.84, R= 2) is another major factor that discourages students using public transit. It has been observed that female passengers are more concern about comfort than their male counterpart. This may be due to the fact that male may tolerate more discomfort when travelling in a fully occupied transit during peak period. In addition, the environment of the public bus service which is not as much of attractive to women.

Fare is a very important parameter in selecting different transportation modes. However, in the study it has been found that students do not think the current public transit fare is too

much high (Mean= 3.78, R=9). 44% of the students disagree with the statement "fare is too high". It may be due the better economic condition of the students. As from the demographic profile it has been seen that the family income is quite high. Students also do not think the distance from the station (Mean= 3.14, R= 8) to their residence is too much. 28% of the students do not have any problem with the statement. It is because, government try to provide as many stations as possible near the vicinity of the universities. However, the waiting area (Mean= 2.02, R= 3) is very below graded. Students suggest that in order to improve the service the waiting area should be better decorated. It has been observed that most of the stations do not have any particular waiting area or bus bay; as a result people get into the buses in the middle of the road. Time (Mean= 2.25, R= 5) is another important variable that discourages students to use public transit. Most of the buses in Dhaka do not follow any time schedule. To increase the profit from a trip they wait hours after hours in particular station. Due to the increased number of stations and increased number of buses near the vicinity of universities most of the students do not wait for long for the particular bus to make a trip.

Accessibility is another important factor that needs to consider in order to improve the service of public transit. The survey suggests that some of the students are concerned about accessibility while others are not. It may be due to the area where they live. Students who live in planned society get better accessibility to public transit than the other.

Security (Mean= 2.15, R= 4) plays a bigger role in choosing public transit. In Dhaka, every day lots of crimes are seen in different places. Especially, students those who travel at night are more concerned about the security. The result shows, 26% students do not care much about security. However, approximately 65% students are concerned about it. The reason may be, students those who live in less crime prone zone and do travel mostly in day time are not worry about the security. On the contrary, those who live in more crime prone zone and do a lot of travel in night time show the reverse.

VI. CONCLUSION

This study reveals the perception of students on the use of public transit. Based on the study it is identified that poor service level is the prime concern of students not to use public transit. Service level should be increased so that students do not feel discomfort in using public transit.

In order to increase the percentage of mode share the authority must need to improve the quality of the waiting area. The waiting area should be such that people can take shelter even in rainy days. Security should be improved in public transit. It should be such that students do not fear for the hijacking and mugging problem.

Most importantly students' awareness, social awareness, should be introduced in order to let student know about the importance of using public transit.

REFERENCES

[1] Bangladesh bureau of statistics. 2011. Bangladesh Population & Housing Census.
[2] Bangladesh Road Transport Authority, 2009. Number of registered vehicle, www.brta.gov.bd, accessed on 17 December, 2009.
[3] STP (2005), The Strategic Transport Plan for Dhaka, The Louis Berger Group Inc. and Bangladesh Consultants Ltd., Dhaka.
[4] Bachok, S., Osman, M. M., Ponrahono, Z., "Passenger's Aspiration towards Sustainable Public Transportation System: Kerian District, Perak, Malaysia", Procedia - Social and Behavioral Sciences 153, pp.553 – 565, 2014.
[5] Sanchez, T. W., "The Connection between Public Transit and Employment: The Cases of Portland and Atlanta", Journal of the American Planning Association, 65(3), 1999.
[6] Gong, H., Jin, W., "Analysis of Urban Public Transit Pricing Adjustment Program Evaluation Based on Trilateral Game" Procedia - Social and Behavioral Sciences, 138, pp. 332-339, July 2014.
[7] Nasrudin, N., Rostam, K., Noor, H. M., "Barriers and Motivations for Sustainable Travel Behaviour: Shah Alam residents' Perspectives", Procedia - Social and Behavioral Sciences, 153, pp. 510-519, October 2014.
[8] Fu, X., Juan, Z., "Transit commuting market investigation using the latent segmentation Approach", Travel Behaviour and Society, 2, pp. 102–108, 2015.
[9] Pronello, C., Camusso, C., "Travellers' profiles definition using statistical multivariate analysis of attitudinal variables", Journal of Transportation Geography, 19 (6), pp. 1294–1308, 2011.

Md. Mosabbir Pasha was born in Chittagong, Bangladesh, in 1990. He received his B.Sc. degree in civil engineering from the Islamic University of Technology, Board Bazar, Gazipur, in 2012. He completed his M.Sc. in Civil Engineering in 2015 from IUT.

He is working as a Lecturer in the Department of Civil & Environment engineering with the Islamic University of Technology. His main research interests are Sustainable Transportation System, Traffic and Pedestrian Safety and Pavement Design.

Ijaj Mahmud Chowdhury was born in Chittagong, Bangladesh, in 1991. He received his B.Sc. degree in civil engineering from the Islamic University of Technology, Board Bazar, Gazipur, in 2013.

He is working as a Lecturer in the Department of Civil & Environment engineering with the Islamic University of Technology. His main research interests are Transportation Infrastructure, Environmental pollution, sustainable development of urban cities etc.

M. A. Afrahim Bhuiyan was born in Gazipur, Bangladesh, in 1992. He received his B.Sc. degree in civil engineering from the Islamic University of Technology, Board Bazar, Gazipur, in 2014.

At present, he is doing M.Sc. in transportation engineering at Islamic University of Technology, Bangladesh. His research interests include Transportation Infrastructure, Resource Allocation and Management, Smart Infrastructure System.