

Effects of Income on Travel: A Study of Dhaka City Dwellers

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Abstract: *This paper briefly presents research findings on the travel characteristics of the people of Dhaka, the capital of Bangladesh. It reveals that there is strongly positive relationship between income and travel expense for the people of Dhaka City. Most of the people of the city use three-wheeler, slow moving, and manually operated non-motorized vehicles. The relationship between monthly income and monthly travel expense for recreational purpose is roughly linear up to certain limit and after this limit, the monthly travel expenses for recreational purpose increases rapidly. Majority people of Dhaka City provided their opinion for using a train service in Dhaka Metropolitan Area, though the travel expense for this train service will be little bit higher than any other public mode. In fact the people of Dhaka City use various types of modes for their daily trips on the basis of purpose, travel cost, travel time and above all comfort-ability of the mode.*

Key Words: *Travel characteristics, daily trips, shopping trips, recreational trips, and willingness to pay.*

1. Introduction

Urban patterns and social conditions of the people of Dhaka City are changing and these changes are creating impacts to urban transport. As the income of the people and promotional activities of financial schemes are increasing, people of the city are trying to change their transport from transit to auto. This, on one hand, may create traffic congestion and on the other hand, can bring some positive socio-economic impacts, like, creating employment opportunity, increasing income level, saving travel time, increasing land value etc.

Specific goals for suitable transport in Dhaka City should include providing sufficient capacity, ready accessibility, minimum door to door travel time, all weather safety, dependability, reasonable

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comfort, minimum adverse effect on neighborhoods and the environment—all at a reasonable cost. Such goals are not always achieved or even possible for Dhaka City, but there is no reason for failing to make an effort towards their attainment.

Travel characteristics of the people of Dhaka City can be characterized by some socio-economic conditions, like, age, gender, income level, willingness to pay etc. Again, travel time, travel cost, preference level of comfortable mode, willingness to pay for working, educational, shopping and recreational trips etc. are the important factors of travel characteristics. The aim of this paper is to analyze the travel characteristics of the people of Dhaka City.

2. Objectives of the Study

The main objectives of the study were:

- i) To establish a relationship among monthly income, travel time and travel expense of the people of Dhaka City.
- ii) To identify the characteristics of working, educational, shopping and recreational trips in Dhaka City.
- iii) To find out people's willingness to pay for choosing public mode with various facilities.

3. Methodology

The study was based on primary data. Primary data were collected through questionnaire survey.

Design of the Questionnaire

In the questionnaire, the questions were selected in such a way that the following information related to travel characteristics of the people of Dhaka City could easily be collected:

- Individual daily travel time,
- Individual daily travel expense,
- Individual travel time and travel expense for educational, shopping and recreational trips,
- Willingness to pay for choosing public mode with various facilities.

In the questionnaire, some questions were also designed for collecting socio-economic information, like, sex, age, income

level, education level etc. The questionnaire was very easy to understand. After proper pre-testing, it was finalized.

Location of Survey

The research was performed in the location of Dhaka Metropolitan Area (DMA). The people, who traveled within this area, were selected for questionnaire survey. Some sub-urban area nearest to Dhaka, like, Narayanganj, Joydevpur, Savar etc. were not included within the research.

Duration of the Study

The duration of the study was from January to December 2003. But the questionnaire survey was conducted during the period of June—July 2003. The rest of the time was used for secondary data collection, literature review, preparation of the questionnaire, data analysis and report preparation.

Target Group

The people of Dhaka City who used any mode of transport were the target group of the study. The trips on foot were not included in this study. Total sample number interviewed of the target group was 150.

Analytical Approach

Data collected through questionnaire survey was checked and edited properly. Descriptive Statistics was used for analyzing the information. SPSS (Statistical Package for Social Sciences) and MS Excel were used for analysis of socio-economic information and travel characteristics of the people of Dhaka City.

Accuracy of Data

The correlation coefficients for different variables were calculated in order to know the accuracy of relationship among different variables. Simple regressions were performed, only if there was strong correlation between variables.

4. Sampling Technique

The population was divided into groups on the basis of Thana in the Dhaka City area. In conducting the survey, all the Thanas of Dhaka City were taken as strata. Disproportionate stratified sampling was used to take an equal number of respondents from each stratum (Thana) irrespective of its size.

5. Relationship among Monthly Income, Travel Time and Travel Expense

According to the survey, the approximate average monthly income of the people of Dhaka City is US\$ 97. Most of the people’s (35.48%) monthly income is less than US\$ 28.5, which is followed by US\$ 2.86—57 (22.58%). Table 1 and Figure 1 indicate the approximate monthly income of the people of Dhaka City.

Table 1. Approximate monthly income of the people of Dhaka City.

Sl. No.	Monthly Income (US\$)	No. of Respondents	Percentage of People
01	<28.5	53	35.48%
02	28.6—57	34	22.58%
03	57.1—85.5	14	9.68%
04	85.6—114	10	6.45%
05	114—142.5	10	6.45%
06	142.6—171	10	6.45%
07	>171	19	12.9%

Total = 99.99%

Source: Field Survey

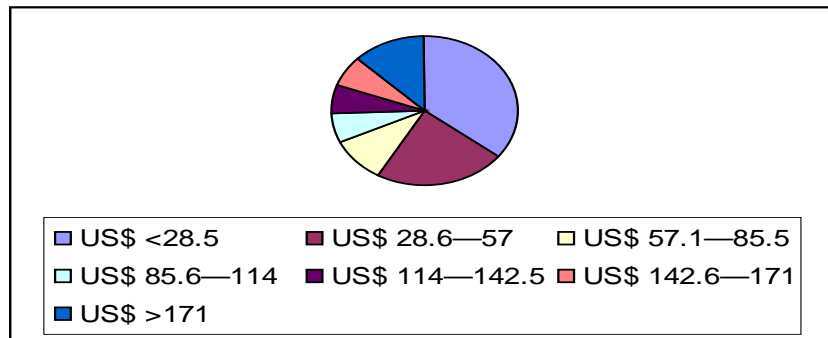


Figure 1. Approximate monthly income of the people of Dhaka City.

The relationship between monthly income and daily travel expense for the people of Dhaka City is almost linear. The value of correlation co-efficient between these two variables is 0.9679,

which indicates strong positive relationship. This strong relationship can be expressed by the following equation:

$$Y = 0.4151 + 0.0063X$$

Here, X = Approximate monthly income (US\$)

Y = Approximate daily travel expense (US\$)

Figure 2: shows the relationship between monthly income and daily travel expense.

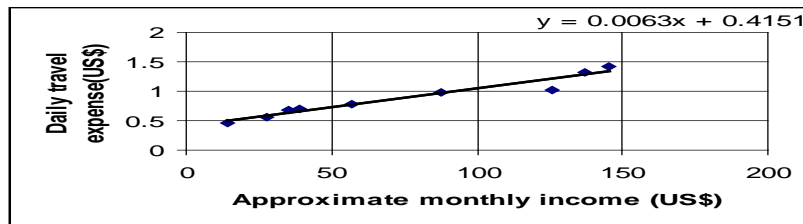


Figure 2. Relationship between monthly income and daily travel expense.

The approximate average daily travel expense for the people of Dhaka City is 2.46 hours (standard deviation is 2.373). Approximately 24.4% people spend 1 to 1.99 hours for their daily trips and approximately 21.95% people spend 3 to 3.99 hours for this purpose. Table 2 indicates the percentage of approximate daily travel time for the people of Dhaka City.

Table 2. Approximate daily travel time for the people of Dhaka City

Sl. No.	Approximate daily travel time (hours)	No. of Respondents	Percentage
01	0—0.99	29	19.5%
02	1--1.99	37	24.4%
03	2—2.99	22	14.63%
04	3—3.99	33	21.95%
05	4—4.99	11	7.32%
06	5—6	7	4.88%
07	>6	11	7.32%

Source: Field Survey

6. Characteristics of Daily Trips

Rickshaw, three-wheeled, slow moving, non-motorized vehicle is mostly (58%) used for daily trips for the people of

Dhaka City, which is followed by bus (20%) .
 Approximately 7% people of Dhaka City use tempo, three-wheeled motorized vehicle. Figure 3 shows the modal share of daily trips.

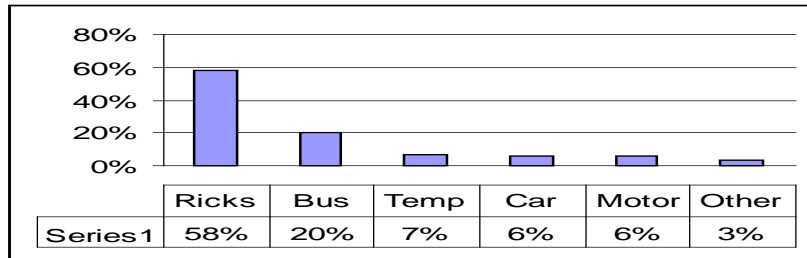


Figure 3. Modal share of daily trips

Rickshaw is very much suitable for traveling of short distance or for door-to-door travel. The approximate average daily travel cost by individual through rickshaw is US\$ 0.23 and approximate average daily travel time by this mode is 33.8 minutes. The people of Dhaka City use buses for comparatively long distance travel for their daily trips. The approximate average daily travel cost and daily travel time by individual by bus are US\$ 0.15 and 58 minutes respectively.

The approximate average individual daily travel time and travel cost for education purposes are US\$ 0.20 and 37 minutes respectively. These figures are US\$ 0.23 and 39 minutes for working purposes. Table 3 and Figure 4 show the modal share of daily trips for different purposes.

Table 3. Modal share of daily trips on different purposes.

Sl. No.	Mode	% for daily working trips	% of daily educational trips	% of daily shopping trips
01	Rickshaw	55%	48.57%	80%
02	Bus	18%	37.14%	10%
03	Car	12.5%	8.57%	5%
04	Motor Bike	8.33%	0%	5%
05	Tempo	4.17%	5.17%	0%
06	Others	2%	0%	0%

Source: Field Survey

Table 4. Percentage of modal share for different types of shopping trips

Sl. No.	Mode	% of modal share for daily shopping	% of modal share for weekly shopping	% of modal share of monthly shopping
01	Rickshaw	80%	68%	61.54%
02	Bus	10%	12%	15.38%
03	Car	5%	8%	7.69%
04	Tempo	0%	8%	11.54%
05	Motor bike	5%	4%	3.85%

Source: Field Survey

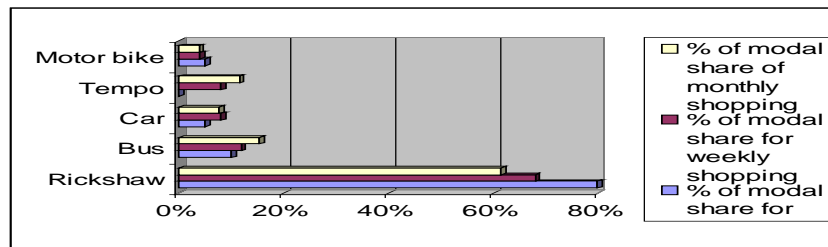


Figure 6. Percentage of modal share for different types of shopping trips

8. Characteristics of Recreational Trips

From the study, it was estimated that the average number of monthly trips for recreational purpose for the people of Dhaka City is 4. The approximate average travel cost and travel time per recreational trips are US\$ 0.40 and 40 minutes respectively. For recreational purpose, rickshaw (43.17%) is more widely used than any other mode. About 29.54% people of Dhaka City use bus for their recreational trips. The use of car for the same purpose is approximately 9%. Table 5 shows the modal share of recreational trips.

Table 5: Percentage of modal share for recreational trips

Sl. No.	Mode of transport	Percentage
01	Rickshaw	43.17%
02	Bus	29.54%
03	Tempo	15.9%
04	Car	9.1%
05	Motor bike	2.27%

Source: Field Survey

Total = 99.98

The relationship between monthly income and monthly travel cost for recreational trip is almost linear (correlation coefficient is 0.996) up to a certain limit. If individual monthly income of the people of Dhaka City is within US\$ 121.4, the relationship can be expressed by the following equation:

$$Y = 0.5149 + 0.0077X$$

Here, Y = Monthly travel cost for recreational trips (US\$)

X = Monthly income (US\$)

If the individual monthly income of the people of Dhaka City is greater than US\$ 121.4, the relationship (correlation coefficient is 0.987) can be expressed by the following equation:

$$Y = -3.4078 + 0.0405X$$

Here, Y = Monthly travel cost for recreational trips (US\$)

X = Monthly income (US\$)

9. People's Willingness to Pay for Using Better Mode of Public Transport

In the study, a topic was selected to know an improved understanding about people's willingness for using train services with better quality and moderate travel cost in Dhaka Metropolitan Area. According to the survey, 77.27% people are willing to use this public mode for their daily trips. Figure 7 shows the willingness of people for using train service in Dhaka Metropolitan area.

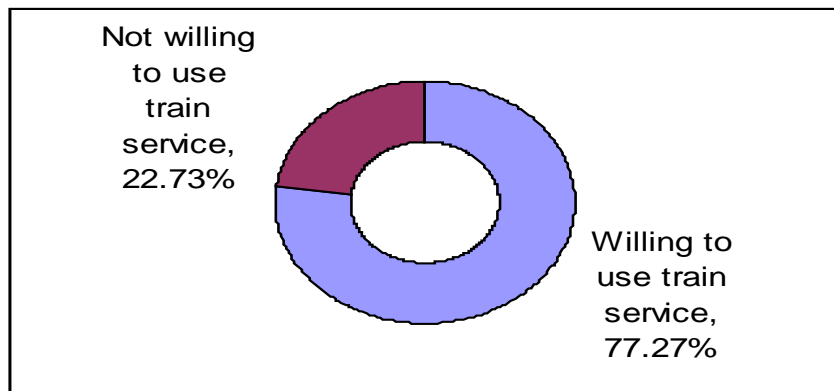


Figure 7. Willingness of people for using train service in Dhaka Metropolitan Area.

For working trips, approximately 28.57% people are willing to pay high travel cost for getting excellent travel services. These values for educational and recreational trips are 25.0% and 61.1% respectively. But, most of the people are willing to pay moderate travel cost in order to get the opportunity of moderate travel services for working (65.71%) and educational (61.1%) purposes. Table 6 shows the percentage of people’s willingness for using various modes of public transport with different travel cost and travel facilities.

Table 6. Percentage of people’s willingness for using various modes of public transport

Sl. No.	Characteristics of public mode of transport	Percentage of people’s willingness for using the public mode of transport		
		Working trips	Educational trips	Recreational trips
01	<ul style="list-style-type: none"> • Excellent service • High travel cost 	28.57%	25.0%	61.1%
02	<ul style="list-style-type: none"> • Moderate service • Moderate travel cost 	65.71%	61.1%	33.33%
03	<ul style="list-style-type: none"> • Low service • Low travel cost 	5.71%	13.89%	5.56%

Source: Field Survey. Total- 99.99% 99.99% 99.99%

10. Lessons Learnt

Following are the observations and lessons learnt from the study of income effect and the travel characteristics of the people of Dhaka City:

- The mass people of Dhaka City live with poor economic condition. Approximately 87.09% people’s annual income is less than US\$ 2052.
- The almost linear relationship between monthly income (X) and daily travel expense (Y) can be expressed by $Y = 0.4151 + 0.0063X$. Approximately 32% people’s income is used for travel purposes in Dhaka city.
- About 58% people of the city use rickshaw which is three wheeler, slow moving, manually operated, non motorized vehicles and this is one of the main reasons for traffic congestion of the city.

- Approximately 77.27% people of Dhaka City are willing to use metropolitan train service. Introducing of such train service may reduce traffic congestion in Dhaka City.
- For recreational purposes, the people of Dhaka City are willing to pay more as travel fare, because they need excellent service. This willingness is opposite for the case of working and educational trips.
- For working and educational trips, people are willing to pay moderate travel fare in order to get moderate travel services.

11. Conclusion

Human behavior is very complex in nature and there is very positive correlation between human behavior and travel characteristics. This is particularly true for the people of Dhaka City and that's why, the travel characteristics are different for working, educational, shopping and recreational trips. But this study belongs to few limitations. Travel characteristics related to trips on foot and trip lengths were not included in the study. So, further study is required to know the travel characteristics related to trips on foot.

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