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The Problems of Public Transport System in Dhaka City

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Abstract

The transport sector in Bangladesh is characterized by weak public and private institutions and low level of investment. Rapid population, urbanization, and motorization growth with unplanned way has been a significant cause of multidimensional, problems in Dhaka city, and inclined to deterioration the accessibility of service levels, safety, comfort, public transport operational deficiency, causes very limited road area only (7-10%) (route) insufficient effective maintenance, geometrical design, road surface condition are not suitable for buses, poor condition of bus industry management, mixed poor traffic with over concentration of non-motorized vehicles, not enough dependable public transport system and inadequate parking facilities, traffic management practice, manually traffic control in the inter-section have generated a significant deteriorating of public transport and environmental problems in Dhaka city. Overcrowded buses and transports with poor safety and security records, unreliable service operations are quite common in cities. In freight transport excessive cost, times, pilferage, are some of another problem. It is the only city of the world without any well and properly planned mass transit system (Hossain,2006) Naturally rapid growth of population, urbanization and vehicles, low incomes and extremes inequality are among the fundamental reasons of transport problems in Dhaka city (pucher et al.2005). few numbers of bus stoppage and terminal facilities, limited way of people travel, problematic boarding and alighting facilities, weak traffic law enforcement system, unfit old public transport playing on the road, irregularity of bus service, severe environmental pollution, unorganized ticket collection system and counters are the majors burning problems of the city. In this paper described the present situation of public transport system and multidimensional severe chronic problems of Dhaka city and to give the direction of remedial steps of that problematic area. I hope that immediately take necessary corrective measures on the concern authorities of the government and private sectors for providing the planned mass transit system with efficient modern traffic control and management system.

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1. Introduction

Dhaka is the capital of Bangladesh, with a population of over 17 million, is among the top ten mega cities of the world and expected to rise 35 million within 2035 (world bank) With the prediction of a faster urbanization, high vehicular population growth and that of the mobility, Insufficient transportations facilities and policies varied traffic mix with over concentration of non-motorized vehicles. s has created a significant worsening of traffic and environmental problems in absences of dependable public transport system and Insufficient traffic management practice in metropolitan Dhaka. This situation has resulted to decline in accessibility, level of service, safety, comfort and operational efficiency causing increase cost, loss of journey time, air pollution, psychological strain and create a serious risk to the economic viability of the city. The cities are the power house of economic growth for any countries. According to Bartone et.al (1994) around 80% of GDP growth in developing countries is expected to come from cities. Firdous (1984) highlighted some of the problems in the bus operation in Metropolitan Dhaka. Ahan (1990) investigate the status of public transport in Dhaka. Particular attention was given to the necessity of functional cost-effective mass transit system. The city is recently facing severe transportation problems of its people. Inadequate malfunction old model small size of buses and some unceremonious paratransit hostile to the demand of such a huge number of populations causes several extremities of congestion, accident,air pollution, and environmental effect climates changes. Unfortunately, it maybe the unplanned way only the Dhaka city of the world without any planned transit system developed. (Hossain, 2006). Generally rapid growth, low incomes, dangerous imbalance are among the rudimentary grounds of transport problems in Dhaka city A study reveals that the minimum emission rates of SO_2, NO_2 and CO in major roadway intersections of Dhaka are 800, 500 and 33,200 μgm/m^3 respectively in comparison with corresponding Bangladesh standard of 100, 100 and 5000 μgm/m^3 respectively. The Air Quality Index (an aggregate measure of air pollution level) at many points of the city road network is found to be above 200, which is much higher than the acceptable limit of 50 for fairly clean air (Alam et al, 2000)and (WHO). It is a one of the dangerous burning air pollution problems and exceeded the limit of the city. Another study discloses that the average speed of a major arterial road of Dhaka city, named Mirpur road will reduce to 4 km/hr which is less than the normal walking period of human 5km/hr. In addition to other losses (economic losses discomfort etc.) traffic congestion worsens the environmental condition, which is already extremely poor in the urban areas of the Dhaka for the purpose of developing a sustainable

transportation system; required short-term, long-term policies must be established. Present improper and imbalanced land-use planning and the causes of required road area of the city only (8-10%) but road area required up to (25%) which is not sufficient as required transport demand, and it is also created alone of major dangerous burning ISSUE of congestion management and public transport system with other problems of Dhaka city.

2. Objectives of the study

The objectives of the study are as follows:

1. To explore the status of public transport systems of Dhaka city.
2. To find out the problems of public transport systems of Dhaka city.
3. To identify the extent environmental pollution caused by public transport system of Dhaka.
4. To provide remedial policy recommendations.

3. Methodology of the Study

The study was conducted at Dhaka in Bangladesh. The study was survey and documentary analysis type. Data and information were collected from primary and secondary sources i.e. primary data were collected from survey. Purposive sampling method was used for sample selection. Secondary data and information were collected from books, journals, research report, newspaper, periodicals, internet etc.

4 Results and Discussion

The Transport system in Dhaka consists of different modes of travel, non-motorized, motorized. These mix modes generally move on the same road space and same time end result high level of operational disrupt the systematic functioning with related to deteriorating traffic congestion, delay the journey time, loss of working hours, create air pollution, affected the environment of the inhabitant, stated in brief of Transport system in Dhaka city:

4.1 Poor Condition in bus industry

According to BRTA, up to March, 2017 there is 43154 numbers of authorized buses in Dhaka City and many of these buses are operated by individual owners. Drivers and crews in most cases rent the buses on a daily or monthly basis. Then they operate the buses on their own more profits to recovery the rental and operational cost, fiercely carrying enough passengers per trips per day. As and when boarding and alighting anywhere, any time in the middle of the road and intersection point. Due to the poor condition of road network, severe

congestion, short route length, but long journey time, poor traffic management system, overall end result come downed the number of journey trips and finally reduce the required income, which is risk of good investment in bus industry of Dhaka city. For the above reason perhaps, the present bus industry of Dhaka city has not been developed as a modern healthy service.

4.2 Defective and road unworthy motor vehicle

Presence of defective and road unworthy motor vehicles on road occupied a thread to safety of road traffic. The common fault of vehicles in our country become visible to be worn out tires, loose wheel nuts overloaded axle, defective break, headlight and indicator system of light and wipers are always created accident, which is uncertainty of passenger and goods.

4.3 Accident Factors. (Barrier of transport)

The main donating factors are unfavorable road and road adjacent environment, poor design of road section and junctions, overloading, over speeding, dangerous overtaking reckless driving, disobey the mandatory traffic regulations, careless of road users and low level of awareness of the safety problems, defects in vehicle and conflicting use of road, inadequate knowledge of safety rules, regulation of traffic law enforcement.

4.4 Rough and reckless driving

The driving scene in Dhaka is a real- life video game (Shiraji, 2006). The city struggles for safety on its roads as millions of citizens' travel in disorganized pattern and number of vehicles exceeds the road capacity. Many drivers' violet universal traffic rules negate the rights of way of cyclists and pedestrians. Aggressive driving and rule violations on the roads such as tailgating, light flashing. Ignoring the traffic signal light, slow driving in fast moving driving lane and wondering lane marking. There is no check point on over speeding, overloading line and lane violation which is causing frequent accidents claiming the lives of innocent people.

4.5 Inadequate road area of Dhaka city

In Dhaka City, inadequate road area only (7-10%) with few alternative connector roads, insufficient effective management and proper regular routine maintenance of road works. Poor geometric design and mostly used weak construction materials poor workmanship has no regular improvement of routine measures, and not provided proper technical supervision team for test of the new or old works of construction materials mixed traffic mode non-

motorized transport as a significant mode. Vehicles movement always delays, due to the poor road surface condition, poor driving, poor vehicle condition without bi-cycle lane, shortage of safe walkways and not available effective footpaths which are always mostly occupied the major portion by the vendors and other activities. The effective road width is reduced by presence of dustbin and stockyard of construction materials, loading and unloading the trucks of shopkeeper's goods Moreover, a significant portion of road is blocked by illegal roadside parking in the absence of adequate parking facilities that adversely affect the capacity of the road network etc. Most of the manually controlled road signals are not properly operated by the experienced traffic police, and lack of road marking and parking which are causes of congestion and accident. For the above reasons and haphazard parking narrow the carriage way which is natural movement of buses and others traffic's are interrupted and also causes delays the journey time.

4.6 Mixed flow operation (Modal Characteristics)

Motorized vehicles MV (such as bus, minibus, truck, car, auto-rickshaw, auto-tempo, motorcycle etc.) is growing rapidly around 300 per day, registered MV grew from in 2003 no-737400 to2012 in June no-1751834. Mostly more than 40% of registered vehicles are in Dhaka,but the increasing rate of public transport services have not considerably up to the present demand. The number of buses 11060 and Minibuses 8,583 playing on the roads which represents only 3% of total motorized traffic. NMV (such as rickshaw, rickshaw-van, bicycle, push car etc.). There is complex mixture of motorized and non-motorized traffic in the same lane along the roads in Dhaka city except some non-motorized traffic restricted roads. The roads are occupied by inefficient modes of transport like private cars, rickshaws etc. Non-motorized transport (walking and rickshaw is particular) According to BRTA, maximum number of private cars had been registered in Dhaka up to 2017. The numbers of 327487, rickshaws are already over 7 lacks. As slow and fast-moving vehicles are plying in same lane, the speed of fast-moving mass transit buses is decreasing significantly.

4.7 Absent of bicycle lane and minimum pedestrian facilities

Absent of by-cycle lane of Dhaka city is one of the exceptional characteristics of another megacity of the world. It is a problem of MV transport movement in the city, causes of accidents, fatalities, injuries, loses of assets, and economy of the country. Moreover, minimum pedestrian facilities are provided beside the roads but most of the time occupied by vendors, shopkeeper goods, construction materials and sometime bad condition of pedestrian surface which is not favor of a person walking along the roadside.

4.8 Limited number of bus route network in Dhaka

Dhaka has only three major bus route corridors in the north-south direction, mostly originated at Uttara and Mirpur areas and terminated mostly at city Centre/ of Motijheel/Gulshan, and some routes are extended up to south-eastern and eastern firings of the city, as shown in table 7. The bus operation in Dhaka city is confined to only 200 km bus road network with 141 routes. DMRTC (Dhaka Metropolitan Regional Transport Committee) is responsible for bus planning and issuing route permits to public transport vehicles in Dhaka.

4.9 Few numbers of bus stoppage and terminal facilities in Dhaka

Bus stoppage and terminals are critical facilities for bus operations that impact on the quality of the bus journey experience. There are only three inter-district bus terminals in Dhaka city but the facilities in the inter-district bus terminals are inadequate (Bhuyian 2007, Dev Con 2009 and STP 2005) Most of the bus operators have no parking spaces for their bus fleet. Due to shortage of parking scope, many buses are illegally parked their buses adjacent roadside of the terminals and causes of unexpecting congestion/jam. And hazard of vehicle movement.

4.10 Limited way people travel in Dhaka city

There is no chronological travel data of Dhaka city, now a day travel data collected by STP (2005) provides information about the characteristics of house hold travel pattern of Dhaka for 2005. The average household size is 4.12 which is almost double the average household size of developed countries, and average daily trip per household is 8.50, so that average per capita trip rate is 2.06, of those daily average household trips 3.71 are made by transit 4.12 trips are made by nonmotorized modes and remaining 0.67 trips made by private cars.

The daily average household trips comprise 2.74 home to work trips 1.11 and length 5.81 km home to education trips 3.90 and 3.59 km, home to others and non- home-based trips 0.75 and lengths 6.02, 6.44 km are respectively.

4.11 Problematic boarding and alighting facilities

Delay occurs at bus stoppages due to boarding and alighting of passengers, due to Absence of platform at the bus stoppages at the time of boarding and alighting of passengers in the buses, because vertical height of the door step of bus not in same level and inadequate width of door of buses at the same time different age of Passenger cannot quickly boarding & alighting and Most of the buses have only one narrow door one conductor to chick the tickets and collect

fare and some buses have two doors. In most cases the second one is not used for the boarding and alighting of passengers due to one conductor to check the tickets in front door one place. Moreover, in the city service buses boarding and alighting is not quickly possible through single narrow one door and high level of bus floor from the road surface.

4.12 Shortage of safety measure

Travelling in Dhaka City, by transports is not safe and sound at all. Most of the time the buses remain overloaded and overcrowded, it is a common practice in Dhaka City, passengers are standing, hanging with the handle of the buses door, body structural condition of buses are not always satisfactory, mostly old model, fitness of vehicles are not properly checked by the authority of Bangladesh Road Transport Authority (BRTA) per year, poor driving resulting increasing the risk of accident and fatality of life. Besides pick pocketing and thieving is a common scenario of public busses. Passengers are losing money and precious materials always facing trouble with rick of accident in life. There is every possible to accident, fatality due to without take any precaution, driver stop the moving vehicle anytime, anywhere for boarding and alighting the passengers in their own interest of the bus service operator owner.

4.13 Unorganized ticket collection systems

Dhaka City several company's individual buses run along the same route but there is no the system of advanced ticket sailed for day/weekly/fortnightly/monthly and there is no any system or display board or time table chart, regarding the actual position of buses and congestion or jam or road block of route and when coming bus at the destination all the matters are unknown, for the waiting standing passenger in queue at the bus stoppage or bus stands, they are uncertain about their journey time. There is another picture there is no bus counter for sailing ticket to the passengers for traveling when bus arrive at the stoppage then the passenger boarding on the bus in the running position conductor collect the fare one by one, over loading condition, standing passenger push to each other and the movement of conductor which is to create a tremendous pressure to the standing different ages passenger which is intolerable situation and also not expected for a comfortable journey. Now a day, there are few companies' buses travel some particular routes; they have some of their own techniques to make temporary arrangements with the one small table and a stool and having ticket books with them. No time schedule is followed or any rule. Passenger come and collect tickets from them, waiting on the footpath in the queue for never ending time and also, they are unsure about their journey times which lead to delays to reach the desire place. Thus, the

passengers waste their working hours on the street doing nothing. On the other hand, some other companies operate buses in the same route almost same time in queues. In off peak hours they compete with each other to get more passengers with fierce attitude for their own sake and benefits. Buses wait for passengers anywhere for a long time which hampers the time of the passengers who are already in the bus and also by blocking the other vehicles behind them. These activities create some unpleasant and uncomfortable situations but unfortunately there is no active authority to control the matter and take necessary action against these buses.

4.14 Minimum integration with supporting modes

No single mode is likely to succeed by itself in providing transport service to the whole city. More integration with supporting modes is required for its efficient functioning. In Dhaka City, there is lacking in the integration of mass transit system with other modes of transit like cycling, walking etc. There are a few authorized bus stops with temporary shade in Dhaka City. There is no definite lane or space for rickshaws, auto-rickshaws, and bicycle or(bus-bay) bus stops. Only a few modes are available among which few are accessible by all strata of people.

4.15 Weak efficient traffic law enforcement system

Traffic police to population ratio in Dhaka City is very inadequate resulting a gap in controlling the traffic in various cases. When the roads are overcrowded with vehicles during peak hours, the traffic junctions are not properly controlled and it always causes traffic congestions. These cramming are not always caused due to mismanagement by the police personnel but in fact the problem is the shortage of experience and knowledge of the police personnel with controlling road traffic. In other scenarios when a significant portion of the road's junction are controlled manually, then lack of proper information on the actual intensity of traffic in different routes, the traffic police tends to open the wrong route direction which ends up causing congestions and delays. In most cases the law enforcing agencies are not concerned about their duties. As a result, traffic rules are frequently violated by the Bus and other drivers as the law enforcing personnel engages themselves with less important work. Some of the most wasteful and dangerous practices by the bus drivers are stopping the bus at traffic intersections for boarding passengers and overcrowding the bus and allowing passengers at the bus exterior in a dangerous manner. This also causes the passengers to occupy a significant proportion of the road. The violations of route permission of buses authorized by BRTA are also occurring due to lack of enforcement.

4.16 Severe Environmental pollution

One major source of air pollution in Dhaka City is the smoke emitted from mass transit-oriented buses and another passenger and good carrier. Emission from buses or other vehicles are injurious to people's health, increasing the problem of respiratory diseases, infections, heart strain and higher blood pressure, lower I.Q. levels in young, children and increasing the risk of cancer. Emissions of buses and other vehicles are also a major contributor to global warming. The black smoke emitted by buses in Dhaka City contains nuclear hydrocarbon, lead, carbon mono-oxide, sulfur-di-oxide, nitrogen etc. each of which is seriously detrimental to health. A study reveals that the minimum emission rates of SO_2, NO_2 and CO in major roadway intersections of Dhaka are 800, 500 and 33,200 μgm/m^3 respectively in comparison with corresponding Bangladesh standard of 100, 100 and 5000 μgm/m^3 respectively. The Air Quality Index (an aggregate measure of air pollution level) at many points of the city road network is found to be above 200, which is much higher than the acceptable limit of 50 for fairly clean air (Alam et. al, 2000)and (WHO). It is a one of the dangerous burning air pollution problems and exceeded the limit of the city. Another study discloses that the average speed of a major arterial road of Dhaka city, named Mirpur road will reduce to 4 km/hr which is less than the normal walking period of human 5km/hr. In addition to other losses (economic losses discomfort etc.) traffic congestion worsens the environmental condition, which is already extremely poor in the urban areas of the Dhaka. Air pollution is a serious environmental health hazard affecting the populations of Bangladesh. Increasing population and Motorization the scenery of the air pollution in Dhaka city as below

Table 1: Bangladesh National Ambient Air Quality Slandered

Land use category	**8-hour average concentration in μgm/m^3**			
Industrial/mixed use	CO	NO_2	SPM	SO_2
Commercial/mixed use	5000	100	500	120
Residential/rural use	5000	100	400	100
Sensitives use	2000	80	200	30

Table 2: Pollutant in the air of Dhaka city

Location in Dhaka city	**Sulfadiazine (SO_2)**		**Nitrogen dioxide (NO_2)**	
	Concentration (μgm/m^3)	Permissible (μgm/m^3)	Concentration (μgm/m^3)	Permissible (μgm/m^3)
Gulshan	800	100	500	100
Jatrabari	1300		500	
Panthopath	900		500	
Mohakhali	1200		500	

Table 3: Pollutant in the air of Dhaka city

Location in Dhaka city	Carbon Monoxide (CO)		Suspended Plastic matter (SPM)	
	Concentration ($\mu gm/m^3$)	Permissible ($\mu gm/m^{3)}$	Concentration ($\mu gm/m^3$)	Permissible ($\mu gm/m^3$)
Gulshan	33200	5000	1332	400
Jatrabari	67000		4667	
Panthopath	85100		2666	
Mohakhali	16992.22		2111	

4.16.1 Emission from Vehicles

Vehicle is one of the major sources of air pollution in urban areas not only unworthy vehicle but also the unburned fuel from the motorized vehicles. Atomic Energy Commission reports that automobiles in Dhaka city emit 100 kg lead, 3.5 tons S02 14 Tons HC and 60 tons C0 in every day. The contributor of air pollution by different types of vehicles and the amount of pollutants emitted from vehicles in Dhaka city is as follows:

Table 4: Contribution of Air pollution by vehicles Type

Types of vehicle	CO (%)	HC (%)	NOX (%)	PM (%)	Annual Growth
Truck	13.4	8.6	59.7	47.5	7.8
Bus	10.3	9.7	18.5	29.4	2.5
Mini Bus	7.3	3.9	6.5	19.1	6.8
Utility	6.3	4.4	2.8	0.7	10.2
Car	38.2	18.2	6.5	1.2	9.4
Three-Wheeler	10.6	26.9	6.0	1.2	31.0
Motor Cycle	14.0	28.3	0.3	1.0	8.1

4.16.2 Water Pollution

Water pollution create serious health hazard for Bangladesh. The damping of municipal wastes, Hospital wastes in the open place and Toxic environmental discharges from mostly industries pollute both surface and underground water sources, which is most dangerous threat emerging from environmental degradation is the arsenic contamination of ground water.

Table 5: Air pollution percentage of most of industry (five types)

Industry	Emission/Tons/year	Pollution (%)
Food Industry	1,46,356.06	38.7
Cement/Clay	62,725.88	16.6
Pulp & Paper	51,963.92	13.7
Textile	39,831.01	10.5
Tobacco	16,992.22	4.5

Source: Research work by Islam Faisal on Industrial pollution in Bangladesh (2002)

4.17 Irregularity in bus service

Although there is a huge number of public buses and minibuses but their trips frequency is not satisfactory enough to carry the people in a regular manner as the trips demand of passenger. There is no specific interval between two consecutive buses trips of same company. The bus companies either do not maintain or cannot maintain strict scheduling of buses due to existing severe road congestion and inadequate passenger flow on the road, as a result, delay the journey time of the passengers, sometime due to congestion passengers have to wait for a long time which makes the bus stoppage as a crowded place.

4.18 Unhealthy and unorganized bus stoppages and counters

In Dhaka City there is a smaller number of passenger sheds are available. But the space of she is so small which cannot provide shelter to all the passengers those are waited for buses or any transport, in the Rainey season most of the passenger wet their papers with wear, then unpleasant situation is arisen. The bus stoppages are not designed with actual specification of BRTA. As a result, passengers suffer a lot during, hot sunny, rainy and cold day or in all seasons. For scheduled buses and minibus operators, fare collection conducted outside the bus at small ticket counter decorated by a stool with small table on the footpath under an umbrella but there is no arrangement for the waiting passenger of boarding on the buses, just they are standing on the footpath at the bus stoppage. In some other cases, there is also no shelter for the ticket sellers at the stoppage of the counter, ticket sellers and passengers are suffered in all the seasons.

4.19 Unfit old public transport.

A certificate of fitness (COF) is a regular check to ensure that your vehicle meets required safety standards regular fitness testing of vehicles and certification for road worthiness is an essential component of road safety and reduction in accidents It cannot be neglected. Most of the public transport (buses) operating in Dhaka City have not properly fitness testing of vehicles and certification for road is not regularly done and enough to carry people. From a survey conducted by BRTA it was found that about 40% of the buses do not have fitness for operation (BRTA, 2017). Weak in body structure and chassis, old model engines, not renewal fitness certificate, narrow dirty unhygienic wear and tear seating arrangements ugly looking, old tire, faulty brake and indicator light system are the most common features of the

public buses. It is a very dangerous condition of public transport system and there is every chance to accident occurs with fatality and injury of passengers in most cases, the owners of the buses are not taken any initiative to solve this long-time problem. For the above situation women, children and educated solvent passengers sometime do not like to travel by public transport**.**

4.20 Shortage of railway network in Dhaka city

If we keenly observed the scenario of Dhaka city, like another mega city of the world, there was no railway city service in Dhaka. recently a community rail service provided in a small range, which is very minimum number of passengers carry but other mega city of the world e.g. Mumbai India, there is a lot of railway trucks and maximum number of passengers are traveled with a schedule time.

4.21 Travel time

The case study a long corridor total travel time at morning and evening peak hour of the day has been observed for 4 weeks. The morning peak hour when all educational institutions start at 7:30-8:30 AM office and court time starts at 9:00-10:00 AM, and the peak hour of evening when all office, court, bank and some educational institutions close their works, then heavy traffic transit on the roads causes congestion and delays, the collected travel time data, the mean travel time has been observed separately for these two peaks hour. The finding is observed that travel time at morning peak is smaller than travel time at evening peak period. The inherent causes of severe congestion and delay behind this also tried to be find out in this paper. Also, the mean travel time is nearly same throughout the seven days except Saturday.

Table 6: Travel time by bus along case study corridor

Day	Asad Gate to Motijheel			Motijheel- Asad Gate		
	Departure	Arrival	Duration(min)	Departure	Arrival	Duration(min)
Saturday	7:55	8:30	35	5:10	5:55	45
Sunday	7:40	8:55	75	6:30	8:00	90
Monday	7:40	8:50	70	6:50	8:25	95
Tuesday	7:55	9:05	70	6:45	8:15	90
Wednesday	7:37	8:50	73	6:30	7:55	85
Thursday	8:00	9:15	75	6:30	7:55	85

Source: Field Survey (2016)

4.22 Capacity of Buses

In the study corridor various bus owner companies give their service. At the morning peak hour (8:30am to 9:30am) the number of vehicles passing in the case study corridor was observed. It was seen that some buses carry passengers only from the starting point to the destination, direct service. On the other hand, some buses take passenger from different stoppages within their assign routes, but it is very much insufficient. The whole scenario is carrying no qualities of public transport. Table 7 shows the passenger carrying scenario of various bus service provider.

Table 7: Passenger carrying capacity of bus

Bus company name	Origin-Destination	Total seat number	Average number of passenger at peak hour	Highest number of passenger at peak hour	Number of bus counted in 1 hour	Total number of passenger in 1 hour
New Vision	Mirpur-Motijeel	40	40	40	10	400
Trans Silva BD.	Mirpur-Motijeel	50	59	60	5	295
Dishari	Mirpur-Motijeel	35	35	35	14	490
ATCL	Md.pur-Motijeel	50	55	67	16	880
BRTC	Mirpur-Motijeel	60	68	80	2	136
BRTC	Md.pur-Motijeel	60	77	85	3	231
Rajdhani	Shamoly-Motijeel	60	76	85	10	760
Tanjil	Mirpur-Motijeel	40	40	40	5	200
Bahon	Mirpur-Motijeel	60	80	85	4	320
Chiriakhana	Mirpur-Motijeel	35	47	50	4	188
Chiriakhana (Direct)	Mirpur-Motijeel	35	35	35	7	245
Super Bus	Mirpur-Motijeel	50	56	60	3	168
Office Bus	Mirpur-Motijeel	25(approx)	20	20	19	380
					Total	4693

Source: Field Survey (2016)

4.23 Mode of service

Along the case study corridor various bus companies give various mode of service. As a whole public transport system must have equal accessibility to any passenger from the bus lay-by. But the scenario in Dhaka does not match with the definition of public transport. Table 8 describes the classification of bus services and their comparison in various parameters.

Table 8: Various types of bus service

Type of service	**Definition**	**Accessibility from Bus stoppage location**	**Fare**	**Women accessibility**
Gate lock	Starts at origin and ends a destination. No accessibility of passenger from other locations	No	Very high	Yes
Seating service	Starts at origin and ends a destination. Having provision of accessibility of passenger from other locations if standing space is available in bus.	No	High	Yes
Ticket service	Ticket system is available. Having provision of accessibility of passenger from other locations if standing space is available in bus.	Yes	Medium	Adequate at origin only
Local service	No ticket system is available. Having provision of accessibility of passenger from other locations if standing space is available in bus.	Yes	Comparatively low	Very low accessibility

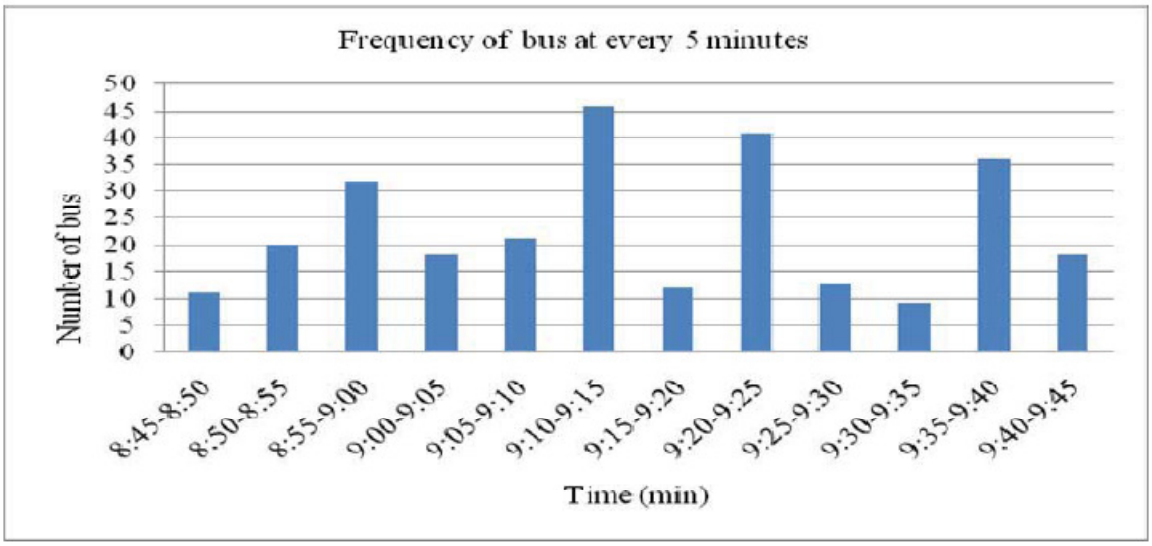
Source: Field Survey (2016)

Table 9: Frequency of bus

Time (AM)	Bus (60 seats)	Bus (40 seats)	Office Bus (40 seats)	Office Bus (Double Decker)	Total number of Bus
8:45-8:50	1	4	4	1	11
8:50-8:55	9	6	3	1	20
8:55-9:00	10	15	5	1	32
9:00-9:05	7	3	4	2	18
9:05-9:10	9	6	4	1	21
9:10-9:15	9	31	4	1	46
9:15-9:20	4	8	0	0	12
9:20-9:25	13	22	2	2	41
9:25-9:30	8	5	0	0	13
9:30-9:35	1	4	0	2	9
9:35-9:40	10	22	0	2	36
9:40-9:45	6	10	0	1	18

Source: Field Survey (2016)

Figure 1: Relation between number of bus and time in every 5 minutes



Source: Field Survey (2016)

4.24 Boarding and alighting time

In Dhaka city for maximum buses only one door exists. So that the passenger slowly boarding and alighting and takes time. Between the origin and destination point of the buses route some time some drivers want to stay a long time in the starting and different bus stoppage points to carry more passengers that the cause of delay the journey time and congestion occurs in the peak hours they usually do not want to stop at the intermediate bus stoppage.

Table 10: Boarding and alighting time atof bus

Motijheel to Asad Gate		Azimpur to Malibag Chowdhury Para	
Bus stoppage	Boarding alighting time	Bus stoppage	Boarding alighting time
Motijheel 1	10 minute	Azimpur	5 minute
Stadium	3 minute	Eden College	7 second
Press Club	30 second	Nilkhet	11 second
Shahbug	15 second	Dhaka College	27 second
Science Laboratory	4 second	Science Laboratory	30 second
Kalabagan	30 second	Sisu Park	32 second
Dhanmondi-32	30 second	Shisu Park	32 second
Asad Gate	15 second	Kakrail	1 second
		Malibug	85 second
		Mouchak	44 second
		Malibu Railgate	15 second
		Malibug Chowdhury Para	10 second

Source: Field Survey (2016)

Table 11: Trip Task by Mode in Greater Dhaka.

Mode	Daily Trips	% by mode	Average Trip time
Auto Rickshaw	1,21,542	1.42	45 minute
Bicycle	76,737	0.90	22 minute
Bus	7,87,028	9.19	54 minute
Car	2,66,243	3.11	25 minute
Motorcycle	1,29,761	1.51	22 minute
Rickshaw	16,46,064	19.21	26 minute
CNG Auto Rickshaw	93,582	101	51 minute
Train	2,752	0.03	118 minute
Walk	51,59,007	60.22	15 minute
Water (Boat, Steamer etc.)	2,74,634		50 minute
Total	85,67,350	100.00	-

Source: Bangladesh Road Transport Authority

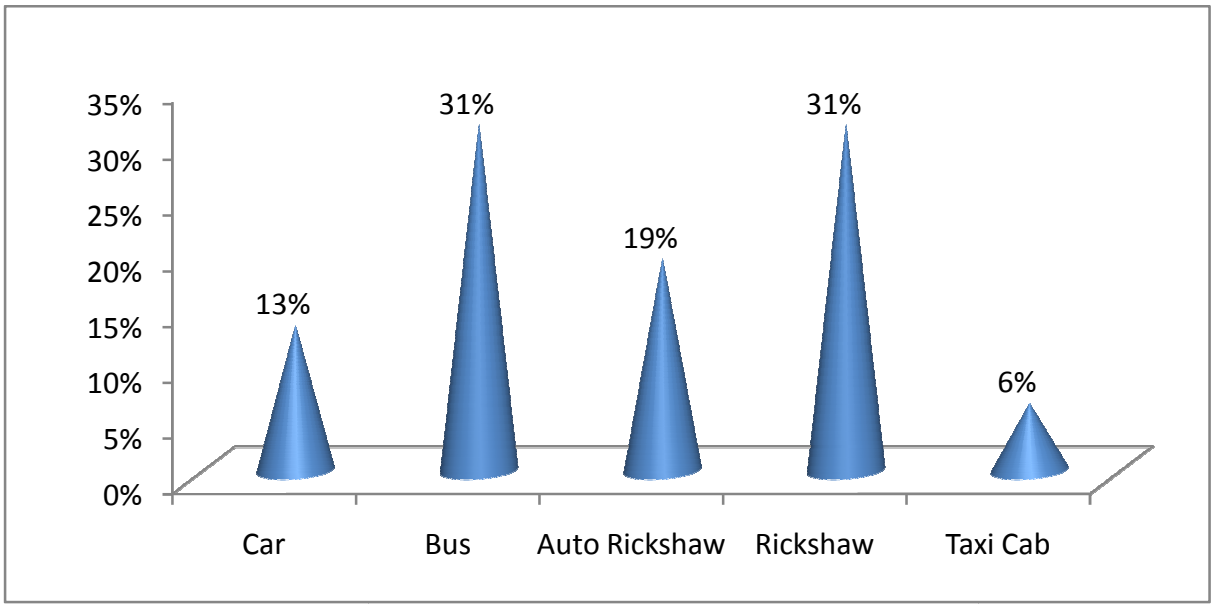
Table 12: Metro-Dhaka: Person Trip by Modes.

Mode	No. of Person Trips		Avg. Trip Length per Day (km)	Passenger – km	
	'000 / day	%		'000 / day	%
Car	576	4.0 (**10.5**)	10.4	5,990	11.9
Bus	1,482	10.2 (**27.0**)	13.5	20,007	39.8
Auto Rickshaw	845	5.8 (**15.2**)	12.8	10,816	21.6
Rickshaw	1,927	13.3 (**35.0**)	4.3	8,286	16.5
Others	675	4.7 (**12.3**)	7.5	5,066	10.1
Subtotal	5,505	38.0 (**100**)	9.1	50,165	100.0
Walk	9,000	62.0	1.0	9,000	(15)
Total	14,505	100	4.1	59,165	(100)

Source: Bangladesh Road Transport Authority

Based upon the statistics provided by DUTP (1998), Hoque and Alam (2002) and DITS (1993) the modal share of central urban portion of Dhaka is estimated as rickshaw (40%-45%), Auto-rickshaw (13%-16%), Bus (25%-35%) and Car (10%-12%). The estimated modal share is shown in Figure 2.

Figure 2: Estimated Modal Share of Urban Area of Dhaka in Person-Trips



Souece: Field Survey (2016)

5. Conclusion

Continuing expansion of mobility growth, to create public transport and traffic problems area wise is deteriorating the congenial environment, increasing the air pollution rate and complex of public transport problem in Dhaka city, which is very unpleasant and not tolerable. In this research I discussed in brief several types of chronic short-term, long-term problems, which is right now should be solved the problems. After independent long time has gone, but not yet taken any effecting step to solve the burning ongoing problems of public transport system. The poor condition of bus industry, one route multi companies' operator. Extremely neglected the proper land use planning, the concern authority cannot realize the impotency of the land use planning, because there is big shortage only (7-10%) of road area in Dhaka city. It is a born characteristic of Dhaka city. Therefore, this is the only major problems which creating the others associating problems. Such as the lowest quality of public (bus) transport service, even one or more bus one operator system, inadequate route provision, mixed flow operation dominant by non-motorized vehicles NMV, lacking of bus route networks Insufficient bus stop and terminal facilities, Unsatisfactory way of people travels, problematic boarding and alighting, inadequate of safety provision, unorganized ticket

collection system, poor integration with supporting modes, shortage of efficient traffic law enforcement, environmental severe pollution, irregularity in bus service, unhealthy, unorganized bus stoppages and counters, fitness problems of buses, unworthy vehicle, irregularities of travel time, passenger carrying capacity not adequate up to the demand, different type of mode of service, not maintaining the boarding time. All are the disadvantages of Dhaka city public transport services. Clearly identified the actual root level problems of public transport in Dhaka city through this paper, now I request to the concern authorities immediately solve the rudimental problems of Dhaka city. Through long term planning with the vision of ideal congestion free mega city required by the attention of head of the Government of Bangladesh.

Transport interventions in urban and national contexts should aim at improving transport and traffic infrastructure so as to meet existing and potential demands, and developing an integrated and balanced system in which all modes (motorized and nonmotorized) can perform efficiently and each mode can fulfill its appropriate role in the system. The main objective of transport strategies should be to support sustainable mobility by considering their economic, social and environmental impacts.

6. Recommendation

The recommendations of the study are as follows:

(1) Removal of Rickshaw: The elimination of rickshaws from the main roadway should be provided. Such rickshaw elimination made the increase rate of peak period total network demand from exponential to linear type. If it is done it will increase the percentage of total roadway length carrying peak hour traffic with volume-capacity ratio.

(2) Improvements of Road Network: Analyzes of peak hour situations of the year of 2002 showed that there were a number of bottleneck points and missing links in the network. A rigorous study is required to identify all bottleneck points and missing links. In this study two major bottleneck points and two closed links were identified to estimate the effects of their improvements. One of the bottleneck points was at “Rampura DIT Road” near “Mailbag Bazar Intersection” and the other was the junction of “Tongi Diversion Road” and “Dhaka-Mymensingh Road”. It was seen that the peak hour travel time was about 30 times higher than that of free flow travel time at those two places. Among the two closed links one was “Pilkhana Road” through ‘BGB Staff Quarter’ and the other was behind “Nagar Bhaban” from “Fulbaria Bus Stand” to “Banga Bazar Market”. It was seen that although those two links were practically existed, those were completely closed for free movements of traffic. Analyses were made by increasing total effective roadway width of two bottleneck places and opening two closed roads for free movements of traffic. It was seen that such improvements of road network reduced total peak period vehicle-km travel demand by 5.61% and vehicle-hours travel demands by 3%. The values of RCI, TRI, VCI and CSI reduced by 6.17%, 12.37%, 3.98% and 14.90% respectively for such improvements.

(3) Improvement of City Bus service: At present, modal share of bus in central urban portion of Dhaka is 34% and it was seen that peak period total vehicular travel demands, both in terms of total vehicle-km and total vehicle-hours reduced exponentially with the increase in modal share of bus. The values of RCI, TRI, VCI and CSI also reduced exponentially with the increase in modal share of bus. In addition to exponential reduction of traffic congestion, pollution rates also reduced exponentially with increasing modal share of bus. In an attempt to analyze the scope of improving modal share of bus, it was seen that average speed of bus was the most sensitive parameter. The modal share of bus increased with increasing bus speed. So, to increase the modal share of bus higher speed of bus should be ensured.

(4) Incorporation of Intra-city Rail Service: An intra-city rail service from Uttara to Kamlapur, connecting fifteen TAZs were considered in this study. The Connecting TAZs were Uttara sub-region (TAZ no 01), four zones of Gulshan sub-region (TAZ no. 17, 18, 19, 20), five zones of Central Metropolitan sub-region (TAZ no. 33, 34, 35, 36, 54), two zones of Eastern Metropolitan sub-region (TAZ no. 28, 55) and three zones of Dhanmondi-Farmgate sub-region (TAZ no. 37, 38, 39). The analyses were made without considering long term land-use pattern changes. It was seen that incorporation of such an additional mode diverted a significant portion of road traffic and reduced traffic congestion on different roadway links. It was seen that for a particular zone of Uttara, it diverted 54% of total peak period generated road trips, thereby increased average peak period speed of Airport road by 6% and average peak period speed of Dhaka-Mymensingh road by 40%. It was also found that for such intra-city rail service, the access to rail service was very important. Full utilization of such intra-city rail service would not be effective unless suitable access mode to railway could be provided.

(5) Incorporation of Metro Rail: It will be better to provide metro rail for whole Dhaka city starting from Gazipur and Savar and ending to Narayanganj.

(6) Remarks on the Selected Planning Options: Evaluations of five alternative planning options reveal that removal of rickshaw is highly beneficial. But in this case, the major portion of rickshaw users shifts to bus. In order to keep the mobility level unchanged after removal of rickshaw, bus service should be improved and the number of buses should be increased by 51 percent. Removal of auto-rickshaw reduces air pollution and traffic congestion but demands the increase of other modes accordingly. Within the road network, there exist a number of bottleneck points and missing or closed links. Improvements of bottleneck points and opening of closed links or construction of missing links will reduce both traffic congestion and resulting air pollution. In this connection it is important to identify all bottlenecks and the missing links in the network. Increase in modal share of bus reduces the number of vehicles on the roads and thereby reduces traffic congestion and resulting air pollution. Maximum increase in modal share of bus can be achieved by increasing the speed of bus service. Incorporation of intra-city rail service diverts road traffic towards it and thereby reduces road traffic congestion and resulting air pollution. For such

intra-city rail service, the access to rail service is important. For effective use of intra-city rail service, location of railway stations should be carefully selected to give better access of people to rail service from different zones and convenient access mode should be provided.

(7) Development of Side Road: It may be constructed parallel to main roads.

Several attempts have recently taken by the concern authorities like RAJUK, DCC, DMP, DTCP and BRTA to improve the worsening situation, traffic control, congestion minimized and small type vehicles such as Rickshaw, baby taxi, tempo, human hauler remove and provide an efficient modern transport system in Dhaka city with vigorously promoting the non-motorized modes only walking and cycling like others developed country, but not successful in all respect because most of the time fail to identify the real problems, first of all try to be solved the rudimental problem as land-use planning one of the major issue for reforming of transportation system and successively solving the problem of other priority basis.

However, the specific recommendations of the study are as follows;

1) To increase the road space area up to 25% maximum by providing three (3) layer of service, underground, at grade and flyover system should be provided.

2) Improving the condition of modern bus industries, one route operate by at least one bus company with sufficient number of modern buses. With providing opportunities for successful private sector participation.

3) The road surface condition should be upgraded and the better quality of motor vehicles should be maintained.

4) The bus route network should be increased, bus stoppage with shades, bus terminal and the ticket counters should be upgraded, and number of modern buses and minibuses facilities should be increased.

5) Unfit old model public transport should be removed.

6) The condition of environmental pollution should be improved by a. reducing congestion, b. reducing the accidental factors.

7) The safety measures should be increased.

10) Intra-city Rail Service should be incorporated

11)To improve the driving quality providing the driving training, awareness of accident fatality, injury, loss of economy and suffering of family both driver and victims.

12) Before issuing the driving license and route permit of the transport, the physical capabilities, eye-vision, education, driving efficiency of driver should be examined strictly and looking good appearance of vehicles with necessary fitness.

(13) Incorporation of Metro Rail: It will be better to provide metro rail for whole Dhaka city starting from Gazipur and Saver and ending to Narayanganj

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