

## **COMMUTERS' PERCEPTION ABOUT SERVICE QUALITY OF INTERCITY BUS AND RAIL TRANSPORTATION IN BANGLADESH: A Comparative Study**

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### **Abstract**

Of all the different transport networks, road and rail are the two significant transportation modes in Bangladesh as they carry major share of goods and people. However, the service quality of these two public transports has its own merit and demerit. This study made an in-depth comparative study of the service quality of intercity road and rail transport for improving the quality of transport services in Bangladesh. The study surveyed 277 commuters who travel in both the intercity bus and rail modes of transport. All the service quality dimensions grouped into nine complex and 38 simple variables. Of these total respondents 189 (68.23%) are male and 88 (31.77%) are female. Occupation wise 169 (61.0%) are students, 74 (26.7%) are employed, and the rest 34 (12.3%) are involved in other professions. Age wise 13 (4.7%) is less than 18 years, 169 (61%) between 18-28 years, 48 (17.3%) between 28-38 years, 20 (7.2%) between 38-48 years, and the rest 27 (9.7%) are above 48 years.

The study found that bus service quality is better than train broadly in ticketing accessibility & convenience, customer service and responsiveness, and time & timeliness; on the other hand, bus service quality is lagging behind train broadly in operational efficiency, environment & ambience, and physical facility & condition. Overall, none of the modes has significant advantage over other. Specifically, train is giving significantly better physical facility in lighting, ventilation, handicap sitting, and delicate goods carriage. But the respondents found bus seats in a better condition. Regarding environment & ambience train is found better in almost all the attributes (i.e., movement, refreshment facility, hijacking/mugging possibility, environment).

Regarding time & timeliness bus is doing better in terms of departure and arrival, time/schedule information and stoppage time. Ticketing accessibility & convenience is also perceived to be better in bus in terms of queuing time, ticket availability, frequency, ticket return facility, ticket pre-purchase and black market. Customer service and responsiveness for bus employees is found better than train employees in terms of luggage handling, emergency handling, query clarification, problem handling, consistent service, greeting and assistance. Regarding operational efficiency trains are found to do better in congestion/ interruptions, accidents, breaks down, and reckless driving; but in terms of frequency of service and illegal/ smuggled goods carriage, bus is found better.

To mitigate negative quality perception of buses, specifically, bus companies need to provide proper training to their drivers and discourage them from speeding, reckless driving. They need to properly check the fitness of the buses to avoid breaks down on the road. Refreshment facilities in stoppages and clean surrounding are ways to improve the bus services. Bus companies need

to improve proper lighting, ventilation and space for movement inside the bus. Proper carriage of delicate goods and seats for female, children and handicap can improve the bus service quality. Policing and appropriate identification of passengers can go a long way in improving the safety concerns like hijacking, theft, mugging, robbery, etc.

To ease negative quality perception of trains improvement is necessary in queuing time, ticket availability, train frequency, ticket return facility, and ticket pre-purchase facility. Also, they need to prevent carrying of smuggled goods and black marketing of tickets. Maintaining scheduled arrival and departure time, time/schedule information and stoppage time should be closely monitored. Other issues of concern are luggage management, sitting arrangements, emergency handling, query clarification, problem handling, consistent service, and timely assistance. Improving environment, restroom facilities, ensure cleanliness of the toilets in the train and railway stations need to be improved for better service delivery. The train employees need to be trained for courtesy and cordial greeting of the passengers.

Luggage scanners can reduce the chances of illegal goods smuggling and trafficking prohibited goods. Consideration may also be given to personnel training, awareness development and certifying transportation workers. Such training and certification are actually needed across the board in all service sectors and may even be introduced in school curriculums. A visible and vigorous supervision in the overall service is likely to give greater confidence and satisfaction to the passengers.

**Key phrases:** Customer service, Environment, Operational efficiency, Physical facility, Road and rail transport, Service quality, Ticketing, Time & timeliness,

## 1.0 INTRODUCTION

### 1.1 Issue

Transportation is an inevitable part for keeping Bangladesh awake and moving. With the development and industrialization of the country, the number of commuters travelling intercity for work, personal interest, or education is increasing day by day (Rahman, Chowdhury, Haque, Rahman, and Islam, 2017). Road, river, rail and air are the major means of transportation in Bangladesh. In many cases they substitute and/or complement one another. Often the choice of the public transport varies vastly depending on the demographic uniqueness of the commuters (Islam & Hoque, 2020, Mahmud, Rahman, and Hasanat-E-Rabbi, 2006). The country being a flat plain, all three modes of surface transport (i.e., road, railway and waterway) are widely used in carrying both passengers and cargo.

Road transport is the main mode of transport in Bangladesh. Road transport in Bangladesh is mainly a private sector affair operating predominantly in domestic routes. Rates are among the cheapest in the world. Express and non-stop services are available to principal towns from three bus terminals (Gabtoli, Saidabad, and Mohakhai) in Dhaka. The government-run Bangladesh Road Transport Corporation (BRTC) also maintains a countrywide network of bus services. On the other hand, a good number of premium and good quality intercity bus services are transporting majority of the commuters in Bangladesh. It is estimated that mechanized road transport carries about 70% of the country's total passenger and cargo volume (Ahsan, Rahman, and Hayder, 2016, Islam, and Hoque, 2020). Apart from quick movement of goods and passenger traffic, it is facilitating transmission of electricity and natural gas and has integrated the telecommunication links.

Nationally operated Bangladesh Railway (BR) provides an efficient service throughout Bangladesh. The BR provides services to places of interest to and from Dhaka (BRIB 2019). The intercity express service is available to and from important cities if in all. About one-third of the

total area of Bangladesh is effectively covered by the railways. State-owned Bangladesh Railway operates a track of 2,855 kilometer, employs about 60,000 people, owns a fleet of 307 locomotives, 1240 coaching vehicles and 643 freight wagons, and provides passenger and cargo services through 502 stations. In 2017, Bangladesh Railway operated 90 inter-city trains (up & down), 52 mail or express trains, 64 commuter trains, 135 shuttle or local trains and 2 international services (BRIB 2019). Bangladesh Railway would often take seasonal initiatives by beginning advance ticket sales to ensure hassle-free journey of holidaymakers. Local trains serve in cheaper rates. About two-thirds of Bangladesh is a wetland laced with a dense network of rivers, canals and creeks. The alluvial flood plain formed by these rivers covers most of the country. Water transport is the only means available in nearly 10% of the total area.

The transportation sector in Bangladesh is often considered dire. Trains, buses and ferryboats are often found overcrowded. Transport companies seen taking advantage of high demand often providing substandard service, lacking considerations for passenger safety and comfort, and carrying passengers beyond their specified capacity in order to make big profits. Such problems are exacerbated during periods of higher demand (holidays and religious festivals). Of all the different transport networks, road and rail are the two significant transportation modes in Bangladesh as they carry major share of goods and people (Islam et al. 2020). Their network is also spread throughout the country. However, the service quality of these two public transports has its own merit and demerit (Hasan 2009, Islam et al. 2020).

As bus and train are two major means of intercity public transport, it is important to know the perception of the commuters regarding the quality of their services (Islam, 2016). Customer satisfaction plays a key role in the choice of medium of transport, underscoring the need to determine the nature and impact of such factors that leads to customer satisfaction (Balakrishnan, 2012, Farajpour, Bazeghi, and Bagheri, 2017). Thus, an in-depth study of the level of customer satisfaction can serve as both a qualitative and quantitative compass for improving the quality of transport services for passengers in Bangladesh.

#### **1.4 Objective**

The broad objective of this research is to compare the service quality of intercity road and rail transport in Bangladesh on the basis of the responses by the commuters travelling in both the modes. Specifically, this research (i) developed the hypothesized variables for comparison, (ii) compared the commuters' perceptual difference between the service quality of road and rail transport, (iii) compared the commuters' perceptual difference between the road and rail service quality based on complex variables, (iv) compared the commuters' perceptual difference between the service quality of road and rail transport focusing different demographic features (gender, age, education, occupation, etc.), (v) grouped the service quality variables into important factors (Factor analysis), and (vi) made some policy recommendations for the improvement of the service quality of road and rail transport.

#### **2.0 METHODOLOGY**

The study made use of both primary and secondary data and pertinent literature review. Primary data was collected by a questionnaire survey. A coordination schema was developed identifying the parameter, complex variables (6), simple variables (38), values, and question sequence (Appendix 1). The comparative service quality of bus and rail transport are identified by reviewing a number of literature and consulting the knowledgeable persons in this field. The questionnaire is developed focusing the coordination schema. A pre-test was done with 8 commuters taken from different demography for necessary improvement of the questionnaire. The target population of this research comprises of individuals who has the experience of commuting in both intercity bus and train. The sample size of the study is 277 ( $\alpha = 7\%$ , precision = 5%,  $p = 0.50$ ,  $N = \infty$ ).

The sample mostly consists of students and working officials in both the public and private sector. Due to absence of sampling frame, sampling was done through non-probabilistic convenience sampling method. Comparatively high cronbach's alpha (0.750) of the responses showed strong reliability and internal consistency of the responses. The study used face validity indicating that the items chosen to measure the parameter are logically related to it. The study made use of both descriptive and inferential analysis. The descriptive analysis includes index analysis, mean, standard deviation, variance, etc. The inferential statistics includes t-test, ANOVA test, one-population t-test, two-population t-test, correlation analysis, regression analysis, Chi-square test, F-test, etc.

**4.0 DATA ANALYSIS AND FINDINGS**

In this section, analysis and comparison is made of the responses of the commuters having experience of travelling in both the buses and the trains. Here, as the respondents of the two modes of transport are same, they gave their comparative view about the service quality of the two modes. Hence, a better and direct comparative assessment is made of the respondents travelling in both the modes regarding different common service qualities.

**4.1 Demography of Commuters Using Both the Modes**

In this study a total of 277 respondents are surveyed who has the experience of travelling in both inter-district bus and train. Of these respondents 189 (68.23%) are male and 88 (31.77%) are female. Occupation wise 169 (61.0%) are students, 74 (26.7%) are employed, and the rest 34 (12.3%) are involved in other professions like, business, home making, etc. Age wise 13 (4.7%) is less than 18 years, 169 (61%) between 18-28 years, 48 (17.3%) between 28-38 years, 20 (7.2%) between 38-48 years, and the rest 27 (9.7%) are above 48 years.

**4.2 Development of the Hypothesized Variables**

As noted, a total of 38 comparative statements are developed hypothesizing present condition of the bus and train quality services. All the statements are written in comparative hypotheses format. The hypotheses were divided into two groups based on researcher's understanding on the service quality of bus and train: i) Group A: favoring trains over of buses (18 variables), and ii) Group B: favoring buses over trains (20 variables) (Table 1). Group A hypotheses, if agreed, shows positive preference for train, but negative preference for bus; Group B hypotheses, if agreed, shows positive preference for bus, but negative preference for train.

Table 1: Hypothesized Comparative Statements

Group A	Group B
1) Buses face more congestions/interruptions than trains (1)	1) Buses reach a destination faster than trains (2)
2) Movement in a train coach is easier than in a bus (4)	2) Trains spend more time in a stoppage than buses (3)
3) The refreshment facility is more convenient in a train than in a bus (5)	3) The condition of seats is better in buses than trains (6)
4) The cooling facility is better in a train than in a bus (7)	4) Luggage management is easier in buses than trains (10)
5) The ventilation facility is better in a train than in a bus (8)	5) Ticket return facility is more available in buses than trains (13)
6) The condition of lights are better in trains than buses (9)	6) Delay in starting a vehicle (departure) more happens in trains than buses (14)

7) Buses are more crowded than trains (11)	7) Time gap between departures (frequency is less) is longer for trains than buses (15)
8) Normally the pre-purchase of tickets is an easier process in trains than buses (12)	8) Trains are more irregular in reaching destination (arrival) than buses (16)
9) Hijacking is a greater possibility in buses than in trains (20)	9) Tickets are more easily available in buses than trains (17)
10) Buses are more prone to road accidents than trains (21)	10) More train tickets go to black market than bus tickets (18)
11) More break down of vehicles happens for buses than trains (23)	11) Waiting time in a queue is longer during buying a train ticket than a bus ticket (19)
12) Bus drivers drive more recklessly than train drivers (24)	12) Chances of carrying smuggled goods are more for trains than buses (22)
13) Trains provide each person with consistent service than buses (28)	13) Employees of buses are more helpful than the employees of trains (25)
14) Station environment is better in train than bus (34)	14) Commuters are greeted more cordially in buses than in trains (26)
15) Better female/children seat available in trains than buses (35)	15) Buses have better restroom facility than trains (27)
16) Better handicap seats available in trains than buses (36)	16) Bus service providers are more accessible over telephone than train service providers (29)
17) Easy to carry delicate goods in trains (37)	17) Information regarding time & vehicles is more available in buses than trains (30)
18) Less illegal passenger pickup in train than bus (38)	18) Bus employees during travel respond more quickly than train employees in case of emergency (31)
	19) Bus counter service providers are more apt at clarifying queries than train service providers (32)
	20) Problems are more effectively handled by bus service providers than train service providers (33)

### 4.3 Mean Index Analysis of the Hypothesized Variables

As noted, the 38 hypothesized comparative variables were grouped into two groups: i) Group A favoring trains over of buses (18 variables), and ii) Group B favoring buses over trains (20 variables). The respondents were asked to give their agreement of these constructed statements in a 5-point likert scale (strongly agree, agree, neutral, disagree and strongly disagree). To neutralize positive/negative combination of the statements regarding bus/train, all mean index values calculated are focusing bus service quality (positive for bus) in comparison to train service quality. The negative mean values indicate negative attitude towards bus service and thus positive for train service; the positive values indicate positive attitude towards bus and thus negative towards train. To keep this consistency:

- a) For Group “A” hypotheses (+ve for train), strongly agree has been denoted as -2 and strongly disagree as +2, if these hypotheses are agreed (resulting in -ve mean values) they indicate negative attitude towards bus service, but positive attitude towards train service and vice versa.

b) For Group “B” hypotheses (+ve for bus), strongly agree has been denoted as +2 and strongly disagree as -2, if these hypotheses are agreed (resulting in +ve mean values) they indicate positive attitude towards bus service but negative attitude towards train service and vice versa.

**Group A**

The analysis for group A shows that out of 18 services the respondents found trains better in 12 cases, buses better in one case and in five cases there is no significant difference at 5% level of significance (Table 2). The respondents found that pre-purchase of tickets is not easier in trains than buses (0.36). But the respondents quite strongly agree that buses are more prone to accidents (-1.26), and bus drivers are reckless in driving (-1.23). Other strong competitive advantages trains have over buses are: easy movement (-0.89), less congestion/interruptions (-0.86), sudden breakdowns (-0.68), better ventilation (-0.66), better refreshment facility (-0.56), less hijacking/ mugging (-0.55), better light condition (-0.34). Overall, it can be said that in this section the service qualities of trains are comparatively better than buses (-0.42). The findings support the researcher’s hypothesized positive bias towards train service.

Table 2: Mean Indices of Group A Variables

Simple Variables	Mean Index ( $\mu$ )	Level of significance ( $\alpha$ )
1) Normally pre-purchase of tickets is easier in trains <sup>a</sup> (12)	0.36	0.000
2) Buses are more crowded <sup>a</sup> (11)	0.06	0.359
3) Trains provide customers consistent service <sup>a</sup> (28)	0.01	0.908
4) Cooling is better in trains <sup>a</sup> (7)	-0.04	0.584
5) Less illegal passenger pickup in train than bus <sup>a</sup> (38)	-0.07	0.170
6) Better female/children seats in trains than buses <sup>a</sup> (35)	-0.11	0.087
7) Environment of rail station is better than bus <sup>a</sup> (34)	-0.18	0.008
8) Easy to carry delicate goods in trains <sup>a</sup> (37)	-0.23	0.000
9) Light condition is better in trains <sup>a</sup> (9)	-0.34	0.000
10) Better handicap seats in trains than buses <sup>a</sup> (36)	-0.36	0.000
11) Hijacking/mugging more in buses <sup>a</sup> (20)	-0.55	0.000
12) Refreshment facility is better in trains <sup>a</sup> (5)	-0.56	0.000
13) Ventilation is better in trains <sup>a</sup> (8)	-0.66	0.000
14) Sudden breakdowns more for buses <sup>a</sup> (23)	-0.68	0.000
15) Buses face more congestion/interruptions <sup>a</sup> (1)	-0.86	0.000
16) Movement in train is easier <sup>a</sup> (4)	-0.89	0.000
17) Bus drivers have less experience/capability <sup>a</sup> (24)	-1.23	0.000
18) Buses are more prone to accidents <sup>a</sup> (21)	-1.26	0.000

**Group B**

The analysis for group B shows that out of 20 services the respondents found in 19 cases bus services are better than train services at 5% level of significance (Table 3). The findings support the researcher’s hypothesized positive bias towards bus service. The respondents found that ticket queuing time is much better ( $\mu \geq 1.0$ ) in buses than trains (1.16). Also, the respondents quite strongly ( $1.0 \geq \mu \geq 0.7$ ) agree that a) buses are more accessible through telephone (0.92), b) more train tickets go to black market (0.92), c) tickets are more easily available in buses (0.86), d) emergency handling is more efficient in buses (0.80), e) clarification of queries are more in buses (0.79) and f) problems more efficiently handled in buses (0.70).

The respondents also noted strongly ( $0.69 \geq \mu \geq 0.27$ ) that a) delay in departure is more for trains (0.66), b) frequency of trains is less (0.62), c) trains carry more illegal/smuggled goods (0.59), d) time/schedule information is more in buses (0.55), and e) more cordial greeting in buses (0.50). The respondents also agreed ( $0.50 \geq \mu \geq 0.5$ ) that a) luggage handling is easier in buses (0.49), b) employees in buses are more helpful (0.47), c) ticket return facility is more in buses (0.47), d) condition of seats is better in buses (0.42), e) trains spend more time in a stoppage (0.38), f) arrival uncertainty is more in trains (0.27) and buses reach destination faster (0.27). Overall, it can be said that in this section the service qualities of buses are comparatively better than trains (0.586). From the combined analysis of both the groups (A and B) responses, it is clear that overall bus has little comparative advantage over train (0.11).

Table 3: Mean Indices of Group B Variables

Simple Variables	Mean Index ( $\mu$ )	Level of significance( $\alpha$ )
1) Ticket queuing time is longer for train <sup>b</sup> (19)	1.16	0.000
2) Telephone accessibility is more in bus <sup>b</sup> (29)	0.92	0.000
3) More train tickets go to black market <sup>b</sup> (18)	0.92	0.000
4) Tickets are more easily available in buses <sup>b</sup> (17)	0.86	0.000
5) Emergency handling is more efficient in buses <sup>b</sup> (33)	0.80	0.000
6) Clarification of queries more for buses <sup>b</sup> (7)	0.79	0.000
7) Problems more efficiently handled in buses <sup>b</sup> (32)	0.70	0.000
8) Delay in departure is more for trains <sup>b</sup> (14)	0.66	0.000
9) Frequency of trains is less <sup>b</sup> (15)	0.62	0.000
10) Trains carry more illegal/smuggled goods <sup>b</sup> (22)	0.59	0.000
11) Time/schedule information is more in buses <sup>b</sup> (30)	0.55	0.000
12) More cordial greeting in buses <sup>b</sup> (26)	0.50	0.000
13) Luggage handling is easier in buses <sup>b</sup> (10)	0.49	0.000
14) Employees in buses are more helpful <sup>b</sup> (25)	0.47	0.000
15) Ticket return facility is more in buses <sup>b</sup> (13)	0.45	0.000
16) Condition of seats is better in buses <sup>b</sup> (6)	0.42	0.000
17) Trains spend more time in a stoppage <sup>b</sup> (3)	0.38	0.000
18) Uncertainty of arrival is more in trains <sup>b</sup> (16)	0.27	0.000
19) Buses reach destination faster <sup>b</sup> (2)	0.27	0.000
20) Buses have better restroom than trains <sup>b</sup> (27)	-0.11	0.128

#### 4.4 Complex Variable Wise Analysis

The coordination schema has grouped the 38 simple variables into six complex variables (broad groups): i) Physical facilities and condition (7), ii) environment & ambience (6), iii) Time & timeliness (5), iv) Ticketing, accessibility & convenience (5), v) Customer service and responsiveness (8), and vi) Operational efficiency (7). A comparative analysis of the commuters' responses of bus over train is made based on the group variables mean values (Table 4). The group mean values showed that bus service quality is better than train in three broad areas: i) Ticketing, accessibility & convenience (0.750), ii) Customer service and responsiveness (0.585), and iii) Time & timeliness (0.426); on the other hand, bus service quality is lagging behind train also in three areas: i) Operational efficiency (-0.413), ii) Environment & ambience (-0.372), and iii) Physical facility & condition (- 0.189). As noted, overall, none of the modes has significant advantage over other (0.11).

Further analysis showed that train is giving significantly better physical facility in terms of lighting, ventilation, handicap sitting, and delicate goods carriage. But the respondents found bus seats in a better condition. Regarding environment & ambience train is found better in almost all the attributes (i.e., movement, refreshment facility, hijacking/mugging possibility,

environment). Regarding time & timeliness bus is doing better in terms of departure and arrival, time/schedule information and stoppage time. Ticketing, accessibility & convenience is also perceived to be better in bus in terms of queuing time, ticket available, frequency, ticket return facility, ticket pre-purchase and black market. Customer service and responsiveness for bus employees is found better than train employees in terms of luggage handling, emergency handling, query clarification, problem handling, consistent service, greeting and assistance. Regarding operational efficiency trains are found to do significantly better in congestion/interruptions, accidents, breaks down, and reckless driving; but in terms of frequency of service and illegal/ smuggled goods carriage, bus is found better.

Table 4: Mean Indices of the complex (Group) variables

Parameters	Complex Variables	Simple Variables	Mean	α
Commuters comparative perception of service quality of Bus & Train (0.11)	1. Physical facility & condition (- 0.189)		0.42	0.00
			-	0
			0.04	0.58
			-	4
		1) Condition of seats is better in buses <sup>b</sup> (6)	-	0.00
		2) Cooling is better in trains <sup>a</sup> (7)	0.66	0
		3) Ventilation is better in trains <sup>a</sup> (8)	-	0.00
		0.34	0	
		-	0	
	4) Light condition is better in trains <sup>a</sup> (9)	0.11	0.16	
	5) Better female/children seats in trains <sup>a</sup> (35)	-	4	
	6) Better handicap seats in trains than buses <sup>a</sup> (36)	-	0.00	
	7) Easy to carry delicate goods in trains <sup>a</sup> (37)	0.36	0	
		-	0.00	
		0.23	0	
			-	0.00
			0.89	0
			-	0.00
			0.56	0
			0.06	0.35
			-	9
			0.55	0.00
			-	0
			0.11	0.27
			-	9
			0.18	0.00
				6
				0.00
				0
			0.27	0.00
			0.38	0
			0.66	0.00
			0.27	0
			0.55	0.00
				0
				0.00
				0



	4. Ticketing, accessibility & convenience (0.750)	1) Pre-purchase of tickets is easier in trains <sup>a</sup> (12) 2) Ticket return facility is more in buses <sup>b</sup> (13) 3) Tickets are more easily available in buses <sup>b</sup> (17) 4) More train tickets go to black market <sup>b</sup> (18) 5) Ticket queuing time is longer for train <sup>b</sup> (19)	0.36 0.45 0.86 0.92 1.16	0.00 0 0.00 0 0.00 0 0.00 0
	5. Customer service and responsiveness (0.585)	1) Luggage handling is easier in buses <sup>b</sup> (10) 2) Employees in buses are more helpful <sup>b</sup> (25) 3) More cordial greeting in buses <sup>b</sup> (26) 4) Trains provide customers consistent service <sup>a</sup> (28) 5) Telephone accessibility is more in bus <sup>b</sup> (29) 6) Emergency handling is more in buses <sup>b</sup> (31) 7) Clarification of queries more for buses <sup>b</sup> (32) 8) Problems more efficiently handled in buses <sup>b</sup> (33)	0.49 0.47 0.50 0.01 0.92 0.80 0.79 0.70	0.00 0 0.00 0 0.00 0.90 8 0.00 0 0.00 0 0.00 0
	6. Operational efficiency (- 0.413)	1) Buses face more congestion/interruptions <sup>a</sup> (1) 2) Frequency of trains is less <sup>b</sup> (15) 3) Buses are more prone to accidents <sup>a</sup> (21) 4) Trains carry more illegal/smuggled goods <sup>b</sup> (22) 5) Sudden breakdowns more for buses <sup>a</sup> (23) 6) Buses drive recklessly <sup>a</sup> (24) 7) Less illegal passenger pickup in train than bus <sup>a</sup> (38)	- 0.86 0.62 - 1.26 0.59 - 0.68 - 1.23 - 0.07	0.00 0 0.00 0 0.00 0 0 0.00 0 0.00 0 0 0.17 0
Note: The hypothesized statements of group A and group B are marked as “a” and “b” respectively.				

#### 4.5 Demography Wise Perceptual Difference of the Responses

##### 4.5.1 Gender wise difference

The study tried to find out gender wise perceptual differences of the commuters of the 38 comparative service quality variables. The study surveyed 188 male and 88 female commuters. The study found that in 10 cases there is significant ( $\alpha = 5\%$ ) gender wise difference of the perception of the commuters (Table 5). These are: i) stoppage time (0.41 vs 0.17), ii) refreshment facility (-0.66 vs -0.30), iii) departure delay (0.77 vs 0.44), frequency of transport (0.71 vs. 0.43), arrival uncertainty (0.39 vs 0.02), ticket availability (0.96 vs 0.65), black market (1.02 vs 0.69), ticket queuing time (1.26 vs 0.93), hijacking/mugging (- 0.63 vs - 0.38), and accident proneness (- 1.36 vs - 1.06).

These 10 cases can be divided into three A group variables and seven B group variables. A close look revealed that in all B group cases males found bus service better than train service. On the other hand, in all A group cases females found bus service better than train service. Overall, there is not much gender wise perceptual difference of the bus and train commuters.

Table 5: Gender wise comparative analysis of the commuters

Comparative Simple Variables	Gender	Combined response focusing Bus		
		Mean	St. Dev.	Sig. (2-tail)
1) Trains spend more time in a stoppage <sup>b</sup> (3)	Male	0.41	1.039	0.03
	Female	0.17	1.091	
2) Refreshment facility is better in trains <sup>a</sup> (5)	Male	-0.69	1.134	0.007
	Female	-0.30	1.074	
3) Delay in departure is more for trains <sup>b</sup> (14)	Male	0.77	0.898	0.010
	Female	0.44	1.102	
4) Frequency of trains is less <sup>b</sup> (15)	Male	0.71	1.058	0.033
	Female	0.43	0.932	
5) Uncertainty of arrival is more in trains <sup>b</sup> (16)	Male	0.39	1.115	0.013
	Female	0.02	1.164	
6) Tickets are more easily available in buses <sup>b</sup> (17)	Male	0.96	1.041	0.023
	Female	0.65	1.062	
7) More train tickets go to black market <sup>b</sup> (18)	Male	1.02	1.005	0.013
	Female	0.69	1.054	
8) Ticket queuing time is longer for train <sup>b</sup> (19)	Male	1.26	0.878	0.006
	Female	0.93	1.059	
9) Hijacking/mugging more in buses <sup>a</sup> (20)	Male	-0.63	1.036	0.049
	Female	-0.38	0.975	
10) Buses are more prone to accidents <sup>a</sup> (21)	Male	-1.36	0.797	0.009
	Female	-1.06	1.065	

**4.5.2 Occupation Wise Difference**

Of the total respondents (277) occupation wise 169 (61.0%) are students, 74 (26.7%) are employed, and the rest 34 (12.3%) are involved in other professions like, business (11), home making (9), others (13). As majority of the respondents are students and service holders, the study tried to compare their responses with respect 38 comparative variables using two-population t-test. In majority of the cases (29) no significant difference of the perception is found at 5% level of significance except nine cases: i) Movement in a train coach is easier (-0.84 vs -1.16), ii) Condition of seats is better in buses (0.54 vs 0.20), iii) Cooling is better in trains (0.04 vs -0.31), iv) The condition of lights are better in trains (-0.21 vs -0.67), vi) More train tickets go to black market (1.05 vs 0.77), vi) Hijacking/mugging more in buses (-0.51 vs -0.79), vii) Trains provide customers consistent service (0.08 vs -0.29), viii) Telephone accessibility is more in bus (1.05 vs 0.79), ix) Bus employees during travel respond more quickly (0.92 vs 0.64) (Table 6). A close look of the data showed that students found bus services comparatively better than train services.

Table 6: Occupation wise comparative analysis of the commuters

Comparative Simple Variables	Gender	Combined response focusing Bus		
		Mean	St. Dev.	Sig. (2-tail)
1) Movement in a train coach is easier <sup>a</sup> (4)	Student	-0.84	1.071	0.026
	Service	-1.16	0.931	
2) Condition of seats is better in buses <sup>a</sup> (6)	Student	0.54	1.000	0.018
	Service	0.20	1.139	
3) Cooling is better in trains <sup>b</sup> (7)	Student	0.04	1.020	0.024
	Service	-0.31	1.273	
4) The condition of lights is better in trains <sup>b</sup> (9)	Student	-0.21	1.076	0.002
	Service	-0.67	1.070	
5) More train tickets go to black market <sup>b</sup> (18)	Student	1.05	0.881	0.043
	Service	0.77	1.203	
6) Hijacking/mugging more in buses <sup>a</sup> (20)	Student	-0.51	0.927	0.045
	Service	-0.79	1.069	
7) Trains provide customers consistent service <sup>b</sup> (28)	Student	0.08	0.935	0.007
	Service	-0.29	1.136	
8) Telephone accessibility is more in bus <sup>b</sup> (29)	Student	1.05	0.778	0.026
	Service	0.79	0.963	
9) Bus employees during travel respond more quickly <sup>b</sup> (31)	Student	0.92	0.816	0.019
	Service	0.64	0.968	

**4.5.3 Correlation between age and comparative service variables**

Of the total 38 simple comparative variables 22 of them have significant correlation with age (Table 7). Those variables which have significant correlation, 15 belong to group “A” and seven belong to group “B”. As noted, 17 of these variables has negative and five of them have positive correlation. All the B group variables have –ve correlation and majority of the A group variables have +ve correlation with age. Most of the relationship indicates weak correlation. The negative correlation of the B group variables (favoring Bus) and mainly +ve for A group variables indicate that young respondents found bus better than train regarding these variables and the seniors found otherwise.

Table 7: Significant correlations between age and comparative service variables

Variables	Pearson correlation	Sig. (2-tailed)
1) The refreshment facility is more convenient in a train than in a bus <sup>a</sup> (5)	0.121	0.045
2) The condition of lights are better in trains than buses <sup>a</sup> (9)	-0.182	0.002
3) Buses are more crowded than trains <sup>b</sup> (11)	-0.161	0.007
4) Ticket return facility is more available in buses than trains <sup>b</sup> (13)	-0.200	0.001
5) Delay in starting a vehicle (departure) more happens in trains than buses <sup>b</sup> (14)	-0.134	0.026
6) Time gap between departures (frequency is less) is longer for trains than buses <sup>b</sup> (15)	-0.176	0.003
7) Tickets are more easily available in buses than trains <sup>b</sup> (17)	-0.241	0.000

8) More train tickets go to black market than bus tickets <sup>b</sup> (18)	-0.170	0.005
9) Waiting time in a queue is longer during buying a train ticket than a bus ticket <sup>b</sup> (19)	-0.272	0.000
10) Hijacking is a greater possibility in buses than in trains <sup>a</sup> (20)	0.123	0.04
11) Buses are more prone to road accidents than trains <sup>a</sup> (21)	0.231	0.000
12) Chances of carrying smuggled goods are more for trains than buses <sup>b</sup> (22)	-0.135	0.025
13) More break down of vehicles happens for buses than trains <sup>a</sup> (23)	0.228	0.000
14) Bus drivers drive more recklessly than train drivers <sup>a</sup> (24)	0.225	0.000
15) Employees of buses are more helpful than the employees of trains <sup>b</sup> (25)	-0.142	0.018
16) Commuters are greeted more cordially in buses than in trains <sup>b</sup> (26)	-0.317	0.000
17) Bus service providers are more accessible over telephone than train service providers <sup>b</sup> (29)	-0.278	0.000
18) Information regarding time & vehicles is more available in buses than trains <sup>b</sup> (30)	-0.181	0.002
19) Bus employees during travel respond more quickly than train employees in case of emergency <sup>b</sup> (31)	-0.244	0.000
20) Bus counter service providers are more apt at clarifying queries than train service providers <sup>b</sup> (32)	-0.156	0.009
21) Problems are more effectively handled by bus service providers than train service providers <sup>b</sup> (33)	-0.158	0.008
22) Better handicap seats available in trains than buses <sup>a</sup> (36)	-0.139	0.021

#### 4.6 Factor Analysis

##### 4.6.1 Factor Analysis

The factor analysis<sup>1</sup> reduced the 38 survey variables into 11 factors<sup>2</sup> with eigen value greater than one explaining 63.67% of the variability (Table 8). The factor analysis of 38 variables with 277 sample is found adequate (KMO test result=0.799 ≥ 0.5) and valid (significance level of 0.000)<sup>3</sup>. A relatively higher communality<sup>4</sup> indicates that a variable has much in common with the other group variables (Appendix 2). It can be noted that the first two factors explain major variability (16.437%, 11.457%). The next three factors are to some extent significant (5.681%, 5.508%, 5.307%); but the rest do not explain much. The naming of the variables is done on the basis of important variables identified in each factor. The detailed analysis of the factors follows.

Table 8: Factors for Bus Commuters and their Variability

Factors	Eigen value	Variance ( $\sigma^2$ ) (%)	Cumulative Variance (%)
1. Operational Efficacy	6.246	16.437	16.437
2. Physical facility and condition (1)	4.354	11.457	27.894
3. Physical facility and condition (2)	2.159	5.681	33.575
4. Customer service and responsiveness (1)	2.093	5.508	39.083
5. Ticketing accessibility & convenience	2.017	5.307	44.389
6. Time and timeliness (1)	1.480	3.894	48.283
7. Customer service and responsiveness (2)	1.397	3.678	51.961
8. Environment & ambience (1)	1.246	3.279	55.240
9. Time & timeliness (2)	1.167	3.072	58.312
10. Environment & ambience (2)	1.035	2.724	61.036
11. Physical facility & condition (3)	1.001	2.635	63.671

factor (**Physical facilities and consistency**) appears to be the most important as they explain 16.437% variability. Some of the other factors include **Time, timeliness and convenience** ( $\sigma^2=8.13\%$ ), **Illegal activity, security & efficiency** ( $\sigma^2=5.63\%$ ) and **Counter service & responsiveness** ( $\sigma^2=5.04\%$ ). The communalities<sup>5</sup> of the variables that constituted the factors are found very strong, which indicates strong relationships among the group variables. The following sections describe and analyze these factors in detail.

**Factor 1: Operational Efficiency ( $\sigma^2=16.437\%$ )**

It appears that the first factor “Operational Efficiency” is the most important factor as it explains maximum 16.437% variability. It contains eight variables (Table 14). Mostly, all the variables have factor loadings<sup>5</sup> of 0.5 or greater indicating relative strengths of these individual variables. Based on grouping, it may be deduced that the respondents believe that different operational efficiency are important comparative variables. Also, the factor variables are found quite like the complex variable items under “operational efficacy” the study has identified (\*). Hence it can be concluded that operational efficiency is a very important factor as it comprises the maximum number of the variables and the variables have high factor loadings.

Table 9: Operational Efficacy

Variable Name	Factor loading
Q24 Bus drivers drive more recklessly than train drivers*	0.719
Q21 Buses are more prone to road accidents than trains*	0.710
Q04 Movement in a train coach is easier than in a bus	0.630
Q05 The refreshment facility is more convenient in a train than in a bus	0.543
Q15 Frequency of trains is less than that of buses*	-0.506
Q23 More break down of vehicles happens for buses than trains*	0.476
Q01 Buses face more congestions/interruptions than trains*	0.425
Q22 Chances of carrying smuggled goods are more in trains than buses*	-0.400

**Factor 2: Physical facility & condition ( $\sigma^2=11.457\%$ )**

The second factor “physical facility & condition” contains four variables and explains 11.457% of the variability (Table 10). It appears that this factor is also an important comparative factor and all the variables have very high factor loadings indicating relative strengths of the individual variables. Further, it may be deduced that better handicap seats, better light condition, easy to carry delicate goods, and less random passenger pickup in trains than busses are important comparative variables. Here also, the factor variables are found quite like the complex variable items under “physical facility & condition” the study has identified (\*).

Table 10: Physical facility & condition

Variable Name	Factor Loading
Q36 Better handicap seats in trains than buses*	0.914
Q09 Light condition is better in trains than buses*	0.860
Q37 Easy to carry delicate goods in trains than buses*	0.859
Q38 Less random passenger pickup in trains than busses	0.748

**Factor 3: Physical facility & condition ( $\sigma^2=5.681\%$ )**

The third factor also focuses “physical facility & condition” contains three variables and explains 5.681% of the variability (Table 11). It appears that this is also an important factor and the variables have very high factor loadings. Based on the analysis, the factor physical facility & condition includes two related variables (\*): the cooling facility is better in a train than in a bus, better female/children seats in trains than buses. Factor 2 and 3 together resembles 5 out of 7 group variables.

Table 11: Physical facility & condition

Variable Name	Factor Loading
Q07 The cooling facility is better in a train than in a bus*	0.935
Q34 Rail environment is better than bus	0.901
Q35 Better female/children seats in trains than buses*	0.890

**Factor 4: Customer service and responsiveness ( $\sigma^2=5.508\%$ )**

The fourth factor “counter service & responsiveness” contains four variables and explains 5.508% of the variability (Table 12). It appears that this factor is also an important factor in the eyes of the respondents. Based on their responses, it may be deduced that the respondents believe that counter service & responsiveness are important for buses. The first three variables here have high factor loadings. All the four variables are included in the group variables (8).

Table 12: Customer service and responsiveness

Variable Name	Factor Loading
Q32 Bus counter service providers are more apt at clarifying queries than that of trains*	0.714
Q33 Problems are more effectively handled by bus service providers than train service providers*	0.690
Q31 Employees in buses during travel respond more quickly than employees of trains in case of any emergency*	0.539
Q29 Bus service providers are more accessible via telephone than train service providers*	0.377

**Factors 5: Ticketing accessibility & convenience ( $\sigma^2=5.307\%$ )**

The fifth factor (Ticketing accessibility & convenience) contains five variables and explain 5.307% of the variability (Table 13). Most of the variables in the factor have high factor loadings. Four variables in this factor resembles the group variable ticketing accessibility & convenience (5).

Table 13: Ticketing accessibility & convenience

Variable Name	Factor Loading
Q18 More train tickets go to black market than bus tickets*	0.699
Q13 Ticket return facility is more available in buses than trains*	0.664
Q19 Waiting time in a queue is longer during buying a train ticket than a bus ticket*	0.553
Q28 Trains provide each person with equivalent service than buses	-0.520
Q17 Tickets are more easily available in buses than trains*	0.460

**Factors 6-11: Other Factors**

The other six factors Time and timeliness, Customer service and responsiveness, Environment & ambience, Time & timeliness, Environment & ambience, Physical facility & condition, explain

only 3.894%, 3.678%, 3.279%, 3.072%, 2.727%, 2.635% of the variability respectively (Table 14). The naming of the variables is done on the basis of important variables identified in each factor (\*). It can be noted that the variables in each of the factors have high factor loadings indicating the importance of the variable in measuring each factor and their strong correlation with the corresponding factors.

It can be noted that, all the variables of factor 6 (Time and timeliness) resembles the group variables of “Time and timeliness”. Similarly, all the variables of factor 7 (Customer service and responsiveness) resembles the group variables of “Customer service and responsiveness”. Over all it can be said that the factors identified by factor analysis are quite consistent with the previous grouping (Complex variables) made by the coordination schema.

Table 14: Other Factors (6-11)

Variable Name	Factor Loading
<b>Factor 6: Time and timeliness (<math>\sigma^2=3.894\%</math>)</b>	
Q02 Buses reach a destination faster than trains*	0.784
Q16 Trains are more irregular in reaching a destination timely than are buses*	0.734
Q14 Delay in starting a vehicle happens more in case of trains than buses*	0.521
Q03 Trains spend more time in a stoppage than buses*	0.473
<b>Factor 7: Customer service and responsiveness (<math>\sigma^2=3.678\%</math>)</b>	
Q10 Luggage management is easier in buses than trains*	0.688
Q26 Commuters are greeted more cordially in buses than in trains*	0.686
Q25 Employees in buses are more helpful than the employees of trains*	0.619
<b>Factor 8: Environment &amp; ambience (<math>\sigma^2=3.279\%</math>)</b>	
Q11 Buses are more crowded than trains*	0.719
Q12 The pre-purchase of tickets is an easier process in trains than buses	0.654
Q20 Hijacking is a greater possibility in buses than in trains*	0.467
<b>Factor 9: Time &amp; timeliness (<math>\sigma^2=3.072\%</math>)</b>	
Q30 time and vehicles Information is better available in buses than trains*	0.654
Q08 The ventilation facility is better in a train than in a bus	-0.453
<b>Factor 10: Environment &amp; ambience (<math>\sigma^2=2.724\%</math>)</b>	
Q27 Buses have better restroom than trains*	0.759
<b>Factor 11: Physical facility &amp; condition (<math>\sigma^2=2.635\%</math>)</b>	
Q06 The condition of seats is better in buses than trains*	0.779

## 6.0 SUMMARY, CONCLUSION AND RECOMMENDATION

### 6.1 Summary and Conclusion

The transport sector of Bangladesh consists of roads, railways, inland waterways, two seaports, maritime shipping and airways. Of all the different transport networks, road and rail are the two significant transportation modes in Bangladesh as they carry major share of goods and people. However, the service quality of these two public transports has its own merit and demerit. Customer satisfaction plays a key role in the choice of medium of transport, underscoring the need to determine the nature and impact of such factors that lead to customer approval. Thus, an in-depth comparative study of the level of customer satisfaction is made to find the quality of road and rail transport services in Bangladesh. The study made use of both primary and secondary data and pertinent literature review.

Primary data is collected using questionnaire survey from commuters who travel both in the intercity bus and rail modes. The questionnaires were developed in a manner such that all the service quality dimensions grouped into nine complex and 38 simple variables. The total sample size of the questionnaire survey is 277 who has the experience of commuting in both bus and train regularly. The bus and rail commuters gave their comparative satisfaction level regarding different service dimensions in the two modes. Of these total respondents that have the experience of travelling in both the modes 189 (68.23%) are male and 88 (31.77%) are female. Occupation wise 169 (61.0%) of them are students, 74 (26.7%) are employed, and the rest 34 (12.3%) are involved in other professions (e.g., business, home making, etc.). Age wise 13 (4.7%) is less than 18 years, 169 (61%) between 18-28 years, 48 (17.3%) between 28-38 years, 20 (7.2%) between 38-48 years, and the rest 27 (9.7%) are above 48 years.

As noted, the study has grouped the 38 simple variables into six complex variables: i) Physical facilities and condition, ii) environment & ambience, iii) Time & timeliness, iv) Ticketing, accessibility & convenience, v) Customer service and responsiveness, and vi) Operational efficiency. A comparative analysis of the commuters' responses of bus over train is made based on the group variables mean values. The group mean values showed that bus service quality is better than train in three broad areas: i) Ticketing, accessibility & convenience, ii) Customer service and responsiveness, and iii) Time & timeliness; on the other hand, bus service quality is lagging behind train also in three areas: i) Operational efficiency, ii) Environment & ambience, and iii) Physical facility & condition. As noted, overall, none of the modes has significant advantage over other.

Further analysis showed that train is giving significantly better physical facility in terms of lighting, ventilation, handicap sitting, and delicate goods carriage. But the respondents found bus seats in a better condition. Regarding environment & ambience train is found better in almost all the attributes (i.e., movement, refreshment facility, hijacking/mugging possibility, environment). Regarding time & timeliness bus is doing better in terms of departure and arrival, time/schedule information and stoppage time. Ticketing, accessibility & convenience is also perceived to be better in bus in terms of queuing time, ticket available, frequency, ticket return facility, ticket pre-purchase and black market. Customer service and responsiveness for bus employees is found better than train employees in terms of luggage handling, emergency handling, query clarification, problem handling, consistent service, greeting and assistance. Regarding operational efficiency trains are found to do significantly better in congestion/interruptions, accidents, breaks down, and reckless driving; but in terms of frequency of service and illegal/ smuggled goods carriage, bus is found better.

## 6.2 Recommendations for Buses

To mitigate negative quality perception of buses and address these alarming issues, the bus companies need to improve in the areas of i) Operational efficiency, ii) Environment & ambience, and iii) Physical facility & condition. Specifically, bus companies need to provide proper training to their drivers and discourage them from speeding, reckless driving to avoid accidents. They need to properly check the fitness of the buses to avoid breaks down on the road. Refreshment facilities in stoppages and clean surrounding are ways to improve the bus services. Bus companies need to improve proper lighting, ventilation and space for movement inside the bus. Proper carriage of delicate goods and seats for female, children and handicap can improve the bus service quality. Policing and appropriate identification of passengers can go a long way in improving the safety concerns like hijacking, theft, mugging, robbery, etc. Penalties in accordance to updated company policies may be imposed in extreme cases.



### 6.3 Recommendations for Trains

The focuses of improvement of trains are a little different from buses. To ease negative quality perception of trains it is needed to improve in the broad areas of i) Ticketing, accessibility & convenience, ii) Customer service and responsiveness, and iii) Time & timeliness. Specific areas of improvement are queuing time, ticket availability, train frequency, ticket return facility, and ticket pre-purchase facility. Also, they need to prevent carrying of smuggled goods and black marketing of tickets. Maintaining scheduled arrival and departure time, time/schedule information and stoppage time should be closely monitored. Other issues of concern are luggage management, sitting arrangements, emergency handling, query clarification, problem handling, consistent service, and timely assistance. Improving environment, restroom facilities, ensure cleanliness of the toilets in the train and railway stations need to be improved for better service delivery. The train employees need to be trained for courtesy and cordial greeting of the passengers.

Luggage scanners installed in train stations can reduce the chances of illegal goods smuggling and can also reduce the possibility of trafficking prohibited goods. To improve staff behavior a complaint box may be installed to track offenders and take effective action against them. Consideration may also be given to personnel training, awareness development and certifying transportation workers placed in public service. Such training and certification are actually needed across the board in all service sectors and may even be introduced in school curriculums to sensitize young citizens to the needs of society. A visible and vigorous supervision in the overall service is likely to give greater confidence and satisfaction to the passengers.

#### NOTES

- 1 Factor Analysis is a type of analysis used to discern the underlying dimensions or regularity in phenomenon. Its general purpose is to summarize the information contained in many variables into a smaller number of factors. It is an interdependence technique in which all variables are simultaneously considered.
- 2 Factor is a linear combination of the original variables. Factors also represent the underlying dimensions (constructs) that summarize or account for the original set of observed variables.
- 3 Ideally the sample size should be at least 150 (subject to variable ratio greater than 5). The factor analysis of 38 variables with 277 sample is found adequate (KMO test result = 0.731  $\geq$  0.5) and valid (Bartlett’s test of sphericity indicates a significance level of 0.000).
- 4 Communality refers to a measure of the percentage of a variable’s variation that is explained by the factors. It is the amount of variance original variables share with all other variables included in the analysis. A relatively higher communality indicates that a variable has much in common with the other variables taken as a group.
- 5 ‘Factor loading’ is a measure of the importance of the variable in measuring each factor. It is used for interpreting and labeling a factor. It is the correlation between the original variables and the factors, and key to understanding the nature of a factor.

Appendix 1: Coordination Schema

Parameters	Complex Variables	Simple Variables	Value	Question No.
Commuters comparative perception of service quality of	1) Physical facility & condition	1) Seat condition is better in buses <sup>b</sup> 2) Cooling is better in trains <sup>a</sup> 3) Ventilation is better in trains <sup>a</sup> 4) Light condition is better in trains <sup>a</sup> 5) Easy to carry delicate goods in trains <sup>a</sup> 6) Better female/children seats in trains than buses <sup>a</sup>	Likert scale	Q06 Q07 Q08 Q09 Q37 Q35 Q36

Bus & Train		7) Better handicap seats in trains than buses <sup>a</sup>		
	2) Environment & ambience	1) Movement in train is easier <sup>a</sup> 2) Refreshment facility is better in trains <sup>a</sup> 3) Buses are more crowded <sup>a</sup> 4) Hijacking/mugging more in buses than trains <sup>a</sup> 5) Buses have better restroom than trains <sup>b</sup> 6) Rail environment is better than bus <sup>a</sup>	Likert scale	Q04 Q05 Q11 Q20 Q27 Q34
	3) Time & timeliness	1) Buses reach destination faster <sup>b</sup> 2) Trains spend more time in a stoppage <sup>b</sup> 3) Delay in departure is more for trains <sup>b</sup> 4) Uncertainty of arrival (irregularity) is more in trains <sup>b</sup> 5) Time/schedule information is more in buses <sup>b</sup>	Likert scale	Q02 Q03 Q14 Q16 Q30
	4) Ticketing, accessibility & convenience	1) Pre-purchase of tickets is easier in trains <sup>a</sup> 2) Ticket return facility is better in buses <sup>b</sup> 3) Tickets are more easily available in buses <sup>b</sup> 4) More train tickets go to black market <sup>b</sup> 5) Ticket queuing time is longer for train <sup>b</sup>	Likert scale	Q12 Q13 Q17 Q18 Q19
	5) Customer service and responsiveness	1) Luggage handling is easier in buses <sup>b</sup> 2) Employees in buses are more helpful <sup>b</sup> 3) More cordial greeting in buses <sup>b</sup> 4) Trains provide customers consistent service <sup>a</sup> 5) Telephone accessibility is more in bus counters <sup>b</sup> 6) Emergency handling is more in buses <sup>b</sup> 7) Clarification of queries by counter more for buses <sup>b</sup> 8) Problems more efficiently handled in buses <sup>b</sup>	Likert scale	Q10 Q25 Q26 Q28 Q29 Q31 Q32 Q33
	6) Operational efficacy	1) Buses face more congestion/interruptions <sup>a</sup> 2) Frequency of trains is less <sup>b</sup> 3) Buses are more prone to accidents <sup>a</sup> 4) Trains carry more illegal/smuggled goods <sup>b</sup> 5) Sudden breakdowns more for buses <sup>a</sup> 6) Bus drivers drive recklessly than train drivers <sup>a</sup> 7) Random passenger pickup is less in train than bus <sup>a</sup>	Likert scale	Q01 Q15 Q21 Q22 Q23 Q24 Q38
Note: The hypothesized statements of group A and group B are marked as “a” & “b” respectively.				

Appendix 2: Communalities

Variables	Extraction	Variables	Extraction
Q4_congest: Buses face more congestions/interruptions than trains do	.602	Q23_hijack: Hijacking is a greater possibility in buses than in trains.	.542

Q5_fast: Buses reach a destination faster than trains	.694	Q24_accident: Buses are more prone to road accidents than trains	.690
Q6_stop: Trains spend more time in a stoppage than buses	.609	Q25_smuggle: Chances of carrying smuggled goods are more for trains than buses.	.502
Q7_move: Movement in a train coach is easier than in a bus	.520	Q26_break: More break down of vehicles happens for buses than trains	.536
Q8_refresh: The refreshment facility is more convenient in a train than in a bus	.419	Q27_reckless: Bus drivers drive more recklessly than train drivers	.638
Q9_seat: The condition of seats is better in buses than trains	.694	Q28_help: Employees in buses are more helpful than the employees of trains	.593
Q10_cool: The cooling facility is better in a train than in a bus	.923	Q29_greet: Commuters are greeted more cordially in buses than in trains	.618
Q11_ventilate: The ventilation facility is better in a train than in a bus	.557	Q30_restroom: Buses have better restroom than trains.	.644
Q12_light: The condition of lights are better in trains than buses	.846	Q31_uniperson: Trains provide each person with equivalent service than do buses	.595
Q13_Luggage: Luggage management is easier in buses than trains	.608	Q32_access: Bus service providers are more accessible via telephone than train service providers	.476
Q14_crowd: Buses are more overcrowded than trains	.630	Q33_info: Information regarding time and vehicles is more available in case of buses than trains	.658
Q15_purchase: The pre-purchase of tickets is an easier process in trains than buses	.565	Q34_prob1: Employees in buses during travel respond more quickly than employees of trains in case of any emergency	.679
Q16_return: Ticket return (after buying if anyone returns) facility is more available in buses than trains	.623	Q35_query: Bus counter service providers are more apt at clarifying queries than that of trains	.602
Q17_depart1: Delay in starting a vehicle happens more in case of trains than buses	.577	Q36_prob2: Problems are more effectively handled by bus service providers than train service providers.	.562
Q18_depart2: Time gap between departures is longer for trains than buses	.596	Q37_Station Environ	.843
Q19_arrive: Trains are more irregular in case of reaching destination timely than are buses	.670	Q38_Female Seat	.817
Q20_available: Tickets are more easily available in buses than trains	.551	Q39_Handicap Seat	.861
Q21_black: More train tickets go to black market than bus tickets	.705	Q40_Delicate goods	.762
Q22_queue: Waiting time in a queue is longer during buying a train ticket than a bus ticket	.613	Q41_Illegal pickup	.576
Extraction Method: Principal Component Analysis.			

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