Nakhara: Journal of Environmental Design and Planning
Volume 16, June 2019

Rationalizing Public Transport System of Dhaka City:

A Proposal for Creating a Multimodal Hierarchical Transport Network to Reduce Traffic Congestion

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Received December 31, 2018; revised May 15, 2019; accepted June 5, 2019

ABSTRACT

The concept of rationalization can be defined as a structured process to increase effectiveness through a maximize use of existing resources. Rationalization in terms of road infrastructure or systems can be achieved in various ways; establishing hierarchy of routes, optimize bus-stop points with density distribution changes, proper integration of motorized and non-motorized transport and providing policy framework. In the highly densely populated city of Dhaka, rationalizing public transport is one way to minimize the mismatch between demand and supply.

This paper is concerned with the following issues: providing a general description of the city transport system, identifying problems and demands analysis in the area of study area; studying the rationalization of public transport, particularly public transport system design (routes and their categorization) and proposing the creation of a multimodal hierarchical transport network for Dhaka. The findings suggest establishing a major component, a hierarchal-network. Beside establishing network hierarchy, rationalizing is also interdependent upon system planning, institutional framework, organization and financing, terminal locations, public-private relationships, government roles, policies, service integration, and the management of public transport. This is can be accomplished by all stakeholders sharing the relative success and failure, depending different levels of each components' performances. The findings of this paper will help planners and decision makers to optimize the investment in the transport infrastructure.

Keywords: *rationalization, public transport planning and policies, backbone network, route hierarchy*

INTRODUCTION

Mobility and accessibility provided by the transport system play a major role in influencing the location of social and economic activity and shaping the form and size of cities (Zuidgeest, 2005).Transportation is the backbone for the development of a city, both socially and economically (Murray & Davis, 1998; World Bank, 1996; World Bank, 2009). The efficiency of transportation network is fundamental to the connectivity of the social and physical functioning of the urban settlements, a precondition for economic prosperity and creation of a livable city. Without the provision of an efficient public transport, people tend to rely on the use of private automobile (Banister, 2008; Gwilliam, 2002). Apart from creating congestion on roads, the use of private automobiles for individual mobility increases the carbon footprint and has other environmental and economical detrimental effects. The provision of an efficient transportation system is thus needed to curb the continual increase in private automobile use and promote shared mobility fostering responsible citizenship.

Public transport is a collection of modes of transportation which are available to the public irrespective of ownership (White, 2002; Tiwari, 2006), also called mass-transit in a city context. It can be provided by various types of modes; in most developing cities, it is provided by a wide range of buses and minibuses. Public transport plays a crucial role in the overall success of a city's transportation system. It also provides a large number of transport opportunities simultaneously in order to meet maximum demands during the peak hours. The provision of public transport has proven to be efficient in controlling congestion and to generate an efficient public dispersion. Public transport systems evolve over time and are not always directly responsive to the changing demand vs. supply to achieve equilibrium overnight, unlike a private vehicle solution.

In a developing city like Dhaka, to invest more on infrastructure to meet the growing demand is often quite expensive. Effort is needed to tackle the problem through innovative planning solutions and rethinking the existing infrastructure. One way to solve this problem is rationalizing the existing public transport network structure. The concept of rationalization can be defined as a structured process to increase effectiveness through a maximize use of existing resources. Rationalization in terms of road infrastructure or systems can be achieved in various ways; by establishing hierarchy of routes, optimize bus-stop points with density distribution changes, proper integration of motorized and non-motorized transport and providing policy framework. This study is concerned with the rationalization of public transport system (restructuring strategic route network) focusing on establishing hierarchy of routes.

PROBLEM STATEMENT

With the growing population and with economical limitations, the existing public transport capacities in most of the developing countries do not satisfy the demand. The quality of travel on public transport is poor, roads are badly maintained and managed, and in most cases, there is no hierarchy of the routes. Public transportation systems face particular challenges caused by the accumulation of rapid and uneven changes due to unfavorable inheritance from the past. Public transport has the potential for improving existing systems by rationalizing current systems. Dhaka, the capital city of Bangladesh, is one of the most over-populated cities in the world. It houses roughly 14 million residents within 2,000 sq. km. land area (which means 7000 persons/sq. km). With a growth rate of about eight percent per year, it is expected to be in the seventh position in terms of population by 2015 (Nagari, 2001). Rapid population increase over the past decade has resulted in its transport services not being able to respond to the travel needs of its residents.

Demand has not been matched by sufficient investment in transport infrastructure, services and management. Traffic and public transport conditions in Dhaka have seriously deteriorated. This deterioration is characterized by the following; traffic congestion and delays, inadequate traffic management, public transport crisis, unaffordable and inaccessible public transport for many people, high accident rates, and increasing air pollution problems (DUTP, 1998; Khan, 2010). The crisis in public transport is largely the result of growing concentration of population and economic activities, and inadequate public transport systems. However, the projected population of the city is expected to be around 16 million by the year 2015 and around 24 million by 2021 (DDC, 1998; DDC., 1998); which already alarming and will make the situation more critical if appropriate measures are not taken to tackle the increasing travel demand.

Further, the road hierarchy is poorly established and most of the new development is taking place without any coherent road system (DDC, 1998). This rapid population growth, together with the limited space available for new transport infrastructure, will further aggravate the heavy congestion in Dhaka. The existing road network in metropolitan Dhaka needs a planned restructuring to support an efficient public transport system. This restructuring should be based on standard and functional road classification system, which provides a hierarchy of roads, viz: Local streets, Collectors, Arterials, Access Controlled Freeways. This paper looks at rationalizing bus routes and upgrading bus transport services. An efficient use of limited space is therefore critical for ensuring people's mobility, improving their quality of life, and boosting economic growth.

METHODOLOGY

The research methodology is designed in three phases which are as follows:

1. To provide a general description of the city transport system, problem identification and demand analysis of the study area.
2. To develop and apply rationalization concept in public bus route network with the help of scientific literature.
3. To draw planning lessons and recommendation on bus route hierarchy of study area.

The research methodology used for this paper is shown in the diagram below:

TRANSPORT SCENARIO IN DHAKA CITY

Being the administrative, commercial and cultural capital of Bangladesh, the Mega City Dhaka has a major role to play in the socioeconomic development of the country and in the era of regional and sub-regional cooperation. But the existing transportation system is a major bottleneck for the city's development. Unplanned urbanization, especially poor transportation planning and lower land utilization efficiency, has turned the city into a dangerous urban jungle (M. S. Rahman, 2008) The rapid rise in population along with increased and versatile urban land use patterns has generated considerable travel demands as well as numerous transport problems in Dhaka City. It has resulted in a deterioration of accessibility, levels of service, safety, comfort, operational efficiency and in the urban environment. The population of the Dhaka's metropolitan area is expected to reach 36 million by 2024 (DSP, 2015). This additional population will add new dimensions to the urban fabric in the coming decades. To maintain the economic viability of this city and to keep its environment sustainable, an efficient transportation system is imperative. An overview of the existing transportation system shows that at present the city is reeling from an acute crisis of adequate public transport, the road network is neither sufficient nor designed to handle the tremendous growth of traffic (10% per annum) (Rahman, 2008), and there is no integrated multimodal transportation system. Although, there is an opportunity to create such a system using the routes of rail, bus and waterways. The lack of roads

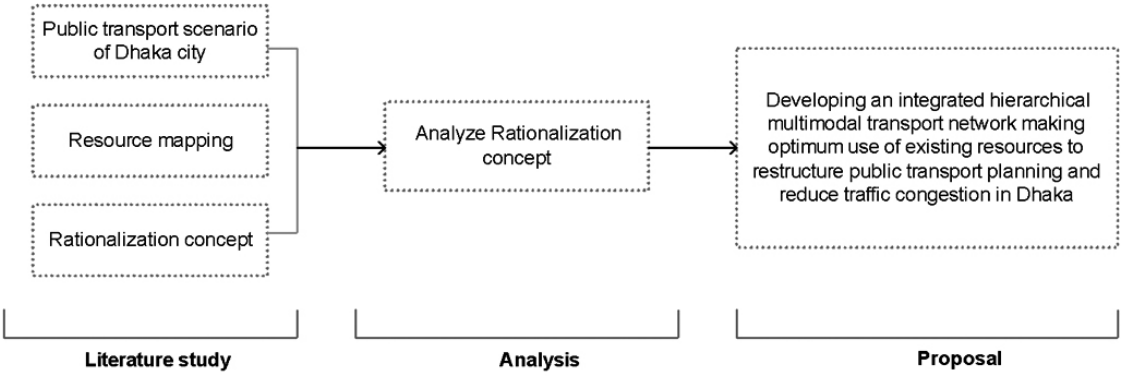

Figure 1:
Research methodology

on the east west direction, and the location of the Dhaka Cantonment all adds to the transportation crisis. Over the last 15 years there has been tremendous growth in new townships surrounding the city, but the transport infrastructure has not grown in tandem. This has further worsened the situation.

EXISTING BUS SYSTEM OF DHAKA CITY

The existing mass transit system in metropolitan Dhaka is mainly characterized by large buses, mini buses and human hauler/auto-tempo. Bus and minibus routes tend to be concentrated along the limited number of arterial roads, in a generally north-south orientation. Human hauler routes are more dispersed, penetrating narrower roads, and include more east-west linkage. The 2004 Dhaka STP (Strategic transport plan) divides buses into several categories: minibuses (41%), microbuses (30%), large buses (13%), auto tempo/Laguna maxi (12%), and staff and school buses (4%) (STP, 2004; Urban transport policy, 2015).

Residents of Dhaka understand the bus system as divided mainly into ticket buses and local buses. Ticket buses have set stoppages on their routes, which can be located by the companies' respective ticket counters. Their fares are collected at the curb side from ticket sellers associated with each private company, and have a single conductor on board who checks tickets at the doorway. Almost all of the large buses are ticket buses. Local buses have stoppages that are unmarked and have on-board fare collection. Local buses can also be boarded and alighted from at any point on the route, at the conductor's discretion. There are a handful of large buses that operate as local buses, but the vast majority of local buses are minibuses. Buses in Dhaka city are

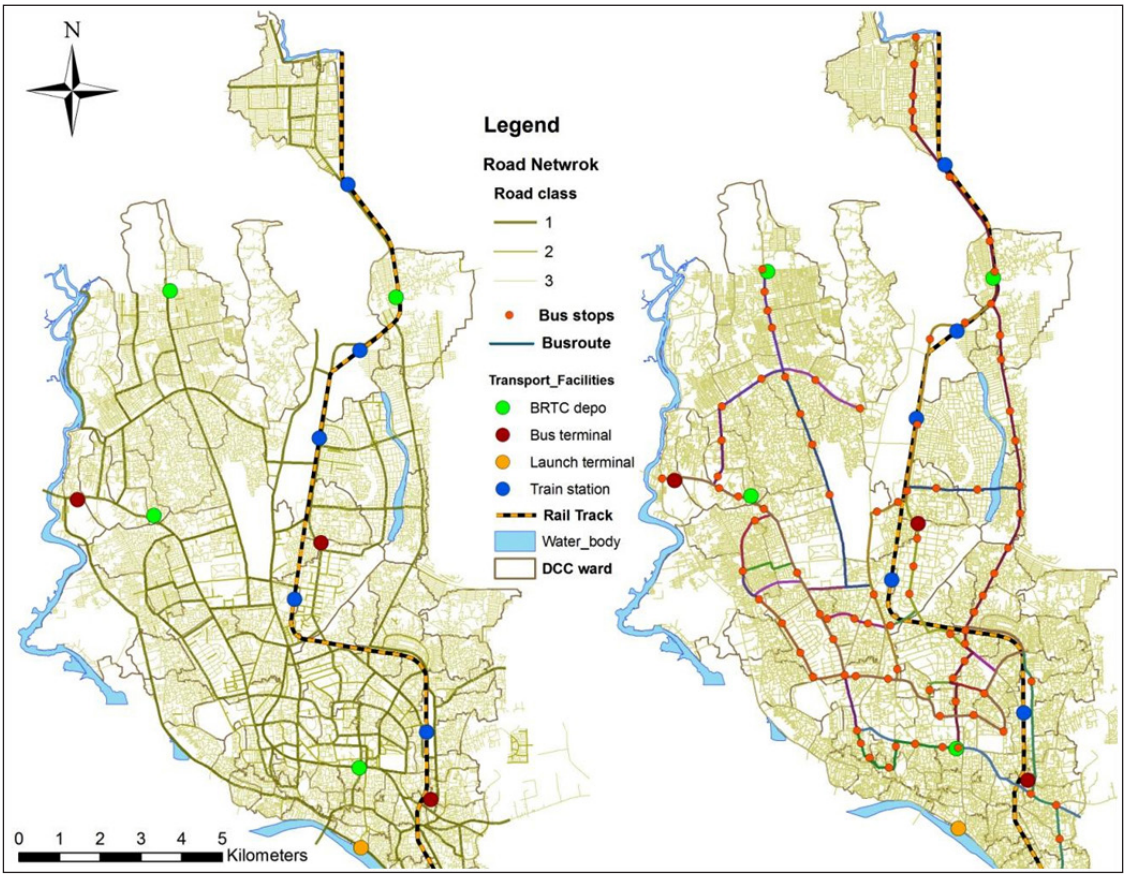

Figure 2:
Road network and existing bus route and bus stops of Dhaka City

operated by both in private and public sectors. The private sector is dominating and provides a monopoly service (95% of total bus services) compared to public sector operation. The present bus services provide inefficient, unproductive, and unsafe levels of services. Long waits, delay of arrivals and schedules overloading, discomfort, and long walking distance from residences/work places to bus stops are some of the obvious problems that confront users daily (DSP, 2015; Urban transport policy, 2015).

Public transport of the city is poor and disorganized with limited coverage (DMDP, 1995). The present mass transit mode in the form of bus transport is not popular and does not grow in its share of catering to the demand. The poor institutional and regulatory framework, reluctance to enforce existing legislation, and lack of enforcement reduce the capacity of existing roads (DMDP, 1995; DSP, 2015).

Major corridors and hotspots of Dhaka

In order to develop the strategic road network of the city as well as those which could provide major connections to the growth poles/satellite cities around Dhaka, it is necessary to identify the major arterial road networks of the city which carry most of the North-South and East-West traffic. A brief analysis of the existing road network and existing situation reveals that there are about five major North-South corridors and there are several missing links in the East-West direction. This east/west area needs to be built on a priority basis to provide alternative routes. The traffic analysis along the Kazi Nazrul Islam Avenue towards Mymenshing Road indicates that this is a heavy traffic demand corridor. In addition, along this corridor a particularly high-

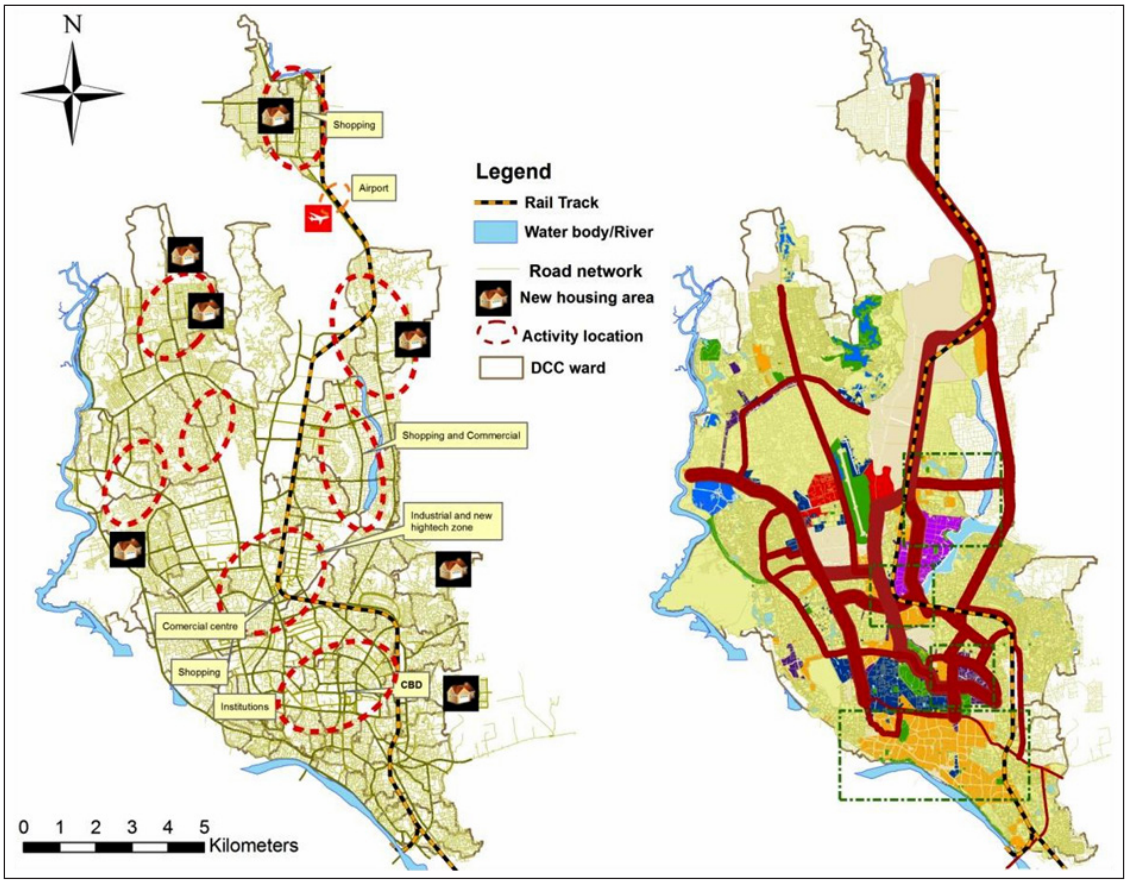

Figure 3:
Major corridors and hotspots of Dhaka

income group of people live and generate private traffic Both conditions are responsible for traffic congestion on these roads. The existing Dhaka-Tongi regional line has all of the infrastructures from Zia International Airport to the Mohakhali rail Crossing. Slight modifications of the existing line and a new development from Mohakhali rail crossing to Sadarghat via Farmgate and Motijheel will tremendously increase commuter traffic and ease traffic congestion.

The older part of Dhaka and Mirpur, and the East and Western suburbs are quite densely populated zones. There the agglomeration of human activities in a small area is so intense that the employment of private vehicle causes recurrent congestion, which no feasible expansion of the street system could eliminate. Commuting a distance of three to four kilometres to certain spots like Gulistan, Motijheel, Old Dhaka, Moghbazar, Malibagh, Gulshan, Banani, Dhanmondi, Science Laboratory, Green Road, Jatrabari, Sayedabad and Mohakhali have become nightmares for city commuters. The traffic problem is also significantly fueled by the unplanned location of numerous shopping malls, commercial buildings, schools, hospitals and CNG filling stations in various part of the city.

RATIONALIZATION FROM A SCIENTIFIC KNOWLEDGE AND PLANNING PRACTICE

Rationalization is a process of making something seem consistent with or based on certain reasons, criteria and scientific study. It also means systematic organization. The concept of rationalization can also be defined as a structured process to increase the effectiveness with a maximize use of existing resources. Rationalization in terms of road infrastructure or systems can be achieved in a various ways by establishing hierarchy of routes, optimize bus stops locations, proper integration of motorized and non-motorized transport etc. Eppell, V. A. T., J. M. Bunker, et al. (2001) describes rationalization in terms of road hierarchy one of the important tools used for road network and land use planning. They further describe each roadway in terms of its function such that appropriate objectives for that roadway can be set and appropriate design criteria can be implemented. These objectives and design criteria are aimed at achieving an efficient road system whereby conflicts between the roadway and the adjacent land use are minimized and the appropriate level of interaction between the roadway and land use is permitted. Expanding the use of the road hierarchy as a tool, allows for a broad spread of uses ranging from network/land use planning to asset management

To achieve proper and efficient networks in order to rationalize public transport, it is necessary to first establish a hierarchy of routes in terms of backbone (BRT) networks and feeder networks. The backbone should be served by separate bus ways or dedicated routes and it should be characterized by high capacity, speed and frequency. Internal/ feeder route can be served by minibus, and also by the metro and trains. Also, the terminals' locations play an important role towards achieving a proper network. There are different ways of establishing hierarchy. This can be accomplished by categorizing routes according to the backbone, feeders and also by external or direct routes connecting outlying areas. These networks can be established by any form of mass transit like BRT, LRT, and Metro, depending on city size and demand. Also, backbone networks can be achieved by the combination of BRT, LRT and Metro. The functions of these main arteries effectively reach their capacity by reducing travel time and by increasing speed of service. Also, in designating separate bus ways or dedicated bus lanes the service provision can be increased and act as an integral part of establishing hierarchy. Terminal location plays a major role towards ensuring an efficient network. It can also act as a hub where all types of modes' interchange are possible.

PROPOSAL OF CREATING A MULTIMODAL HIERARCHICAL TRANSPORT NETWORK IN DHAKA

The public transportation system in Metropolitan Dhaka is not only performing below standard as compared to other capital cities, but it has also reached a crisis point that requires immediate attention. An intensive effort is needed from all concerned to resolve the city's transportation problem. The overall design of the public transport systems, both public and private transport, needs to be re-planned and re-constructed.

According to the rationalization concept, towards a better and effective public transport the first and most important aspect is to ensure an efficient and effective PT network. To develop this, the first step

is to establish hierarchy of routes. Below there is a brief discussion on these aspects to implement in study area.

Establishing hierarchy of PT routes:

The network should have a certain, logical hierarchy for PT routes. A new network and service concept has been designed consisting of three layers. Each layer has a dedicated function with specific service characteristics. This hierarchy will be achieved by establishing backbone network, internal network and external network in study area.

Backbone network:

The backbone network (1st layer) consists of services on the main corridors in Dhaka. The backbone lines provide a high operational speed (high vehicle speed, relative long distances between stops and short dwelling times at bus stops) and have a high frequency. On the backbone network regular big buses will operate. Based on the major hotspots and major corridors four backbone networks are proposed in the areas studied. Among these four backbone networks two will be served by BRT line, one by LRT line and another will be served by the metro line which is an elevated line already being planned. Within large metropolitan areas like Dhaka, with a population of over 10 million, it is unsuitable and uneconomical to operate only one exclusive public transportation system (Ahsan, 1990). From this viewpoint introduction of improved mass transit is important.

BRT:

The first backbone is a proposal for a Bus Rapid Transport (BRT) system. There will be two BRT lines located on identified major corridors, one is in a north south direction and another one is in an east west direction. These locations are based on the analysis of demand and major hotspots, but with a separate designated lane exclusive to a bus system. The main characteristics of these BRT lines will be:

- Create a new network of bus routes along selected axes of movement. For these routes, keep the left/central lane free as the dedicated route for special and designated buses;
- Frequency of buses will be high, with service every 10 to 15 minutes in peak and 20 to 25 minutes during off peak hours;
- Construct specially designed bus stops for faster transfer and passenger loading;
- Large, articulated, buses will ply these routes in order to carry a maximum of passengers. All small vehicles such as tempos and human haulers will have to be eliminated.

LRT:

In a large city, like Dhaka, especially when it reaches a stage where the concentration of travel demand cannot be efficiently handled by the road-based system, the development of an urban rail system becomes essential. From the experience of other mega cities, it can be said that road networks alone cannot satisfy the need for transportation. To cope with the problems of increasing transportation demands, Light Rail Transit can be a viable solution. Considering its potential, LRT proves a suitable solution to the present transportation need of Dhaka City as there is an existing rail track passing through the heart of the city. A rail-based mass rapid transit system along with efficient bus services can resolve the high transport demands in Dhaka. Also, it is accepted that the best solution is to have the city train system on the ground, not over or under a city. Constructing and operating an extensive new underground or elevated rail network would be extremely complex, expensive and time consuming for a developing city like Dhaka. In the perspective of rationalization, it would be more efficient to use existing resources. So, there is a potential of developing an integrated transport and urbanization scheme by upgrading the existing railway network and connecting it to a backbone network of new BRT routes of public transport for the greater Dhaka region.

Metro:

The third network of the backbone is a proposal to develop some 20.8 kilometers of a Metro system which will be elevated. It has been proposed in the STP plan that the METRO system will be developed and incorporated into this proposed backbone network. This line will run from Uttara to Saidabad via Mohakhali, Sonargoan Hotel and Motijheel. As already mentioned, a study of rationalization, it's

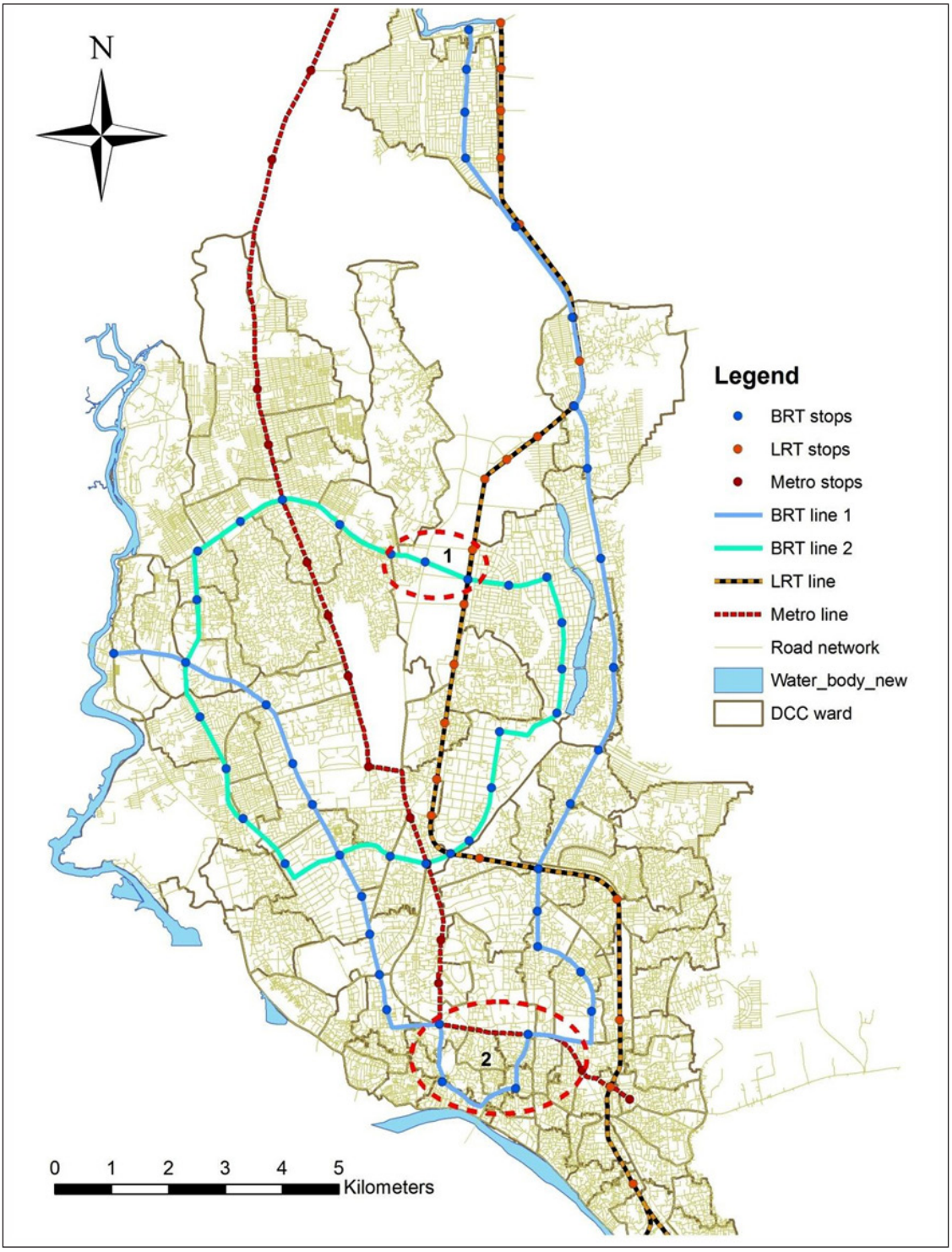

Figure 4:
Proposed Backbone network

logical to include existing plans, and that corridor is already identified as a high demand corridor in the existing situation analysis.

In the context of a low income, developing country, dedicated bus lanes and light rail transits seem to be the most realistic solutions for the urban transportation problem of metropolitan Dhaka. Once the system is in place, it is expected that people would not be interested in using their private cars anymore. The city and the economy will get tremendous relief from the vehicle pressure and reduction of fuel related pollutants respectively. The majority of the people could have easy access to the Metro.

Internal network/Feeder route:

The internal network, which is the second layer, consists of services to the areas that are not served by the backbone network. In general, the internal network services would accommodate the internal areas of Dhaka. The internal network would provide services at intervals of between 7 and 15 minutes during peak hours and between 10 and 30 minutes during the day. On the internal network, mini buses with the capacity between 20 and 30 passengers per vehicle,) may operate. Some of the existing bus routes might operate as a feeder route because those routes are not served by the Backbone network.

External network:

Geographically the location of Dhaka is in the center of the country and there are three gateways connecting the city with adjacent cities and villages. As a result, a great deal of vehicle related traffic passes through the city creating tremendous pressure on city roads. That's why it's really necessary to differentiate these inter-district connections from the city's own PT system. This external network, the third layer consists of direct fast services to different towns in the Dhaka district. The length of lines are much longer than the internal network and, depending on travel demands, the frequencies will vary from 15-30 minutes in peak hours to 30-60 minutes during the day. Connections from the external network to the backbone network can be made either on Saidabad bus terminal (for southern corridor) or for some lines at the Gabtoli bus terminal (north western corridor). Connections from Dhaka to outlying areas is beyond the scope of study. Due to the data limitations it's not possible to show the proposed external network.

Terminals and stops location:

Saidabad and Gabtoli terminals would serve the south and north-west corridors because of their central locations. The Mohakhali terminal can also serve these routes. But at the location of Farmgate, a hub needs to be created where the BRT and LRT come together. This is illustrated in Figure 4. It is necessary to establish an interchange station at this location. Keeping this in mind there is a possibility to create a multimodal terminal, as Saidabad terminal and the Kamalapur rail station are close together.

The standard spacing for BRT stops varies from 0.5km to 2 km. In the proposed two BRT lines, the stops need to be located accordingly. Only a few existing stops can be adapted but they also need some modifications (permanent structure, sitting facilities, information display et.) and better facilities. The leading locations for the stops are the potential demand at new residential areas and major facilities. So, the BRT stop spacing will not always be within 500 meter, it varies from 500 meter to 1.5 km. Bus stops need to be located at designated points only on the major roads, with locations for boarding and alighting passengers. For the proposed LRT the existing railway stations at Airport, Cantonment, Banani, Tejgaon, Kamalapur must be expanded to function as multimodal exchange nodes. These new stations will have to be constructed at the intersections of key roads and railway tracks at Mohakhali, Maghbazar, Panthapath and Rampura Road.

EVALUATION OF MULTIMODAL HIERARCHICAL NETWORK

The hierarchy of network would improve the existing situation or not. To come up with this conclusion and to find out its potential it's necessary to evaluate the network. Below is attempted to evaluate the proposed backbone network on the base of a few indicators.

Key features of proposed backbone network:

The key features of the proposed backbone network is summarized in table 1.

Table 1: Key features of proposed Backbone network

Passenger	Proposed backbone network		
	BRT	LRT	Metro (source: JICA)
Segregation	Segregation / dedicated lane	Existing track	Elevated
Space requirement	1 lane from existing road	1 or 2 lanes from existing track	Little impact on existing road
Public transit integration	Integrated with feeder & Para transit	Integrated with BRT stops, feeder & Para transit	Integrated with BRT stops, feeder & Para transit
Implementation time	Short	Medium	Long

Access to CBD:

Access is the process associated with getting to and departing from the stops or stations. It is important that transport services are efficient and reliable as compared with an acceptable level of accessibility to transport facilities. Most public transport users access bus stops by walking, particularly in urban areas. Such access is typically perceived in spatial terms as the physical proximity to transit stops or stations. The significance of access is that the more people that reside and/or are employed in close proximity to transit, the greater the likelihood that the service will be used (Murray et al, 1998). Actually, accessibility to transit is a critical issue from a point of view both of sustainable mobility and of sustainable accessibility (Javier Gutierrez, 2008).

As the city is growing, residential areas started to develop outside the CBD. People tend to live outside the city center and commute daily to the CBD for work. Using a bus system to commute is expected to reduce the traffic volume on main roads. One of the indicators to analyze the accessibility to the CBD is the travel time from each bus stop to the CBD's Motijheel area, which is the main commercial centre of the city. The world average commuting time is 40 minutes, one way for work. Here 30 to 45 minutes is used as threshold to define how long commuting time should take place. Travelling within this timeframe is regarded. It is assumed that all people work in one of the Central Business Districts (CBD). The analysis is execute sequentially, first using the existing bus then followed by adding one by one the backbone network (one BRT, LRT, two BRT and finally with MRT) to see the effect of the additions gradually (Figure 5). Finally from Figure 5 it is clear that accessibility to CBD is increased by adding the four backbone network, most of the area is covered within the time threshold of 45 minutes.

Policy guidelines and recommendations:

After analyzing the existing situation, it is clear that without a collaborative Mass Rapid Transport (MRT) system the roads of Dhaka City will not be able to cope with the growing vehicles and expanded passenger usage in the near future and the whole transportation system will collapse. An integrated transport scheme with BRT, LRT and metro to achieve a hierarchy discussed. To overcome these increasing transportation burdens and to meet

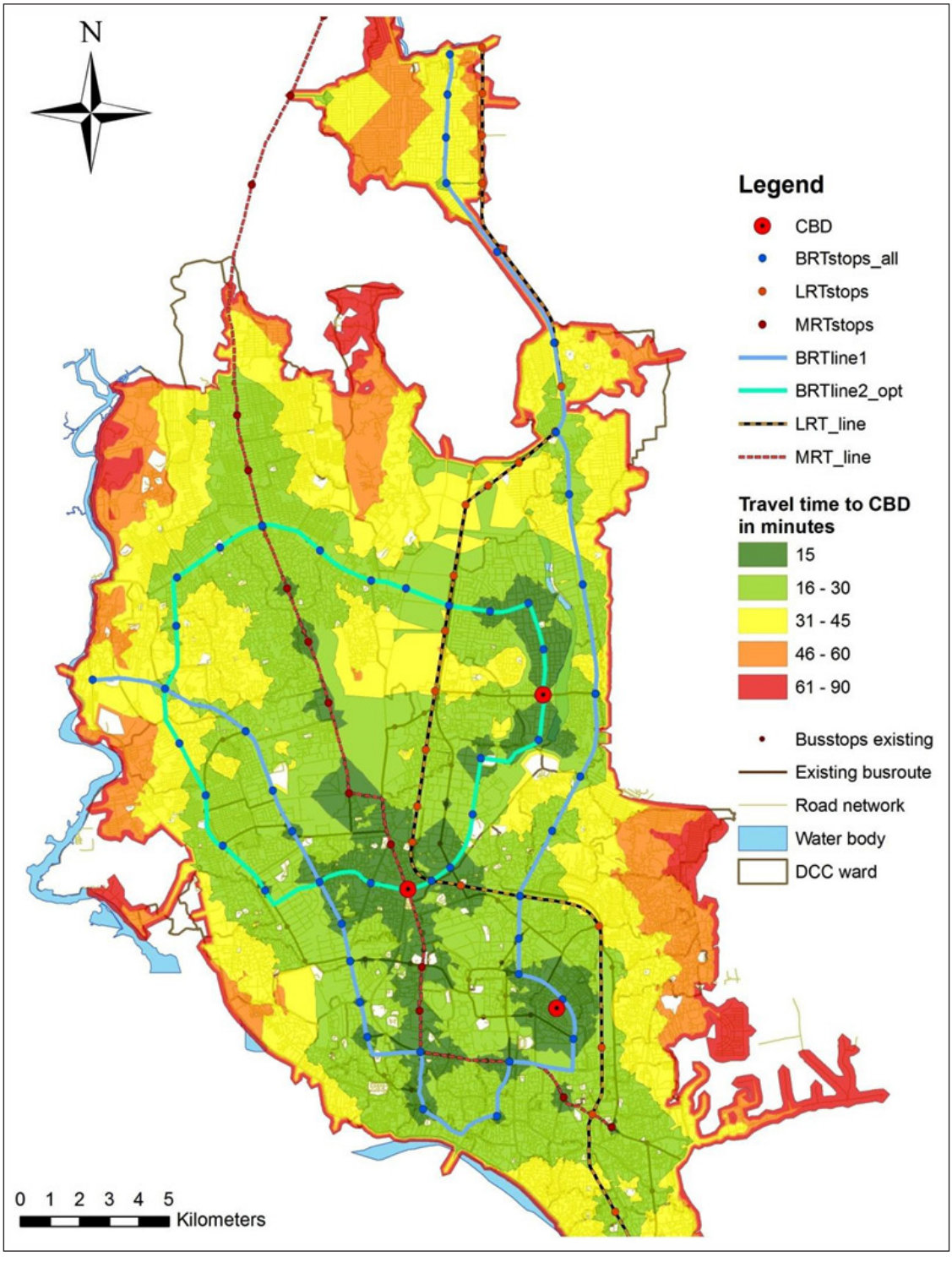

Figure 5:
Accessibility to CBD by backbone network

the transport needs of residents and to promote desirable patterns of land use in Greater Dhaka over the next decades it is necessary to change the existing policies. However, organizational supports and infrastructure development needed to meet the demand of the mobility of urban dwellers. Below are a few policy guide lines and recommendations provided towards achieving rationalized public transport system in Dhaka city.

a) Rationalize and harmonize the existing private sector buses into a number of limited companies and allocate major routes to one of these different companies. Each route will be served by only one company under a strictly set of rules and regulations

b) The Government should identify those areas of the city and the expanded development where there will be a policy of emphasizing public transport access over private vehicle access.

c) Parking control should be the responsibility of the municipalities who will administer it through a central parking control office. The office will retain its own staff and will employ parking wardens to monitor space usage and issue tickets to violators. It is preferred that this aspect be undertaken by the private sector and the Government will enact such rules as will make this possible. And also need to provide and build as many parking-only structures (not mixed with other commercial uses) as possible on all major arterial roads of the city.

d) Public transport of all kinds needs to be planned and designed or adapted so as to provide some facilities in the vehicles so that disabled persons can access the vehicles and ride on them in comfort. The bus stations, terminals, railway stations and landing stations will be re-planned to provide proper facilities for disabled persons so that they do not encounter any impedance to movement.

e) Non-motorized transport will be prevented from operating on many sections of arterial highways and especially at intersections. Rickshaws will be encouraged and assisted to ply the lanes and narrow roads to serve local neighborhood demands and to provide feeder services from the neighborhoods to the main line rapid transit stops.

f) Bicycles need to be recognized as a mode of transport and separate lanes and crossings will be provided within the city in order to make bicycle journeys safe and pleasant.

g) The Government needs to enact a pedestrian policy to ensure the construction of properly designed and continuous pedestrians with well-defined and maintained pedestrian routes in the city, the provision of pedestrian crossing facilities giving the pedestrian priority over all other traffic and the prohibition of unauthorized encroachment on the footpath by street vendors and others.

The formulation of the most efficient plan and organizational set up will not be enough, the political will and determination of the Government. is essentially needed.

CONCLUSION

Dhaka is a densely populated city and its transport system is mainly based on road systems and it's related traffic congestion and traffic management. The study shows that current public bus provision is inadequate in relation to the demand. The present bus services (operated under as many as 750 individual ownerships) provide inefficient, unproductive, and unsafe levels of services. Long waiting, delay on plying, overloading, discomfort, and long walking distance from the residence/work place to bus stops are some of the obvious problems that confront the users daily. The real hindrance to smooth traffic, as experts look at it, does not lie in inadequate roads. Some of the contributory factors to these problem are as follows: Dhaka's unplanned growth, a Dhaka-centric development of the country, the lack of east-west connecting roads, unplanned construction inside the city, increased number of private transports, the lack of mass transit. At the same time the poor traffic management, increasing number of rickshaws, lack of parking space and pedestrian walkways and reluctance to use of foot over-bridges, make travelling more difficult on the streets.

After analyzing the existing situation, it is clear that without a collaborative transport system the roads of Dhaka City will not be able to cope with the growing number of vehicles and expanded number of passengers in the near future. The whole transportation system will collapse. So, establishing the rationalization concept where one of the major components is to ensure proper networks that include proper mass rapid transit systems is one way to solve the existing PT problem of Dhaka city. This paper establishes a rational concept and an

integrated, multimodal transport network for Dhaka using the existing surface transport and the rail route. Highest emphasis is laid on the judicious use of existing resources, and interweaving transport planning with land use planning. It does not claim to be conclusive as it is obvious that such a proposal requires an extensive feasibility study which calls for a huge effort between urban planners, transport planners, transport engineers, transport economists, finance and development experts, and environment specialists. So far only piecemeal attempts have been made to improve the traffic situation and, in most cases, uncoordinated investor driven projects have been initiated with very little analysis of their impact on the urban scenario. However, establishment of this proposed plan in Dhaka will be useful to transportation planners, urban planner and policy makers in development of present PT crisis and congestion of Dhaka city. Also, to overcome these increasing transportation burdens and to meet the transport needs of residents and to promote desirable patterns of land use in Greater Dhaka over the next decades it is necessary to change the existing policies. However, organizational support and infrastructure development needed to meet the demand of urban mobility. Hopefully, the hierarchy of routes and future proposed feeder access accordingly will be of help to PT planner and experts to influence the performance of public transportation systems of Dhaka.

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