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Traveler preference analysis for the proposed bus Rapid Transit (BRT) service in Dhaka

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Abstract

Dhaka, one of the fastest growing cities in the world, has a wide range of transport modes (both motorized and non-motorized), which often share the same roadway, resulting in high levels of physical and operational disorder. To meet the growing travel demand and to improve the existing transportation system, a Bus Rapid Transit (BRT) Service has been proposed on three primary routes of the city. This study explores the interest of the passengers towards the proposed BRT service and compares the preferences based on commuter's socioeconomic and trip characteristics. In this study, we developed logit models for the choice between the existing modes and the proposed BRT service identifying the attraction of the BRT based on its utility in a particular route. The gathered questionnaire survey data provided the information about the travel behavior of 1,111 commuters and their likelihood to switch to BRT based on stated preference. Model estimation results provide useful insights on travel preferences, which show that travel time of the BRT service has significant influence on the switching probabilities. Important socio-economic characters to influence the choice decision include: income, age, gender, and trip purpose. This study can be used to quantify and identify the potential modal shift and demand of BRT in Dhaka city.

Keywords: Bus rapid transit, binary logit model, utility function, stated preference survey.

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1. Introduction

Dhaka, one of the fastest growing megacities in the world, has a population of 12 million and faces severe traffic congestion in almost every working day. The city is projected to have 27.7 million people by 2030 (UN 2014). Therefore, Dhaka is desperately in need of an effective and efficient transportation system. In parallel, Dhaka needs to plan for a sustainable transportation system. Instead of giving priority towards expressways, it should promote public transportation with an emphasis on people's mobility and accessibility needs. The Strategic Transport Plan (STP 2005) of Dhaka city recommended several mass transit options such as a Bus Rapid Transit (BRT) service along the three major public transportation routes of the city.

A recent study on Dhaka's traffic congestion found that traffic congestion results a loss of 195.55 billion BDT (USD 1 = 80 BDT) a year which was more than half the country's total annual development expenditure and one fourth of the revenue collection target for that fiscal year (Daily Star 2010). The study also found that due to the traffic congestion in Dhaka, about 3.2 million working hours are lost every day which is equivalent to about one hour per working people. However, due to its high ratio of built-up areas (estimated to be 70%), it will be difficult for Dhaka to increase the physical capacity of its road network (Bari and Hasan 2001; Siddique et al. 2014). Thus, improvements of Dhaka's transit system will significantly address the mobility needs of the residents who are currently depending on an inefficient and chaotic transportation system. As a potential solution to the severe traffic congestion, the government of Bangladesh has decided to implement a Bus Rapid Transit (BRT) system.

BRT is considered as one of the most viable and economic solutions for urban mobility issues. However, critical aspects of its success include its accessibility and acceptance over all socioeconomic groups of the urban population, its potential impacts on the existing transportation system, and its probable trip attraction capacity. From this perspective, we investigated the potential of the proposed BRT service analyzing traveler attitudes and preferences to the system. This study aims to aid the implementation of BRT system in Dhaka by analyzing the potential modal shift towards it.

A number of challenges exist to study the mode choice behavior of a heterogeneous population like Dhaka's residents, mainly due to the fact that there are wide gap to access various modes (Enam and Charisma 2011). Furthermore, the characteristics of the available choices are also difficult to infer from the limited information of the network. To account for this limitation, (Enam and Charisma 2011, 2013) proposed a probabilistic model of generating the choice-set of modes based on a stated preference (SP) survey. Such an approach of generating the choice-set probabilistically has advanced the methodological frontier of mode choice studies in developing countries. In most of the cases, however, Dhaka's riders are captive to a single mode. Thus an alternative to developing a choice-set generation model is to observe directly the preference between the existing choice and the proposed service. In this paper, we develop binary logit models between the existing mode and the proposed mode.

Thus the main objective of this study is to analyze traveler preferences from their current mode towards the proposed BRT service and explore user perception, attitude towards BRT in terms of its service quality attributes by determining the influence of individual and trip characteristics on the utility value of different modes. The outcome of the research will serve the planners and decision makers with the information about the possible design demand of BRT and consequently, assist them to develop better awareness about the spatial distribution, strength and weaknesses of the proposed services.

2. Literature review

Urban transport planners of the developing countries are continuously seeking for sustainable solution of public transport services to meet the ever-increasing travel demand and expectation of the commuters (Mfinanga and Meshack 2006; Ji and Xiaolu 2010; Currie and

Alexa 2011). As each commuter has different options available to complete the trip, public transport has to render an attractive, accessible, reliable and affordable service in order to meet the expectations of the traveling public (Stradling et al. 2007; Currie 2005). Therefore, to satisfy the mentioned requirements of the passengers, a thorough understanding of the perception of the service quality provided by the public transport system is of utmost importance.

Passenger perception of transit performance reflects the quality of service of the public transport system (Currie and Ian 2008; Hensher et al. 2003). A number of approaches (e.g. customer loyalty and benchmarks) are developed to define, assess and evaluate the quality of service. These approaches have been implemented in various countries but most in the developed countries (Foote 2001; TRB 1999; TRB 2003). Some studies have focused on the evaluation of the level of service of the public transport (Mfinangaand Meshack 2006; Too and Earl 2010), while others appraise public transit service quality from user's perspective (Stradling et al. 2007; Tyrinopoulosand Constantinos 2008).

A number of studies used stated choice experiments to assess commuter preferences to transit services. Based on stated preference experiments, (Eboli and Mazzulla 2008) developed a multinomial logit model to identify the importance of service quality attributes on customer satisfaction and calculated a service quality index measuring the effectiveness of current or potential services. Currie 2005 used trip attributes approach to identify relative attractiveness of BRT systems compared to other transit modes. Dell'Olio et al. 2010 used ordered probit models to evaluate how the bus riders perceive the quality of their public transit service. Nkurunziza et al. 2012 used stated choice data to by develop binary logit models to analyze commuter preference towards BRT in Dar-es-Salaam, Tanzania.

Although there are several works studying BRT system attraction and modal shift throughout the world, similar studies related to Dhaka city is very limited. For Dhaka, mainly four step travel demand models were applied both in urban transportation planning studies such as Greater Dhaka Metropolitan Area Integrated Transport Study (DITS 1994), Strategic Transport Plan (STP 2005), Dhaka Urban Transport Network Development Study (DHUTS 2010) as well as in research studies by Habib 2002 and Hasan 2007. In a recent study, Enam and Choudhury 2013 addressed the deficiencies of the earlier studies and developed a mode choice model for mass rapid transit (MRT) of Dhaka based on revealed preference and stated preference data. However, each of the earlier study have some limitation or somewhat different from this study. For instance, in (DITS 1994), a binomial choice model was introduced to choose between private and public modes. Although a multinomial logit model was adapted in Habib 2002 the calibrated results were counterintuitive. In STP 2005, a wide-scale household survey has been conducted, however, in mode choice component only two modes were considered i.e. public transport and individualized motorized vehicle.

Moreover, the SPR model followed pre-determined rules regarding choice-set and paid no heed to the heterogeneity among commuters. Similar approach was followed by Hasan 2007. Even though his model was based on STP data, the level-of-service (LOS) variables were updated using a supplementary survey. In DHUTS 2010, a two-step mode choice model has been developed, which involves making a choice among walking, rickshaw and other modes based on shortest path between origin and destination, again choosing an option among car, bus and auto-rickshaw based on travel cost. In this regard, it should be noted that the limitations of the earlier studies has promoted the current research.

This paper aims to address this gap in knowledge and allow for a possible option for policy makers to estimate the potential design demand based on stated preference by commuters.

3. Study area

Six major corridors were selected in Dhaka as potentially being suitable for either Bus Rapid Transit (BRT) or rail based metro operation: three radial corridors for BRT, 2 radial corridors and 1 circular line for metro. Among them, the BRT-1 corridor (starting in Uttara in the north and following Dhaka Mymensingh Road, Pragati Road, DIT Road, Toyenbee Circular Road to Saidabad Bus Terminal) was selected for this study. Six zones were selected along the corridor (i.e. Azampur, Khilkhet, ModhyaBadda, Motijheel, Saidabad) for which travel demand data was available from CASE study (2009). This corridor was planned to serve the eastern corridor between Uttara and Saidabad Bus Terminal. The main route is based on Pragati Sarani and DIT Road. It was suggested in STP that this corridor would be the first corridor to implement BRT in Dhaka city, which is the main reason for selecting this route for study purpose.

4. Data

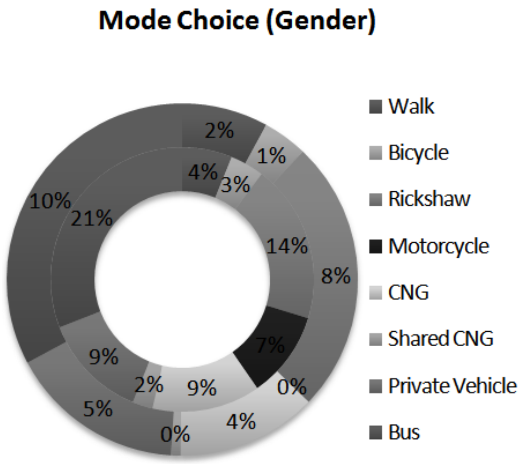
A survey is essential for gathering information regarding commuter preference towards proposed BRT Service. The survey characterizes different mode users as well as reveal their preferences, establishing differences based on their varied socioeconomic and trip characteristics. Given that the BRT system was not yet in place at the time of the survey, the study was conducted to only daily commuters who were assumed to be an appropriate target group with the potential of using and affording the BRT system service within the study area. Part of the survey covered ‘‘Revealed Preferences’’ meaning it was asked in real time while the journey was taking place or the commuter has a clear notion about his preferred travel mode, while the other part was ‘‘Stated Preferences’’, meaning that the passengers were being asked to give an opinion about the hypothetical scenarios of BRT service.

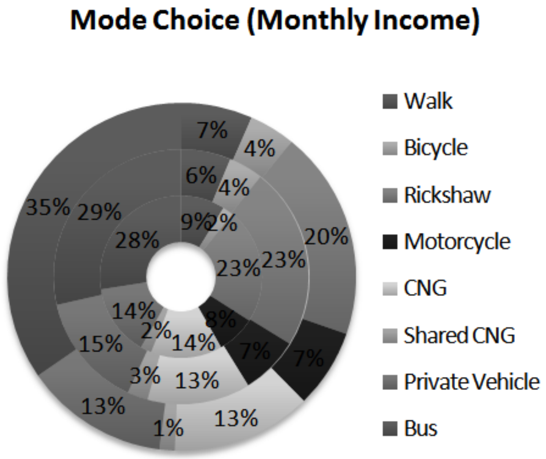
Table 1
Attributes and alternatives for BRT choice

Attributes	Revealed preference	Stated preference
Travel Mode	Rickshaw	BRT
Travel Purpose	(as reported by respondents)	
Travel Distance	(as reported by respondents)	
Vehicle Availability	-	Every 10-15 minutes
Time to get from home to vehicle	(as reported by respondents)	Within 10 minutes walking distance
Travel time	(as reported by respondents)	(as derived from bus speed)
Time to get from vehicle to destination	(as reported by respondents)	Within 10 minutes walking distance
Travel cost	(as reported by respondents)	Tk. 15/25/40/50 (based on travel distance)
Additional cost (parking cost, ownership cost etc.)	Yes	No
Your Choice (Please tick)	Alternative 1 ☐	Alternative 2 ☐

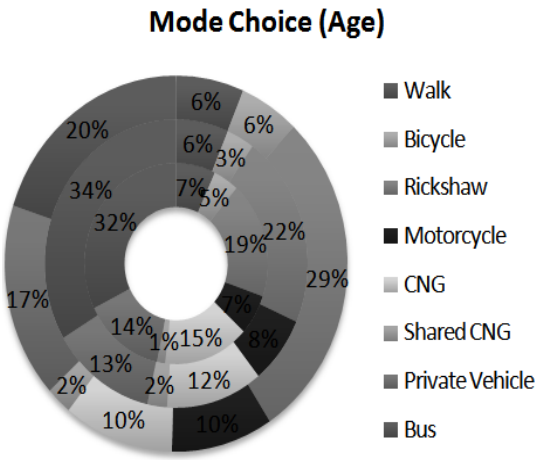
The interview was divided into three sections: in the first and second section information about socioeconomic characteristics (gender, age, monthly income level and vehicle ownership) and travel habits were elicited. The last section included an SP experiment submitted to users, in which they were asked to make a choice between the current transport mode, which was the alternative, representing user’s habitual service, and a hypothetical BRT service, which was the SP alternative. The real-time SP questions were asked both at bus stops, rickshaw stands, shopping malls, commercial places, etc. to obtain an efficient and complete coverage of the study area. Different attributes of choice is presented in Table 1.

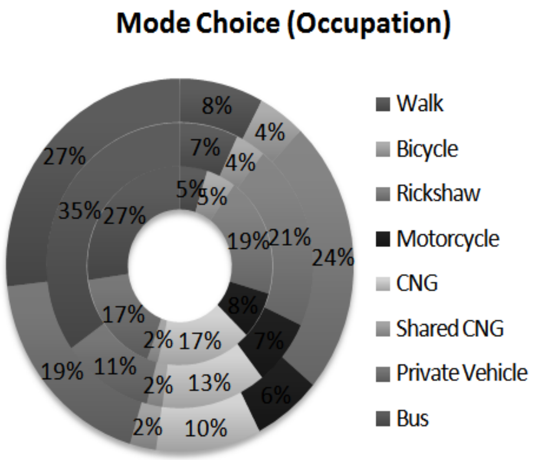
The attributes included in the research covers most of the main factors on which choice makers make a decision because if this is not the case, then this will result in less valid stated choice data. The more the levels of an attribute, the better the analyst's ability to detect and understand complex utility relationships. Considering the travel pattern obtained from the Clean Air and Sustainable Environment (CASE) study (2009), six distinct zones were selected for data collection. The survey involved a sample of total 1111 passengers who live in this survey zone and regularly use the selected corridor for various purposes. The study employed multiple nuclei approach (Harris and Edward 1945), which is sampling respondents from different nuclei zone other than central business district based on their trip pattern. The sampling rate for each zone was more than 1% of peak hour passenger of each zone, which is estimated by CASE study. Table 2 shows the distribution of the respondents among the six nuclei zones in the study area.





Outer doughnut	Male	69.31%	Outer doughnut	< 20,000 Tk	50.50%
Inner doughnut	Female	30.69%	Middle doughnut	20,000-50,000 Tk	41.31%
			Inner doughnut	50,000 Tk	8.19%





Outer doughnut	Yrs 45+	11.25%	Outer doughnut	Business	18.45%
Middle doughnut	Yrs 45-30	44.73%	Middle doughnut	Job holder	57.16%
Inner doughnut	Yrs 14-30	44.01%	Inner doughnut	Student	24.39%

*** CNG is shortened for CNG run auto-rickshaw*

Fig. 1. Effects of different attributes on mode choice

The socioeconomic and trip data were assessed to characterize the commuters in this corridor. Figure 1 graphically illustrates the profiles of respondents by various user groups. The results are summarized as following:

– About 69% respondents are male.
– Nearly half of the male has a monthly income within Tk. 20,000-50,000. In contrast, more than two thirds of the female earn less than Tk. 20,000 a month. This is likely referable to the fact that, almost 50% the male respondents are in the age range 30-45, while a high share of female respondents are less than 30 years of age.
– In comparison with workers/job holders, almost twice as many businessmen have a monthly income above Tk. 50,000. While four times as many students earn less than Tk. 20,000 a month, compared to a businessman.
– About a third (31.5%) of the respondents chooses bus as a mode of their travel. While, the second most common (21.24%) mode of travel among the respondents are rickshaw.
– Travel by rickshaw is three times more popular than bus among the aged respondents.
– Majority of the auto-rickshaw (Compressed natural gas (CNG) run auto-rickshaw) users are male, while the females have a higher tendency to use rickshaw.

Table 2
Number of survey respondents in various zones

Zone	Peak hour Passenger	No. of respondents	Percentage
Azampur	19773	221	1.12%
Khilkhet	26220	296	1.13%
ModhyaBadda	10769	119	1.11%
NoyaPolton	4190	69	1.65%
Motijheel	13981	178	1.27%
Saidabad	19882	228	1.15%
Total number of respondents		1111	

5. Methodology

To analyze traveler preferences towards the proposed BRT Service, binary choice models are constructed where an individual has to choose between two options, one being the commuter's current transport mode and the other is the proposed BRT service. The model is used to estimate a linear utility function estimating the relative importance of the BRT attributes and the importance of individual socio-economic characteristics. However, this model cannot be used for estimation of modal choice probabilities among different modes other than BRT, since no other alternative except BRT is considered. This is done intentionally to avoid the difficulty of generating the underlying choice-set when identifying the potential modal shift to BRT. This is a reasonable construction since most of the commuters in Dhaka depend on a single mode. The utility function U_i^n to determine the outcome of the mode choice decision for individual n can be defined as:

$$U_i^n = V_i^n + \varepsilon_i^n \tag{1}$$

Where, V_i^n = systematic utility function of mode i for individual n

ε_i^n = disturbance term

The systematic utility functions of the alternatives are linear combinations of the service quality attributes and individual socio-economic characteristics, as shown in the following expressions:

$$V_{mode}^{n} = ASC + \beta_1 * TT_{mode} + \beta_2 * TC_{mode}$$
$$V_{BRT}^{n} = \beta_3 * G + \beta_4 * A + \beta_5 * I + \beta_6 * S + \beta_7 * TP + \beta_8 * TD + \beta_9 * TT_{BRT} + \beta_{10} * TC_{BRT} \quad (2)$$

Where, V_{mode}^{n} = Systematic utility function of a specific mode for individual n
V_{BRT}^{n} = Systematic utility of BRT for individual n
ASC = Alternative specific constants
$\beta_1, \beta_2, \beta_3 \ldots \ldots \ldots \ldots$ = Utility parameter coefficients

G = Gender (Male/ Female)
A = Age (14-30, 30-45, 45+)
I = Monthly income (<20,000, 20,000-50,000, >50,000)
S = Occupational status (Student, Job holder, Businessman)
TP = Travel purpose (Education, Work, Other)
TD = Travel distance
TT_{mode} = Travel time for the respondent's current modes (In-vehicle + out-vehicle travel time)
TC_{mode} = Travel cost for the respondent's current modes
TT_{BRT} = Travel time for BRT (In-vehicle + out-vehicle travel time)
TC_{BRT} = Travel cost for BRT
If the disturbances ε_i^n are assumed as extreme-value Type I distributed, then the standard binary logit form for the mode choice decision is as follows:

$$P_n(BRT) = \frac{e^{V_{BRT}^{n}}}{e^{V_{BRT}^{n}} + e^{V_j^n}} \quad (3)$$

Where $P_n(BRT)$= probability of individual n choosing BRT

Logit models are estimated using LIMDEP 9.0 (Greene 2007). Variables are included in the final models based on our priory beliefs and the statistical significance of the estimated parameters.

6. Data analysis

Table 3 presents the model estimation results including the description of the variables, parameter values and their statistical significance, and model goodness-of-fit statistics. Four separate models are estimated for the choice between commuters' current mode and the proposed BRT service.

These modes include: bus, car, CNG run auto-rickshaw and rickshaw.
Table 3 shows that most of the factors included in the logit model for the choice between commuter's existing travel mode and BRT are statistically significant with plausible signs. However, travel time parameter for bus and car show counter-intuitive positive sign of the parameter corresponding to the travel time for the bus trips may explain the unobserved features related to bus, car trips (e.g. cost of the trip, comfort level etc.). Costs of the trips are not calculated hence cannot be used in the model specification. In Rickshaw vs. BRT panel, a positive sign of the travel cost parameter can also be explained by the aforementioned reason. It may also explain the preference towards BRT for longer trips due to the relative comfort and lower price available for BRT for such trips. Another exception is observable for Bus and CNG run auto-rickshaw, where indicator variable for workers shows a low t-stat.

The alternative specific constant (ASC) is defined in the utility function all the analyzed modes. The constant term defined represents the determining function for choosing bus for an individual when everything else remains same. This term is always positive, except for bus. A negative value of it indicates that, given that everything else remains the same, an individual is more likely prefer BRT to buses. This is quite plausible given that a BRT ride will offer better travel time. Since, only people with high income can afford maintaining a car or travel by CNG run auto-rickshaw (due to high fare rate). Therefore, this is quite plausible that car owners and auto-rickshaw users are less likely to switch to other modes. Again, for the existing circumstances rickshaw users also would prefer rickshaw over BRT, which is plausible due to opportunity of getting door to door service by rickshaw. Apart from that, it is also found that BRT is more preferred by young and low income bus riders.

However, it is interesting to find that BRT will be less preferred to the existing bus riders for education and work trips compared to other trips. It is interesting to find that BRT will be more preferred by females, young people, low and medium income passengers and for those making education or work trips by car or auto rickshaw.

Table 3
Estimation results of the binary logit models for the choice between the current mode and the proposed BRT service (all the variables are defined for BRT's utility function except mentioned otherwise)

Bus vs. BRT			
Variable Description	Estimated Coefficient	Standard Error	t-Statistic
Constant (defined for bus)	-13.590	1.888	-7.196
Travel time for bus (defined for bus)	0.029	0.013	2.259
Indicator variable for travelers of age 30 and below	1.595	0.546	2.920
Indicator variable for monthly income less than 20,000 tk.	0.927	0.522	1.775
Indicator variable for education related trips	-1.958	0.921	-2.125
Indicator variable for work trips	-0.593	0.510	-1.161
BRT travel time	-0.248	0.048	-5.118
Number of observations	350		
Log likelihood at constant only	-148.8127		
Log likelihood at convergence	-65.74481		
Adjusted ρ2	0.54919		
Car vs. BRT			
Variable Description	Estimated Coefficient	Standard Error	t-Statistic
Constant (defined for car)	0.342	2.841	0.116
Travel time for car (defined for car)	0.006	0.015	0.437
Indicator variable for female	1.125	0.482	2.382
Indicator variable for travelers of age 30 and below	0.617	0.464	1.327
Indicator variable for monthly income less than 20,000 tk.	1.789	0.964	1.856
Indicator variable for monthly income greater than 20,000 tk. bus less than 50,000 tk.	1.249	0.96	1.302
Indicator variable for education related trips	1.837	0.718	2.557
Indicator variable for work trips	0.718	0.434	1.653
BRT travel time	-.0247	0.026	-0.938
BRT travel cost	-0.017	0.068	-0.255
Number of observations	155		
Log likelihood at constant only	-105.725		
Log likelihood at convergence	-77.255		
Adjusted ρ2	0.21889		

CNG run auto-rickshaw vs. BRT			
Variable Description	Estimated Coefficient	Standard Error	t-Statistic
Constant (defined for CNG)	5.129	2.270	2.259
Travel cost for CNG (defined for CNG)	-0.0323	0.011	-2.925
Indicator variable for female	-1.096	0.670	-1.635
Indicator variable for travelers of age 30 and below	6.233	1.958	3.183
Indicator variable for travelers of age above 30	5.248	1.958	2.68
Indicator variable for monthly income less than 20,000 tk.	2.233	0.98	2.278
Indicator variable for monthly income greater than 20,000 tk. bus less than 50,000 tk.	1.538	0.871	1.765
Indicator variable for workers	-0.661	0.612	-1.080
BRT travel cost	-0.125	0.0562	-2.228
Number of observations	146		
Log likelihood at constant only	-80.4115		
Log likelihood at convergence	-50.75667		
Adjusted ρ2	0.32732		

Rickshaw vs. BRT			
Variable Description	Estimated Coefficient	Standard Error	t-Statistic
Constant (defined for rickshaw)	14.426	3.701	3.898
Travel time for rickshaw (defined for rickshaw)	-0.0066	0.0099	-0.669
Travel cost for rickshaw (defined for rickshaw)	-0.0011	0.0273	-0.041
Indicator variable for female	0.766	0.4758	1.610
Indicator variable for travelers of age between 30 and 45	-0.155	0.4224	-0.367
Indicator variable for monthly income less than 20,000 tk.	-1.883	0.9143	-2.060
Indicator variable for monthly income greater than 20,000 tk. bus less than 50,000 tk.	-1.947	0.7985	-2.438
Indicator variable for workers	1.122	0.5674	1.977
Indicator variable for students	2.212	0.7708	2.870
BRT travel time	-0.0393	0.0647	-0.607
BRT travel cost	0.4116	0.1024	4.018
Number of observations	236		
Log likelihood at constant only	-158.6672		
Log likelihood at convergence	-85.61338		
Adjusted ρ2	0.43404		

However, BRT will be less preferred by regular female and jobholder auto-rickshaw riders. Given the comfort and security provided by the auto-rickshaws this trend is quite plausible.

In addition to that, it is also observed in the analysis that BRT will be more preferred by females, job holders, and students who regularly ride rickshaws. On the contrary, BRT will be less preferred by young and low and medium income rickshaw riders. In summary the utility parameters for different transportation modes shows the following trends:

– Given that everything else remains the same only bus passengers are likely to switch to BRT.
– Young passengers (age 30 or below) are more attracted to BRT than others.
– BRT is more attractive to low-income individual riders of all the modes except rickshaws.
– BRT travel time has a negative impact in all of the utility equations implying that with an increase in travel time, attraction towards BRT decreases to the commuters.

7. Policy implications

Commuter preferences are hardly taken into account by decision makers in most of the developing nation while introducing new policies or adding infrastructures in the existing transportation systems. There are ways, however, for policy-makers getting closer to popular views. The stated preference approach used in this study has shown its potential in modeling peoples' attitudes, thus planning and policy-making can be done from peoples' preferences for more sustainability and meeting the desires of the society under question. Mode choice experiments also help us to investigate the propensity of the commuters to change their travel behavior in relation to the choice of a particular mode for their trips.

The study analyzed the users' perceptions and preferences towards the proposed BRT service and compared the preferences of commuters based on their socioeconomic and trip characteristic differences. This study reached its goals in (1) identifying commuters' perceptions and preferences towards the proposed BRT service and (2) assessing the contribution of different attributes of the proposed BRT system and the existing transport modes. This study can be used to quantify and identify the potential modal shift and demand of BRT in Dhaka city. Typically in developing countries, policy makers tend to assume possible modal shifts from various transport modes based on GDP growth rate, population growth rate, vehicle growth rate, etc. However, we need to consider the influence of passenger socio-economic characteristics and service attributes for determining the future demand. Otherwise, this will lead to inaccurate demand estimation with serious consequence to the success of the big transportation projects. This study explores one of the possible approaches to avoid such assumptions. The models estimated in this study for different modes can be extended and enhanced to predict the modal shift. Thus this study provides a guideline for future large scale studies before implementing BRT in Dhaka city.

However, particular attention should be given to overcome the limitations of this study; these limitations include: small sample size, lack of information about the cost variables for cars and buses, lack of information about other service characteristics such as comfort of the mode, presence of correlation among few explanatory variables.

8. Conclusion

Dhaka, being one of the fastest growing megacities in the world, is desperately in need of an effective and efficient transportation system such as Bus Rapid Transit (BRT). The government of Bangladesh has decided to implement three BRT route along three main corridors of the city. However, success of implementing BRT is dependent on its accessibility and acceptance over all socioeconomic groups of the urban population, its potential impacts on the existing transportation system, and its probable trip attraction capacity. Keeping this in mind, the main objective of this paper was to analyze traveler preferences from their current mode towards the proposed BRT service and explore user perception, attitude towards BRT in terms of its service quality attributes by determining the influence of individual and trip characteristics on the utility value of different modes. Given that the BRT system was not yet in place at the time of the study, the study was conducted to only daily commuters who were assumed to be an appropriate target group with the potential of using and affording the BRT system service within the study area. Part of the survey covered ''Revealed Preferences'' meaning it was asked in real time while the journey was taking place or the commuter has a clear notion about his preferred travel mode, while the other part was ''Stated Preferences'', meaning that the passengers were being asked to give an opinion about the hypothetical scenarios of BRT service. To analyze traveler preferences towards the proposed BRT Service, mode dependent binary choice models were constructed where an individual has to choose between two options, one being the commuter's current transport mode and the other is the proposed BRT service. Four separate models were estimated (i.e. Bus, Car, CNG run auto-rickshaw and Rickshaw) for the choice between commuters' current mode and the proposed BRT service. Most of the variables included in the legit model for the choice between commuter's existing travel mode and BRT are statistically significant with plausible signs. Though some exceptions are found in a few variables, this phenomenon can be explained by the idiosyncrasy of the operating condition and travel behavior in Dhaka. Nevertheless, model estimation results provide useful insights on travel preferences, which show that travel time of the BRT service has significant influence on the switching probabilities. Important socio-economic characters to influence the choice decision include: income, age, gender, and trip purpose.

This mode choice experiment helps us to investigate the propensity of the commuters to change their travel behavior in relation to the choice of a particular mode for their trips. The study analyzed the users' perceptions and preferences towards the proposed BRT service and compared the preferences of commuters based on their socioeconomic and trip characteristic differences. This study reached its goals in (a) identifying commuters' perceptions and preferences towards the proposed BRT service and (b) assessing the contribution of different attributes of the proposed BRT system and the existing transport modes. This study can be used to quantify and identify the potential modal shift and demand of BRT in Dhaka city. Typically in developing countries, policy makers tend to assume possible modal shifts from various transport modes based on GDP growth rate, population growth rate, vehicle growth rate, etc. However, we need to consider the influence of passenger socio-economic characteristics and service attributes for determining the future demand. Otherwise, this will lead to inaccurate demand estimation with serious consequence to the success of the big transportation projects. Depending upon the aim, nature and extent of data, this study approach can assist in operational adjustments, predicting design parameters, future planning and many other aspects of planning and policy making.

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