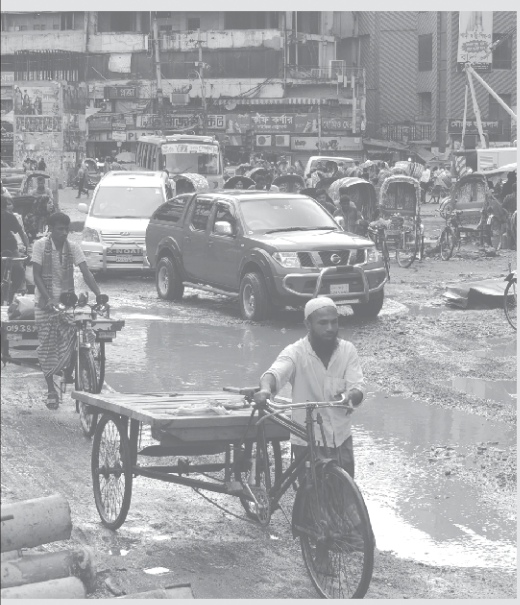
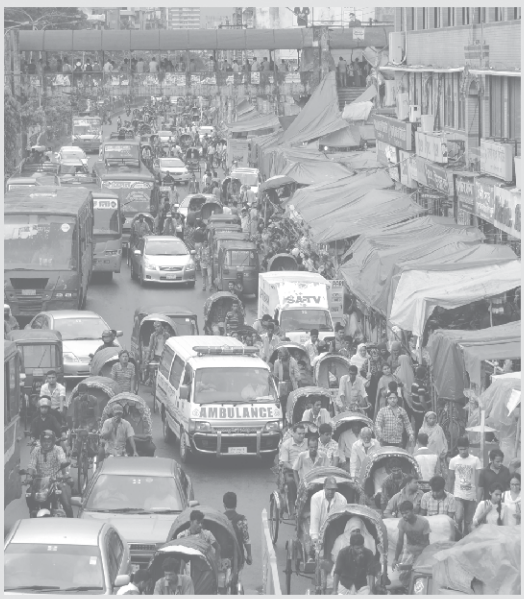
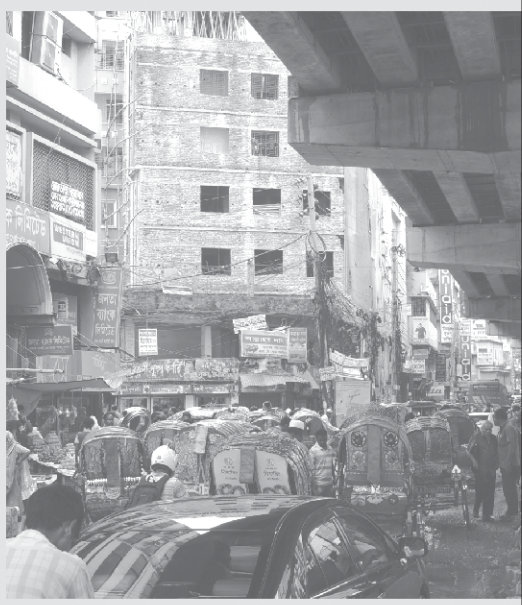
STATE OF CITIES 2016

Traffic Congestion in Dhaka City

Governance Perspectives







BRAC Institute of Governance and Development
BRAC University

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Traffic Congestion in Dhaka City- Governance Perspectives

BRAC Institute of Governance and Development
BRAC University
Dhaka, Bangladesh

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The State of Cities 2016 'Traffic Congestion in Dhaka City- Governance Perspectives' is the product of an interdisciplinary team of researchers of the BRAC Institute of Governance and Development (BIGD), BRAC University. Dr. Sultan Hafeez Rahman, Executive Director, BIGD provided valuable advice and guidance throughout the preparation of the report. Dr. Md. Shanawaz Hossain, Research Fellow and Head Urban, Climate Change and Environment (UCCE) Cluster, BIGD led the study. BIGD Researcher contributed in different chapter includes:

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Chapter 3:	Policy and Institutional Framework of Traffic Management in Dhaka City	Md. Bayazid Hasan, S.M. Gubair Bin Arafat and Md. Mahan Ul Hoque
Chapter 4:	Enforcement of Traffic Laws: Current Status and Options for Improvement	Gazi Arafat Uz Zaman Markony and Md. Mahbub Hasan
Chapter 5:	Governing Bus Route and Sidewalks in Dhaka: A Political Economy Analysis	Mohammad Sirajul Islam and Nadir Shah
Chapter 6:	Impacts and Costs of Traffic Congestion	Nabila Zaman and Sumaiya Kabir Talukder
Chapter 7:	Conclusion and Recommendations	Dr. Md. Shanawez Hossain

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Table of Contents

List of Boxes, Figures and Tables

List of Boxes

List of Figures

List of Tables

List of Acronyms

ADB	Asian Development Bank
BADA	Bangladesh Automobiles Distributors Association
BARVIDA	Bangladesh Reconditioned Vehicles Importers & Dealers Association
BBS	Bangladesh Bureau of Statistics
BG	Bangladesh Government
BIGD	BRAC Institute of Governance and Development
BIWTA	Bangladesh Inland Water Transport Authority
BIWTC	Bangladesh Inland Water Transport Corporation
BNP	Bangladesh Nationalist Party
BP	Bangladesh Police
BPA	Bangladesh Police Academy
BRT	Bus Rapid Transit
BRTA	Bangladesh Road Transport Authority
BRTC	Bangladesh Road Transport Corporation
BTCL	Bangladesh Telecommunications Company
BTMS	Bangladesh Truck Malik Samity
BUET	Bangladesh University of Engineering and Technology
CASE	Clean Air and Sustainable Environment
CBD	Central Business District
CC	City Corporation
CNG	Compressed Natural Gas
CUS	Centre for Urban Studies
DCC	Dhaka City Corporation
DESCO	Dhaka Electric Supply Company
DHUTS	Dhaka Urban Transport Study
DIT	Dhaka Improvement Trust
DITS	Dhaka Integrated Transport Study
DITS	Dhaka Integrated Transport Strategy
DMA	Dhaka Metropolitan Area
DMCH	Dhaka Medical College Hospital
DMDP	Dhaka Metropolitan Development Project
DMP	Dhaka Metropolitan Police
DMRTDP	Dhaka Mass Rapid Transit Development Project
DMTCL	Dhaka Mass Transit Company Limited
DNCC	Dhaka North City Corporation

DOE	Department of Environment
DRTM	Directorate of Road Transport Maintenance
DRTOA	Dhaka Road Transport Owners' Association
DSCC	Dhaka South City Corporation
DTCA	Dhaka Transport Coordination Authority
DTCB	Dhaka Transport Coordination Board
DUTP	Dhaka Urban Transport Project
EIU	Economist Intelligence Unit
EPZ	Export Processing Zone
ERP	Electronic Road Pricing
GDA	Greater Dhaka Area
GDP	Gross Domestic Product
GDTPCB	Greater Dhaka Transport Planning and Coordination Board
IDI	In-depth Interviews
IGC	International Growth Centre
IGS	Institute of Governance Studies
ITS	Intelligent Transportation Systems
JICA	Japan International Cooperation Agency
KII	Key Informant Information
KII	Key Informant Interviews
km	Kilometer
LGED	Local Government Engineering Department
LRT	Light Rail Transit
MRT	Mass Rapid Transit
MVO	Motor Vehicles Ordinance
NGO'S	Non Governmental Organisations
NIOSH	National Institute for Occupational Safety and Health
NLTP	National Land Transport Policy
NMT	Non-motorised Transport
OD	Origin and Destination
ODS	Origin and Destination Survey
OECD	Organisation for Economic Co-operation and Development
PEA	Political Economy Analysis
PS	Police Station
PWD	Public Works Department
RAJUK	Rajdhani Unnayan Kartripakkha
RFID	Radio Frequency Identification

RHD	Roads and Highways Department
RMG	Dhaka is Readymade Garments
RMP	Road Master Plan
RSTP	Revised Strategic Transport Plan
RTC	Regional Transport Committee
SI	Sub Inspector
SMA	Statistical Metropolitan Area
STP	Strategic Transport Plan
TDM	Transportation Demand management
TED	Traffic Engineering department
TV	Television
UDD	Urban Development Directorate
UN	United Nation
UNB	United News of Bangladesh
WASA	Dhaka Water Supply and Sewerage Authority
WHO	World Health Organisation
WTP	Willingness To Pay

Preface

The BRAC Institute of Governance and Development (BIGD) publishes the *State of Cities* (SOC) report annually to assess the status of cities in Bangladesh. This year's report is the fifth publication of the institution. The BIGD specialises in research on a wide range of governance and development issues with a view to generate a rigorously obtained evidence base to inform public policy and to contribute to the public discourse on contemporary concerns.

With rapid economic growth and urbanisation developing countries of Asia are experiencing multi-faceted problems among which traffic congestion is the top most. Put simply, it is a situation where demand for travel has far exceeded supply. For Dhaka, one of the largest, most densely populated and most rapidly growing cities in the world, traffic congestion is to be expected. What is perplexing is the lackadaisical, moreover in which the authorities have gone about addressing it, allowing it to become a monumental challenge. Its' disorganised, least motorised, primitive transportation system and poor infrastructure creates major problems in the daily lives of over 18 million inhabitants. Even in the major thoroughfare of the city numerous types of motorised and non-motorised vehicles run at differential speeds which reduces the average speed of motorised vehicles and creates severe traffic congestion. Moreover, traffic law enforcing agencies, drivers and commuters' practice also contribute to traffic congestion. Various measures have been taken to address the problem, including issuing new laws and creating new institutions. However, despite all these measures traffic congestion is a growing predicament, with major economic, social and environmental impacts.

This study- 'State of Cities (SOC 2016): Traffic Congestion in Dhaka City- Governance Perspectives' is conceptualised within the above context. The study adopts a 'governance perspective' in developing and explaining the traffic management system and its associated dynamics in Dhaka city. It argues that, without a much fuller understanding of the governance perspective and seeing the 'big picture' (i.e. developing a comprehensive view of different dynamics), piecemeal and sporadic efforts and interventions in improving the situation (including building a flyover here and widening a road there) may not provide desired results or live up to the expectations of the common citizenry'. In this backdrop the study explores the related demand-supply aspects, policy and institutional arrangements, socio-economic and political economy dimensions/impacts, keeping liveability at the centre of the study. Thus, based on a multi-faceted conceptual framework and using both primary and secondary data this study focuses on the governance aspects of traffic management in Dhaka, to assess its successes and shortcomings, and identifying how it could be strengthened.

This report is the result of an outstanding team effort by a BIGD research team led by Md. Shanawez Hossain, which included AKM Fazlur Rahman, Raihan Ahamed, Md. Bayazid Hasan, S.M. Gubair Bin Arafat, Md. Mahan Ul Hoque, Gazi Arafat Uz Zaman Markony, Md. Mahbub Hasan, Mohammad Sirajul Islam, Nadir Shah, Nabila Zaman and Sumaiya Kabir Talukder. The operations team of BIGD also deserve thanks for their help and facilitation. Special thanks are due to Mr. Robert Adrian Gallagher, a transport specialist with long experience in Bangladesh and Visiting Fellow of BIGD for his extensive review of the report, besides language editing. The support received from the DMP, BRTA, RAJUK, DSCC, DNCC and DTCA officials is gratefully acknowledged. We would also like to express our deep appreciation to the Think Tank Initiative (TTI) administrated by International Development Research Centre (IDRC) for their generous support to BIGD which made the study possible.

Dr. Sultan Hafeez Rahman
Executive Director
BIGD, BRAC University

Executive Summary

This is the fifth report in the State of Cities series and focuses on the problem of traffic congestion in Dhaka city. The study's main objective is to examine the governance and institutional issues underlying traffic congestion in Dhaka, and develop proposals to tackle the issues and strengthen the institutions responsible for Dhaka's transport management.

Study Approach: The study focuses on the Dhaka Metropolitan (DMP) area and six key government agencies in particular – DMP, DNCC, DSCC, BRTA, DTCA and Rajuk[1]. Based on 'governance perspective' the investigation was conducted adopting a 'political economy framework'. Data was collected from both primary and secondary sources through key informant interviews, a 'score-card' survey of the six institutions, case studies and site observations. A major questionnaire survey of 774 transport users was also carried out to obtain people's views of the main traffic issues and priorities for action.

The report is organised in seven chapters. Chapter 1 sets the scene and describes the study's background, objectives and methodology.

Chapter 2 examines transport demand and supply in Dhaka city and how it affects traffic congestion. Congestion is caused by transport demand outstripping the supply of infrastructure. Government authorities in Dhaka have responded by building more infrastructure, especially roads, flyovers and now elevated expressways, but the management perspectives of traffic congestion have largely been overlooked. This study found that institutional and management factors underlay most of the traffic congestion problems, including:

- Poor planning of the road network
- Minimal restraint of private car use
- Poor organisation of Dhaka's bus system
- Poor co-ordination of the government agencies involved in transport.

The survey of transport users found that most people identified management issues as the main causes of traffic congestion, particularly: (1) haphazard parking, (2) streets occupied by private transport, and (3) violation of traffic rules. Therefore effective traffic management, including restraining the demand for private transport, is crucial for reducing Dhaka's congestion.

Chapter 3 examines the institutional arrangements and coordination mechanisms for transport in Dhaka. There are over 30 agencies involved in transport in the metropolitan area, which makes co-ordination very difficult. However, the main transport coordinating authority (DTCA) is significantly under-staffed and lacking authority.

Similarly, most of the key institutions are internally challenged due to limited human capacity (number and skills of professional staff), limited equipment, poor internal accountability mechanisms and lack of transparency. They are also externally challenged in their co-ordination with other organisations as they are all responsible to different ministries, four of which are mainly responsible for Dhaka's transport management: Home Ministry (police); Ministry of Local Government (city corporations and

1. Dhaka Metropolitan Police, Dhaka North and Dhaka South City Corporations, Bangladesh Road Transport Authority, Dhaka Transport Co-ordinating Authority, and Rajdhani Unnayan Kartripakkha (Capital Development Authority)

upazilas); Road Transport and Bridges (DTCA and BRTA) and Ministry of Housing and Public Works (Rajuk). This diffusion of responsibility together with DTCA's weakness is considered the single most important challenge for improving transport co-ordination in Dhaka.

Chapter 4 examines the status of traffic law enforcement in Dhaka, particularly the roles of the Bangladesh Road Transport Authority (BRTA) and Dhaka Metropolitan Police (DMP). The study found that despite many laws and much activity by the enforcement agencies, drivers frequently break the rules and likewise pedestrians. On the other hand, survey respondents reported weaknesses and poor practices in traffic law enforcement.

People's knowledge of the traffic laws was patchy, with less than half of interviewees knowing about parking rules, speed limits or requirements for official documents. A high proportion of road users admitted they sometimes broke the traffic laws, and bus drivers were considered more likely to break the laws than private drivers. However, people identified the main causes of traffic law violations as competitive pressures on bus operators, and poor police enforcement.

The study examined institutional issues relating to enforcement. Regarding BRTA, it was noted that the driver and vehicle licence system is dominated by 'brokers' who charge substantial fees and can even arrange a licence without a test. In 2015 there were nearly 2 million fake licences, according to the High Court. Regarding police enforcement, despite the official activity, survey respondents said poor enforcement was the main challenge for traffic management in Dhaka.

Chapter 5 examines how stakeholders' interests affect traffic congestion in Dhaka, with case studies of bus operations and sidewalk management. The study found that entry to the bus sector in Dhaka was very difficult due to informal payments and the need for political connections, which tended to reduce healthy competition. Once a bus enters service, numerous informal payments have to be made to keep operating. Although government officials deny it, bus operators allege that standard monthly informal payments are paid, as well as random on-the-spot daily payments. Both types of payment are facilitated by weak guidelines and processes from the enforcing agencies: for example, no background studies are carried out when route permits are issued; bus stops are not clearly marked in many places in Dhaka; the traffic police have no equipment for measuring vehicles' speeds; and most public vehicles do not have speedometers due to weaknesses in vehicle fitness inspection.

Bus operators considered that informal transactions constituted one-half of their monthly operating costs, reducing their profitability which was further reduced by Dhaka's increasing congestion. As a result, bus service quality was compromised since the operator's survival depended on management of informalities and their focus was shifted from passengers to patrons.

Management of hawkers and sidewalks presented a similar picture: Dhaka's 2.6 lakh hawkers are actually highly regulated and pay significant sums to the authorities for the privilege of trading on the streets. The system is well-organised, with informal daily payments to 'line-men' as well as monthly informal rents. The funds are passed on to the enforcing authorities as well as local political parties, and the total sums are quite remarkable. Based on information from stakeholders as well as secondary sources, this study estimated that the annual collection of informal 'rents' from hawkers totaled about Tk.1,825 crore per year (about $228 million), which is nearly as great as the combined budgets of Dhaka North and Dhaka South City Corporations in 2015/16. However, this informal management of Dhaka's footways has negative consequences for almost everyone: for the general public, who suffer from crowded footways and increased traffic congestion; for the hawkers, who pay high rents yet face daily insecurity; and for the city authorities, who lose substantial revenue income.

Chapter 6 examined the costs and impacts of traffic congestion on Dhaka's citizens, particularly the economic costs (measured as the value of people's time lost in traffic delays and the increased vehicle costs due to wasted fuel); and the social costs such as discomfort, stress, and changed social behavior. With a case study of a particular route of Dhaka (from Airport to Postogola Bridge via Gulshan, Mohakhali, Gulistan and Buriganga Bridge, 26km), the average off-peak journey speed for motor vehicles was measured at around 22kph, while the peak period average speed fell to around 9 kph. The economic cost of this delay was estimated at around Tk. 227 crore per month ($28.4m per month), or roughly Tk.53 for each passenger trip, most of which was due to lost time rather than vehicle operating costs.

If other components of Dhaka's traffic congestion are taken into account, such as environmental and social costs, the results are even more alarming. The study also identified that the impacts were heavily clustered among service holders, who had a higher willingness-to-pay to avoid or reduce congestion.

Recommendations and Way Forward

The study offers five main recommendations for reducing traffic congestion in Dhaka and improving governance of the transport sector. In summary, these are:

1. More emphasis on demand management measures to balance transport demand and supply – in particular, slowing down the growth in private car and motor-cycle use by means of traffic management measures and fiscal instruments.
2. Greater priority for high quality, high capacity public transport through increased investment and supporting traffic management measures.
3. Strengthening transport co-ordination in Dhaka, in particular by strengthening the Dhaka Transport Co-ordination Authority (DTCA).
4. Strengthening the other government agencies responsible for Dhaka's transport management through a package of institutional measures (e.g. increased staffing, improved career paths for staff, skill development, and so on).
5. Converting the current informal practices into legal, formal systems by creating incentives for the stakeholders to act in positive rather negative ways. This final recommendation is perhaps the most innovative, but also the most challenging, of the various recommendations, and further details are presented in Chapter 7, Conclusions and Recommendations.

CHAPTER 1

INTRODUCTION

1.1 The traffic congestion problem in Dhaka

With over 18 million people, Dhaka is one of the largest and most densely populated cities in the world (UN, 2015). Its rapid growth has brought many challenges, and traffic congestion is high amongst these. Although Dhaka is one of Asia's least motorised capitals, its traffic congestion is among the worst and steadily deteriorating. In the past five years over 4.2 lakh motor vehicles have been registered in Dhaka (Ahamed, Hossain and Hossain, 2016), yet the city is acutely short of road-space.[1] With future population predicted to rise to over 26 million by 2035 (RSTP, 2015), numerous urban problems have led to Dhaka being described as one of the least liveable cities in the world (EIU, 2015).

The historical context

The traffic congestion problem is not new to Dhaka. The city's origins go back more than four hundred years, to the Mughal period. In the early British period the first 'Town Improvement Committee' was established in 1823 and soon set about widening roads. In 1864 an elected Municipal Committee was formed under the new Municipal Improvement Act, and commissioned a study which recommended two new broad streets parallel to the river and extending into the countryside. However, the recommendation was not implemented largely due to financial incapability and also unwillingness of the Municipal Commissioners to risk popular discontent by increasing taxes and demolishing buildings (Sharifuddin, 1990). The authority did, however, introduce a tax on wheeled carriages, horses and elephants to meet the costs of road management, and later a registration system for all horse-drawn hackney (taxi) carriages (Ibid, page 200).

Growth of the capital city

After the partition of India in 1947, Dhaka became the capital of East Pakistan. The land use pattern changed rapidly as the city expanded northwards. New institutions such as the Dhaka Improvement Trust (DIT) were created to try and guide this growth in an organised way. Some planned areas were developed such as Motijheel commercial area, Dhanmondi residential area and Tejgaon industrial area in the 1950's, followed by Gulshan and Banani in the 1960's. However, in the rest of the city the growth was largely unplanned and the road network developed haphazardly.

1. According to Mahmud and Rabbani (2012), ideally 25 percent road of a city's total area should be available for roads, but only 7 percent of Dhaka's area is available for roads.

After the liberation war of 1971 Bangladesh emerged as an independent nation and Dhaka's growth accelerated rapidly. The demand and supply of transport increased exponentially, and with it the scale of the traffic congestion problem (Chapter 2). Various measures have been taken to tackle the problem, including new laws and institutions (Chapter 3). However, despite all these measures traffic congestion is a growing problem, with major economic, social and environmental impacts.

Current scale of the traffic congestion problem in Dhaka

As Dhaka grows, the institutions managing its transport system have been slow to adapt and the city's traffic has been slowing down. In 2004 the average daily speed of traffic was estimated at about 21.2kph (STP, 2005); five years later, according to the Dhaka Urban Transport Network Development Study (DHUTS) this had fallen to 15.1kph (DHUTS, 2010), and by 2015 this had fallen further to 6.8kph (RSTP, 2015).

Traffic congestion now affects most of the city's road network, with traffic jams sometimes lasting several hours; often it is quicker to walk than travel by motor vehicle. Further decline was predicted in the recent Revised Strategic Transport Plan (RSTP), unless public transport is expanded and the traffic / transport system managed more effectively

The traffic congestion has huge economic, social and environmental costs. While the economic costs include wasted travel time and increased vehicle operating costs, the social costs include factors such as road casualties, psychological stress and discomfort, reduced social activities, re-location of residences and businesses, effects on family lives and reduced efficiency of public transport. The environmental impacts include air and noise pollution, greenhouse gases, and general traffic domination of everyday life. These social and environmental costs are not easily expressed in monetary terms, but are substantial nonetheless.

Various estimates have been made of the economic costs of traffic congestion in Dhaka city. One estimate in 2013 put the cost as high as $3.8 billion a year, mainly due to delays and environmental externalities (Khan and Islam, 2013). The RSTP for Dhaka put the cost in 2014 as high as $11.4bn per year (RSTP, 2015).

Cities and traffic develop hand-in-hand and road traffic congestion poses a challenge for all large and growing urban areas. Urban dwellers often rank congestion as one of the most severe problems they face in the city; hence it is often one of the major pre-occupations for urban decision-makers, and effective management of congestion requires a careful balancing between the benefits of agglomeration and the dis-benefits of congestion.

Causes and responses to the traffic congestion

Traffic congestion is the result of too much traffic trying to use the available road space (OECD, 2007); in other words, traffic demand exceeds the supply of road space. Demand increases due to rising urban population, increasing numbers of lower-capacity vehicles (e.g. cars, rickshaws, CNG's and motor-cycles), and insufficient public transport (buses, rail, etc.). Meanwhile, limited supply of road space occurs in all urban areas worldwide, but especially in Dhaka due poor urban planning and poor management of the available road space.

Faced with growing traffic congestion, the city authorities have three basic options:

1. Adapt the city to the traffic – e.g. build more roads, flyovers, metros, multi-storey car parks, etc. to meet the growing demand; and in the longer-term, limit building densities and decentralise growth to other areas;
2. Adapt the traffic to the city – e.g. ration road space and promote higher capacity transport through traffic management, travel demand management and investment in public transport;
3. Do nothing – allow traffic to be 'self-regulating' so that people adapt to congestion in various ways (e.g. by using different modes, choosing different routes, avoiding busy times, or relocating in the longer term).

In practice, a city authority's response to traffic congestion is usually a combination of all three approaches, though in Dhaka more emphasis has been given in the past to 'adapting the city to the traffic' than 'adapting the traffic to the city'.

(1) Adapting the city to the traffic: Over the years, the government's main emphasis for dealing with Dhaka's traffic congestion has been to increase road capacity, especially new roads and flyovers. These are still a top priority, with a major programme of six elevated expressways now proposed at a huge cost.[2] However, investment in mass public transport is also beginning to take place, with a $3 billion loan from the Japan International Cooperation Agency to build a metro rail system (MRT) and a $250 million loan from the Asian Development Bank and French Government to build a bus rapid-transit (BRT) line.

(2) Adapting the traffic to the city: In response to the growing traffic problems, over the years the city authorities have also adopted many demand management and traffic management measures, including:

- Vehicle licence controls (for example, ceilings on cycle-rickshaws and auto-rickshaws / CNG's);
- Demand management measures (such as increasing import duties on cars and motor-cycles, increasing fuel taxes, providing loans for bus purchase, closing shops area-wide once a week; and so on);
- Movement restrictions on certain types of vehicle (e.g. rickshaw bans on some roads, restrictions on bus and tempo routes, day-time restrictions on truck movement);
- Various traffic engineering measures such as road dividers, one-way streets, closing-off side roads, etc.

Yet despite all these measures the congestion problems have not only persisted but grown steadily worse, and 'doing nothing' has often seemed the most common approach.

This study: focus on traffic management and governance

Various studies have examined the causes of traffic congestion in Dhaka. According to Morshed (2015), Dhaka's traffic congestion is not a problem of transportation engineering alone, it is much more a result

2. The Revised Strategic Transport Plan for Dhaka (2015) proposed investment of $12.4bn in new roads in Dhaka in the next twenty years (2015-2030), of which $4bn was proposed for six expressways and $4.5bn was for three ring roads. In addition, the RSTP proposed investment of $20.8bn for five metro rail lines and two bus rapid transit routes.

of ad-hoc planning and broken bureaucracy. Mahmud et al (2012) similarly identified management issues as key factors underlying the traffic congestion problems.

This study argues that while the government has emphasised development of infrastructure, the overall status of traffic management remains less than satisfactory. This study also argues that there are cheaper solutions to Dhaka's traffic congestion than simply building more infrastructure: namely, traffic management and demand management measures in the form of enforcing the law, reducing cars, improving bus services, and so on.

This approach was also emphasised in the RSTP for Dhaka (RSTP, 2015), which recommended that traffic management improvements should be the priority for the short-term because the road network is substantially underutilised due to poor management, and also to keep traffic moving when the new infrastructure (e.g. MRT, BRT, etc.) is being built.

A governance perspective

It is important, therefore, to understand the underlying reasons for the shortcomings in traffic and travel demand management, hence this study adopts a 'governance perspective'. The study argues that without a good understanding of the governance perspective, piecemeal and sporadic interventions may not provide desired results or live up to the citizens' expectations. Although there is common agreement among the public about the inefficiency of traffic management in Dhaka, the underlying factors remain in dispute. Moreover, although there have been many projects to improve the traffic management, a thorough study of the institutional aspects still remains to be done.

This study therefore focuses on the governance aspects of traffic management in Dhaka, to assess the successes and shortcomings and identify how Dhaka's urban transport governance could be strengthened.

1.2 Study objectives and conceptual framework

In a growing megacity like Dhaka, major transport infrastructure investment is of course needed to provide an effective transport system. However, if institutional measures are not addressed properly the problems of traffic congestion will not change significantly. Experts often claim that a large part of Dhaka's traffic congestion is due to lack of coordination and poor implementation of traffic management systems. In this study, we argue that Dhaka's severe traffic congestion can be reduced significantly and at low cost by strengthening the government institutions responsible for traffic management and enforcement. Improving governance will ensure making the institutions responsible for traffic management, 'smaller, strongest, effective and efficient'.

Overall objective

The overall objective of this study is to explore the governance issues of traffic congestion in Dhaka city. The study also explores the related socio-economic and political dimensions and impacts, keeping liveability at the centre of the study.

Conceptual framework

The traffic congestion problem in Dhaka has multiple dimensions, including legal and institutional structures, stakeholder interests and expectations relating to transport demand and supply, political economy effects of various interest groups, issues relating to implementation and enforcement, and so on. Therefore, a conceptual framework with multiple theoretical aspects is needed for carrying out the research.

In this study a Political Economy Analysis (PEA) approach has been adopted to assess the effectiveness of transport interventions in Dhaka city and examine why traffic management is generally so weak. The approach identifies the relevant stakeholders, mapping their preferences and interests and explaining how the institutional context and constraints (both formal and informal) facilitate or hinder the different stakeholders in promoting their agendas.

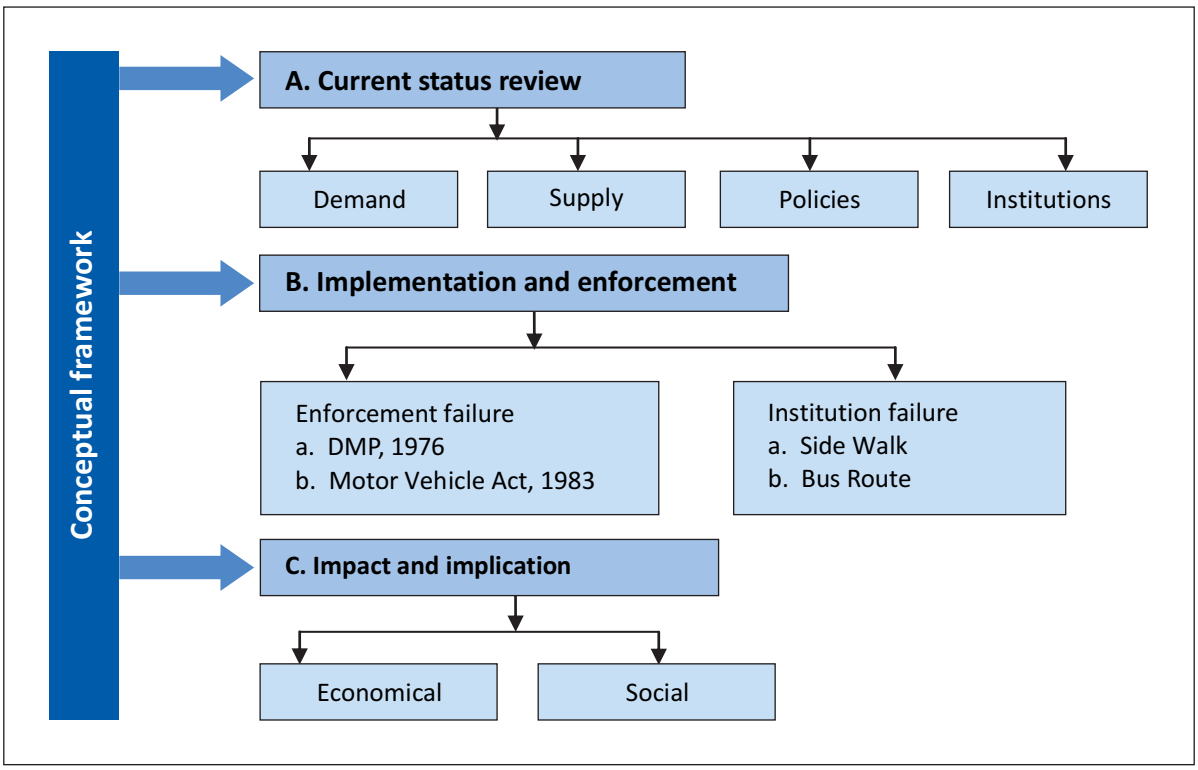
Using this PEA approach, a conceptual framework (Figure 1.1) was developed with three main components, as follows:

(A) Review of the current situation: This involved reviewing the transport demand and supply in Dhaka to understand the underlying dynamics of traffic congestion; and also reviewing the main institutions responsible for managing transport in Dhaka – their policies, rules, regulations, roles and accountability for managing traffic and related activities.

(B) Implementation and enforcement: This component included a political economy analysis of the different stakeholders involved in implementation and enforcement of rules and regulations on the ground, and assessing their capacity and performance in managing congestion. With some specific case studies, it also examines the vested interests of different stakeholders from the traffic and road-related infrastructure perspective.

(C) Impact and implications: The third component focussed on the socio-economic impacts related to traffic congestion. It also explores some policy implications, such as assessing people's willingness to pay to avoid traffic congestion.

Figure 1.1: Conceptual framework of the study



Specific study objectives

Within this conceptual framework, the following specific objectives were defined:

1. To explore the transport demand and supply situation in explaining the status of traffic congestion in Dhaka (Chapter 2);
2. To understand the existing institutions and policy arrangements for traffic management in Dhaka city, particularly the institutions' roles, responsibilities and coordination gaps (Chapter 3);
3. To explore the status and effectiveness of traffic law enforcement in Dhaka city (Chapter 4);
4. To examine in depth the institutional causes of traffic congestion and explain why those factors continue to exist leading to the persistence of congestion (Chapter 5);
5. To evaluate the components of economic and social costs of traffic congestion in Dhaka city, and some policy implications (Chapter 6).

1.3 Study methodology

The geographical area for this study is the Dhaka Metropolitan Police (DMP) area. This area was selected as it covers the main city area and also contains the most severe traffic congestion. It also made the research easier in terms of area demarcation due to clear DMP zoning, and easier selection of respondents as well as organisations and institutions related to traffic management.

For the overall methodology this study utilised both quantitative and qualitative survey approaches. Various research tools were used for collecting the data and conducting the research, including:

1. **Secondary data collection:**
   - Desk review of previous transport studies and reports;
   - Collection of relevant information from secondary sources, for example: statistics (e.g. population, vehicles, road network, financial data), laws, institutional structures, etc.
2. **Qualitative surveys:** for this study, three types of qualitative survey were undertaken:
   I. **Key Informant Interviews (KII's) and consultations with experts:** Approximately 100 knowledgeable persons were interviewed to obtain the views of experts and practitioners about the adequacy or inadequacy of laws, regulations and institutions related to governance of traffic management in Dhaka city. The respondents were selected from:
      a. Government organisations (DTCA, DNCC, DSCC, RHD, RAJUK, BRTA, DMP, DoE, LGED);[3]
      b. Transport sector stakeholders (drivers, transport workers, drivers' association, vehicle owners associations, hawkers/hawkers' association, driving school);
      c. Transport users (e.g. pedestrians, bus users, private vehicle owners, etc.)
      d. Politicians;
      e. Academics, consultants and NGO's.

3. DTCA = Dhaka Transport Co-ordination AuthorityDNCC = Dhaka North City Corporation
   DSCC = Dhaka South City Corporation
   RHD = Roads and Highways Department
   RAJUK = Rajdhani Unnayan Kartripakkha
   BRTA = Bangladesh Road Transport Authority
   DMP = Dhaka Metropolitan Police
   DoE = Department of Environment
   LGED = Local Government Engineering Department

ii. **Scorecard survey:** This was an assessment survey carried out with six government organisations responsible for traffic management in Dhaka (DMP, DNCC, DSCC, BRTA, DTCA, RAJUK), to review their institutional capacity, accountability and transparency. The survey involved each organisation completing a 'scorecard' as a self-evaluation of their experience in coordinating with other organisations (Chapter 3).

iii. **Specific case examples:** In-depth analysis was made of specific aspects of traffic management in Dhaka, for example introduction of digital traffic signals, vehicle licences, enforcement of traffic laws, parking, footpath, bus route allocation process, and so on.

3. Quantitative survey of transport users:

The qualitative information was backed-up with a major questionnaire survey of 774 transport users, interviewed at residences and workplaces. This survey was conducted to understand the citizens/transport users' views of the main issues concerning traffic congestion and management: for example, their socio-economic condition, trip generation, modal choice; and their perceptions and practice regarding traffic rules enforcement, behavioural issues, congestion impacts and possible way forward.

Questionnaire sample selection

(i) Survey area: The survey sample was obtained from the area covered by DMP and BRTA, including all three Dhaka Metro Circles, with two Police Station (PS) areas selected from each. From the establishments (as a selected category) within every PS, respondents were selected maintaining certain area in the PS's (Figure 1.2).

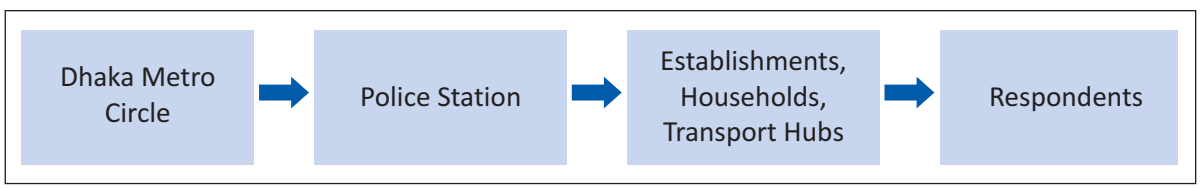
(ii) Sample size and user categories: The survey involved 774 questionnaire interviews of transport users selected from four categories: households, business establishments, educational institutions and offices (private and public). The sample size was chosen using the following formula, which gave 768 interviews (subsequently increased to 774 to keep the sample size equal between areas):

$$n = \frac{Z^2 pq}{e^2} X\ Deff$$

where,
p = Expected value of the indicator = 50%
q = (1- p)
e = Margin of error = 5%
Deff = Design effect =2
Z-score = 1.96 at standard of 95% confidence interval

(iii) Survey delivery method: The selection of specific sites for interviewing transport users was done: (a) according to bus routes of BRTA (crowded routes were selected); (b) some transport hubs or major intersections were selected such as Motijheel, Farmgate, Mohakhali.

Figure 1.2: Respondent selection process



1.4 Report structure, outputs and recommendations

The study's findings are presented in seven chapters, corresponding to the six specific objectives and the final conclusions / recommendations.

Chapter 2 explores the background to traffic congestion in Dhaka by considering the demand and supply factors. Chapter 3 examines the institutional arrangements, policies and coordination mechanisms that underpin the operation and governance of traffic management in Dhaka City.

The status of actual traffic governance on the road is discussed in Chapter 4 by assessing laws, rules and regulations enforcement. Chapter 5 analyses how the stakeholders' underlying interests affect traffic congestion in Dhaka, with two detailed case studies on bus route and footpath management.

In Chapter 6, the economic and social costs of traffic congestion are examined, as well as peoples' willingness to pay to improve the situation and reduce traffic congestion.

Finally, Chapter 7 summarises the study's overall findings, with recommendations on some ways forward to improve the overall traffic governance in Dhaka.

CHAPTER 2

EXAMINING TRAFFIC CONGESTION IN DHAKA CITY

2.1 Introduction

Traffic congestion is ubiquitous in Dhaka due to many reasons, including unplanned urbanisation and inadequate road network, increasing numbers of private and public transport, traffic rule violations by road users and lack of enforcement; reduction of effective road width due to poor street management, and lack of coordination among the concerned authorities.

For this research, it is essential to understand the different factors that create demand for transport and the resultant traffic congestion. This chapter discusses the current state of transport demand and supply in Dhaka city. It analyses demand in respect of population, housing, land use/transport interaction, rural-urban migration, urban poverty, and so on. The spatial and temporal pattern of traffic congestion in Dhaka city is also considered. The supply side situation is captured by reviewing the urban transport system, including analysis of the road network, growth of vehicles and private vehicle ownership, non-motorised transport and pedestrians, and typical transport user characteristics.

The main sources of information were: (1) secondary sources; (2) surveys carried out by the BIGD team. A transport user survey was conducted to collect travel characteristics, with 774 people interviewed. Secondly, key informant interviews (KIIs) were also conducted with 15 experts, academics and car owners to identify different issues including growth of private transport. Thirdly, in-depth interviews (IDIs) were conducted with staff of car rental services, transport users, drivers of cars and CNG-run auto rickshaws, and rickshaw pullers, to know about growth of vehicles, travel characteristics, parking, licencing etc. Fourthly, observation methods were also employed to know about parking, banning of rickshaws in arterial roads, and other traffic management issues.

2.2 Growth of Dhaka

Dhaka has been a prominent urban centre since its founding more than 400 years ago during the Mughal rule. After independence in 1971, its population increased rapidly and pressure on the limited urban land increased manifold. The result has been gross shortage of land for housing and other urban activities.

The economy of Dhaka city has experienced remarkable growth as major institutions, industries, trade and commerce have taken root. The government's macroeconomic policies have supported the concentration of economic activity in and around Dhaka, which today contains nearly one-third of the urban population of Bangladesh.

Bangladesh's urban population has increased exponentially. In 1951 the urban population was about 1.83 million or roughly 4.4% of the national total (in the East Pakistan). Today it is about 55.5 million, or 34.3% of Bangladesh's total population.

Dhaka city has accounted for a major share of this growth. In 1981, the city had an area of 749 square km with 3.45 million population (BBS, 1981). In 1990, its administrative area had increased to 906 square km and its population to 6.62 million. By 2001 Greater Dhaka had an area of 1,528 square km and nearly 10 million population (Rahman, et al., 2008). Today, the metropolitan population is over 18 million people, and Dhaka retains it's share of the national urban total (Table 2.1). A World Bank study has observed that Dhaka's density and sprawl is increasing day by day (World Bank, 2012).

Table 2.1: The primacy of Dhaka in the national and national urban context

Year	Population of Dhaka (million)	National Population (%)	Urban Population (%)
1990	6.62	6.2	31.1
1995	8.33	7.0	32.0
2000	10.28	7.8	32.9
2005	12.33	8.6	32.1
2010	14.73	9.7	32.0
2015	17.59	11.0	32.0

Source: UN, 2015

2.3 Land use / transport interaction

2.3.1 Residential location and mode choice

An analysis of urban expansion in the Dhaka metropolitan area by the European Space Agency in 2010/11 revealed that the urbanised area was 48%, but a large part of this was occupied by rural settlements and scattered built-up areas (18%). The non-urbanised area is dominated by agricultural land (43%). The study found that urban sprawl in Dhaka is clearly dominated by residential build-up, including rural settlements. The latter is a sign of gradual densification of rural settlements leading to disappearance of surrounding vegetation and gardens (World Bank, 2012). While Dhaka is growing horizontally, urban services were found inadequate for all residents. The travel demand from other urbanised areas (resulting from horizontal expansion) was also increased. As the inner city becomes denser, overcrowding increases manifold.

Horizontal expansion from the old Dhaka included the Tejgaon airport to its boundary. Three major establishments – Old Airport in Tejgaon, the Cantonment and Hazrat Shahjalal International Airport – stretch for nearly 10 km and cut the city into half. This causes obstacles to east-west movement and also to proper traffic management. An uninterrupted transport system cannot easily be developed with these barriers.

BIGD's transport user survey

To understand the transport demand of different income groups, the BIGD research team studied the relation between housing and transport mode choice. Most of the urban population of Dhaka lives in low cost housing, slum or squatter settlements: the research team looked into the reasons why do people chose to live at their current location.

In a questionnaire survey of 774 transport users, 38.2 percent identified close-to-work location as the major reason for living in their current location (Table 2.2). Suitable environment and permanent living (own house) were the two next most important reasons for place selection, with nearly 19 percent each (Annex Table A2.1).

Table 2.2: Reason for living in current location by income group

	Reason for living in current location							
	Close to the working place	Low transport cost	Availability of service	Permanent living	Less rent	Suitable environment	Other	Total
Number of Respondents	296	10	85	144	72	145	22	774
Percentage	38.2%	1.3%	11.0%	18.6%	9.3%	18.7%	2.8%	100.0%

Source: BIGD Survey, 2016 – *See Annex 2, Table A2.1 for detailed income-wise breakdown*

It is important to distinguish between the transport needs of the very poor and the low-income groups, and public transport should be targeted at the population that has the greatest potential to benefit from it. The trade-off between housing and transport costs helps households decide upon the type and amount of housing and transport services they consume. Table 2.3 conceptualises a classification of households by income to demonstrate these housing/transport trade-offs. It can be seen from the table that very poor households live in informal housing and often locate very close to their employment: examples are domestic workers that live on the western embankment near Mohammadpur and work in the vicinity. Their mobility needs are different from low-income households whose location is constrained more by housing affordability. The low- to mid-income households depend on public transport more than either very poor or high-income households. From the user survey conducted by the research team, demand for bus is consistent among all the income groups, apart from the very poor (Annex Table A2.2). Use of car is evident among the higher income group, and generally, mode diversification is more in higher income groups. About half of the users in highest income group (more than 30,000 taka monthly expenditure) use bus and a quarter of the users in that income group use car.

Table 2.3: Income level and modal choice of passenger

Income level	Housing	Mode of travel
Extreme poor	Informal housing	NMT/Walking
Poor	Inadequate housing	NMT/Walking
Low-income	Semi-adequate housing	Public transport/NMT
Lower-mid income	Less than sufficient housing	Auto-rickshaw/ Public transport
Middle income	Sufficient housing	Auto-rickshaw/ Public transport
Upper mid-income	Adequate housing	Auto-rickshaw / Taxi/Car
High income	Adequate housing	Auto-rickshaw/Car

Source: Adopted from ADB, 2007 and reorganised by the research team

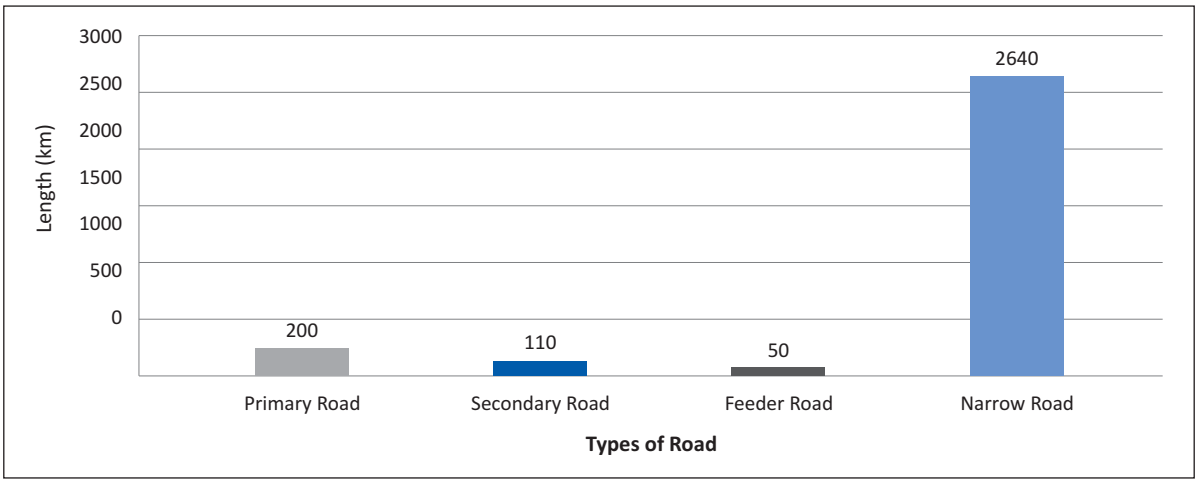
2.4 Dhaka's urban transport system

In the following section, we discuss about the different aspects of the transport system of Dhaka city. Dhaka has a low level of motorisation compared to similar cities. The number of all vehicles per 100,000 population is only 2,630 of which 2,195 (83%) are non-motorised vehicles, and seat capacity in public transport is only about 11,000 per 100,000 population (Mannan and Karim, 2001). In total, 18 different types of vehicles ply in the roads, with different speeds and dimensions which can create problems for all the road users.

2.4.1 Road network: length and capacities

Most roads built in Dhaka by various government organisations are finally handed over to the local governments[1] for maintenance, and Dhaka North and Dhaka South City Corporations are responsible for over 3,000 km of different categories of roads. The roads were constructed and expanded over the past few decades by different agencies including Roads and Highways Department (RHD), RAJUK (Capital Development Authority), Public Works Department (PWD) and City Corporation at different times. The road network has been developed in the past to meet the short-term needs and was constructed without proper planning or sufficient assessment of road user's needs. This is illustrated by the relative lack of secondary and feeder roads compared with primary roads and narrow local roads (Figure 2.1).

Figure 2.1: Road categories of Dhaka City

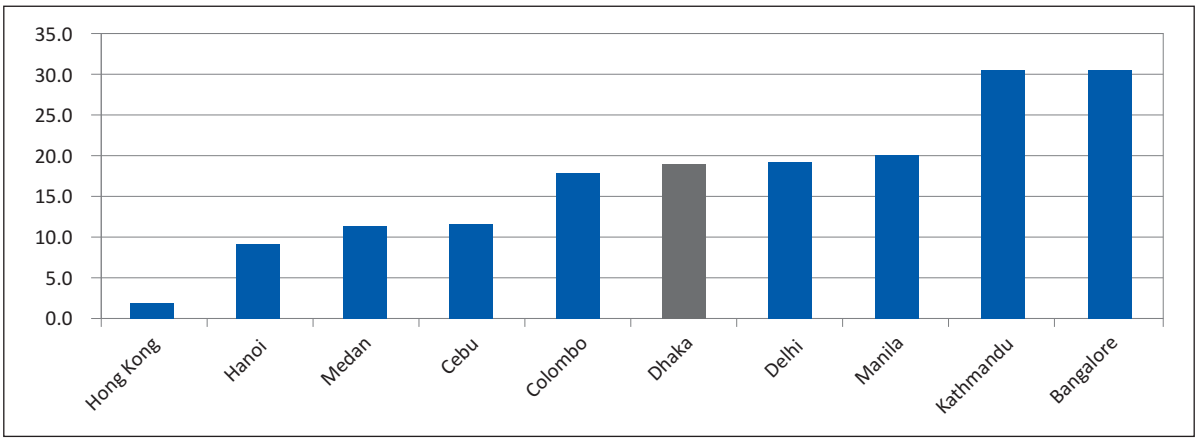


Source: Mahmud and Rabbani, 2012

A comparison of road densities in selected Asian cities in shown in Figure 2.2. It is a common perception that Dhaka does not have enough roads, yet the figure shows that the city is averagely served. However, journeys to work are dominated by north-south movements, and the 2015 Revised Strategic Transport Plan contains many proposals for east-west roads on the basis that these are in short supply.

1. This study focuses on Dhaka's two central city corporations (Dhaka North and Dhaka South). The wider metropolitan area contains many other local government bodies, including Gazipur and Narayanganj City Corporations, various Municipalities (e.g. Munshiganj, Manikganj, Narsingdi, Savar), several Upazilas (e.g. Keraniganj, Kaliakair, Bandar, Rupganj), and also specially constituted authorities such as the Cantonment Board.

Figure 2.2: Road densities in selected Asian cities (km/ sq. km)



Source: ADB City Profiles and ADB, 2007

2.4.2 Growth of private vehicles in Dhaka city

The classification system for vehicles has changed several times in the past two decades, therefore it is very hard to make year-on-year comparisons. According to Bangladesh Road Transport Authority (BRTA) data, until 31 July 2016, of the total 1,011,270 vehicles in Dhaka, there were 412,524 motorcycles, 234,512 cars, 66,297 microbuses, 30,956 jeeps, 26,095 buses and 10,149 mini buses, 8,792 auto-rickshaws and 4,769 human hauler transporting passengers. The remaining vehicles are used to transport goods (Annex Table A2.3). However, these numbers need to be interpreted with caution, as some of the vehicles actually operate outside Dhaka; also, data on vehicle scrappage is not accurately recorded. Furthermore, licences for some vehicles such as auto-rickshaws are officially restricted in number, though the number actually operating is much higher.

Motorcycles

The number of registered motor cycles is steadily increasing. Considering the traffic situation in Dhaka, motorcycle is the fastest vehicle to have. Owning a motorcycle is also easy as loans and instalments are available. On top of that, local producers have started to produce local brands of motorcycle with lower cost and incentives to buy.

Cars

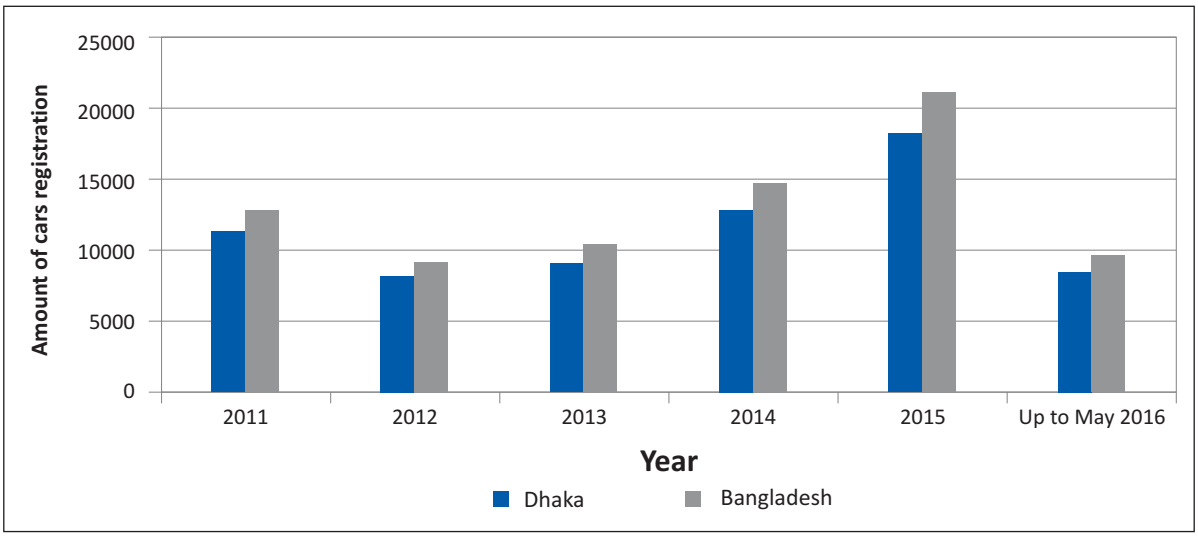
The most recent increase in car ownership in Dhaka, at 8.1% per year, is much higher than the average for Bangladesh over the same period of 5.3%. More than half of private cars in Bangladesh are registered in Dhaka (Figure 2.3). According to the government's Road Master plan (RMP)[2], by the year 2025 there could be half a million motor cars in Dhaka, a major increase compared to today. People's purchasing power is increasing with the steady economic growth, and car ownership is attractive due to comfort, safety and status, and the lack of suitable alternative public transport.

2. Ministry of Communications, Road and Highways Department, Road Master Plan, WSP Inc, 2007

There are other factors contributing to the rapid growth in car use, including the opportunity of renting out cars to development projects (as an alternative to buying), and the tendency to operate development project cars in Dhaka rather than in the project area. The low cost of CNG as fuel has also encouraged people to buy cars, and there are many workshops available in Dhaka for converting cars to CNG.

Dholai Khal, a place in Old Dhaka where motor parts are available, also has a significant contribution to keeping the motorised vehicles up and running. It provides vehicle owners with the much-needed spare parts that the original vehicle manufacturers might stop producing. Consequently, vehicles outlive their service life and blessed with low level of enforcement and corruption by regulatory authorities, are seldom declared unfit for plying on the roads. If some vehicles are unlucky enough to be removed from the street, there are options for the owners to sell these unfit vehicles to the mechanics of Dholai Khal who rebuild the vehicles as other type of private vehicles (Imran, 2009).

Figure 2.3: Car registrations in Dhaka and Bangladesh



Source: BRTA, 2016a

According to the RSTP, 2015 the modal share of passenger trips by private transport was 12% in 2014. Given the anticipated growth in car ownership, expected shares by private transport in the future could increase about three times by 2035. However, given the current level of congestion, a three-fold increase in the share by private transport is clearly not sustainable. The government's National Land Transport Policy target of 30% for car is even less sustainable. Urban transport policy must, almost by definition, focus on this modal split, and modal targets and means of achieving them are fundamental to sustainable urban transport.

In Dhaka, car use is being allowed to continue increasing without restraint. Once a vehicle is owned the normal incentives to reduce use in congested urban areas, such as fuel taxes, area licences, cordon charges, parking control and parking charges are not used in Dhaka. Hence the only incentive to reduce private transport use is traffic congestion. This is an extremely inefficient means of rationing road space. Dhaka requires a comprehensive demand management policy, including car parking controls, that is appropriate for the management of congestion and the effective functioning of land use.

2.4.3 Public transport

The RSTP states that buses and minibuses are the main mode of vehicular transport for dwellers of the Greater Dhaka Area, accounting for about 47% of all passenger trips.[3] The bus routes are increasing in number every year; however, the buses cannot complete the planned daily trips due to traffic congestion. More than one hundred bus operators are in Dhaka and each of them has a small number of vehicles. The system is hard to organise into a well-planned and coherent public transport system. Different sources confirm that many of the bus owners are linked to political parties and it is difficult for government to unify or regulate them. Many of the bus routes had sufficient operators in the past, but now they have only 1-2 operators with very few buses. It is not that these routes are not profitable; politics play a pivotal role in this regard.

The fare per kilometre is fixed by the government, but the bus owners hardly follow the rate and the passengers have to bargain with the transport worker over the fare. Buses plying in the same route compete with each other; the drivers drive aggressively to reach the stops and place their bus in the way so that their rivals cannot move forward to take passengers. This rivalry often takes up the roadway space and creates congestion. Passengers also want to get down close to their destination disregarding the official bus stops. Buses also want to take passengers from different road intersections beyond the bus stops. For example, people even wait on the step of Mohakhali flyover to take buses, as there is no bus stop after Farmgate and surround by area for the buses that use the flyover. There is lack of signage for bus stops. Some people know where the stops are, but most only know the informal stops. Even the buses do not have clear markings about their routes.

There are also many minibuses as they are easily manoeuvrable in the busy, narrow streets of Dhaka. However, minibuses increase the number of operators on the road as many people are able to put a minibus on some routes by paying bribe to the authorities.

Several organisations have bought private minibuses to transport their employees. Some other organisations also hire buses from the BRTC and owners for their employees. In addition, some employees combine to hire buses for their ease of travel. Some schools arrange buses for their student. Similarly, colleges, universities own or arrange buses for their student.

Human haulers

Human haulers (also known as Legunas, Tempos and Maxis) are also seen plying in Dhaka – these are light vans converted to carrying 8-15 passengers on regular routes (Photo 1). In addition to the major thoroughfares, human haulers run in narrow streets where buses cannot enter. They fill a niche role where there are insufficient buses, and travel faster with fewer passengers. Human haulers are notorious at changing lanes while trying to go faster on the busy road. Most of the drivers do not have licences and were formerly assistants to the drivers, collecting fares from passengers.

3. Greater Dhaka Area (GDA) consists of Dhaka, Gazipur, Manikganj, Munshiganj, Narayanganj, and Narshingdi districts

Photo 1: Human hauler is carrying more passengers for extra earning

Shared auto-rickshaws

Use of shared CNG-powered auto-rickshaw is another option for transport users in Dhaka, which has been locally developed to meet the demand of passengers. However, this para-transit has its own set of limitations– overcrowding, lack of comfort, safety, etc. These shared auto-rickshaws also run informally without any route permit from relevant authority, and their use is officially restricted in the more central areas of metropolitan Dhaka.

Auto-rickshaws

Auto-rickshaws, now powered by CNG, are another important form of passenger transport in Dhaka city. Their actual numbers are uncertain, as the number of licences is officially restricted to less than 9,000. However, some sources have suggested that there could be as many as 40,000 operating in metropolitan Dhaka (Gallagher, 2016a). Surveys carried out in 2014 for the Dhaka Revised Strategic Transport Plan found that about 9% of all passenger trips were made on auto-rickshaws (or CNG's), which was about the same proportion of passengers carried on cars, jeeps and microbuses.[4]

Four-wheeled taxis

Although four-wheeled taxis are very common in many Asian cities (for example, over 50,000 in Mumbai and over 40,000 in Kolkata), their numbers in Dhaka have stagnated at a very low level for several reasons, particularly their higher cost, and competition from smaller, cheaper alternatives such as CNG's. For the time being, and particularly in view of the growing traffic congestion, there seems to be little prospect of their numbers increasing substantially.

2.4.4 Freight transport

A daytime ban (7:00 am to 8:00 pm) on trucks and trailers (large-size trucks) has operated in Dhaka for over 15 years, enforced by the DMP. However, covered trucks can move between 10:00 am to 4:00 pm and 8:00 pm to 7:00 am. Thus, most major freight movements take place at night. Businesses suffer by

4. Source: RSTP Interim Report 2, August 2015, Fig. 11-17

this regulation since they are not able to carry their goods out from their properties or vice versa (DTCA, 2010). The garments industries located inside Dhaka reported in a recent survey that due to the daytime ban of large/commercial trucks they faced an increase in delivery time for their export items (and therefore lead time), and 25 percent of these industries reported an increase in delivery costs (Muzzini and Aparicio, 2013).

During the day, freight movements are limited to small trucks, and smaller quantities of produce (e.g. fruit and vegetables) are moved from wholesale markets to retail outlets by rickshaw, auto-rickshaw, rickshaw vans etc. These small vehicles try to carry as many goods as possible, so the vehicle weight increases and they cannot operate at their normal speed and eventually disrupt traffic flow on the road. For freight movement this is sometimes ineffective and less productive with regard to travel time and loading capacity (DTCA, 2010). In addition, these vehicles only serve some destinations since non-motorised transports are banned in some major roads.

Truck parking

In the early 1990's there were more than 10 truck terminals in Dhaka. At present, there are 6 terminals that are mainly operated and managed by Bangladesh Truck Malik Samity (BTMS) and Truck Workers Association. These terminals do not handle freight, but provide parking space for trucks. In these terminals, trucks are seen to illegally occupy roadside space causing traffic congestion. One mayor of Dhaka recently decided to do something about it, and in one location (Tejgaon) he had some success.

In the dilapidated industrial area of Tejgaon, truck drivers converted several major thoroughfares into truck terminals over the last 25 years. This occupation of road space caused congestion on the link between Satrasta crossing and Farmgate. The truck drivers claimed that lack of authorised truck parking in Tejgaon area forced them to occupy the roads illegally. Successive city corporation administrations failed to move this illegal terminal elsewhere due political patronage. The current Mayor of Dhaka North City Corporation also faced stern resistance and one day he was reported to be confined in the area by these so called transport workers, until law enforcement agencies rescued him after three hours. He promised the transport workers a terminal in one or two years' time and evicted illegal parking of truck from there. Now, from Satrasta crossing to Farmgate or Karwan Bazaar the traffic flows smoothly except for the rail crossings. Locals claim that the travel time savings is more than 30 minutes. On the other hand, parked trucks still occupy roads in the surrounding area.

The question was why the city corporation could not evict the truck parking for all these years. Discussions with local people revealed that there is a powerful syndicate in that area who grabbed around 40 bighas of land in and around the truck depot. This is a large, profitable business for the syndicate. Over the years, they received political support to run their illegal activities. This syndicate involved some transport owners and workers and was also alleged to be involved in illicit drug, arms and toll collection business. The Mayor was able to uproot the syndicate from the connecting road from Satrasta crossing to Farmgate/Karwan Bazaar; however problems still remain in other places.

2.4.5 Non-motorised transport

Rickshaws

It is difficult to provide any reliable estimate on the number of rickshaws in Dhaka city. There are nearly 80,000 officially licenced rickshaws in the Dhaka City Corporation area, but the real number may be anywhere between 800,000-1,000,000 (New Age, 2015). About 1,600,000-2,000,000 people are directly employed in the rickshaw transport, while another sizeable number is indirectly involved as makers, painters, repairers, owners and spare parts sellers of rickshaw.

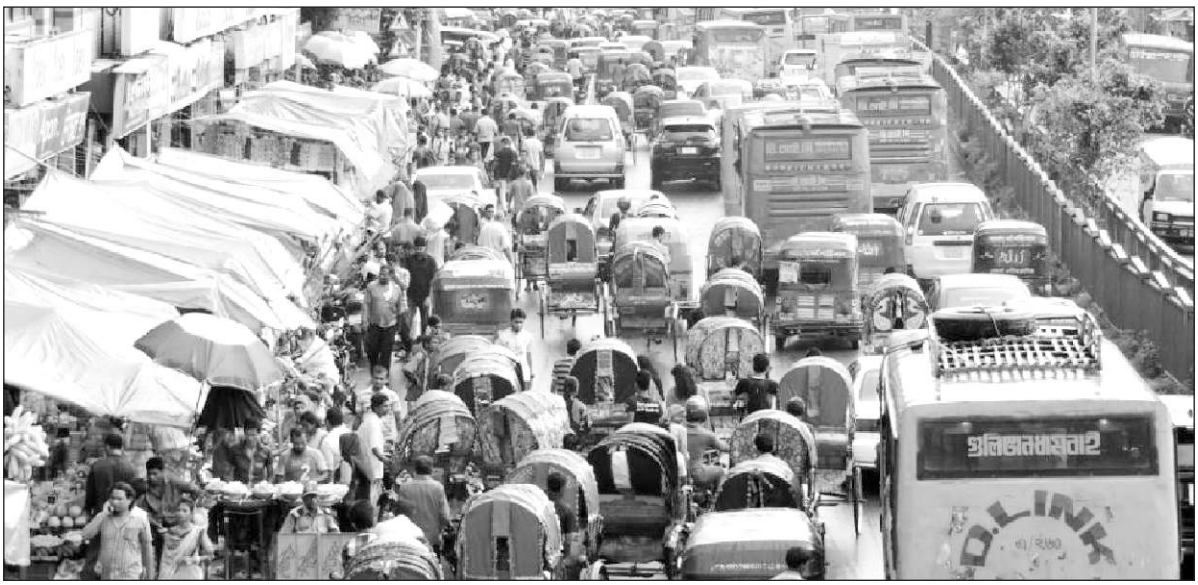
Poverty is a dominant feature in Dhaka and this has forced people to seek employment in jobs of all possible categories. Based on several studies (World Bank, 2007; CUS, 2006), rickshaw pullers and other transport workers, also hawkers and vendors, small traders, unskilled manual workers, industrial or workshop labourers and some formal sector lowest grade employees form the bulk of the male poor occupational groups. A large number of these are in-migrants from rural areas. Therefore, Dhaka will always experience supply-driven availability of rickshaws and rickshaw pullers. During the lean period in rural areas of Bangladesh, substantial numbers of able-bodied men temporarily migrate to cities looking for work. Many of them become rickshaw pullers in different cities (Box 2.1).

Box 2.1: Seasonal migrant as rickshaw puller

Matin, a rickshaw puller from Rangpur came to Dhaka 10 days back and wished to stay 5 more days for rickshaw pulling. He will go back to his village and then return to Dhaka after staying 10-15 days at his village. Matin is currently living in a rickshaw garage with other rickshaw pullers. He pays Tk.200 every day for food, lodging and rent of rickshaw. He earns more than Tk.500 each day. Apart from the regular rickshaw pullers who reside in the city, Dhaka will continue to receive these temporary rickshaw pullers as alternative income opportunities in the rural area during the lean period are absent (Rahman and Rana, 2016).

Rickshaws are often blamed for traffic congestion, and other road users often express support for the government policy of progressively banning rickshaws on major arterial roads (Photo 2). However, around 2 million people are directly or indirectly involved with operating rickshaws in Dhaka. Without proper rehabilitation of these people dependent on the income from rickshaw, government should not seek to get users out of rickshaws and into other modes.

Photo 2: Rickshaws are moving in the primary roads beside motorised transport



Banning rickshaws in some major arterial roads has caused difficulty for people living in the vicinity of those roads who do not own a car nor can afford to hire a taxi/auto-rickshaw. They are left with only one choice of bus, which is not always available and reliable. Now these people either take the overcrowded bus or walk to their destination or to a road where they can avail rickshaws. Sometimes law enforcement agencies let some rickshaw pullers to ply on the road where rickshaw was banned

(Box 2.2). The ban does not necessarily push most rickshaws out of Dhaka: some rickshaws have shifted to secondary or feeder roads where the ban is not still imposed. Therefore, with more rickshaws those roads are facing more traffic congestion than before.

Box 2.2: Banning rickshaws on a major arterial road

Manik Mia Avenue was declared as a rickshaw-free zone but some rickshaws are still plying in that area. Rickshaw pullers pay Tk.60-90 to Ansars and Traffic Police working in that area in order to pull rickshaws in Manik Mia Avenue. There is huge demand for rickshaws from the side of Aarong and also from Khamar Bari. The rickshaw pullers bribe the Ansars and Police because they will get many passengers. But without rickshaws people have to walk or avail overcrowded public transport.

Bicycles

In last five years, Bangladesh has seen significant growth in bicycle use among the urban residents. In the winter, we can see many people are using bicycle, though in the summer their number decreases. There are no dedicated lanes for bicycles and the drivers of fast moving vehicles are not sensitive to bicycle riders. Therefore, many accidents involve bicycle users. During night and in areas that are not very much crowded, bicycle riders may also be an easy victim for hoodlums. Despite all these the cyclist groups has increasing the number of members. Now the necessary industries are in place for bicycle in Bangladesh, these industries are also trying to create demand. If the roads can be made safer for cyclists then we may see an increase number of bicycle use in Dhaka as well as in Bangladesh. In Dhaka, traffic problems cannot be solved without regulating the use of rickshaw, and one possible solution can be increasing the use of bicycle.

2.4.6 Pedestrians

Pedestrians are the most important mode of transpor t in Dhaka in the sense that everyone is a pedestrian at some stage, and many public transport trips include a walking stage. Overall, at least 20 percent of all trips in Dhaka are made by walking (main mode), though this may be an underestimate as capital cities in developed countries often have walking modal shares of 30-40% (e.g. London, Berlin, Madrid, New York).

Pedestrians suffer a lot in Dhaka as they are at the bottom of the 'pecking order'. There are only 400 km of footpaths of which 40 percent are occupied by street vendors, garbage bins, or construction materials at any given time (DOE, 2009). Also, pedestrians account for up to 70 percent of road accident fatalities (ADB, 2007).

There are almost no safe zebra or traffic-signal crossings for pedestrians in Dhaka. Some 66 foot over-bridges and 3 under-passes have been constructed (Dhaka Tribune, 2014), but usually pedestrians do not prefer these facilities because of having to climb up and climb down stairways, poor maintenance and upkeep, and beggars and vendors occupying much of the space (Photo 3). Maintenance is an important issue that is often overlooked during construction, and experts urge that some funds should be kept aside for this purpose.

Due to inadequate infrastructure for pedestrians, people walk along and cross the road at will. In the urban evolution of cities such as New York, London, and Paris, they also faced problem to motivate people to respect the basic rules of the street (Morshed, 2015). To make the urban transport infrastructures functional, users need to follow certain city etiquettes. This is a big challenge for cities such as Dhaka where Bangladeshis do not have long urban history. Social campaign is needed to motivate the users to follow traffic rules.

Photo 3: Foot over-bridge is occupied by vendors in Farmgate area

2.5 Travel demand: traffic users' modal choice and distances

From the BIGD user survey, the research team found that 97.8 percent of travellers in Dhaka city make two trips in a day, and 2.2 percent generate 4 trips per day (Annex Table A2.4). The majority of these trips (56%) are within 10km, though interestingly a significant number (32%) are more than 16km (Table 2.4). Work and educational trips dominate the first trip, while the second trip is mainly trips returning home in evening time (Annex Table A2.5).

Table 2.4: Travel distance (km) according to different trip purposes (For trip 01)

Trip Purpose	Less than 5	5-10	11-15	16-20	21-25	More than 25	Total
House	1	1	0	3	2	4	11
	9.1%	9.1%	.0%	27.3%	18.2%	36.4%	100.0%
Work	83	176	68	85	24	66	502
	16.5%	35.1%	13.5%	16.9%	4.8%	13.1%	100.0%
Educational	46	101	24	29	7	18	225
	20.4%	44.9%	10.7%	12.9%	3.1%	8.0%	100.0%
Shopping	2	10	1	2	0	3	18
	11.1%	55.6%	5.6%	11.1%	.0%	16.7%	100.0%
Social	3	0	3	2	1	0	9
	33.3%	.0%	33.3%	22.2%	11.1%	.0%	100.0%
Recreation	1	3	0	1	0	0	5
	20.0%	60.0%	.0%	20.0%	.0%	.0%	100.0%
Medical treatment	0	4	0	0	0	0	4
	.0%	100.0%	.0%	.0%	.0%	.0%	100.0%
Total	136	295	96	122	34	91	774
	17.6%	38.1%	12.4%	15.8%	4.4%	11.8%	100.0%

Source: BIGD Survey, 2016

The modal choice is of course influenced by trip distance. For the first trip, the majority of users use bus for work and education, followed by rickshaw (Table 2.5). Most of the car trips (53.1%) were also for work, followed by education (39.1%). However, people also used walking, bicycle, motor cycle, CNG/Auto rickshaw for different purposes. A similar pattern was observed for the second trip (Annex Table A2.6), mostly returning home.

Table 2.5: Trip purposes by mode (Trip 01)

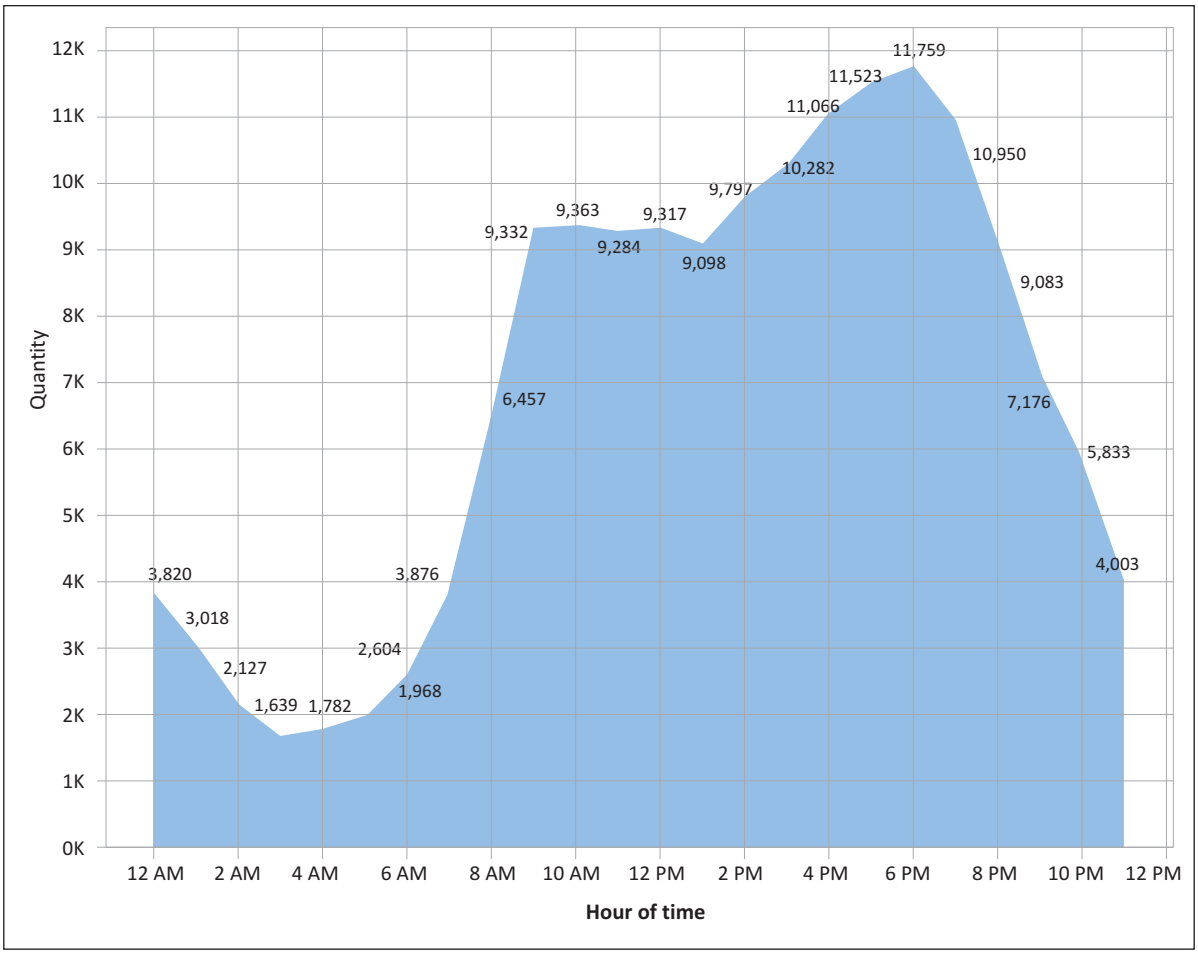
Mode	House	Work	Educational	Shopping	Social	Recreation	Medical treatment	Total
Walking	0	8	2	0	0	1	0	11
	.0%	72.7%	18.2%	.0%	.0%	9.1%	.0%	100.0%
Cycle	0	1	1	0	0	0	0	2
	.0%	50.0%	50.0%	.0%	.0%	.0%	.0%	100.0%
Motor cycle	1	10	6	0	0	0	0	17
	5.9%	58.8%	35.3%	.0%	.0%	.0%	.0%	100.0%
Bus	6	348	141	6	7	1	1	510
	1.2%	68.2%	27.6%	1.2%	1.4%	.2%	.2%	100.0%
CNG/ Auto rickshaw	2	16	4	5	1	1	2	31
	6.5%	51.6%	12.9%	16.1%	3.2%	3.2%	6.5%	100.0%
Tempo/ Leguna	0	21	9	0	0	0	0	30
	.0%	70.0%	30.0%	.0%	.0%	.0%	.0%	100.0%
Car	1	34	25	1	0	2	1	64
	1.6%	53.1%	39.1%	1.6%	.0%	3.1%	1.6%	100.0%
Microbus/ Jeep	0	2	0	0	0	0	0	2
	.0%	100.0%	.0%	.0%	.0%	.0%	.0%	100.0%
Rickshaw	1	62	37	6	1	0	0	107
	.9%	57.9%	34.6%	5.6%	.9%	.0%	.0%	100.0%
Total	11	502	225	18	9	5	4	774
	1.4%	64.9%	29.1%	2.3%	1.2%	.6%	.5%	100.0%

Source: BIGD Survey, 2016

2.6 Traffic flows and congestion in Dhaka

In 2014 Bangladesh Road Transport Authority (BRTA) and the International Growth Centre (IGC) collected hourly traffic volume data of Airport Road to Postagola Bridge (following major arterial roads) using Radio Frequency Identification (RFID) technology for tracking vehicles. The survey found that the volume of vehicles increased significantly during the morning peak from 7 am to 9 am, and then remained high from 9 am to 1 pm. Between 1 pm to 6 pm the corridor became even busier, with a maximum peak in the early evening around 6pm. After 8pm the numbers of vehicles decreased sharply (Figure 2.4).

Figure 2.4: Hourly traffic volumes in Dhaka, 1 January 2014

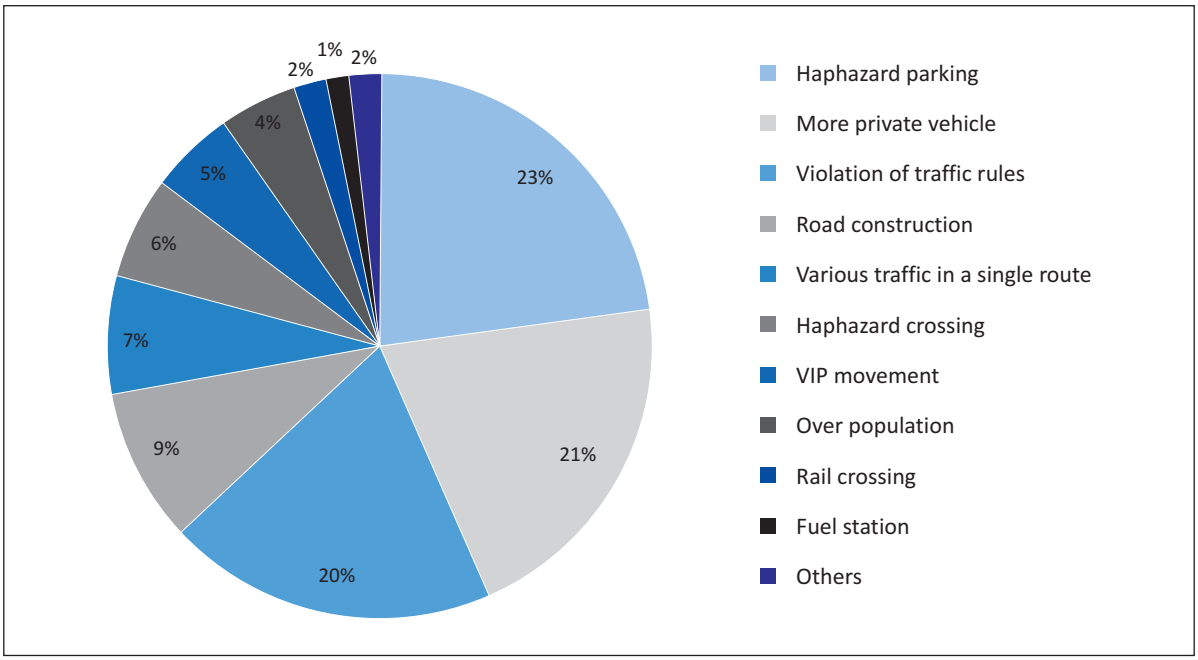


Source: IGC and BRTA, 2014[5]

The above graph of traffic flows is typical of main roads throughout Dhaka, which are often highly congested throughout much of the day. Congested primary and secondary roads result in vehicle queues, increased travel time and cost, more fuel consumption and additional pollution in the environment. To gain a better understanding of causes of traffic congestion in Dhaka, the BIGD research team collected information from transport users on their views of what caused traffic congestion. In the survey, most identified (1) haphazard parking, (2) street occupied by private transport, and (3) violation of traffic rules as the three most important causes of traffic congestion in the city (Figure 2.5).

5. For this study, BIGD has collected these data from International Growth Centre (IGC)

Figure 2.5: Causes of traffic congestion in Dhaka city, as perceived by transport users



Source: BIGD Survey, 2016

2.7 Responses to traffic congestion in Dhaka

2.7.1 Investments in urban transport infrastructure

In response to the severe traffic congestion and associated problems, only a limited number of traffic management measures have been taken in Dhaka– these include day-time bans on trucks; bans on buses and trucks over 20 years old; rickshaw bans; and other measures (ADB, 2007). However, the traffic management initiatives are often inconsistent, taken in piecemeal basis and do not last long. Sometimes we see a street is 'one way' and sometimes those streets again become 'two way street'. Rickshaws are sometimes banned in some streets; then again we find them back on those streets. We also see indiscriminate construction and dismantling of road dividers.

There are currently no significant traffic management measures to make owners of private transport pay the full economic cost of taking up more space on the roads. The government took around $3 billion loan from Japan International Cooperation Agency (JICA) to build a metro rail line (MRT) and about $250 million loan from French Government and the Asian Development Bank to build a bus rapid-transit line (BRT). However, the previous strategic transport studies have highlighted that there are also low-cost solutions to Dhaka's traffic congestion: e.g. traffic management solutions in the form of enforcing the law, increasing effective utilisation of road-space, improving the public transport system, educating transport users and drivers, and so on.

However, the fact that the strategic studies have not been implemented leaves the issue of urban transport in Dhaka in something of a policy vacuum. This vacuum is being exploited by a number of private sector enterprises who approach the government with unsolicited bids. It is observed that various offers are received by the government, with multimedia presentations from different country/agencies proposing construction of more infrastructure such as metro rail/elevated expressway/light rail etc. However, these proposals are considered in the absence of an adopted strategy for transport.

Table 2.6: Examples of agencies involved with transport infrastructure and regulation in metro Dhaka

SL	Name of the agencies	Relevant areas of responsibility
1	Dhaka Transport Co-ordination Authority (DTCA)	Policy formulation, planning and monitoring
2	Rajdhani Unnayan Kartipakkha (RAJUK)	Strategic and local planning, control of physical development, major land and infrastructure projects
3	Dhaka Metropolitan Police(DMP)	Traffic management and enforcement
4	Dhaka North City Corporation (DCC)	Infrastructure development, maintenance, traffic management, vehicle licencing and enforcement
5	Dhaka South City Corporation (DCC)	Ditto
6	Bangladesh Road Transport Authority (BRTA)	Environmental regulation and monitoring
7	Narayanganj City Corporation	Ditto
8	Gazipur City Corporation	Ditto
9	Munshiganj Municipality	Ditto
10	Manikganj Municipality	Ditto
11	Narsingdi Municipality	Ditto
12	Savar Municipality	Ditto
13	Keraniganj Upazila	Ditto
14	Bandar Upazila	Ditto
15	Kaliakair Upazila	Ditto
16	Bandar Upazila	Ditto
17	Rupganj Upazila	Ditto
18	Dhaka Zilla Parishad	Co-ordination of district-wise development activities
19	Department of Environment (DoE)	Regulation of motor vehicles, drivers and bus routes
20	Roads and Highways Department (RHD)	Major highways (construction and maintenance); also highway design standards
21	Bangladesh Bridge Authority	Major bridges and elevated expressways (construction and maintenance)
22	Local Government Engineering Department (LGED)	Supervision of Upazila planning and infrastructure; also design and construction of flyovers
23	Bangladesh Railway	Railway construction and operation
24	Bangladesh Inland Water Transport Authority (BIWTA)	Management of waterways and ferry ghats; regulation of private water transport
25	Bangladesh Inland Water Transport Corporation (BIWTC)	Operation of government-owned ferries and water transport
26	Bangladesh Road Transport Corporation (BRTC)	Operation of road transport (government-owned buses and truck fleet)
27	Cantonment Board	Management of Dhaka Cantonment
28	Bangladesh Army	Operation of Dhaka Cantonment, and contractor for major road and bridge projects
29	Bangladesh Airforce	Management of Tejgaon Airport and military operation of Hazrat Shahjalal International Airport
30	Civil Aviation Authority, Bangladesh	Regulatory body for all civil aviation affairs, including airport management
31	Dhaka Mass Transit Company Limited	Operational authority for new MRT, under DTCA

Source: *The above list does not include the Ministries who are responsible at a higher level for the above organisations; nor the utility organisations (e.g. Dhaka WASA, Titas Gas, Bangladesh Telecommunications Company (BTCL), Dhaka Electric Supply Company (DESCO), etc., who provide services and dig up roads; nor the official government committees established to manage specific aspects of transport in Dhaka.*

Another (DTCA, DSCC, DNCC, BRTA, DMP, RAJUK) obstacle to reducing congestion is the lack of coordination among the agencies involved. Six agencies are primarily involved in transport or the enforcement and regulation of transport in Dhaka, and at least 25 other agencies under different ministries also have significant responsibilities, leading to a very complex situation for coordinating Dhaka's transport (Table 2.6). This is considered in more detail in the next chapter.

2.7.2 Driver licences and enforcement

Traffic rules violation by drivers is another major cause of congestion in Dhaka city. Newspapers reports that only 50 percent of bus drivers and less than half of CNG-run auto-rickshaw drivers had proper licences (Hobbes, 2014). Traffic police are on the street to enforce the law; however they take bribes to overlook fake, expired, or non-existence of licence and other necessary paperwork. Traffic police do not want to dry up their income stream by enforcing the law strictly; and updating and regularising the licencing system is crippled by corruption and inefficiencies.

BRTA, the agency responsible for issuing licences to drivers, is marred with widespread corruption and massive irregularities.[6] It is alleged that people seeking different services from BRTA are hostage to brokers who openly control issuance of driving licence, registration of new vehicles, fitness certificates etc. It is observed that drivers lack proper training and many of them receive their licence by giving bribe varied from Tk.100 to Tk.7,000 and without even appear in the driving test. The licencing process described by BRTA would cost Tk.7,500 and take five to seven months to get the licence. Brokers can arrange a licence in two to three months costing Tk.10,000. Even bypassing the driving test could be possible if anyone hires a broker. In August 2015, The High Court asked the government to seize 18.77 lakh 'fake driving licences' and take action against the holders of fake licences (New Age, 2015). In a recent TV program, BRTA are termed as 'Babura Rashik Takar Ashik' (Fancy officers who loves money). A series of TV programmes was telecast on what goes on in BRTA while issuing licences and fitness certificates. Ongoing digitisation may help to some extent to curb corruption; however the syndicate among the brokers, BRTA staff, political party adherents and others may continue to undermine the licencing system. A common suggestion for curbing traffic congestion is to create separate lanes for different types of vehicles. However, experts argue that urban dwellers will not obey traffic lights unless they accept it as the basic need of a functioning street (Morshed, 2015). The recent young migrant from rural areas who becomes a bus driver has no knowledge of, nor incentive, to follow basic traffic laws.

Issues regarding enforcement are discussed further in Chapter 4.

2.8 Conclusion

This chapter examined the current state of transport demand and supply in Dhaka city, particularly the demand factors relating to population, housing, land use/transport interaction, rural-urban migration, urban poverty and so on. The supply side situation was reviewed considering the road network, growth of vehicles, non-motorised transport and pedestrians, and typical transport user travel patterns. Various surveys were conducted to collect information about the transport users and the issues relating to management of the transport system.

6. Source: Key Informant Interviews (KII's)

The obvious cause of Dhaka's traffic congestion problems is demand fast-outstripping the availability of transport infrastructure. To tackle this congestion, the popular view is to build more infrastructure through a combination of flyovers, elevated expressways, metro-railways, and so on. However, policymakers have tended to overlook the management perspectives of traffic congestion. This chapter has observed, based on the transport users survey and interviews with key informants and stakeholders, that institutional and management factors underlie most of the traffic congestion problems; for example:

- The road network was developed in the past to meet the short-term needs but without proper planning or sufficient assessment of road user's needs. This resulted particularly in under-provision of east-west roads and secondary and feeder roads.
- Car use is being allowed to continue increasing without restraint. The normal management measures used in other world cities to reduce private car use in congested urban areas, such as parking controls and parking charges, area licences, cordon charges, and higher fuel taxes, are not being used in Dhaka.
- The bus system has evolved haphazardly and is difficult to organise into a coherent and well-planned public transport system.
- There is acute lack of provision for pedestrians, and poor maintenance and management of footways.
- Traffic rules violations by drivers are closely linked to poor management by the regulatory agencies, particularly BRTA in the issuing of licences.
- Co-ordination of government organisations is a major challenge, with so many agencies having responsibilities for transport in Dhaka (more than 31).

The BIGD survey of transport users found that most identified management issues as the main causes of traffic congestion, particularly: (1) haphazard parking, (2) streets occupied by private transport, and (3) violation of traffic rules.

Therefore traffic management, including restraint of private transport, can play a good role to reduce congestion. The following chapters now examine the institutional issues in greater depth. Chapter 3 examines the policy and institutional framework for traffic management in Dhaka, especially strategic plan-making and co-ordination of activities. Chapter 4 focuses on enforcement of traffic laws. Chapter 5 considers the management of bus routes and sidewalks, and Chapter 6 looks at the costs of traffic congestion in Dhaka as experienced by the transport users.

CHAPTER 3

POLICY AND INSTITUTIONAL FRAMEWORK OF TRAFFIC MANAGEMENT IN DHAKA CITY

3.1 Introduction

This chapter examines the policy and institutional framework for traffic management in Dhaka, and focuses on strategic planning and co-ordination. Whilst a considerable number of policies and institutions are employed to ensure the orderly and timely flow of traffic, nevertheless Dhaka's traffic congestion is increasing. Against this backdrop, the chapter argues that congestion can be reduced to a large extent with an integrated visionary policy and effective implementation, together with good coordination among key agencies related to traffic management.

In Dhaka city, traffic congestion is not only a problem of transportation engineering; it is also the result of broken bureaucracy and ad-hoc planning (Morshed, 2015). As the city continues to grow toward the anticipated 36 million people and beyond (Salam, 2012), the policy paradigm has to shift from urban transport infrastructure development to sustainable urban transport system management (Pardo, 2011). Such a policy requires appropriate institutional arrangements (Talukdar, 2013).

To this end, the objective of this chapter is to understand the challenges to effective implementation and coordination. The chapter poses the following key questions: “What is the existing policy and institutional arrangement of the traffic/transport in Dhaka, and what are the challenges and gaps in policies and institutions regarding traffic management in Dhaka city?”

To examine these questions, four main survey methods were employed: (1) research of secondary sources; (2) key informant interviews (KIIs), as described in the previous chapters; (3) in-depth interviews (IDIs) with transport users; (4) a 'score-card methodology', which enabled government institutions to carry out self-evaluation based on their experience in coordinating with other organisations regarding traffic management. One score-card was completed by each institution, for the following six key institutions:

- Dhaka Transport Co-ordination Authority (DTCA)
- Dhaka North City Corporation (DNCC)
- Dhaka South City Corporation (DSCC)
- Dhaka Metropolitan Police (DMP)

- Rajdhani Unnayan Kartipakkha (RAJUK)
- Bangladesh Road Transport Authority (BRTA)

This chapter presents the findings in two sections. The first section (3.2) discusses the policy framework of transport in Dhaka city including some historical perspectives; it also discusses challenges in formulating and implementing policies, and examples from around the world. The second section (3.3) discusses the institutional arrangements and coordination. Its sub-sections look in-depth at the organisations to consider their capacity, accountability and transparency as well as gaps and challenges in coordination.

3.2 Policy framework and institutions: transport in Dhaka city

3.2.1 Historical perspective: policies, plans and institutions

The history of transport policy in Dhaka can be traced back to when it was a busy port during the Mughal era. During that period, the first basis of today's urban transport was initiated with the surfaced road in Dhaka in 1679 under the governorship of Prince Muhammad Azam (GoB, 1975). Since the road was constructed, horse carriages appeared in the early 19th century (Dhaka Calling, 2009). The need for an urban management authority triggered the authorities to establish a 'Town Improvement Committee' in 1823. Within seven years of forming the committee, many roads were widened and 34 years later, in 1864, the Municipal Improvement Act was adopted. This was perhaps the first institution that allowed the authority to plan and manage the city. According to the Act, an elected Municipal Committee was formed (Act III B.C. of 1864). Under this committee, Dr. Henry Catliffe, an appointed consultant, published a study report on Dhaka city in which he recommended to establish two broad streets running parallel by the Guriganga river for the whole length of the city, and extending to the countryside to allow for future growth. However, the recommendation was not implemented largely due to financial incapability and unwillingness of the Municipal Commissioners to double the taxes; partly also because the nature of authority to avoid popular discontent (Sharifuddin, 1990). The authority did, however, introduce a tax in 1865 on wheeled carriages, horses and elephants, in order to meet the costs of road management. Nine years later, an important policy was adopted under which all hackney-carriages were taken into a registration system and pedestrians were provided with the guideline for safely walking on roads.

In 1917, the first well-documented planning report on Dhaka City was published by Patrick Geddes in which he recommended cleaning and deepening the canal, and opening it for water transport (which he described as “the best and incomparably cheapest of communication– better than the current bullock carts)”. However, as happened before the bureaucrats' minds were on Dhaka-Narayanganj communications rather than considering the recommendations being implemented.

In 1939 the first transport regulation 'Motor Vehicles Act' was enacted. The Act was meant to regulate driving licences, vehicle registrations, fitness certificates and route permits, etc.

After the British period ended, Dhaka's transportation system began to change and grow during the East Pakistan period. In 1953 the 'Town Improvement Act' was passed and the Dhaka Improvement Trust (DIT) was created. Six year later, DIT engaged consultants to prepare the first Dhaka Master Plan, in 1959.

Since independence in 1971, Dhaka has experienced as explosion in population, physical size and vehicle numbers (Gallagher, 2010). Various transport projects, plans and policies were initiated to meet the city's needs. In 1983 'The Motor Vehicle Act 1939' was repealed and a new Ordinance (The Motor Vehicles Ordinance, 1983 [Ordinance No. LV of 1983]) was promulgated. Dhaka Transport Coordination Board (DTCB) was established under the Dhaka Transport Coordination Board Act 2001. In 2012 this body was formally re-constituted as the Dhaka Transport Coordination Authority (DTCA). Previously, in 2005 the DTCB had laid out a comprehensive transport plan called the 'Strategic Transport Plan' (STP) for the greater Dhaka city and its adjoining areas. This plan was revised in 2015 by DTCA with JICA support as the draft 'Revised Strategic Transport Plan' (RSTP).

Present-day institutions for transport

In response to Dhaka's expanding population and growing demand for transport, various institutions have been established sequentially. At present over 31 agencies have responsibilities in the transportation sector in Dhaka, and most are stakeholders of different transportation projects (see Table 2.6 in the previous chapter). Among them, several government agencies and institutions play a leading role in managing Dhaka's transportation and are mainly in four types, based on their mandates and responsibilities:

(i) Formulating policy and plans

(ii) Developing infrastructure and maintenance

(iii) Regulatory role

(iv) Enforcing laws on the road

Six agencies in particular play a key role in managing Dhaka city's transportation (Table 3.1). It is worth noting that most are not new entities, though they may have new names, mandates and responsibilities.

Table 3.1: Six key agencies for transportation of Dhaka city and their responsibilities

Sl	Name of agencies	Name of act/ ordiance/rules followed	Type of authority	Key responsibilities
1	Dhaka Transport Co-ordination Authority (DTCA)	Dhaka Transport Coordination Authority Act, 2012	Policy formulation, planning and monitoring	• Formulation of strategic transport planning and urban transport policy; • Coordination of transport related activities in the Dhaka Metorpoliton Area (DMA); • Setting Public Transport Policies and Guidelines; • Traffic Management Planning and Monitoring; • Traffic Safety Initiatives
2	Dhaka North City Corporation (DNCC)	The Local Government (City Corporation) (Amendment) Act, 2011	Infrastructure development, maintenance and enforcement	• Maintenance and development of the city streets/roads/lanes • Maintenance and operation of street lights and traffic signals • Sweeping and clearing of streets, roads, lanes, drains, markets and public places
3	Dhaka South City Corporation (DSCC)			
4	Dhaka Metropolitan Police (DMP)	The Motor Vehicles Ordinance,1983,The Dhaka Metropolitan Police Ordinance,1976	Traffic management and enforcement	• Parking • Lane Discipline • Footpath and Pedestrian crossing

Sl	Name of agencies	Name of act/ordiance/ rules followed	Type of authority	Key responsibilities
5	Rajdhani Unnayan Kartipakkha (RAJUK):	The Town Improvement Act, 1953 and Dhaka Improvement Trust (Allotment of Land) Rule, 1969	Planning, approval	• Preparation of Master Plan and Development Plan for Dhaka Metropolitan Area • Land Use Planning and Zoning Control • Detailed Area Planning • Planning and construction of new major roads, link roads, bridges and culverts • Planned housing areas within the city • Satellite Town Development • Construction of markets and shopping centers • Implementation of special projects
6	Bangladesh Road Transport Authority (BRTA):	The Motor Vehicles Ordinance, 1983	Regulatory	• Regulation and registration of motor vehicles in Bangladesh • Issuance of driving licences to individuals • Issuance of route permits for transport vehicles • Issuance of certificates of roadworthiness for motor vehicles • Identification of new bus routes and public transport services • Identification of defective and faulty vehicles • Responsibility for road safety and the control of overloading of trucks • Formulation of rules and guidelines for motorised transport in general • Inspection of government vehicles • Inspection of vehicles involved in road collisions • Registration of driver training schools and maintenance

Source: DMP, BRTA, RAJUK, DSCC, DNCC, DTCA, 2016

Some general comments can be made about transport policy and practice in Dhaka over the years. Generally, although various policies were introduced, these tended to be improvised in response to immediate problems and needs, and there was lack of long-term vision and planning. The policies mainly focused on instant results rather than improving the city and achieving long term goals. Moreover, a lack of integration is visible in all aspects of transportation. With these limitations, the policies and plans faced major challenges for implementation. Politics also strongly influenced the process; all of the government regimes tried to avoid popular discontent and put emphasis on visible infrastructural development (rather than traffic management). It is also observed that different institution or agencies were established and managed different aspects of transportation, but in practice were not integrated under an independent and unique authority – despite the formation of the Dhaka Transport Co-ordinating Board in 2001.

3.2.2 Recent strategic plans for Dhaka's transportation

Since the independence of Bangladesh, the government has had numerous strategies and projects to improve Dhaka' transportation. These are summarised in Table 3.2 below.

One of the early projects was 'National Physical Planning Project' taken by Urban Development Directorate (UDD) in 1976; this project looked at national physical planning and many aspects were related to Dhaka. In 1980, the 'Dhaka Metropolitan Area Integrated Development Project' was taken and this project looked at land use and transportation. In 1991, the government created a Task Force and prepared a report on urbanisation, with various recommendations including proposals for decentralisation and transport improvements.

In 1992, a major metropolitan study named 'Dhaka Integrated Transport Study' (DITS) was commissioned under the Planning Commission, with UNDP support. It was the first full-scale study on Dhaka city's transport. This study produced short, medium and long term proposals for all aspects of transportation, infrastructure and management in the Dhaka area, though the proposals were largely drawn up by foreign consultants with only limited participation from government agencies (Gallagher, 2010).

From 1996 to 2005 the 'Dhaka Urban Transport Project' (DUTP) was initiated in three different phases with World Bank support. DUTP Phase-I focused on review of DITS and preliminary design of urgent transport improvements (e.g. traffic management and junction improvements, operations, institutional measures, etc). Phase-II focused on feasibility and detailed design of project components, and Phase-III (implementation phase) focused on development of urban transport infrastructure such as roads, flyovers, bus priorities, terminals, vehicle fleets and management, strengthening of institutions and policy support.

In 2005 the 'Strategic Transport Plan' (STP) for Dhaka was prepared as a component of the DUTP, and set out a 20-year transport strategy for Dhaka and proposals for long-term infrastructure development as well as short-term management improvements. The STP proposed $5.5bn transport investment in total (in 2005 prices), including three metro rail lines, three BRT (bus rapid transit) routes, an elevated expressway and numerous main road improvements. However, apart from some new main roads, none of the major transport investments (such as MRT, BRT or elevated expressway) were implemented during the first ten years of the STP period, and very few traffic management reforms were implemented either.

In 2014-15 a new 'Revised Strategic Transport Plan' (RSTP) was prepared for Dhaka with Japan International Co-operation Agency (JICA) support. As with previous studies, this was largely prepared by foreign consultants, and proposed a much larger scale of investment in Dhaka's urban transport system: $45bn of public investment over the next twenty years (2015-35), including 5 metro rail lines, 2 BRT routes and 6 elevated expressways. To implement Dhaka's first metro railway, the Dhaka Mass Rapid Transit Development Project (DMRTDP) was initiated in 2012, and is currently under construction with a target opening date for 2020.

Table 3.2: List of (some) major projects concerned with transport and land use planning in Dhaka, since 1971

Year	Project	Main focus
1976-82	National Physical Planning Project	National physical planning. Many aspects related to Dhaka
1980-1	Dhaka Metropolitan Area Integrated Development Project	Land use and transportation (all aspects)
1991	Bangladesh Government Task Force Report on Urbanisation	Proposals for decentralisation and transport improvements
1992-4	Dhaka Integrated Transport Study (DITS)	Short, medium and long-term proposals for transport infrastructure and management
1992-5	Dhaka Metropolitan Development Project (DMDP)–Phase1	Land-use planning, including structure plan, master plan, area action plans and multi-sectoral investment plan
1994	Urban Land Management Project, Bangladesh	Land use management
1996	2nd Road Rehabilitation & Maintenance Project	Road Safety in Bangladesh

Year	Project	Main focus
1997	Dhaka Eastern Study (Halcrow)	Flood control and Eastern Bypass
1996-8	Integration of Non-Motorised Transport in Dhaka City	Regulatory measures and traffic management for rickshaws
1996-7	Dhaka Urban Transport Project (DUTP), Phase 1	Review of DITS, and preliminary design of urgent transport improvements
1997-8	Dhaka Urban Transport Project (DUTP), Phase 2	Feasibility and detailed design of project components
1998-2005	Dhaka Urban Transport Project (DUTP), Phase 3	Development of urban transport infrastructure; strengthening of institutions; and policy support
2001-2	Urban Transport and Environment Improvement Study	Air quality improvements through emissions control and traffic management
2004-5	Strategic Transport Plan for Dhaka (STP)	Preparation of Dhaka's transport strategy
2007-8	Detailed Area Plans for Six Areas of Dhaka	Detail area plan
2009-14	Clean Air and Sustainable Environment Project	Brick kilns and traffic management/ restructuring in Dhaka, including BRT
2009-10	Dhaka Urban Transport Network Development Study (DHUTS)	Feasibility of mass transit in Dhaka
2012	Dhaka Mass Rapid Transit Development Project (DMRTDP)	Effective & smart transportation, safe & environment friendly transportation and arrange mass transit facilities for Dhaka.
2013	National Integrated Multimodal Transport policy	National transport policy
2015	Revised Strategic Transport Plan for Dhaka (RSTP)	Preparation of Dhaka's transport strategy

Source: Adopted from different documents of Ministries and agencies of Government and reorganised by research team of BIGD

3.2.3 Policy-making and coordination – gaps and challenges

To formulate a policy a ministry must have the necessary staff capacity and also the ability to coordinate relevant agencies, set the priorities and the strategy for implementation. Typically, in the policy-making process in Bangladesh, a ministry will create a committee accommodating all the relevant departments and agencies. Usually, the ministry who initiates the policy will lead the committee. The process is complex and has to undergo constant negotiations among key stakeholders. On top of this, the policy-making process is also challenged by various other factors, which include:

- Lack of coordination among key agencies
- Lack of appropriate manpower
- Lack of logistical support, and
- Lack of vision / realism

Lack of coordination among key agencies involved in Dhaka's transportation is evident. Each and every agency formulates policy separately and it has been suggested that policy-making in isolation is an inherent problem in our system. The isolation can be noticed especially during the planning stage. Once the policy is drafted, ministries usually share the policy with relevant stakeholders as if "going through process" (i.e. token consultation). For instance; in the 2005 STP the MRT line was designed to end at Jatrabari; subsequently, however, this was not possible due to a flyover being constructed by another agency. Hence the MRT route had to be revised and terminated at Motijheel instead.

During BIGD's research some experts commented about the procedure of meeting and decision-taking: 'in most cases the lead agency is pre-determined about their decision or plan so the meeting/discussion with other agencies is only a formality to be maintained'. Greater Dhaka Transport Planning and Coordination Board (GDTPCB) is an example of failure to implement or undertake responsibilities (Box 3.1).

Box 3.1: GDTPCB responsibilities or implementation failure

City transportation is complex and requires coordination. In 1998, the GDTPCB was established following a recommendation from the 1992 DITS project, and formally became the Dhaka Transport Coordination Board (DTCB) under an Act of 2001, prompted by the 1996-2005 Dhaka Urban Transport Project.

The DTCB purpose was to co-ordinate transport activities and formulate strategic transport planning policies across the metropolitan area (STP, 2005). The Board was headed by the Mayor of Dhaka and included senior representatives of government and local government organisations related to transport and planning in Greater Dhaka. However, the experience of the DTCB proved disappointing, and in November 2009 the government announced that the Board would be converted to a Mass Transit Authority. Throughout its eight years the DTCB suffered from shortages of staff and equipment, and limited ability to influence other government organisations (Ershad, 2009).

In 2012, the Dhaka Transport Coordination Authority (DTCA) was established under an act, replacing the former DTCB. In an interview for the BIGD study, a senior official stated that DTCA is still facing obstacles and has only limited influence over other agencies. It is now trying to link as an organ under the Prime Minister's office, which could potentially empower DTCA and give it more influence other agencies related to transportation.

To give other examples of the lack of coordination, one respondent said that 'in the planning period RAJUK does not know about the plans of City Corporations for road construction in this year, and BRTA does not know DMP's plan about the management of traffic flow. Agencies take their decision their own way then sit together for discussion to justify their decisions. In this process, if experts or consultants do not agree with the decision they just keep quiet in the meeting, or sometimes they are kept out of the meeting altogether'.

Lack of appropriate manpower: Beside the lack of coordination among key agencies, a lack of appropriate manpower for formulating policy also hinders the process. RAJUK, the chief authority for planning, had less than half of a dozen planners in 1990 for its 1,530 square km and millions of people (Islam, 1999), and only 10 urban planners in 2007 for a metropolitan city of 12 million people (Mahmud, 2007)[1]. A lack of appropriate manpower is also evident in the City Corporations. A Traffic Engineering Department (TED) was created in DCC in 2000 with 18 staff to control and manage the traffic in Dhaka city. But lacking the trained technical manpower, DCC has not been capable of taking control of Dhaka's traffic signal system, and DMP continues to fill the vacuum, while using subjective manual techniques instead of modern automated systems (STP, 2005).

1. Md. Akter Mahmud, August 2007, 'Corruption in Plan Permission Process in RAJUK: A Study of Violations and Proposals', TI-Bangladesh, page 13

During BIGD's survey most of the respondents mentioned that lack of skilled manpower is a major problem for the traffic management agencies. Some experts say that the government has good policies for traffic management but lacks the skilled manpower who can understand the policies and processes accordingly.

Lack of logistics including information and equipment are also challenging issues. Although Dhaka remains one of the least motorised capitals in Asia, there are serious information gaps. The actual number of motor vehicles in Dhaka today is uncertain, and various sources quote widely different numbers (STP, 2005). Another example is given by an ex-chairman of BRTA: he mentioned that BRTA is responsible for assessing the frequency of vehicle and trips; for this they should conduct origin and destination (OD) surveys regularly but they could not because BRTA does have not updated information about Dhaka city transport modes. He gave an example: BRTA's last OD survey was conducted during STP formulation (in 2005), but after that they have not been able to do any. Other surveys have since been done by transport consultants, but these are ad hoc and not updated on a regular basis.

Lack of vision/realism: However, the most crucial issue in Dhaka's urban transport system is the tendency to prefer major infrastructure development projects (such as new roads, flyovers, bus acquisitions) which have big financial implications, while less costly non-infrastructure measures such as travel demand management and traffic management are largely ignored (Akhter, 2009). Similarly, some important transport issues tend to be overlooked or 'swept under the carpet'. Rickshaws in Dhaka, for example, are thought to number six lakhs (STP, 2005), but there is no policy framework for them. Although the issue was recognised in the STP, no comprehensive policy framework was developed. And without a realistic vision, no effective policy can be implemented.

In interviews, some respondents mentioned that RAJUK's plan is not always realistic. They use a unique standard value of land-use ratio for the entire city whereas Motijheel and Gulshan, for example, are of different physical and geographical structure and land use. Similarly, parking planning is absent or sometimes unrealistic. The land use and parking plans should be different for different areas of Dhaka city, and also well-coordinated.

For such visionary policy making, the emphasis should be on strengthening the government agencies with training, equipment, re-organisation and recruitment; however, the institutions seem reluctant to develop their capacities and effectiveness (Gallagher, 2010).

3.2.4 Implementation – gaps and challenges

While policy-making suffers from many challenges, the same is true of the implementation process. Most respondents said that the policy actors do not respond according to recommendations: the government receives many recommendations but often does not integrate these recommendations in a proper way. Policy-makers make the policy by motivating their own interest, sometimes even for the vested interest; even different interest groups play their role according to their benefit. This study found some particular challenges in implementing policies, including:

- Lack of capacity or interest to enforce
- Non-compliance by transport users
- Politics and political economy

Lack of capacity/interest: As with policy-making, the implementation phase often suffers from structural inertia. For example, RAJUK is responsible for planning and approving land use and building plans. Monitoring and enforcing of development is also their mandate. But they have less expertise and less concern over enforcement issues. Respondents mentioned that coordination in planning between RAJUK and private builders or developers is rarely seen in Dhaka city, and consequently the RAJUK plans are not appropriately followed.

Non-motorised transport is another example. The City Corporations are the authority for issuing licences of non-motorised vehicles like rickshaw, but they have not issued licences for a long time. During consultation, an official of DNCC said that they started issuing licences again after a long time, but "only for owners, not for the drivers of the rickshaw."

Pedestrian and bicycle facilities are another example- one respondent said the existing STP and RSTP policies are good enough but the government authority did not respond according to policy. For instance, STP gave more importance to footpaths but in reality there is less budget for this item. Similarly, STP recommended more focus on non-motorised transport but in annual budgets almost nothing is allocated for improving non-motorised transport.

Non-compliance by transport users: During consultations, an official of DNCC talked about user behaviour and the problem of enforcing parking policy. He said RAJUK had built a multi-storied car parking facility at Gulshan but very few people use the facilities; instead, dwellers of this area often park on the road. He also commented about the failure to enforce the parking law and raised a question with frustration that in our socio-political reality, "can you enforce the parking laws against the 'powerful' persons?"

Political economy: As Dhaka grows, the government is looking at various transport alternatives, including MRT (Mass Rapid Transit), BRT (Bus Rapid Transit), light rail, heavy rail, metro /underground rail, and also thinking about the express highway. But in setting the priorities, they tend to focus on highly visible projects even if these are more costly. During BIGD consultations a DNCC official was asked why MRT was first priority to implement instead of BRT which is cost-effective in constructing and operating. His answer was "government always takes an initiative or project considering public demand" (Box 3.2).

Other respondents mentioned that the political gain of government and monetary benefit of interest groups often underlie the policy. The interest groups include foreign companies, automobile industry, media propaganda, contractors, consultants, political influentials and ministry personnel. The respondents mentioned that a strong political economy is working behind the preference for capital-intensive schemes – the various interest groups have less interest in low budget and short duration projects.

The metro rail project was suggested as an example. The cost was originally estimated in 2011 at $1.7 billion but definitely it will not be completed within this budget. The respondent believed that a minimum fare of Tk.200 would be needed for a metro rail journey from Uttara to Motijheel, otherwise the investment and operating cost would not be covered. Based on this calculation, the respondent asked how many passengers would be interested to pay this amount. On the other hand if the projected passengers do not use metro train service then how to cover the cost of operation? So government would have to subsidise the metro rail's operation and maintenance.

Box 3.2: Jatrabari Flyover: another example of emphasis on capital-intensive projects?

An example was given by one of the respondents about Jatrabari Flyover. This was constructed by PPP (Public Private Partnership) and as per agreement a private company invested and will collect revenue from each vehicle for a certain span of time. The project predicted an amount of revenue per annum; however, in practice it will not possible to generate and collect the estimated amount of revenue per annum which was calculated earlier, so the government will have to pay the rest of the amount to the private company. It is observed that the flyover is not used by as many vehicles as was estimated before its construction. The City Corporation is obliged to pay rest of the money if the private company does not get the specified amount according to the contract. Records show that the Dhaka South City Corporation paid a huge amount of money in the last fiscal year to the private company for Jatrabari flyover, because of the agreement.

3.2.5 Lessons from other countries – policy tools to combat congestion

Dhaka has its own particular characteristics, so there is no one single model or policy lesson from other countries that can be applied to solve the congestion issue. However, some lessons (both good and bad) can be learnt from other's experience, and are presented in this section.

Transport demand management: Many cities around the world are implementing various transport demand management strategies to reduce traffic congestion and achieve planning objectives, as a complementary policy to infrastructure investment (CAI-Asia 2007; Strompen et al., 2012). In Seoul, the policy focus has shifted towards "human-oriented transportation". In achieving this, the city leverages on the use of Intelligent Transportation Systems (ITS)[2] so as to provide high quality transport infrastructure and improve services (Hayashi, 2004). Shanghai, on the other hand, restructured its transport planning by implementing an auction system to restrict private car ownership. Shanghai's auction system is limited to private cars only, where a fixed number of private car licences are available for public auction every month. This initiative has reduced the tendency of buying private cars.

Other cities like Tokyo have adopted a parking policy in which the proof-of-parking requires car-buyers to secure a night-time parking place before registering a car (Cheong and Loh 2013). Singapore uses congestion charging to manage congestion along heavy corridors including traffic inflow to the central area. Based on a pay-as-you-use principle, motorists are charged when they use priced roads during peak hours. The Electronic Road Pricing (ERP) rates vary for different roads and time periods, depending on local traffic conditions.

Besides policy tools to restrict motorised vehicles, some cities emphasise policies to encourage bicycles. Bogota and Copenhagen are two cities which have improved their traffic management by implementing bicycle-related policies in the city. The Bogotá and Copenhagen examples are useful because their cycling policies were part of a broader set of policies which created positive feedback to the other transport systems (Pardo, 2011).

2. Intelligent Transportation Systems (ITS) involves the application of information and communication technologies to road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport. (EU Directive 2010/40/EU, 7 July 2010). It includes measures such as traffic signal control, number plate recognition, congestion charging, parking controls, variable message signs, passenger real-time information, smart cards, and so on.

Less successful examples: Cairo and Kolkata

Cairo: As in Dhaka, Cairo's travel demands are rapidly increasing and citizens face serious problems of congested corridors, traffic delay and crowded buses (Ali *et al.* 2009). Cairo had 19 million population in 2010, but is different to Dhaka in the sense that private car transport is much greater (70 percent of all road vehicles) and bus use is lower (only 8% of road vehicles) (World Bank, 2012)[3]. However, the city authorities' response is very similar, prioritising major infrastructure projects of new elevated roads, parking garages, improved buses and metro network expansion, but giving low emphasis to traffic management and travel demand management. A World Bank-funded study in 2010 found traffic problems very similar to Dhaka: "There are many causes for traffic congestion in Cairo. Fuel subsidies make gasoline and diesel inexpensive, encouraging more private cars on the road, and even large investments in highways will not keep pace with growing traffic congestion. Cars are either circulating or parked on the streets, thereby blocking the traffic, since there are no or few parking facilities. The metro ridership is high, but the metro coverage is very limited for a city as big as Cairo, and buses are few and old. Minibuses and taxis help transporting a lot of people, but generally need to be safer, cleaner and be able to pick up and drop off passengers more easily. There are few road crossings for pedestrians and sidewalks are often blocked by vendors. There are also few traffic lights and intersections, and U-turns are badly managed and slow traffic substantially. Drivers' behaviour and poor enforcement often result in the general disregard of traffic rules" (World Bank, 2012).

The Cairo traffic congestion study recommended the gradual removal of fuel subsidies and the introduction of parking charges, which would contribute to reducing private vehicle use as well as generating the necessary funds for public transport investments. The study concluded: "This combination of 'carrot' (good and affordable public transport) and 'stick' (increased cost for the use of private vehicles) is the most sustainable way forward for reducing traffic congestion and costs in Cairo" (World Bank, 2012).

Kolkata: Kolkata is a metropolitan city in West Bengal with 14.1 million people in 2011 and an area of 187 square km. In search of employment opportunities, people migrate to Kolkata from rural areas of West Bengal and neighbouring states. Similar to Dhaka, Kolkata also suffers illegal occupation of footpaths and streets by street vendors. Due to unplanned growth, Kolkata is also suffering from traffic congestion in the central areas and on main corridors. Some experts have suggested building flyovers; however, land is scarce to do that. Private transport is also increasing rapidly but the government does little to discourage it. Cars occupy the majority of road space but carry only 6 percent of total people whereas public transport carries 76 percent of people (Chakrabartty and Gupta, 2014). The number of vehicles in Kolkata has doubled from 1996 to 2011, and as a result, the roads are gridlocked. Private car ownership has also increased from a mere 2 per cent to 11 per cent 1998-2011, and two wheelers from 5.7 percent to 16.5 percent.

If the city continues to be designed for the car owners and ignore the public transport users and pedestrians, the traffic congestion will be exacerbated. Indian commentators have suggested that a congestion charge in Kolkata's Central Business District (CBD) area in the morning peak hours from 9 am to 11 am would discourage the private transport to make unnecessary trips. The charge could be collected by automated machines, installed in the target area with the help of the private sector.

3. World Bank, August 2012, 'Traffic Congestion in Cairo: An Overview of the Causes as well as Possible Solutions', Document 71852. See also World Bank, November 2010, 'Cairo Traffic Congestion Study, Phase 1, Final Report'.

3.3 Institutional arrangement and coordination

As discussed in the previous section, six key organisations including DMP, DTCA, RAJUK, DSCC, DNCC and BRTA play an important role in Dhaka's traffic management. In looking at coordination among the institutions, it is important to understand their capacity, accountability mechanisms and transparency. Here, 'capacity' is understood to mean the available human resource and the skills of the organisations. 'Accountability' on the other hand, is framed by three indicators including internal, external and auditing processes. 'Internal' is the way the institute is held accountable for its doings and 'external' denotes the process through which the organisation is accountable to external organisation(s). The auditing process, on the other hand, is whether an institute is audited by internal or external authorities as well as whether reports are published on the web. 'Transparency' is observed by the process of sharing traffic-related data and information including audit report, annual report, and budget of the organisation.

This section includes a case study on digital traffic signaling systems in Dhaka to illustrate how coordination among organisations has taken place in practice.

3.3.1 Institutional capacity, accountability and transparency

Human resource constraints: In the BIGD score-card survey of the six institutions, shortage of human resources was a common issue for all. However, their requirements need to be understood in the context of each individual organisation, as they do not perform or function in the same way nor have the same mandates or objectives.

If the sanctioned human resources are considered as per the organograms of the institutions, none have met the need (Table 3.3). Among them, RAJUK (905) and BRTA (573) have the largest number of staff though not all are directly related to traffic management. The city corporations, on the other hand are equipped with almost all the sanctioned human resources, but their staff numbers are few in comparison with other organisations.

However, the institutions also have to be judged through the lens of effective use of existing resources. For example, regarding RAJUK's role in preventing illegal establishments and enforcing parking space in residential and commercial buildings, and BRTA's role in controlling unfit vehicles, very little has been done and the authorities give the excuse of the shortage of human resources for this. On the other hand, positions that involve financial incentives are rarely found vacant.

In other situations, the available human resources are sometimes underestimated. For example, in interview it was revealed that DMP has a strong feeling that their human resources are far below the need, as the traffic congestion has been spreading to residential areas and additional traffic police are required. However, the DMP interviewee did not take into account the large number of auxiliary forces under their command, including Ansar and Community Police. Currently, these auxiliary forces are not effectively used due to lack of enforcement power. So the human resources issue is not simply staff numbers, but also how effectively they are utilised.

This human resource issue applies to other institutions besides DMP. The city corporations, for example, out-sourced the traffic signal management system to private companies for a certain amount of yearly rent. However, the quantity of human resource does not ensure the capacity of the institution, unless they are skilled enough to perform.

Lack of appropriate skills: The lack of skilled human resources is one of the key issues in Dhaka's traffic management. In almost all of the organisations, most of the technical positions lack staff with the

required expertise. Usually the organisational arrangement is such that staff cannot develop expertise as they are frequently transferred and replaced by someone without experience of traffic management. In DTCA, RAJUK and the two DCC's, many technical positions are filled with civil engineers and bureaucrats. Another challenge is that many institutes are structured in a way that senior positions are generally filled with external officers whereas the internal staff (recruited by the institution) are only promoted to a certain level. Having few opportunities to be promoted to the top positions, the structural problem underpins the ownership and impacts on the effectiveness of the employee. Furthermore, there is a tendency among institutions to try to be self-sufficient – i.e. they have to be able to carry out all functions themselves, rather than rely on other agencies. Such a mind-set has created additional demands for manpower, which results in additional cost but with limited output.

Table 3.3: Six traffic/key institutions: human resource capacity, accountability and transparency related to traffic management

Institutions	Mandate	Human resource		Budget availability online	Transparency				Accountability		
		Sanctioned staff	Available staff		Annual report	Data	Audit report	Citizen charter	Internal	External	Auditing process (by Auditor General (AG) and Internal Audit)
BRTA	• Regulate, control, manage and ensure discipline in the road transport sector and road safety	823	573	NA	A	A	A	A	Monthly meeting	To Ministry of Road Transport and Bridges	Audit General (yearly)
DSCC	• Improve the traffic signaling and related works. construct the foot over bridges, underpasses and develop low lying areas.	8	7	A	NA	A	NA	A	Monthly meeting	Board meeting at Ministry of Local Government, Rural Development and Cooperatives	Internal audit
DNCC	• Improve the traffic signalling and related works. construct the foot over bridges, underpasses and develop low lying areas.	8	7	A	NA	A	NA	A	Monthly meeting	Ministry of Local Government, Rural Development and Cooperatives	Internal audit
DTCA	• To advise the concerned agencies on an integrated and safe traffic and transportation system for Dhaka. • Co-ordinate the traffic and transportation infrastructure development plan. To formulate strategic planning and to co-ordinate inter agency co-operation	175	11	NA	A	A	NA	A	Monthly meeting	Board meeting at Ministry of Road Transport and Bridges	No audits by AG or Internal
RAJUK	• To prepare development plans, widening roads and reduce congestions. Lay out plans for better traffic circulation,	NA	905	A	A	A	NA	A	Monthly meeting	Board meeting at Ministry of Housing and Public Works	External audit
DMP	• To maintain smooth flow of traffic in the city. Enforcing Traffic laws	-	NA	NA	NA	NA	NA	A	Line manager	Monthly meeting at DMP	Internal audit

- A=Available , NA=Not Available

Source: Interviews and score-cards with individual organisations, 2016; DMP, BRTA, RAJUK, DSCC, DNCC, DTCA, 2016

Budget allocations and transparency: The score-card survey and interviews found that all of the key institutions were dissatisfied with the budget allocation process. Their dissatisfaction included overall budget and various opportunities related to budget. None of the organisations have a separate budget for traffic management (except for some specific projects). Regarding availability of online budgets, except for the city corporations and RAJUK none of the institutions publish their budgets online (Table 3.3). Even with those who had published, it was difficult to identify and justify the rationale of the budget allocation and its necessity according to their mandate. Similarly, there was no clear indication of how much was spent for which purpose of traffic management.

Without a clear estimation of total expenditure for traffic management by a particular organisation, it is difficult to justify the effectiveness of budget. This is also challenging due to many organisations having individual projects for traffic management. However, according to a BUET expert, such separate allotment and implementation of budget causes overlapping and duplication of resources.

In understanding transparency, it is worth noting that among the six key organisations, only BRTA has all the criteria existing and DMP has none except for a Citizens' Charter with few details (Table 3.3). BRTA has updated its data and information to a large extent compared to other organisations. DMP, on the other hand, doesn't have on-line data which is essential for traffic management, including traffic law, diversion of roads and services. Other organisations including the city corporations, DTCA and RAJUK have no annual report published (Table 3.3). It is disappointing that none of the organisations except BRTA has an audit report available on-line. Overall, therefore, there is considerable scope for organisations to improve their visibility and public transparency.

Internal accountability: For the institutions, the monthly internal meeting is found the most common internal accountability mechanism. DMP is an exception: they perceive that the way they work has in-built internal accountability. They work as a team so they always connect with each other via Walki-Talki or mobile and consult in taking any decision. DMP also practices a 'rewards system' in terms of individual staff acquiring points against defined enforcement standards, such as putting a 'wrecker' (tow-away vehicle) to a truck is set as 3 points. However, this does not tell anything about the organisation's accountability; other than only the performance of an individual. It is not sure that to what extent this points system has improved enforcement effectiveness, but to some extent this practice has inspired many officers who have been awarded for getting highest points. The possibility of applying this incentive scheme more widely is worth considering.

Internal accountability in fact is difficult to describe as 'accountability', as the meeting minutes and resolutions are not available and there is no evidence that can show any action has been taken, in the event of any charge for wrong-doing (Table 3.3).

External accountability: The board meeting in the ministry is considered as the main process to hold the organisation accountable to the external authority. In general, such meetings are held every three months in which they are accountable as an organisation to the ministry. Among the six organisations, four different ministries are responsible: (i) Ministry of Road Transport and Bridges, (ii) Ministry of Housing and Public Works (iii) Ministry of Local Government, Rural Development and Cooperatives, and (iv) Ministry of Home Affairs

The diffusion of external responsibility over so many ministries makes co-ordination of a single issue (traffic management) much more difficult, while reducing the overall accountability. Each organisation is accountable for its actions according to its ministerial mandate rather than its contribution to improving the traffic situation. This is perhaps the most important coordination challenge facing traffic management in Dhaka city.

In theory, the key organisations should be aligned with DTCA so that co-ordination of their activities could be more effective. However, DTCA as legal entity does not have such enforcement capacity. If the key organisations could be accountable to some extent to DTCA, this would empower DTCA and would help to promote effective coordination. The mechanism for external accountability to DTCA could be based on the compliance and performance of responsible authorities in overall traffic governance.

Auditing process: BIGD also looked at the auditing process of the organisations. Among the six key institutions, only BRTA and RAJUK are audited yearly by the Auditor General Authority, while DTCA does not have any auditing process (Table 3.3). The other three organisations have their own audit department, though according to experts, internal audit alone is not sufficient. However, all the aid-funded projects are audited by development partners.

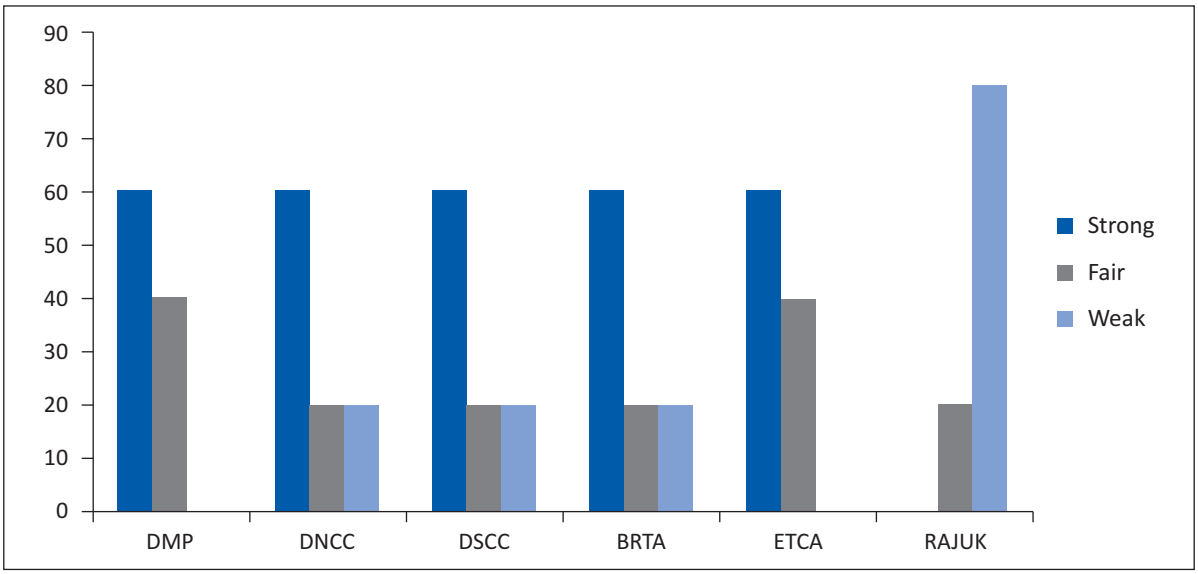
3.3.2 Institutional coordination: gaps and challenges

The institutional challenges are rooted in the structure of the organisations and their mandates. For traffic management in Dhaka city we have key six institutions with different mandates and goals and strategies. Their rules of business have been the key challenge in managing a single issue like traffic congestion, and in interview, some organisations mentioned about the overlapping mandate in making flyovers and developing roads.

At field level there is even less cooperation. While senior management hold meetings at organisational level, field officers are often un-informed about the decision. They are often surprised by each other's initiatives as they work separately. Road works, for example, cause enormous and unexpected challenges for DMP to keep the traffic flowing. Frequent political and social events create unprecedented impacts on traffic congestion. Parking and footpath occupation are common but the responsible organisations are often absent at ground level to deal with the problem.

In understanding how the organisations feel about their inter-cooperation, the challenges were evident in the score-card results (Figure 3.1).

Figure 3.1: Views on coordination for traffic management among key institutions in Dhaka City



Source: BIGD score-card survey, 2016. Numbers show percentage of respondents (out of six), including the organisation's assessment of itself.

RAJUK was rated the weakest in cooperation among the six institutions. About 80% of respondents reported this, and the remaining 20% rated RAJUK as only 'fair' (Figure 3.1). The other five organisations were rated 60% 'strong' in cooperation, with DMP and DTCA scoring higher than DNCC, DSCC and BRTA in the 'fair' category.

The interviews revealed why RAJUK is felt so weak. Experts say the challenges Dhaka city is now facing is largely due to the failure of RAJUK: on the one hand RAJUK focuses on land-use policy without keeping the mobility of people in mind, and on the other it lacks capacity to enforce the plan. Moreover, most of the time RAJUK shares its plans with traffic-related stakeholders only when the plan is published, not earlier during the plan-making stages.

New co-ordination challenges: development of Dhaka's mass transit systems

Realising the coordination gaps and challenges, the government decided to reconstitute DTCB as DTCA particularly to co-ordinate the development of mass transport in Dhaka. In theory DTCA has the power to co-ordinate other organisations, but as discussed above it lacks enforcement or controlling power. It also lacks the trained manpower. Underneath DTCA, new operational companies are being established to run the MRT and (soon) the BRT. The metro rail company (Dhaka Mass Transit Company Limited, DMTCL) was established in 2014 by act of parliament to design, build and run the metro. A similar separate company is being developed for the BRT. It is too soon to say how effective DTCA will be in coordinating these new organisations, but it seems likely that unless the above issues can be addressed– namely, insufficient enforcement power and human resources – the problems may persist (Box 3.3).

Box 3.3: Digital traffic signal system in Dhaka – an example of coordination failure

On 26th of May, 2015, traffic signal lights were put on in Dhaka and transport users were instructed to follow them. As 26th and 27 th were public holidays, traffic was light and no major problems were encountered. But on 28th May in evening, the city was paralysed in gridlock and the traffic system entirely collapsed. As of media report, the situation got so bad that at 9.30 pm the DMP commissioner called for switching off the digital signal lights and reverting to manual control.

The digital signals were installed by Dhaka Transport Cooperation Authority (DTCA) with cooperation of Dhaka City Corporation. Under the Clean Air and Sustainable Environment (CASE) project financed by World Bank in 2010-12, DTCA and DCC installed solar-powered automatic traffic signals at 70 intersections, spending about Tk.15 crore. The automatic signaling system was piloted as an objective of the project. On 28th May, however, the pilot ended with chaos and failure. The day after the event, the authorities blamed each other for this failure. In interviews with BIGD, no organisation, particularly DTCA, DCC or DMP, took responsibility for this. However, the lack of coordination was evident and the problem seems deep-rooted.

Firstly the allocation of management responsibility for traffic signals is still a fragile one. From the beginning of the signaling system in 1977, RAJUK was in charge. Thereafter, in 1980 it shifted to DMP and two years later (1982) DCC was assigned. Since then DCC has been in charge of maintaining traffic lights and countdown timers, but DMP retains authority for manual supervision and control of the junctions (Anonymous, 2016). However, the Tk.15 crore CASE project was implemented by DTCA not DCC or DMP. Authority has been overlapping and human resources including quantity and quality have not been developed within a single institution.

The traffic signals example illustrates the importance of coordination at the planning as well as implementation level. However, it seems organisations have learnt very little from the past. Various institutions are now proposing to initiate different projects for digital signaling systems. BRTA, for example, has initiated an Intelligent Transport System (ITS) using Radio Frequency Identification (RFI) number plate installation and sensors at intersections to track movement of vehicles to bring greater discipline and improve services in the transport sector. DTCA, on the other hand, is going to pilot a new project funded by JICA to install camera-based sensors in some points of the city. This would enable the traffic signaling system to set timings based on the volume of vehicles sensed by camera. In addition, a manually-operated digital signaling system is going to be installed with an aim to bring the vehicles under lighting system. In addition, DMP is also preparing to upgrade the central digital control system.

Hence all of the organisations are taking initiatives according to their rules of business and mandates. In doing so, they are expanding through deploying human and technical resources, and allotting additional budgets for the same purpose. The overlapping initiatives seem non-cooperative and likely to result in misuse of resources and inefficiency in dealing with traffic management.

A better approach could be to develop the traffic management system in phases: firstly, bring greater discipline on the roads by a clearer definition of which roads are suitable for particular vehicles; secondly, the intelligent traffic information has to be in place and well-coordinated among the organisations. In addition, a central body has to be assigned and equipped with sufficient human resource and training, to coordinate the relevant agencies.

3.4 Conclusion

This chapter has shown that there is very limited coordination among the relevant institutions in Dhaka in preparing their transport policies and plans, from inception to the end of the project. Moreover, having a large number of human resources involved separately in each organisation often results in excessive demand for staff and overlapping resources.

Regarding skill capacity, almost every organisation lacks the right people in place. Technical positions are often filled by non-technical persons, which make the organisation less effective and on the other hand creates internal tensions.

Regarding accountability, very few organisations have monitoring processes except for monthly meetings and there is no evidence that such meetings hold anyone to account. External accountability largely depends on the meeting with superiors in the line ministry. This poses a challenge to hold any organisation accountable for particular traffic congestion and related problems. Auditing processes are also very weak, and there is very little transparency.

Overall, therefore, Dhaka's transport system is being managed by organisations that are internally challenged, as well as externally lacking in co-ordination. How this plays out in practice is examined in the next chapter, which looks at enforcement of road user behaviour and also the vehicle fleet.

CHAPTER 4

ENFORCEMENT OF TRAFFIC LAWS: CURRENT STATUS AND OPTIONS FOR IMPROVEMENT

4.1 Introduction

This chapter focuses on traffic law enforcement. It is seen that to tackle traffic congestion, the government authorities have taken many steps but largely in vain as vehicles remain stuck on the roads every day. Among government organisations, BRTA has the authority to regulate vehicles and drivers on the roads through their activities of licencing, registration etc., and Dhaka Metropolitan Police (DMP) is the key organisation for managing vehicle movement, as authorised by the DMP Ordinance 1976 and the Bangladesh Motor Vehicle Ordinance 1983. But both organisations face major challenges in implementing their responsibilities.

Surprisingly, the rate of increase in vehicles is not matched with an increased rate of government personnel and logistics to manage those vehicles. Moreover, actions to ensure law enforcement sometimes create new obstacles to the normal flow of vehicles, which is the reverse of the aim of maintaining a sound traffic flow. The city is plagued with continuous congestion as a result of these challenges and weaknesses. Along with other possible solutions, proper enforcement of traffic laws is one option to significantly reduce congestion (Prothom Alo, 2014). This is supported by the research literature: enforcement weaknesses such as easy process of getting licence or certificate, law-breaking tendencies, irregularities by relevant stakeholders and poor behavioural pattern of pedestrians all contribute to the weakness in traffic management (Mahmud et al., 2012 and Chowdhury, 2003).

As mentioned in previous chapters, there have been many steps taken to reduce traffic congestion in Dhaka city – for example, prohibition of trucks in the city during daytime, banning rickshaw on several roads, changing the lanes of public-private transport, construction of foot over-bridges rather than zebra crossings, construction of flyovers, overpasses and so on. Even, the issue is considered by the High Court Division of the country (Daily Samakal, 2015). Nevertheless, the congestion problem remains largely unsolved. This chapter focuses on the pros and cons of traffic law enforcement as part of the congestion problem, and examines the following research questions in particular:

- What are the roles of stakeholders regarding law enforcement?
- What are the forms of breach of traffic laws and how these are addressed?
- What are the gaps and way forward in case of traffic law enforcement?

Methodology

For this chapter a mixed-method approach is adopted, including review of available literature and both qualitative and quantitative surveys. As part of the qualitative method, Key Informant Interviews (KII's) were conducted with stakeholders. For the quantitative research, a questionnaire survey was conducted with 774 respondents from various establishments – offices, businesses, educational institutions and households of the city. The findings show the current scenario of traffic congestion, including factors and practices which affect congestion and recommendations stated by the respondents.

The chapter contains six sections. The next section (4.2) outlines the laws regarding traffic congestion with specific focus on the Bangladesh Motor Vehicle Ordinance 1983 and DMP Ordinance 1976. Section 4.3 contains discussion regarding law enforcement by responsible authorities with a focus on BRTA and DMP. Section 4.4 presents the users' perspectives on enforcement of traffic laws and Section 4.5 presents proposals about major challenges and way out regarding law enforcement. Section 4.6 sums up the overall chapter discussion.

4.2 Laws regarding road traffic management

Traffic management in the city is primarily based on the Bangladesh Motor Vehicles Ordinance 1983 and the DMP Ordinance 1976[1].

The Bangladesh Motor Vehicles Ordinance 1983[2] defines vehicle and road user provisions that must be maintained and penalties[3] for violating these provisions. The violations include, for example, driving without licences, driving when unfit to drive, driving recklessly, driving under the influence of drink or drug, driving uninsured vehicle, fitting and using of prohibited horns or other sound producing device, using of motor vehicles emitting smokes, using vehicle in unsafe condition, racing or a trial of speed, contravening the ordinance in case of vehicle sale or alteration, taking vehicle without authority, using of motor vehicle without registration or certificate of fitness or permit and exceeding permissible weight. Other provisions relate to obstruction and refusal of information, offences relating to accidents, and many other forms of disobedience of orders (Annex Table A4.1).

The DMP Ordinance 1976 empowers the police to regulate and control traffic, prevent constructions in the streets, and enforce the rules, regulations or orders made under the Ordinance. It incorporates provisions and penalties for violation of traffic regulations, such as parking at wrong place, obstructing footway, causing obstruction in street or public places, making or repairing vehicle in street or public place, and many other provisions.

Further details of penalties under the DMP Ordinance are given in Annex Table A 4.2.

1. To a lesser extent the City Corporation Act, 2009 is also relevant. It gives the city corporations various traffic management responsibilities such as licencing of non-motorised vehicles, control over transport vehicle movements and traffic signals, fixing travel fares, management of bus and truck terminals and so on.
2. A new act called the draft Road Transport Act 2015 is currently under consideration by the government to replace the Motor Vehicles Ordinance (MVO). However the MVO, 1983 remains in force for the time being.
3. See Annex Table A 4.1 for details.

4.3 Law enforcement by key authorities

4.3.1 BRTA: tasks and jurisdictions

BRTA is the main regulatory authority to control, manage and maintain standards in the road transport sector in Bangladesh. It controls vehicle registration, ownership transfer, fitness and tax token, route permit, number plate, driving licence and driving competency test board. BRTA also undertakes awareness-building activities (such as advertisement through posters), and implements legal actions in case of breach of law. One such measure is the 'Mobile Court' which is instrumental in maintaining law and order of traffic in Dhaka city.

A 'Mobile Court' is a moveable court established under the Mobile Courts Act 2009 with powers to enforce laws immediately. BRTA arranges for the mobile courts, which are conducted by Executive Magistrates and District Magistrates and supported by law enforcement authorities (like the police). Their powers in case of violation of law include search, seizure, disposal, and on-the-spot penalties. Table 4.1 shows the activities of the Mobile Court during one year from October 2015 to September 2016.

Table 4.1: Penalties by Mobile Court in Dhaka City

Month	Mobile court	No of cases	Total fine (Tk)	Vehicle seizures	Sent to jail	Seize of paper
October 2015	29	469	480000	64	13	36
November 2015	97	1337	1020800	170	21	33
December 2015	59	877	820600	150	14	29
January 2016	86	1120	998550	263	83	23
February 2016	75	1130	798950	220	153	23
March 2016	61	811	832550	101	10	23
April 2016	69	856	798500	135	5	26
May 2016	57	751	757500	113	9	49
June 2016	56	810	822490	96	12	54
July 2016	38	473	647600	45	5	33
August 2016	55	634	825000	34	48	55
September 2016	51	769	790950	21	33	44
Total (12 Months)	**733**	**10037**	**9593490**	**1412**	**406**	**428**

Source: BRTA, 2016c

Table 4.1 shows that 589 Mobile Court operations took place during this 9-month period and 8,161 legal cases were filed. The courts witnessed 1,312 vehicle seizures, 296 cases of seizing papers, 320 cases of sending victim to jail and fines totalling over Tk.73 lakhs.

Are the Mobile Courts effective? While the system may not be at its most effective level, nonetheless it helps to make the situation better. Although the public tendency is to disregard the traffic rules, but the mobile courts are found useful in many cases including traffic control. At the places where mobile courts are conducted the situation usually improves at least for some days.

4.3.2 DMP: tasks and jurisdictions

In recent decades the transport sector in Bangladesh has witnessed rapid increase and high fatality rates along with upward trend of congestion (Box 4.1). As the responsible authority for enforcement, Bangladesh Police prepared 'the Bangladesh Police Strategic Plan 2012-2014' with the goal to 'Enforce law fairly and firmly, maximise use of existing road infrastructure and facilitate safe operation of transport throughout the country.' Principal transport targets of the plan are to:

- Promote vehicular and pedestrian traffic management in a more professional manner and arrange traffic awareness programs quarterly to sensitise road users about road safety; also plan in dealing with large crowds at special events
- Impress authorities concerned to consult with BP while designing flyover, overpass, bus bay and other road infrastructure and contact authorities concerned to prepare and introduce parking plan in all metropolitan areas. Coordinate with BRTA, DTCA, BRTC, Accident Research Institute and other agencies related to traffic management
- Impart training on road accident investigation and take steps to have road accident cases investigated in metropolitan areas; train traffic officers at home and abroad to take new initiatives and discharge their duties more efficiently and professionally
- Take steps gradually to free roads from illegal occupations to ensure that maximum road spaces can be utilised; gradual shift from manual to accredited traffic signals in metropolitan areas and provide BP with access to the auto signaling system
- Highways to be freed from traffic congestion and impress the government to relocate market places from highways to safer places (at least half a kilometer away from highways). Restrict non-motorised or battery-operated vehicles from plying in the metropolitan areas and on the highways
- Identify black spots on highways and make road users aware to be careful while crossing those spots; at the same time increase the capacity and strength of highway police and traffic police, while providing them with increased financial and service benefits.

Box 4.1: E-Traffic Prosecution

The e-Traffic Prosecution system was launched in the capital to bring transparency to the process of collecting fines from vehicle owners and passers-by breaking traffic rules. Dhaka Metropolitan Police operates the system. Traffic police can file cases against offenders and the lawbreakers can also pay fines through mobile phones. Even people are also able to check the papers of cars, driving licences and other required documents through SMS service over phones.

[Source: Daily Star, September 25, 2012]

DMP enforcement activities

As mentioned above, DMP performs the role of enforcing authority at field level and in case of any violation of traffic laws, there are arrangements of legal cases, fines, seizing, towing away and dumping of vehicles.

A sample of three days of enforcement activity by DMP in June 2016 (Table 4.2) shows that DMP actions included seizing 6 cars and 17 motorbikes and filing 8,574 legal cases against violation of traffic rules by vehicle drivers. The violations included using hydraulic horn, hunter beacon lights, driving on the wrong side and using prohibited tinted window glass. These three days also witnessed 793 vehicles being towed away ('wrecking'), 178 vehicles dumping, and total fines of over TK.11 lakh.

Table 4.2: DMP enforcement action against violations of traffic laws (sample of 3 days)

Penalties for violation of law	June 18, 2016	June 20, 2016	June 24, 2016	Total (3 days)
Legal cases	2954	2992	2628	8574
Wrecking truck (Tow-away)	279	343	171	793
Dumping	70	78	30	178
Seizing motorbikes	7	6	4	17
Seizing cars	3	1	2	6
Fines (Tk)	3,91,150	4,78,100	2,34,000	11,03,250

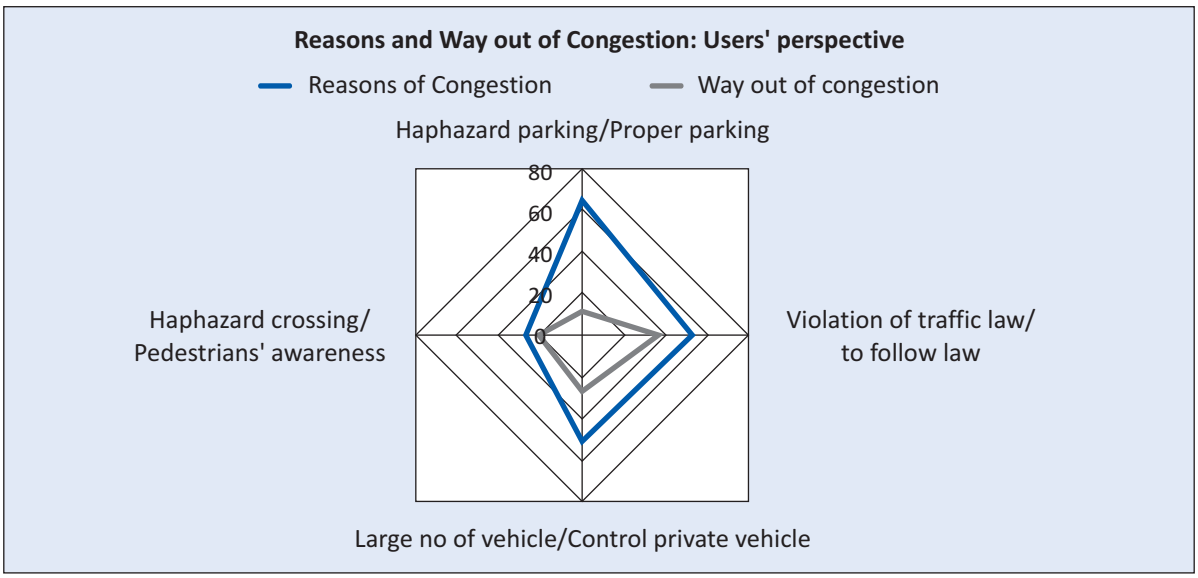
Source: DMP News, June 2016. Note – data relates to four zones of DMP

4.4 User perspectives on enforcement of traffic laws

The following section describes the findings of BIGD's transport user survey regarding reasons for traffic congestion, and the users' perceptions of how the situation could be improved.

Among the main reasons for congestion, the majority of respondents identified (i) haphazard parking; (ii) violation of laws like signal lane and random road crossing by pedestrians; and (iii) the large number of private vehicles on the roads. Respondents thought that if these issues could be addressed, congestion could be reduced significantly. Thus the causes of the problem and the possible ways out were very closely related (see Fig. 4.1).

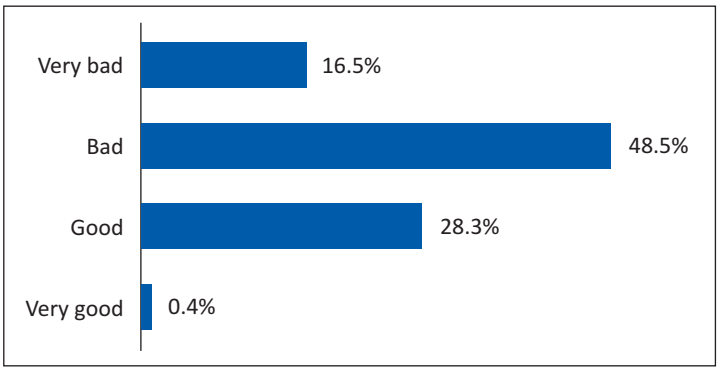
Figure 4.1: Users' views on reasons and way out of congestion



Source: BIGD Survey, 2016

4.4.1 Public transport – evaluation of users' perspective

Figure 4.2: Users' evaluation of public transport

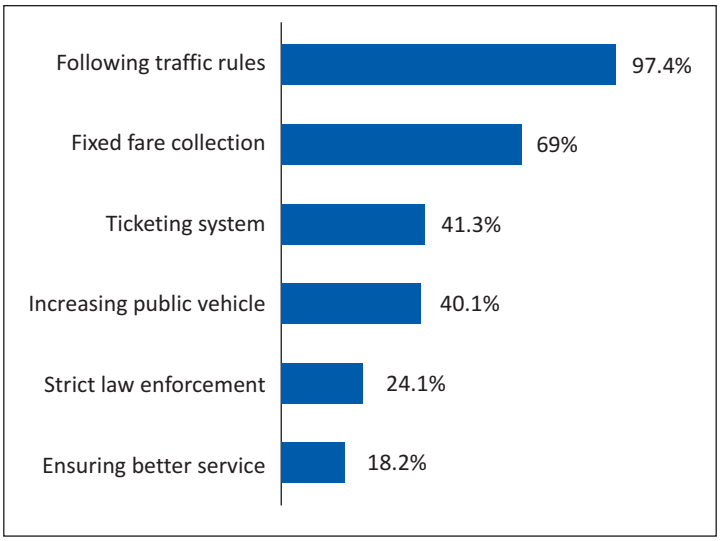


Source: BIGD Survey, 2016

The research found that most people in Dhaka city use public transport regularly – more than 80% of respondents. But the majority, over two-thirds, feel the public transport service is either bad (48.5 percent) or very bad (16.5 percent). Only 28.3 percent thought the service is good (Figure 4.2). Thus, given the heavy dependence of commuters on public transport, improving the quality and quantity of public transport could be instrumental in reducing congestion as more people will be encouraged to use the public transport as opposed to private vehicles.

Users' suggestions for improvement of public transport

Figure 4.3: Users' suggestions for improvement of public transport



Source: BIGD Survey, 2016

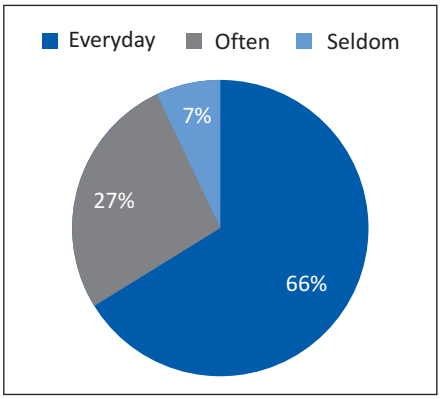
Respondents gave their suggestions for improving public transport. Almost all (97.4 percent) felt that following traffic laws would make the public transport sector better. The next most common recommendations were for (i) fixed or proper fare collection, (ii) improved ticketing system, and (iii) increased number of public transport vehicles. The data showed that both sides of law enforcement – following traffic law by the vehicles and strict enforcement by the authority – are high priorities, as seen by the public (Figure 4.3).

4.4.2 Private vehicle owners/users' perspective

Use of private vehicles

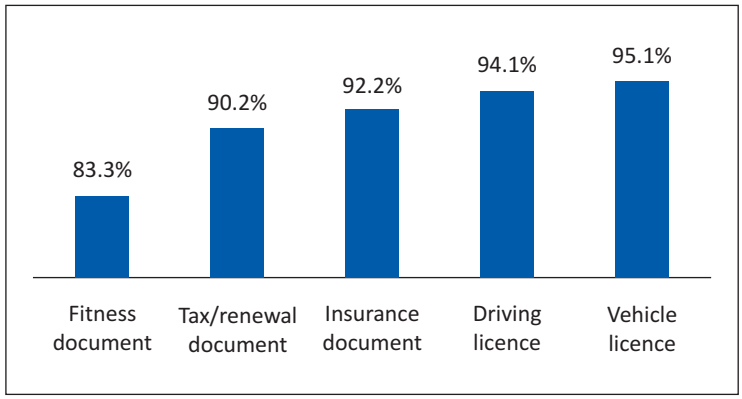
Among the 774 respondents, only a small proportion (13 percent) owned a car or motorcycle. Of these, 10.4 percent owned one vehicle and 2.7 percent owned two or more. Two-thirds of these owners used their car/motorbike every day and just over one-quarter 'often' used their vehicle. The remaining 7 percent rarely used their vehicle (Figure 4.4).

Figure 4.4: Use of private vehicles



Source: BIGD Survey, 2016

Figure 4.5: Maintaining required documents



Source: BIGD Survey, 2016

Maintaining required documents

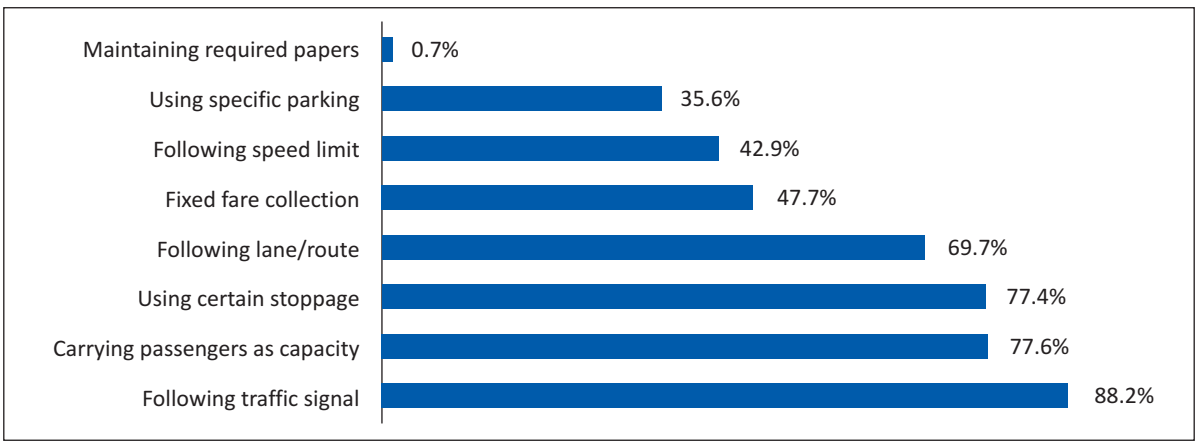
The frequency of obtaining necessary documents (like licence) was overwhelmingly high– more than 90 percent in most cases, and highest regarding vehicle and driver licences (94 to 95 percent), and lowest for vehicle fitness certificate (83 percent) (Figure 4.5).

4.4.3 Observance of traffic laws (both public[4] and private transport users)

Awareness of traffic laws to be followed

Generally, people are well acquainted with the traffic laws. Respondents mentioned multiple common laws applicable for both public and private transport vehicles. 88.2 percent said they knew about traffic signals, 69.7 percent knew about following proper lanes, 42.9 percent about speed limits and 35.6 percent about using designated parking. But less than 1 percent knew that vehicles had to carry required documents. Similarly, most respondents knew about the traffic laws relating to public transport, such as using bus stops, collecting fixed/proper fare and maximum passenger capacity (Figure 4.6).

Figure 4.6: Awareness of traffic laws to be followed



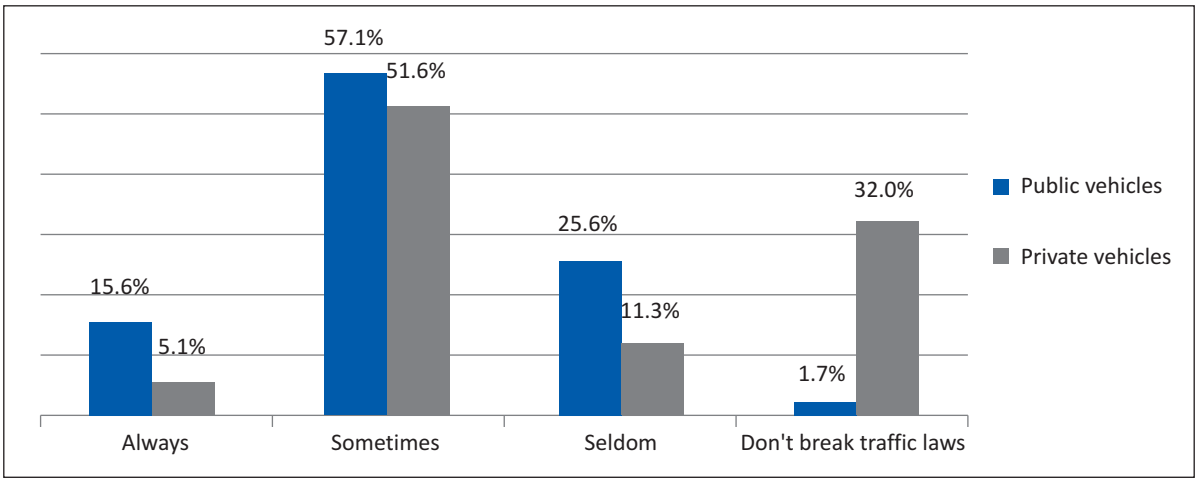
Source: BIGD Survey, 2016

4. Public transport here means mainly the motorised vehicles as they are the main users of major roads. CNGs are included but rickshaws are given less focus as they are only allowed on sub/linking roads.

Actual observance of traffic laws

However, observance of the traffic laws is much lower. Figure 4.7 shows user perceptions of the frequency of violation of traffic laws. Public transport generally performs much worse, with less than 2 percent of public vehicles 'never' breaking the law compared with 32 percent of private vehicles. Nonetheless, the majority of vehicles, both public and private, 'sometimes' break the law, and a significant proportion 'always' break the law (Figure 4.7).

Figure 4.7: Perceived frequency of violating the traffic laws



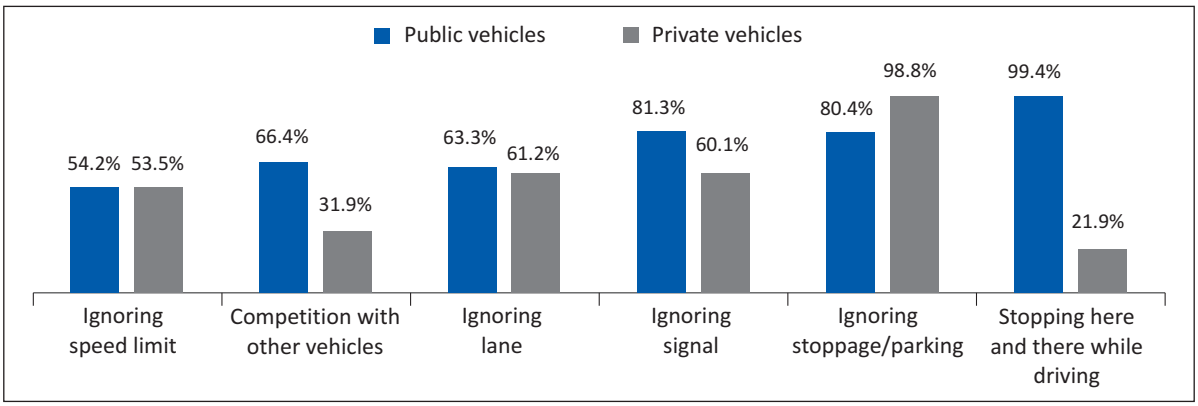
Source: BIGD Survey, 2016

Forms of traffic law violation

For public transport the main form of traffic law violation reported in the BIGD users' survey was random stopping to pick up and put down passengers (99.4 percent of respondents identified this), This was followed by ignoring signals (81.3 percent) and not keeping within lanes (63.3 percent). Competing with other vehicles over roads and ignoring speed limits was also mentioned by more than half of respondents.

For private vehicles the picture was slightly different: highest (98.8 percent) for illegal car parking, and lowest (31.2 percent) for competing over roads to go faster. However, ignoring lanes and speed limits was about equal for both public and private vehicles (Figure 4.8).

Figure 4.8: Forms of traffic law violation

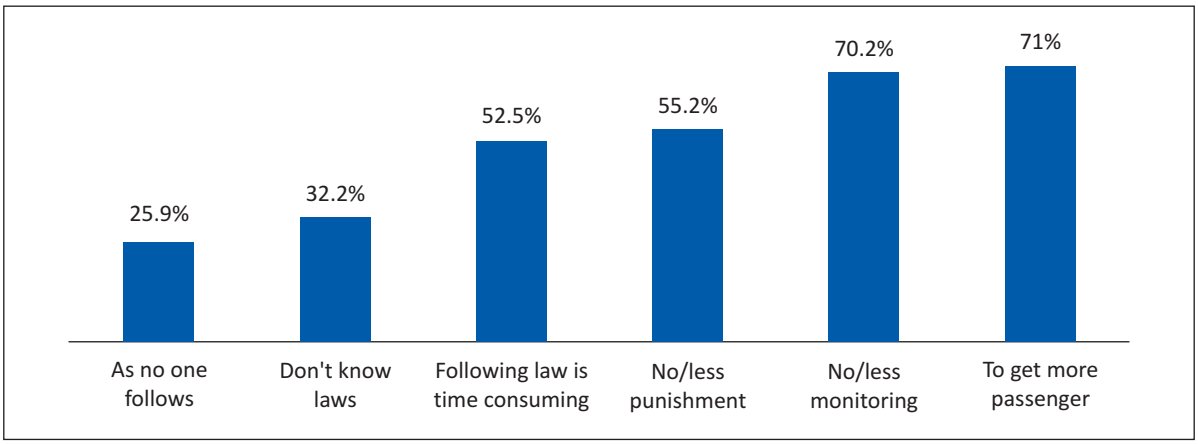


Source: BIGD Survey, 2016

Reasons for avoiding traffic rules

Respondents identified multiple reasons why traffic rules were broken by both public and private transport vehicles. Most commonly, they mentioned that drivers broke laws to get more passengers, save time and reach their destination faster; and also lack of police monitoring or disciplinary action. Lack of knowledge about traffic laws was considered a less important factor (Figure 4.9).

Figure 4.9: Reasons for breaking traffic laws

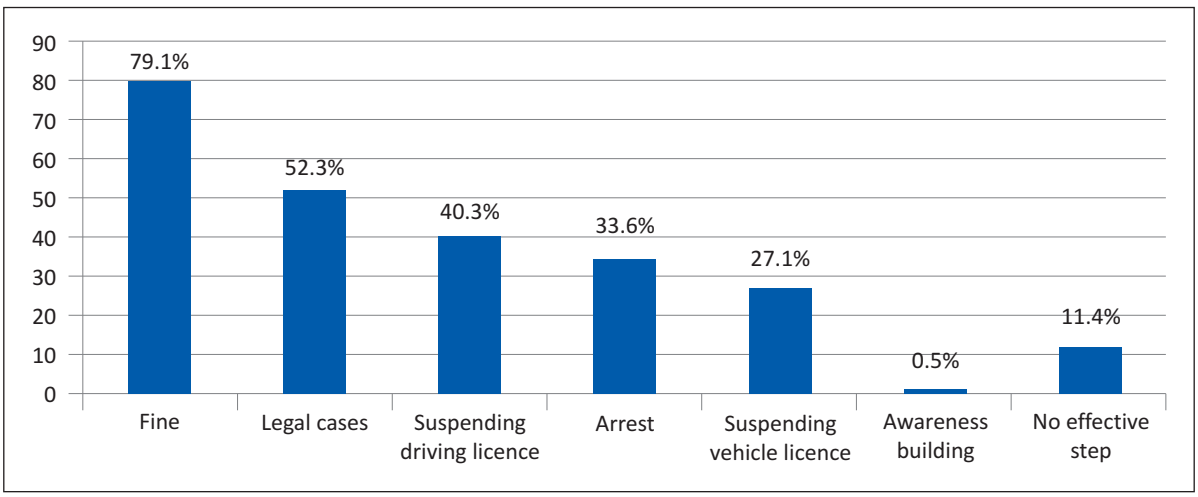


Source: BIGD Survey, 2016

Steps regarding violation of laws

When asked what steps the enforcement authority takes regarding traffic law violations, most respondents mentioned fines (79.1 percent) and filing legal cases (52.3 percent). Less than half mentioned suspending driving licences (40.3 percent) or suspending vehicle licences (27.1%). Very few mentioned awareness-building activities, and significantly, 11.4 percent said the law enforcement authority doesn't take any major effective steps to reduce or stop violation of traffic laws (Figure 4.10).

Figure 4.10: Steps regarding violation of law

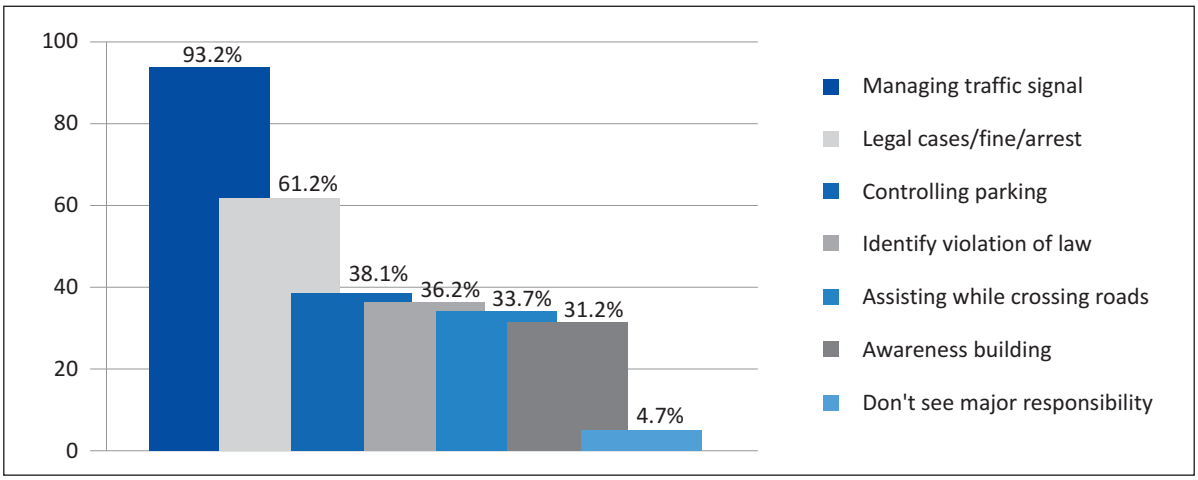


Source: BIGD Survey, 2016

Role of traffic police in traffic management

Regarding the traffic police's role in traffic management, managing the traffic signals was by far the most commonly mentioned function (93.2 percent of respondents), followed by taking legal actions such as fines, etc. (61.2 percent). Other functions included managing car parking, helping pedestrians and awareness-building were mentioned by about one-third of respondents. It is seen that people are knowledgeable about the law enforcement responsibilities of the traffic police, so co-operation with police through following rules may help in ensuring fluent traffic flow over roads.

Figure 4.11: Traffic police responsibilities for traffic management

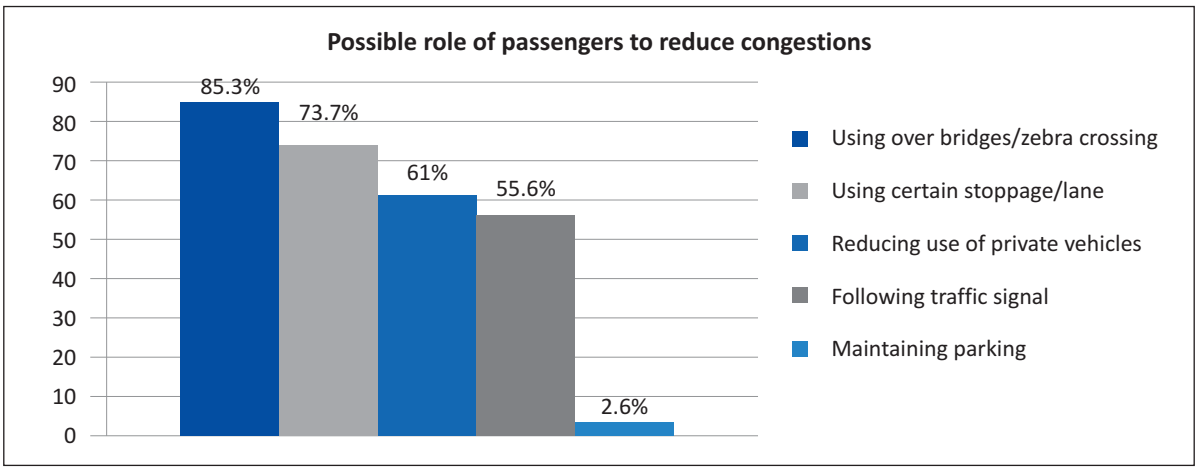


Source: BIGD Survey, 2016

Role of passengers and pedestrians in reducing congestion

What should be the role of passengers of public and private transport vehicles and pedestrians in reducing traffic congestion? The most common response (85.3 percent) was that pedestrians should use over-bridges or zebra crossing to cross roads; secondly, to influence drivers to use designated bus stops and lanes (73.7 percent); and thirdly to follow traffic signals (55.6 percent). Interestingly only a few respondents mentioned influencing drivers to use designated parking (Figure 4.12).

Figure 4.12: Role of passengers to reduce congestion

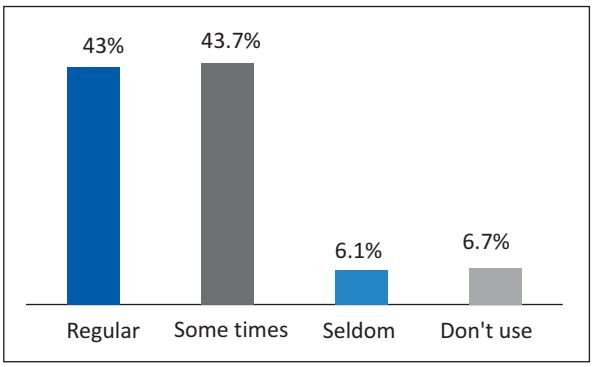


Source: BIGD Survey, 2016

4.4.4 Pedestrians' use of foot over-bridges and bus stops

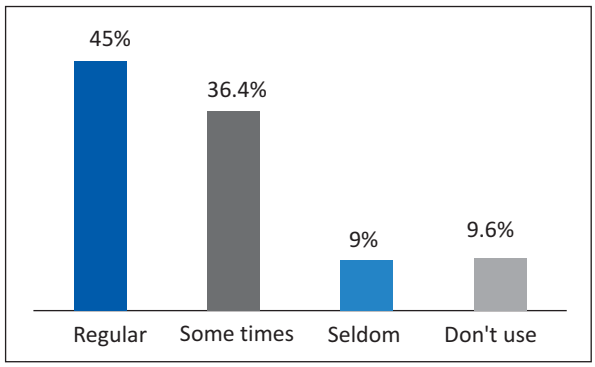
Pedestrian use of foot over-bridges or zebra crossings was mixed. Most people only use them sometimes or even never. Only 43 percent of respondents said they used them 'regularly' (Figure 4.13).

Figure 4.13: Use of zebras/foot-bridges



Source: BIGD Survey, 2016

Figure 4.14: Use of designated bus stops



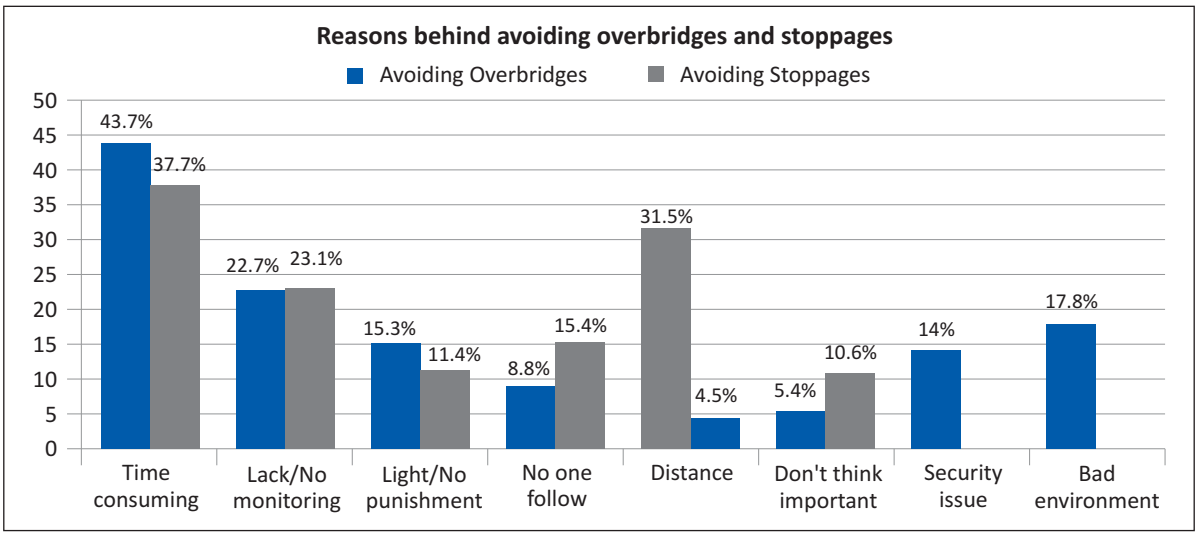
Source: BIGD Survey, 2016

A similar picture applied to designated bus stops. Most people only use them sometimes or not at all (Figure 4.14). Such behaviour encourages the approaching vehicles to stop anywhere and hampers expected traffic flow, thus contributing to congestion.

Reasons for not using foot over-bridges/zebra crossings

Asked the reasons behind such practice, 43.7 percent said they avoid over-bridges because they are more time-consuming to follow. Long distance (which is similar to time-consuming) was mentioned by another 31.5 percent of respondents. Poor enforcement by the authorities was mentioned by 22.7 percent of respondents. Importantly, the bad environment of over-bridges was also a significant reason why people did not use them (17.8 percent) (Figure 4.15).

Figure 4.15: Reasons for avoiding over-bridges & official bus stops



Source: BIGD Survey, 2016

Reasons for not using designated bus stops

A similar picture applies to use of designated bus stops: 'time-consuming' (37.7 percent); 'lack of monitoring' (23.1 percent); and similarly 'no punishment for such acts' (11.4 percent) (see Figure 4.15). Weakness of monitoring and absence of punishment is therefore a common cause of people ignoring over-bridges or designated bus stops, and making people aware together with stricter enforcement can help to address this issue, as the experience in the Cantonment demonstrates (Box 4.2).

Box 4. 2: Proper enforcement and less congestion: An example from the Cantonment

There are roads in the cantonment area where usually no significant level of congestion is seen as there is no scope of violating traffic rules. In the cantonment area there are all sorts of vehicles on the roads, but vehicles are checked on a regular basis so drivers maintain required documents. Also there are strict provisions of maintaining speed limit and lanes, so no vehicle changes lane or exceeds the speed limit. Even the rickshaws and 'human haulers' use the lanes provided for them. Because of the strict rules and enforcement of penalties, so breaches of traffic laws are almost absent in the Cantonment areas, and there is significantly less traffic congestion.

[Source: KII with drivers, driving schools and DMP]

4.4.5 Stakeholder perspectives on traffic law enforcement

Training of drivers

According to the key informant interviews (KII's), most drivers of public transport vehicles learn driving from the person (driver) he worked with or knows. They were basically helpers previously and gradually they became drivers. Drivers who trained in driving schools are rare in the case of public transport vehicles. When drivers have to pass the BRTA driving test, there are middlemen who can help them get a driving licence easily. This often leads to drivers with insufficient knowledge and skill[5].

Driving schools provide training facilities, both theoretical and practical. Trainee drivers are introduced with the theoretical part – hardwires, traffic signals, traffic laws and so on; and then they complete their practical session with on-road driving. Drivers are provided with a manual prepared by BRTA to know the traffic issues and law and applicants have to pass the BRTA test for driving licences. Though the trainees are supposed to follow the rules taught by the driving schools, but they frequently ignore traffic laws while driving[6].

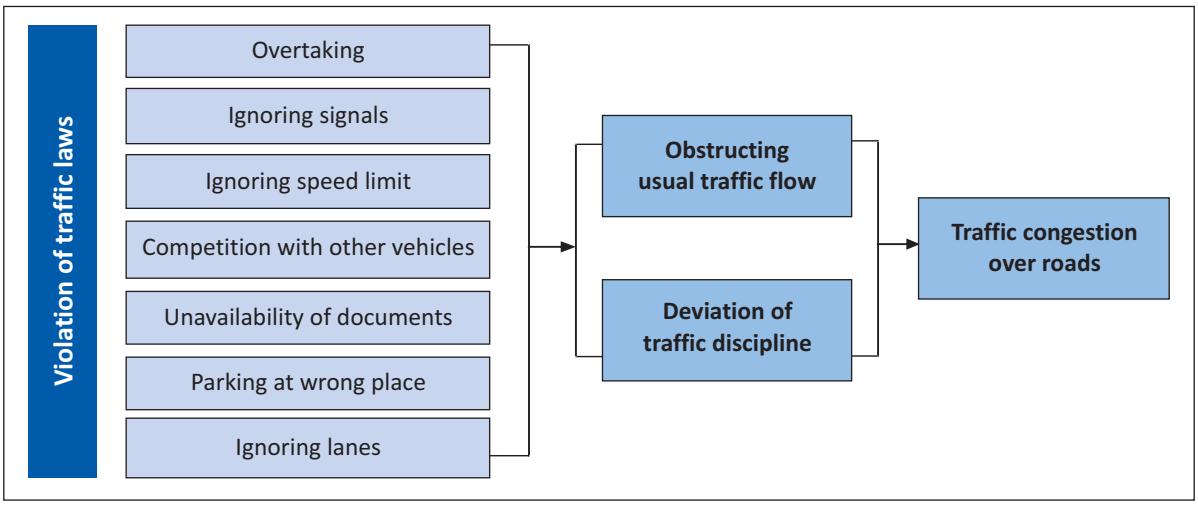
Law violation and congestion

As discussed earlier, the major forms of violation of laws by public transport vehicles are ignoring signals by vehicles, picking up and dropping passengers here and there, reckless overtaking, excessive use of the horn, competition with other vehicles and so on. Drivers seldom follow the traffic rules and as a result they are frequently fined or have legal cases against them. Drivers follow the rules if they know that responsible sergeants are present over roads and intersections. It was mentioned by stakeholders that combined efforts by all stakeholders are required to address these issues[7].

5. Source: KII with drivers
6. Source: KII with driving schools
7. Source: KII with drivers, driving schools and DMP staffs

An illustration of the effect of traffic law violations on congestion is shown in Figure 4.16, and further analysis of bus enforcement issues is given in Chapter 5.

Figure 4.16: Flow chart of law violations and congestion



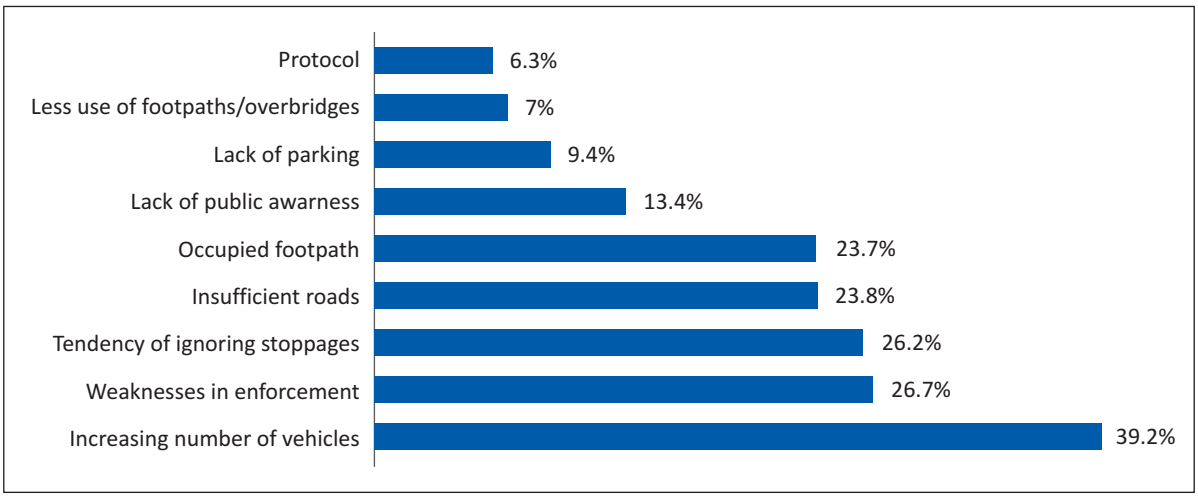
Source: BIGD research, 2016

4.5 Major challenges and way forward

4.5.1 Challenges

The BIGD survey asked transport users how they viewed the challenges for Dhaka's transport congestion, and in their view, the number one challenge is the increasing number of vehicles, especially private vehicles (39.2 percent of total respondents) – Figure 4.17. The second biggest challenge is weaknesses in law enforcement (26.7% of respondents) and related issues such as not using designated bus stops, occupied footpaths, and so on. The need for additional roads was given less priority (23.8 percent) (Figure 4.17).

Figure 4.17: Major challenges of traffic management



Source: BIGD Survey, 2016

4.5.2 Way forward suggested by stakeholders

According to both the interviewed stakeholders and survey respondents, strict implementation of law is a prerequisite for less congestion and better traffic management. The law enforcement authorities need to play the most important role here in the various stages from issuing vehicle permits to controlling running vehicles on the roads. Similarly, the behaviour and practices of vehicle owners, passengers and pedestrians should reflect traffic laws. It is expected that improved enforcement can reduce congestion significantly.

Awareness-building is another issue to be addressed. Awareness regarding driving, accessing public transports and using footpaths should be given more focus by the relevant authorities.

Applying the penalties and strict implementation of such can decrease the law-breaking tendency. In some cases DMP imposes fines which vehicle owners can easily bear although the ceiling of penalty is higher according to the law. Increasing the fines in practice could help to discourage traffic law violations.

However, perhaps the most important factor to reduce congestion is an integrated planning and implementation approach including all the stakeholders – planners, implementing agencies and target groups. Better coordination among the planning and implementing authorities like City Corporation(s), RAJUK, DTCA, BRTA, DMP and other relevant stakeholders can make the situation better, while the general public also has to play a responsible role to reduce congestion (Box 4.3).

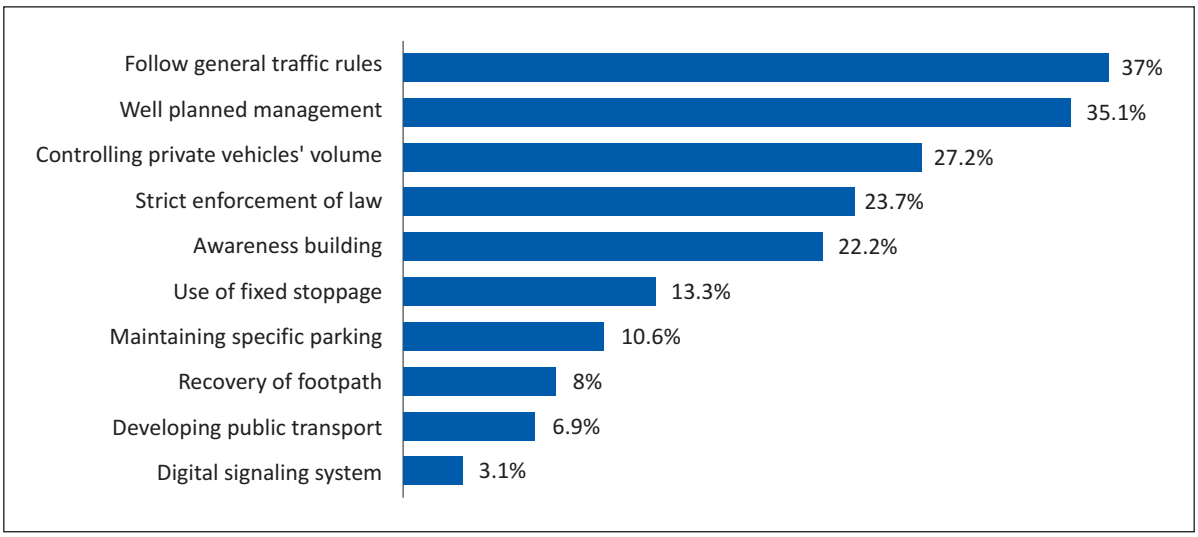
Box 4.3: Weakness of coordination hampers actions against illegal parking

Illegal parking, which occupies almost 30 percent of the city streets, is seriously hampering normal traffic flow on the city streets and causing nuisance to pedestrians. In absence of car parking facilities, vehicles are being randomly parked on the streets adjacent to shopping malls, schools, financial institutions, business establishments and government and private offices. Though illegal car parking is on the rise contributing to vexing traffic congestions in the capital, there is no solution is in sight as the authorities concerned are blaming each other for the problem instead of taking actions, reports UNB. The two City Corporations (DCCs) in Dhaka and the Traffic Department of the Dhaka Metropolitan Police blame each other for the rise in the unlawful car parking in the city. Also RAJUK is mentioned as another authority to take care parking issues as it permits building constructions. Sometimes vehicles are seen parked on both sides of the road occupying nearly 30 percent of the streets although there are some designated parking lots, and the traffic police appear to be reluctant about enforcing traffic laws. Though there are parking arrangements, but the capacity is enough to address the issue. To solve the problems, proper enforcement of law regarding the issue needs to be taken care of considering it for a cooperative steps by the authorities.

[Source: News Today, March 22, 2015]

The BIGD survey showed the users' view regarding the way out of congestion problems. Highest priority was given to following traffic laws (37 percent of respondents). Almost equal priority was given to well-planned traffic management (35.1%), which includes good co-ordination. Third priority was given to controlling the number of private vehicles on city roads (27.2 percent), and fourth was awareness-building (22.2%) (Figure 4.18).

Figure 4.18: Suggestions for reducing congestion



Source: BIGD Survey, 2016

In addition to the suggestions mentioned above, the following measures were also recommended by survey respondents and stakeholders:

- Traffic management measures:
  - Arranging clear signal and road/instruction marking for vehicles to follow
  - Maintaining lane and permitted route by the drivers
  - Specific lane for rickshaws, bicycles and human haulers
  - Keeping left lane available to ensure traffic flow in intersections
  - Portable dividers and zigzag way for controlling traffic as necessity
  - Eviction of illegal establishments over roads to increase capacity of the roads
- Travel demand management measures, planning and land use controls:
  - Introducing the system of permitting vehicles as odd or even numbers of the vehicles on alternative days of the week
  - Controlling the number of private vehicles, specifically, permission of single vehicle (private car) for each family might be considered in such case
  - Proper parking arrangement and management for roadside high-rise buildings
- Administrative and institutional measures:
  - Cooperation among concerned authorities, such as integrated approach in case of construction or repairing or other development activities which have impact over transport of the city.

4.6 Conclusion

This chapter considered traffic law enforcement in Dhaka, particularly the roles of the Bangladesh Road Transport Authority (BRTA) and Dhaka Metropolitan Police (DMP) in controlling vehicles and drivers, both in licencing and moving on the roads. The chapter looked at the pros and cons of traffic law enforcement, the role of stakeholders, the types of breaches of traffic laws, and ways to improve the situation. The research was based on feedback from the road user survey and also key informant interviews.

Recent years have seen several significant infrastructural initiatives and also new laws regarding traffic management in Dhaka city. Yet despite an extensive legal framework and plenty of activity by the enforcement agencies, the research found that drivers of both public and private transport vehicles have tendency of legal violation while pedestrians also contribute to the process. On the other hand responses from the surveys tell the story of weaknesses in management mechanism for proper enforcement of traffic laws.

The user survey revealed the high use of public transport (over 80 percent of respondents), yet very poor perceptions about its quality and quantity. People felt that enforcement of traffic rules, improved fare systems and ticketing, and increased supply were the main ways forward for public transport.

Regarding private vehicle users, there was a high rate of observance of the required legal documentation (licences, fitness certificates, etc). For both public and private motor transport users there was also a high level of awareness of various traffic laws. However, observance was seriously lacking, particularly with public transport. For buses, the main enforcement issues were indiscipline due to competitive behaviour and lack of enforcement. For private vehicle users the main issue perceived by respondents was haphazard parking. Among both categories, speeding and poor lane discipline were widespread.

To improve the situation, the respondents gave high priority to controlling the volume of private vehicles, and only low priority to increasing the road space. Their highest priority was given to proper enforcement of traffic laws based on a well-planned traffic management system.

The next chapter now considers the governance of Dhaka's traffic in more detail, with specific investigation of the management processes relating to bus operations and footways/ sidewalks.

CHAPTER 5

Governing Bus Routes and Sidewalks in Dhaka: A Political Economy Analysis

5.1 Introduction

This chapter examines the causes of traffic congestion, and why it persists despite the government's efforts to mitigate it through many projects and studies (DTCA online, 2016). In this chapter, which focuses on two case studies of bus sector management and sidewalk management it is argued that traffic congestion is the product of human behaviour in which various players have striven to fulfil their individual economic interests. Their pursuance to maximise economic gain causes 'manoeuvring' and 'informal activities' to become standard practice, which results in institutional and enforcement failures of traffic governance.

Political economy framework

A political economy analytical framework has been adopted to analyse the stakeholders' behaviour in traffic governance. Here, economic gains have been the ultimate targets of stakeholders, and politics (both formal and informal policy decisions) has been used to establish control over economic resources. The political economy framework, by bringing together politics and economics, presents the allocation, utilisation and regular management of bus routes and sidewalks, through which the underlying factors of traffic congestion are identified.

The political economy analysis (PEA) framework (Corduneanu-Huci, Hamilton and Ferrer, 2013) consists of identifying relevant stakeholders, mapping preferences and interests of the stakeholders and explaining how the formal and informal rules and constraints facilitate or hinder the power of different stakeholders in promoting their respective agendas. Formal institutions have written traffic rules to ensure checks and balance in traffic management while informal institutions include social norms and conventions which are usually unwritten and have function outside official channels such as rent seeking. Mapping these processes provides clues behind why stakeholders want or do not want to be involved in the management process. Similarly, the constraints provide clues as to why standard (i.e. good) management is difficult to establish.

Key informant interviews

Forty-two key informant interviews were conducted with stakeholders closely involved in the bus route and sidewalk management process to understand their insights, observations, interests and challenges. The respondents included private bus company executives or owners, owners' association leader, current and former officials of Bangladesh Road Transport Authority (BRTA) and Dhaka

Metropolitan Police (DMP), street hawkers, City Corporation officials, and transport experts. In addition, secondary data was gathered from relevant agencies such as BRTA, Bangladesh Road Transport Corporation (BRTC) and the City Corporations (i.e. Dhaka North and Dhaka South City Corporations). Anecdotal evidence from the interviews with these stakeholders was corroborated with relevant official data and newspaper publications.

The Chapter is in four sections. Section 5.2 draws on international literature to shed light on the dominance of politics in addressing congestion. Sections 5.3 and 5.4 explore the underlying causes of congestion by studying bus route and sidewalk management and how those causal phenomena contribute towards sustaining congestion. The two case studies examine the interfaces between management officials, private actors and political beneficiary groups and hence the extent of informal rent seeking in traffic governance. Views of stakeholders about possible reforms are also highlighted. Conclusions and recommendations for a possible way forward are presented at the end of each case study, in Sections 5.3.7 and 5.4.5 respectively.

5.2 Politics and traffic congestion: global views

Traffic congestion receives political impetus when the issue captures a defining position among the development challenges of Bangladesh. Dhaka's poor infrastructure and its ranking as the fourth least liveable city in the world (Economist Intelligence Unit, 2016) highlights the government policy failure in addressing issues such as traffic congestion (Hobbes, 2014).

Politics has been a key deciding factor in the on-going debate about building more physical infrastructure versus cheaper management solutions to address traffic congestion. Public officials use congestion as a rationale for high-profile, politically-popular transportation infrastructure projects (Taylor, 2004), although the scholars dispute that congestion will be tackled by building more roads or increasing the road capacities (Holden, 1989). Studies internationally have put emphasis on appropriate disincentives to using cars and positive incentives to using public transport (e.g. bus, metro rail) for tackling congestion, resulting in faster average journey speeds (Holden, 1989; Frias, 2007).

The goal of achieving a successful public transportation requires the cooperation of national and local officials, as well as private business and the individual citizen (Frias, 2007). Winston (2000) points to the problem of entrenched political forces that hold back constructive change while shaping urban transport governance. The politicians show interest in new roadway construction as a way to please both constituents generally and well-organised and powerful interest groups in particular (Nash, 2008). Entrenched interests within the political system and difficulty in resisting their pressures leads to the government building more physical structures like metro rail, flyovers and express roads rather than adopting cheaper solutions such as enforcing the traffic laws, reducing car numbers, improving the bus service and freeing the sidewalks for pedestrians.

The same entrenched interests dominate the management of public transport and pedestrian space. In Dhaka each bus company has its own ever-changing routes and schedules. Many of these bus companies are owned or linked to political parties or powerful trade unions (Hobbes, 2014). This linkage works as a shield to protect the interests of bus owners while unifying or regularising the system though leaving the sector poorly regulated. Similarly, the pedestrian paths or sidewalks are generally occupied by shops, hawkers and other activities, and controlled by powerful vested interests. The result is that people walk on the roads or else depend on rickshaws and motor vehicles even for short trips (Badami, 2009) which worsens the congestion still further.

5.3 Governance of bus routes in Dhaka

5.3.1 Bus routes in Dhaka city

Sufficient numbers of buses on each route is a key indicator of improved transport performance, but Dhaka performs badly in this respect. Currently, Dhaka metropolitan area is divided into 168 routes to manage bus traffic. The government has set a ceiling of 7,362 buses[1] to operate on these routes. However, government statistics record that the city has only 5,407 buses and minibuses at present, 27 per cent fewer than the ceiling, or 30 buses for every one lakh population in the metropolitan area (Table 5.1). But, in reality, fewer buses operate on the routes: Dhaka Road Transport Owners' Association (DRTOA) estimates that only 3,000 buses run on Dhaka's roads every day.

The number of buses in Dhaka is significantly lower than in many other major cities. For example, the number of buses per one lakh population in some Indian cities ranges from 33 to 73, while in developed cities like Hong Kong and London it is around 80 to 108; and all of these cities have extensive rail services too (Table 5.1).

Table 5.1: Details of bus route, companies and number of buses in Metropolitan Dhaka

Description	Number
Bus routes	168
Enterprises of bus service	157
Ceiling for buses & minibuses	7,362
Total issued permits for buses & minibuses	5,407
Issued permits for buses	2,281
Issued permits for minibuses	3,126
Population of metropolitan Dhaka (people)	18 million
Number of buses per lakh population	Dhaka – 30
Number of buses per lakh population in other major cities	Delhi – 33 Kolkata – 44 Bangalore – 73 Hong Kong – 80 London – 108

Source: BRTA, 2016d. Data for other cities mainly from Wikipedia

The inadequate number of buses encourages entrepreneurs to invest in the transport sector. But informal payments and connections are required for obtaining the route permits which chases out healthy competition. Media reports state that potential investors have to secure membership of the bus owners' association prior to applying for a route permit which is bought by the investors (Prothom Alo, 2015). These payments along with route maintenance expenditures add to the hike in costs of doing transport business and eventually the sector witnesses a dearth of quality bus services. The shortfall is filled with entry of lower-capacity vehicles, e.g. rickshaws and legunas (shared pick-up vans), which exacerbate the traffic congestion (Prothom Alo, 2015). It is opined that a good quality bus service could reduce movement of vehicles by approximate 50 per cent (Prothom Alo, 2016a).

1. The ceiling is for private sector buses, not BRTC buses.

5.3.2 Urban bus service providers: private sector versus BRTC

Should government be engaged in metro bus operation? Jahangir (Prothom Alo, 2016a) argues that no government agency should be engaged in operating bus services; instead, the government should formulate policy and declare incentives for entry of quality buses by private sector. Financial incentives – including loan on easy terms, reduction in vehicle tax, and tax rebate on import of materials – will encourage private investment in the sector. These privileges can be offered to existing bus owners on a priority basis. In addition government can determine guidelines for formation of bus companies, route plans, bus stops and colour of buses. At present private sector bus service provision is availed by about 85 per cent of bus service users. Table 5.2 demonstrates the daily capacity of private sector bus services in Dhaka, based on type of buses, seat capacity and average number of trips.

Table 5.2: Private buses in Dhaka: number, capacity and daily passengers

Types of bus a	No. Of buses b	Seat capacity (per bus) c	Average single trips (daily) d	No. of passengers carried (daily) e (b*c*d)
Bus	2,281	56	6	766,416
Mini-bus	3,126	30	6	562,680
Total				**1,329,096**

Source: Calculation based on number of buses issued by BRTA, seat capacity and average daily trips

The case for Bangladesh Road Transport Corporation (BRTC)

Leaving the sector to the private actors, however, may create a private sector monopoly to the disadvantage of transport users. While profitability is the central criteria for private bus service provision, BRTC gives priority to commuters' interests (Interview with a senior official of BRTC). For instance, fare is halved for students, and war-wounded as well as awarded freedom fighters can travel free of cost on BRTC buses. For other commuters BRTC follows the fare structure determined by the government. Furthermore, BRTC operates 15 buses for women exclusively on various routes of Dhaka and two buses for students on Mirpur 12 to Azimpur route targeting 26 educational institutions. There are nine depots of BRTC in Dhaka and every day 620 buses run on 64 routes of the city and its suburbs. Of these buses, 252 buses have been rented to various organisations and universities to carry staffs and students. About a quarter million commuters travel every day by BRTC buses. Table 5.3 provides the details regarding BRTC's daily output. It is revealed that in total, about 1.5 million city dwellers travel by buses provided by private operators and BRTC.

Table 5.3: BRTC buses: number, capacity and daily passengers

Types of bus a	No. of buses b	Seat capacity (per bus) c	Average single trips (daily) d	No. of passengers carried (daily) e (b*c*d)
TC 1316/55 Bus	22	50	6	6,600
Double Decker Bus	282	75	6	126,900
Single Decker Bus	241	52	6	75,192
Articulated	38	58	6	13,224
Ashok Leyland AC Bus	37	40	6	8,880
Total				**230,796**

Source: BRTC, 2016 (collected during interview with BRTC official)

Competition between BRTC and private bus operators

There is observed confrontation between BRTC and private bus operators on some popular routes. For example, BRTC was operating bus services between Motijheel and Savar EPZ and the route appeared to be profitable. According to a BRTC official, in order to undermine BRTC some private companies began the service on the same route. A similar allegation against BRTC was observed by the private operators in the case of Motijheel-Uttara route. According to a bus company executive, they were operating on this route with adequate number of passengers. When BRTC added to the route with a good number of buses the private company was losing passengers since commuters preferred BTRC's new buses. Because of this, the private operator changed modality of bus service by leasing the buses to drivers on daily basis which deteriorated quality of service and vehicle. Private providers argue that when there is adequate number of buses and private companies in a route BRTC should not run on the same route. Rather, it can select a route which is not yet covered by private sector in order to make it attractive for private sector. In addition, BRTC should cover student transportation by distributing buses among schools. A contrary view from a senior BTRC executive emphasised that leaving profitable routes to the private sector would result in the organisation incurring losses. By generating revenues from popular routes the BRTC can introduce services on less profitable new routes and also cross-subsidise its bus services for special groups such as students and women.

The private sector argues that entry of government bus service into routes creates uneven competition with the private sector since the former has no obligation for ensuring returns whereas the latter's survival depends on enough revenue generation. In addition, investment of both sectors is not similar. Private sector buys buses on bank interest while BRTC buys buses with government money. Moreover, as observed by the private bus operators, BRTC enjoys light enforcement of regulations on the road compared to private buses. On the other hand, a key BRTC official argued that BRTC is not exempted from paying informal rents on the road. Rather, it faces more difficulties to move on the road since it is not so easy like private companies to make the informal payments.

The advantages enjoyed by BRTC services cannot be denied. Most importantly, when BRTC and private services operate on a route the commuters have an opportunity to compare the fares of both services. Since BRTC is obliged to follow the government regulations its presence on the roads provides a check on private operators against fare hike. However, if the race between public and private service providers aims at driving each other out of the market it will lead to the monopolisation which, eventually, will disregard the public interest. So, the current confrontation between BRTC and private sector should turn into a healthy competition by setting highest ceiling of buses on a particular route based on proper feasibility study and monitoring.

5.3.3 Route allocation for bus service provision

BRTC is not required to seek for route permit in order to operate on the roads of Dhaka City. The initiative to begin operating on any new route is undertaken by BRTC bus depot. At first, the depot assesses, through road survey, feasibility of public service, profitability and successful operation of the service on the proposed route and then submits its assessment to BRTC headquarters for approval. BRTC's final decision of operating the service is communicated with relevant organisations including the Regional Transport Committee (see below) and district administration.

In order to begin bus service the private entrepreneurs need to have a route permit which is issued by Dhaka Metropolitan Regional Transport Committee (RTC). This committee is constituted under Article 54(1) of Motor Vehicle Ordinance, 1983 and is headed by Dhaka Metropolitan Police Commissioner.

The Committee consists of twenty members with representatives from various government agencies, city corporations, commercial chamber, and transport owners' and workers' associations. An application for route permit is submitted first to RTC which is the focal point of decision for route allocations. RTC usually meets after every six months. Prior to RTC meeting the applications are scrutinised at two levels: firstly, the concerned Deputy Commission of DMP (Traffic) examines the field situation against the application; and secondly, the Joint Commissioner of DMP (Traffic) reviews the field report and sends summary to RTC for final consideration. Representatives of various organisations including DRTOA and BRTA participate at each step. A representative of DRTOA observed that field assessment is done based on perception rather than through road survey or any other systematic methods. A similar observation was given by a former BRTA senior official. He said, although origin-destination survey (ODS) was supposed to be conducted prior to route permit, but it is not always done except occasionally under auspices of major planning projects such as Dhaka Integrated Transport Strategy (DITS) 1994, and Strategic Transport Plan (STP), 2005. Because of irregular surveys, there is no systematic route plan which results in overlapping of bus services in a single route. In practice, multiple companies operate in a route and this is justified with slight difference in location coverage, said a bus company official.

The current composition of RTC is dominated by representatives of both government and transport owners' and workers' associations. It lacks any representatives from citizen bodies. Inclusion of representatives from national or regional citizen committees might work as a check on forging coalition between vehicle owners and regulators. In addition, preliminary assessment of route permit applications could go through public hearing prior to RTC meetings.

Formal requirements for route permit include formation of a company and its registration with Office of the Registrar of Joint Stock Companies and Firms; documents of booking vehicle purchase from suppliers; back-up facilities such as garage for vehicles; and trade licence from City Corporation. Apart from fulfilment of these official requirements, personal contacts and political lobbying and speed money facilitate in obtaining route permits (according to a bus company official). For instance, DRTOA's reference had been the de facto qualification in winning route permit, observed another bus company official. In addition, media reports suggest that a bus owners' political identity and personal contacts with influential people, and cash transaction with regulators on the road, facilitate route change (Daily Star, 2007).

Unlike the past, route permit is now issued to a company having a minimum of twenty buses instead of an individual with a single bus. Any individual investor can join the existing companies. The joining fee depends on the importance of the route generally. In some cases, entry into the company is facilitated by political influence. For example, a bus company official said they were forced to induct two buses upon request from a local Member of the Parliament. Moreover, equal opportunity to enter into bus service provision is only on paper. It is observed that when an influential person operates on a route, entrance to that route for any other person appears to be impossible.

Approval of route permit follows vehicle registration, fitness certificate and tax token from BRTA, and insurance from insurance company. These are renewed on an annual basis while the route permit is renewed every three years. A bus company official said that for new vehicles no extra money has to be spent (this is taken care of by the bus sellers as part of the deal). However, for existing vehicles the bus companies have to spend an additional 30% for renewal of these documents.

5.3.4 Day-to-day bus route management and informalities

In the daily operation of bus services, diverse unofficial interactions take place between bus service providers and other stakeholders including traffic police, BRTA, political parties, students-cum-commuters, transport labour unions and owners' association.

Interfaces between traffic police and bus companies

Generally, bus drivers face checking of five papers by traffic police. Cases are filed for missing or failing to have up-to-date documents. In addition, stoppage of bus in the road other than at traffic signal is also monitored by the traffic police. It is revealed that on average there are 15 cases filed monthly per vehicle. A bus company chairman said that they were mostly charged for stoppage on the road.

Designated bus stoppage points are not yet vividly marked in Dhaka City.[2] If a bus stops even in areas that are not publicly prohibited, it is charged for illegal parking. This supply constraint prompts bus drivers to pick and drop passengers while the bus is moving, or park in a place where traffic inspectors have not appeared, resulting in random parking. In contrast, the Strategic Transport Plan (STP) recommended that a bus should be allowed to stop at five points including beginning and ending of the route.

Two factors can be identified behind ignoring formal stoppage points. Firstly, there is strong competitive behaviour to pick up and put down passengers at busy road junctions rather than at designated bus stops: the buses slow down or stop at junctions, and it is quicker to drop off and load passengers without formally stopping. Also, bus drivers using the designated bus stops may find themselves wedged in by other bus drivers, who then get ahead. Passengers respond by waiting where the buses actually stop. Secondly, the authorities seem not to be serious about taking pragmatic steps to manage bus stoppage. Lack of enforcement of formal bus stops pushes the bus companies to violate the traffic rules, which leads to informal dealing with the police. A bus company official reported that daily an average of Tk.1, 950 was spent on the spot to avoid cases for its 39 buses. Media estimations are even higher, that bus driving staff are forced to pay roughly Tk.100 three or four times a day whenever they are stopped (Daily Star, 2004). Furthermore, absence of bus bays and earmarked stoppage points leads bus drivers to make criss-cross stops on the roads to get passengers, slowing down movement of vehicles.

The regulatory regime (detailed in Chapter 4) seems to bestow immense discretionary authority to interpret extent of law-breaking on the roads, which offers scope for informal settlement between bus companies and the regulators. For example, it was revealed in interview with police officials that a vehicle's speed is measured through instant observation rather than speed measurement tools. A senior official of a bus company said that if they did not settle alleged breaches of regulatory obligations on the spot, they would face at least 100 cases for each bus a month instead of the current 15 cases.

Undoubtedly a significant number of cases could be avoided with induction of trained, professional drivers in bus companies. Violation of traffic rules occurs partly due to lack of systematic, formal training of drivers. Their professional development is quite informal. At first they join the profession as

2. A considerable amount of work was done under the Dhaka Urban Transport Project (DUTP) in the early 2000's to provide bus shelters and clearly marked bus stops, but over time these have not been maintained and are now mostly disregarded, as bus drivers and helpers (both BRTC and private sector) prefer to pick up passengers at busy junctions.

a bus helper, and then occasionally sit in steering with or without permission of drivers and over a period of time (say, two years) they emerge as drivers. The production of drivers in this process costs the bus companies in two ways. Firstly, during the professional development from helper to driver, the trainees make accidents and compensation has to be borne by the bus companies. Accident-induced compensation affects take-home income of bus companies, said a bus owner. Secondly, despite the financial and in-kind investment, the drivers, after becoming fully-fledged drivers, leave the bus company to join driving private car with higher salary and benefits. Hence, the bus companies cannot retain the trained, albeit informally, drivers, resulting in their dependency on unprofessional, half-trained drivers. In these circumstances the government can build adequate infrastructure for developing cohorts of professional, skilled drivers for the city bus sector. Currently, BRTC has a driving school at Zoarshara suburb, which is inadequate for the level of demand. Participants of driving schools need to be properly oriented about urban driving specifics. Moreover, driving courses should be subsidised or free for the lower socio-economic groups and subsidies can be recovered through imposing taxes on vehicles owners.

In addition to on-the-spot payment the interviewed companies make different rates of payment to the regulators to keep bus services operational in permitted routes. There are eight 'bits' along one company's route and it pays monthly about Tk.90,000. One of the oldest bus company officials said they had to make payments to twelve points which amounted to Tk.70,000 a month. The amount for each bit is determined through informal negotiation between the bus company and the government counterpart and it varies from Tk.7,000 to Tk.18,000 depending upon the number of enforcers working at each bit, said a bus company partner. Bus company officials asserted that the more the number of the checkpoints and enforcers the more money the bus companies had to pay. In return to such payments, the companies are exempted from regular checking at those points.

However, the above spot and monthly payments are outright denied by a traffic official interviewed. A traffic inspector said that valid prosecutions by police are generally labelled as 'harassment' by defaulters of traffic law. Police officials assert that they primarily emphasise on free flow of traffic rather than prosecution. A former DMP senior official said that given the massive irregularities in driving licence, vehicle fitness, and driving on the road, full-scale checks by the police would turn the traffic into grid-lock. However, the absence of full checking encourages the drivers and vehicle owners to compromise with official standards and good practices, and when facing prosecution informal settlement is preferred since it is quick and less expensive.

Bus companies and Dhaka Road Transport Owners' Association (DRTOA)

Another payment is made by bus companies to the DRTOA. Those who are given route permit become eligible to be a member of DRTOA. Inclusion of new buses is welcome by the Association since it begets revenues. The private bus companies provide daily Tk.40 per bus to the DRTOA. A further Tk.30 is given daily per bus to Sarak Paribhan Workers Federation. These rates were determined by the government to cover operational costs of associations, said a senior leader of DRTOA. The monthly total accumulation for these two associations in fees from roughly 3,000 buses is about Tk.6.3 million.

Membership of DRTOA benefits the bus companies in various ways. The Association representing owners lobbies the government for favourable fare structure, tax rebate, and new route permits. Because of DRTOA's efforts the transportation sector was declared as an industry in 2012, said a senior official of DRTOA. This status potentially entitles the transport sector to industrial facilities such as tax

rebate on import of transport-related materials. In addition, due to DRTOA's advocacy, presumptive tax (a fixed amount of money based on number of bus seats) is levied instead of vehicle value assessment, which frees bus owners from paying a high amount of tax. The Association assists the companies in overcoming obstacles on the road as well. Random bus requisition used to be done by government agencies in the past. Such vehicle requisition resulted in a severe reduction in profit since on those days the company could not generate any revenue from the buses. Because of the Association's initiative, frequency of requisition by the government has been greatly reduced, said a bus company owner.

Bus companies and students, political parties

A non-conventional dealing is observed between bus companies and students in Dhaka. Students tend to give half-fare while travelling by bus. But bus owners said this affected their revenue collection and hence argued for the system either to be limited to government-run buses only or to be subsidised by the government. Differences in understanding often lead to brawls between bus conductor and students, resulting in seizure of bus by students and physical and verbal harassment of students by bus staff. Freeing a bus from students' capture is costly for bus companies. It is revealed that bus companies typically face four such incidents a month, and each occurrence costs the bus company between Tk.10, 000 and Tk.50, 000. Bus staff are sometimes accused of torture and loss of students' valuables. Apart from this, the bus companies make payment to political parties on a regular basis and on the eve of various political events. Generally, bus companies are said to pay regularly at the beginning and end of the route: a company's senior executive said that monthly Tk.5, 000 and Tk.3, 000 was paid to two points.

5.3.5 Fare collection systems and random bus stopping

Bus fare collection from passengers has evolved through different systems with varied outcomes in monetary returns and traffic congestion. In the past, revenues were collected within buses and at the end of the day total amounts were deposited to the bus owner. In this system, bus owners often complained about under-reporting of revenues by bus staff. In addition, bus drivers engaged in a race on the road to win passengers by blocking each other and stopping randomly. These problems led bus companies to set up ticket-selling counters at various points along the route. This system triggered the drivers to concentrate on driving and reaching destinations only. Moreover, the counter system prompted commuters to line up in a disciplined manner to get in and out of the bus and bus random stopping went down since drivers did not have incentive to pick and drop passengers at places other than earmarked ticket counters. Nonetheless, this system was not immune to irregularities such as fake tickets, extortion claims and pilferage, which affected actual revenue collection. Finally, government eviction of the counters from sidewalks led the system to be shut down. At present, two types of system are very common: either (i) bus companies rent out buses to drivers on a daily basis or (ii) way-bill system. The former has brought back random stoppage to maximise revenues, and deterioration in vehicle quality due to reckless driving. Under the way-bill system bus companies have their own checkers and supervisors to write the number of passengers at fixed intervals.

Controlling buses stopping on the road is one of the critical issues for traffic management. Bus drivers deem it as a strategy of reducing their take-home income given their low rate of formal wage. It is revealed that drivers' and helpers' daily wages presently amount to about Tk.480 and Tk.360 respectively under the way-bill system, which previously would have been about Tk.660 for drivers and Tk.540 for helpers eight years ago. This variation is due to more daily trips made by the driver then

compared with now. The drivers' income loss is made up through carrying unlisted number of passengers, resulting in random stops. Due to repeated stops, movement of the bus and other vehicles is slowed down, igniting anger among passengers and other drivers. The scale of random stops is checked by police by filing cases; but the effect of police action on drivers' behaviour is not remarkable since the fines are ultimately paid by the bus owners. Moreover, strict oversight leads drivers to leave the employment which has an impact of bus shortage on the road.

In contrast, the net daily income of bus companies interviewed is reported to be between Tk.1, 800 and Tk.2, 200 per vehicle. Investments in the sector depend on competitive returns generated from the sector. Table 5.4 shows details of daily income and expenditure from a bus with the capacity of 41 seats.

The owners were asked “since income from bus service provision seems low, why are you continuing the services?” They replied, since they have already made a big investment, moving out of the business will be much costlier for them. For example, they bought a bus at Tk.20 lakh: if they want to sell this bus they can sell it at best for Tk.5 lakh.

Investment in bus service provision is a good investment nonetheless. For instance, if the bus operates for 300 days per year, the total annual net income would be Tk. 650,400 (based on daily net income of Tk. 2168 shown in Table 5.4). If the capital cost is Tk. 20 lakh, then the annual rate of return is 32.52 per cent which is impressive. Moreover, the owners will be able to recover their capital cost within three years. So, the entrepreneurs cannot ignore quality of bus services in the city.

Table 5.4: Example of income and expenditure of a bus in a day

Amount of expenditure (Taka)**	Average number of passengers	Fare for per passenger (Tk)	Revenue per round trip (Tk)	Maximum no. of round trips	Total income per day (Tk)	Total expenditure per day (Tk)	Net income per day (Tk)
a	b	c	d = (b x c)	e	f = (d x e)	g = (a x e)	h = (f – g)
958	60	25	1,500	4	6,000	3,832	2,168

** Expenditures include wages of driver and helper, parking fee, rents to DRTOA, fuel cost, and company operational cost

Congestion has a direct bearing on number of passengers carried by buses in a day and hence drivers' wages and company returns from investment. Due to congestion the average number of daily trips has decreased by half or two-thirds in recent years (Table 5.5). Commensurate with the reduction in daily trips the overall capacity of the bus system to carry passengers has reduced significantly over the years. The buses can carry only one-third of the total passengers compared to 2002. Reduction in capacity creates demand for more vehicles which worsens congestion further. If the drivers could have made more trips in reduced traffic congestion the drivers' formal income could go up.

Under the way-bill system, the driver and his helper are given wages based on trips. For instance, Tk.120 and Tk.90 are given to driver and helper respectively for each round trip of a bus company. However, the drivers' tendency to avail of informal ways will not be ended unless formal income beats the informal earning. Another concern is that drivers do not have incentive to pick up as many passengers as possible if they are given a higher fixed rate wage, affecting revenues. Table 5.5 also shows that due to reduction in bus trips, the daily average number of passengers carried per bus has reduced much at present compared to the year the service was introduced.

Table 5.5: Details about bus trips and average number of commuters carried by bus (daily)

Bus Company	Year of beginning of service	Daily average no. of single trip at beginning	Daily average no. of single trip in Aug. 2016	Daily average no. of commuters carried by each bus at beginning	Daily average no. of commuters carried by each bus in Aug. 2016	Percentage reduction in commuters from starting year to 2016
A	2002	20	8	1100	448	59
B	2004	10	5	520	260	50
C	2002	18	6	936	312	67
D	2007	12	8	504	328	35

Source: Interviews with bus company officials

5.3.6 Route franchising and initiative of city corporation

Introduction of route franchises has been recommended in various studies to address traffic congestion, and the city corporations have recently revived the issue. Its necessity is felt by existing bus companies too. A bus company official observed that the present multiple companies' buses are competing with each other on the road and thus contributing to congestion and breaking traffic rules. Entry of multiple companies on a single route resulted from improper assessment of situation. Instead, existing operators can be brought under a single company for a route. Such effort will lead to coordinated services by running one bus behind another uninterruptedly, resulting in discipline in the sector. Government can prescribe rules of operation and monitor companies' compliance.

However, the much-talked about city corporation initiative[3] to streamline bus route management in Dhaka is not sufficiently backed by laws since the corporations are not in charge of either RTC or DTCA. The corporations are members and vice chairmen of these authorities respectively. Before steering the process and to avoid overlapping in decision-making the corporations' roles need to be specified in these two regulatory committees. Moreover, for successful implementation of the proposed route franchises, new buses with quality brands will have to be distributed among the existing companies and owners since they understand the situation well. DRTOA also emphasises on inclusion of present owners in the reform. A bus company executive apprehended that the city corporation's initiative would drive existing companies out of the market and make them dependent on credit again. In order to overcome this opposition and achieve successful implementation, a partisan approach will have to be avoided and interest rates fixed through consultation among stakeholders. A senior bus company executive advocated for regulating the existing informal transactions with various groups at various places before undertaking any reform initiative.

5.3.7 Conclusions and possible ways forward for future bus management in Dhaka

The previous sections examined the informal systems of governance in Dhaka's bus sector, in which bus operators avoid formal prosecutions by making informal payments to various stakeholders. Informal transactions constitute a significant amount of a company's operational costs in a month, directly

3. So far the City Corporation's initiative to reshape bus operating system has come from DNCC's Mayor. This is a proposal for 3,000 new buses to replace the existing buses, and run under 5 operators. The colour of buses will be specified according to routes. The DNCC's Mayor is optimistic of turning this initiative into practice by 2017 and thus the public transport system can be brought in discipline (Daily Star, 2016b). However, this new initiative cannot be implemented without a coordinated joint effort of DSCC and DNCC, as almost all the buses have a starting or end point situated in the DSCC area.

affecting their investment returns. As a result, service quality is compromised since the operator's survival depends on management of informalities and their focus is shifted from passengers to patrons. In addition, if all the many driving and vehicle-related traffic law violations were prosecuted there would be a drastic reduction in buses on the roads. Therefore people allow the status quo to continue, which results in the poor quality of Dhaka's urban public transport.

Dhaka's public transport is caught in a vicious circle – poor governance leads to cost-cutting and declining standards, which in turn creates more opportunities for poor governance. How can the city break out of this 'vicious circle' and improve the transport system? The following policy measures are suggested for a possible way forward:

1. Undertake strategic route planning and bus operator management to streamline the current 168 routes. The revision of bus routes needs to be done through better surveys, route assessments and transparent allocation process. All stakeholders– i.e. bus owners' associations, city corporations, Dhaka Metropolitan Police (Traffic), BRTA, BRTC, and commuters' representatives – need to be brought under one umbrella under the leadership of DTCA. For steering this process the capacity of DTCA has to be strengthened. Haphazard issuing of route permits to small new operators not only discourages the existing companies from new investment but also tends to reduce bus operator discipline; therefore BRTA should encourage the existing companies to bring in new buses rather than new companies.
2. Address supply constraints to reduce excuses of traffic rule violations and hence informalities in bus route management. Creating well-designed, appropriate bus bays will lessen the random stopping of buses. Likewise, adequate number of driving training schools will reduce bus owners' dependency on informal helper-driver system. In addition, if vehicle driving employment sector were embedded with attractive benefits and standard service modalities, better-educated people would be attracted to the sector. Thus, the scope of informal settlement will be minimised due to reduced scope for law breaking.
3. Improve day-to-day operational management of buses. The previous ticket counter system should be re-established and these counters built close to bus bays. In addition, online ticketing system can be introduced. In order to stop tussle between bus staff and students the government can promulgate a clear policy regarding carrying students in private buses. To reduce pressure of on-road prosecutions, fitness of vehicles, route permit and driving licence have to be effectively controlled by BRTA. In this regard, the capacity of BRTA has to be strengthened and its regulatory activities need to be more transparent. To improve compliance of bus staffs with traffic rules there needs to be organised regular campaigns by BRTA, Traffic Police and Bus Owners' and Workers' Associations jointly. The traffic police on the roads should adopt technology to measure the extent of violations of traffic rules such as photo capture for breaking red light, speed measurement machine, and e-prosecutions.
4. Improve the quality of bus services. To attract good companies with better quality buses the investment returns have to be competitive with other sectors. As mentioned earlier, daily informal transactions eat up a company's profits significantly. The above measures can reduce loopholes in existing operation of buses on the roads and thus reduce the burden of informal transactions. In addition, entry requirements for new companies have to be simplified and formalised and RTC meetings made more transparent. The success of the proposed DNCC's initiative depends on how it tackles the partisan pressures and gains the co-operation of

existing stakeholders. The foremost thing is to clarify its legal authority and build up capacity to undertake reforms in bus management system in Dhaka. Once the city commuters can be attracted to buses the congestion will reduce to a great extent which will lead to increase the daily trips of the bus fleet. In addition, road infrastructure such as bus lanes and priority in the use of road space can give buses a competitive advantage over other vehicles.

5. However, the bus sector should not be left entirely to the private companies. BRTC's buses need to continue to provide a check on fare-hike and address the needs of women and students. The right balance between BRTC and the private buses can be determined through further studies.

5.4 Governance of sidewalks in Dhaka

5.4.1 Sidewalks in Dhaka

Sidewalks or footways are an essential element of urban transportation and most roads should have them. However, within the area of the two city corporations the total length of roads is 2,215 km, while the total length of sidewalks is only 430 km, or less than 20 per cent. Admittedly, not all roads are suitable for sidewalks; for instance, Old Dhaka has the lowest proportion of sidewalks, mainly due to its narrow roads. But overall, Dhaka is significantly under-provided with sidewalks (Table 5.6).

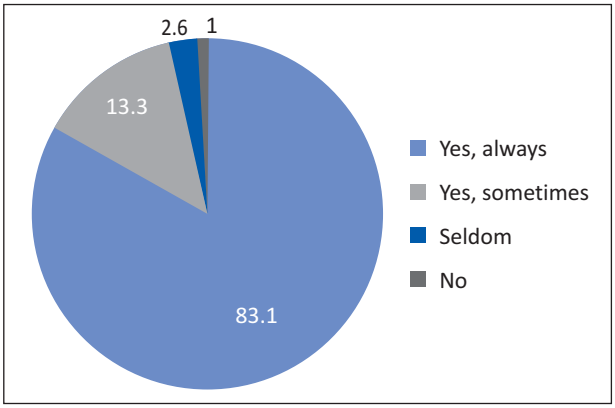
Table 5.6: Length of sidewalks compared to roads and drains in different zones of DSCC and DNCC

Zones in City Corporations	Area (sq km)	Roads (km)	Drains (km)	Footpaths (km)	Footpaths as a percentage of road length
Dhaka South City Corporation					
Zone 1: Dhanmondi-New Market	11.33	149.72	193.13	93.86	62.7
Zone 2: Motijheel-Khilgaon	13.38	273.88	184.81	42.53	15.5
Zone 3: Old Dhaka-Kamrangirchar	10.32	225.11	219.45	25.59	11.4
Zone 4: Old Dhaka (Partly)	10.45	113.87	135.94	9.36	8.2
Zone 5: Maniknagar-Jatrabari	9.52	216.61	111.12	29.06	13.4
Total for DSCC	55.00	979.19	967.64	200.41	20.5
Dhaka North City Corporation					
Zone 1: Uttara	11.57	158.43	196.29	37.66	23.8
Zone 2: Mirpur-Pallabi	21.32	283.47	213.00	57.95	20.4
Zone 3: Gulshan, Banani	18.99	393.43	325.58	67.70	17.2
Zone 4: Mirpur, Kazipara, Gabtoli	11.96	218.30	191.71	22.38	10.3
Zone 5: Kawranbazar	18.80	182.26	218.51	43.86	24.1
Total for DNCC	82.64	1235.89	1145.09	229.55	18.6
Total for both DSCC & DNCC	137.64	2215.08	2112.73	429.96	19.4

Note: Collected from zones of DSCC and DNCC

Sidewalks make walking safer, easier and more comfortable for pedestrians, thus decreasing vehicle trips and assisting traffic movement. The BIGD Survey 2016 found that 83.1 per cent of transport users regularly use sidewalks and about 13.3 per cent sometimes use them (Figure 5.1).

Figure 5.1: Use of sidewalks by city dwellers (percentage)



Source: BIGD Survey, 2016

However, the interviewees reported different types of obstacles impeding their movements. The number one problem was sidewalks occupied by hawkers (77.8 per cent of respondents). Other obstacles included poor condition of sidewalks, dumping of waste materials, storage of construction materials and vehicles parking on footways (see Annex Table A5.1). The survey findings are corroborated by media reports, which show that sidewalks are occupied by hawkers on a large scale (Box 5.1).

In some areas this encroachment has turned into permanent occupation and in other areas, the hawkers' business has expanded to occupy the streets as well. The scale of encroachment leaves hardly any space for pedestrians, which defeats the entire purpose of having sidewalks in the first place (Daily Star, 2015). The encroachment compels pedestrians to spill onto the road and thus slows down vehicle movement.

Furthermore, a new form of sidewalk encroachment is observed with the setting up traffic police boxes on sidewalks near intersections. Approximately 350 police boxes have been built in the city for on-duty traffic police to shelter from heat and rain (Daily Star, 2011). However, such structures adversely affect the city's aesthetics, obstruct sightlines for road users including clear view of the on-coming traffic from side roads, and impede pedestrians on pavements and crossing roads at zebra crossings. Private commercial entities also sponsored the building of these structures. Each box, about 100 square feet in size, was covered with advertisements of various companies and their products. These boxes were rented to companies: for instance, one such police box built on the sidewalk along Satmasjid Road was rented to a real estate developer for a yearly charge of Tk.200, 000 by an ad firm (Daily Star, 2011).

Box 5.1: A typical example of sidewalk occupation in Dhaka City

Sidewalks of Duraripara, Rupnagar, Mirpur are occupied by a timber store house, political party's office, and kitchen shops. Most shops are permanent; some are mobile and the rest are fixed. Shops are of various types including rickshaw maintenance shops, electronic goods, quilt-mattresses, dried fish, seasonal fruits, eggs, gram-puffed rice, tea, vegetables, betel-leaf and betel-nut, and light food stalls. The permanent kitchen market on the walkways has been operating for the past 20-25 years. Shop owners pay unofficial rent on a daily or monthly basis. However, they don't disclose the identities of the rent collectors or patronisers, apparently for fear. This occupation leaves only a narrow width of sidewalk for pedestrians, forcing the latter to walk on roads. A political party's office remains permanently on the sidewalk; but ownership transfers from one party to another depending on which party is in power. For instance, the local Awami League and its front organisations' office of the Ward is situated on the south sidewalk of Dhuaripara main road, Rupnagar of Mirpur, which was previously used by BNP (Prothom Alo, 2016b).

City corporations do not have any figures regarding the amount of sidewalk occupied illegally. It is observed, however, that sidewalks at the busiest locations such as Gulistan, New Market, Chadni Chawk, Gausia, Dhanmondhi, Mohakhali and Mirpur are the most encroached. Even both sides of a

sidewalk are occupied in some areas. The intricacies behind the organisation of sidewalk encroachment are now examined in the following sections.

5.4.2 Informal management of sidewalks

Hawkers are the primary occupiers of sidewalks and all of those interviewed had migrated to Dhaka for a living. They began to work at shops or factories as employee at first, and then became owners of makeshift shops on sidewalks by renting the shop from the employer or opening a new shop. In some cases, the nearby landowners leased out the sidewalk to hawkers. Not all hawkers themselves are shop owners; rather, some are employees of hawker-cum-shop owners. It is revealed that the duration of hawkers' occupation of the sidewalk ranges from four months to 35 years, even handing over the business from one family member to another or relatives. Such transfer of business from husband to wife or from uncle to nephew demonstrates the perennial capture of sidewalks for more than 30 years. Because of doing business for this long period some of the hawkers have registered themselves as voters and settled permanently in Dhaka.

Business on sidewalks takes place through informal channels. Neither any written contract is maintained nor any advance security money paid for establishing lease-outs. Instead, acquaintance of the aspiring lessee with the primary occupier, or unwritten certification by a third person, works as a guarantee in lieu of advance payment. Hawkers pay a fixed amount of rent monthly to the principal occupiers. Based on location, a 2 x 2 foot square is rented monthly for Tk.1, 000 to Tk.3, 000. The monthly space rent is to be paid to the principal occupier irrespective of whether or not the hawker opens a shop; if not, the occupier rents the space to another hawker. Apart from space, another essential service for doing business on sidewalks is electricity, and interviews with hawkers show that this is supplied from either nearby market or generator at inflated rates ranging from daily Tk.25 per light to monthly Tk.2,000.

In addition to the monthly space rent, the hawkers have to pay from Tk.50 to Tk.300 daily to a designated person called the 'line man' for permission to do business on the sidewalk. In some areas this fee doubles during festivals. Rates vary depending on areas, specific location within areas, and type of business (Table 5.7).

Table 5.7: Variation in daily payments to 'linemen' across areas and types of businesses

Area	Type of business	Daily payment to linemen (Tk)
Motijheel	Tea-stall	110
	Shoes	300
	T-shirts & undergarments	200
Mohakhali	Fruits	200
	Tea-stall	50
New Market	Shoes	300
	Clothes	100
	Clothes	200
Uttara	Tea-stall	0
	Stationery	150
Gulistan	Cloths	150

Note: Based on interviews with sidewalk hawkers

The amount of rent generally remains stable for about five years; any change is possibly linked with a change in patrons. It was found that hawkers were not given any written receipt for payment of the daily fees to linemen. However, in one exception, a hawker was found among the interviewees who did not pay regular rent for doing business on sidewalk: he received an identity card from the government during the last caretaker government regime.

Total costs and revenues

After deducting all formal and informal expenditures an individual hawker's net income from doing business on the sidewalk ranges from Tk.400 to Tk.1,500 daily, and this is a better earning than most other employment opportunities available to them. However, they pay heavily for the privilege of using the sidewalk, as illustrated in Box 5.2.

Box 5.2: Hawkers: The most expensive floor space in Dhaka

From the interviews with hawkers, it was found that a typical hawker pays Tk.1,000-3,000 per month in 'rent' for a 2x2 square feet roadside space, plus Tk.50-300 daily to the 'lineman' for permission to stay there. Hence the hawker's typical monthly outlay is in the range of Tk.2,500 to Tk.12,000, excluding 'services' (illicit electricity connection, etc.). Taking an average value of, say, Tk.7,250 per month, this means the monthly rental value is around Tk.1, 812 per square foot.

This can be compared with prime commercial floor space in Dhaka's poshest areas. A ground floor unit of 5,500 square feet at Gulshan 2 was recently advertised at a rent of Tk.1,500,000 per month – i.e. Tk.273 per square foot. In other words, the hawkers are typically paying more than six times as much per square foot as the most prestigious retailers in Dhaka – yet they have no security, facilities or respect.

City-wide revenues from hawkers

There are no statistics on the number of hawkers in Dhaka, so any estimates of city-wide revenues from their rents are guesswork at best. An article in the Daily Star estimated that there were over 2.6 lakh hawkers spread across Dhaka who were generating over Tk.5 crore per day in unofficial payments: i.e. an average of Tk.192 daily per hawker (Daily Star, 2013).

Scaled up to yearly revenues, this suggests that the unofficial income from hawkers' rents could be around Tk.1, 825 crore per year (about $228 million). To put this in context, this was nearly as great as the combined budgets of Dhaka North and Dhaka South City Corporations in 2015/16, and considerably greater than their combined revenues from own sources (property taxes, licences, markets, etc).[4]

According to the Daily Star, this unofficial revenue collection is divided between police (40%), linemen (35%), and local political elements (25%) (ibid). This suggests that any attempt to address the hawker problem in Dhaka will have to find alternative ways of gaining the support of these main stakeholders in the process – i.e. to find ways of benefitting the participants, so that they are signed-up to a better system of hawker management.

4. DSCC's revised budget 2015/16 was Tk.1,052 crore, and DNCC's revised budget 2015/16 was Tk.1,010 crore.

Enforcement activities

Rent collection through lineman can be categorised as a 'one-stop service', which guarantees hawkers from being not evicted or any other disturbances by other extortionists. For instance, one hawker said that she did not face the trouble of being evicted yet. When any high officials travel along the road, hawkers were instructed beforehand to keep the shop closed or shift the shop and they usually adhered to such instructions. On the other hand, two other hawkers in the same area have experienced repeated eviction by police. Such attempts are triggered upon the mayors' firmness to clear sidewalk occupation. In some cases, hawkers' eviction, they argue, is pursued by market owners to get back the street customers to their markets. A recently evicted hawker adds that when the high police officials and mayors make public declaration for not allowing hawkers on sidewalks it becomes impossible for them to return. Except for this, the hawkers generally felt very light pressure of eviction. Instead of full or permanent eviction, hawkers are given informal instructions through line men to reduce sidewalk occupation.

Linemen appear to be instrumental in hawkers' return to sidewalk after being evicted. Evicted hawkers negotiate with the line men for returning to the site at first. For example, a massive eviction drive was undertaken on the eve of Cricket World Cup 2011, said two hawkers. Their return to the sidewalk was facilitated through the negotiation of local political leaders with law enforcers. Finally, they were able to return to the sidewalk within two weeks to a month. Two hawkers in another area were able to re-open shops the very next day after eviction in May 2016, prior to the Holy Month of Ramadan whereas the same shop owner had to wait about two weeks to re-open when he was evicted in January of the same year. This highlights that reopening of shop on the sidewalk does not follow any fixed schedule; rather, it depends on various contingencies. When the hawkers do business on monthly rented space, it galvanises them to re-open shop as soon as possible because monthly rent payment is charged whether or not the shop is open. Moreover, linemen speed up the hawkers' return to sidewalk since daily rent collection is dependent upon opening of the shop.

How do hawkers sustain themselves and their families during the period of eviction? They remain unemployed and try to reopen shops in the previous place or open a shop in a new place. During the eviction period they sustain themselves by borrowing money from their familiars. Most importantly, they are confident of their return to the sidewalks.

Sometimes evictions are also carried out to give the appearance that the authorities are doing something. This was confirmed by a senior city corporation officer, who said that continuous capture of sidewalks by hawkers might create a negative perception among city dwellers about corporation officials having a nexus of hawkers; this triggers the Corporation to conduct eviction drives from time to time to demonstrate their stance against sidewalk occupation.

Hawkers' views

Hawkers seem to accept the system of daily rent payment. They argue that the other alternatives such as doing business in private markets or being unemployed due to their sidewalk shops being closed are costlier for them. In any case, they will not be allowed to open shops on the sidewalk without payment of rents, and their poor investment capacity is not sufficient to rent a space in formal private markets, which leaves them dependent on the sidewalks. In addition, sidewalk hawking is considered a less burdensome profession than other do-able work for hawkers in terms of physical labour and accountability. A do-able alternative profession for a hawker could, for instance, be pulling rickshaw or working at garments factories in Dhaka. Those professions also involve restrictions at various stages and are also tiring. Conversely, hawking provides them with enough leisure and they can handle restrictions by paying a fixed amount of rents to a single point.

Hawkers are generally aware that occupation of sidewalks is illegal; but they totally deny the fact that their occupation hampers pedestrians' movement. They argue that occupation of a tiny portion of sidewalk by informal shops does not impede pedestrian movement. Hawkers further argue that they are catering to the needs of the poor people by selling essential goods at a cheaper rate than formal markets and generating employment for themselves and other poor people. 'Eviction puts our livelihoods in peril', said all hawkers interviewed. Moreover, their eviction for the sake of pedestrians' free movement will lead them to looking for such occupations which may turn to be harmful for the society, said a hawker. One hawker was found to being unemployed for the last six months due to eviction: he said that he was struggling to be partner with another hawker or to open a shop on the opposite side.

To some extent, the hawkers are trapped in their own poverty. Table 5.7 shows that hawkers pay monthly Tk.1,500-9,000 to the 'linemen' (not including monthly rent for the sidewalk space), so renting a shop in a formal market would, in theory, be a cheaper option. However, the up-front costs are much greater and beyond the reach of most hawkers, and they need to earn enough on a daily basis to support their families. Borrowing credit from a bank or financial institution is not an option, because they have no collateral and their location is illegal anyway.

Hence the hawkers pay the informal charges and do their best to get along with the system.

5.4.3 Sidewalk maintenance, and mobile courts

Principal responsibility to manage sidewalks lies with the two city corporations, and also the police to enforce the traffic laws. Generally, the city corporations construct, maintain, improve, and free the sidewalks from illegal encroachment for the use of pedestrians. Table 5.8 demonstrates the budget allocated for roads, drains and sidewalks over the years. The table shows that expenditure has increased substantially in the past two years, which can be linked with elections to these city corporations held in April 2015. However, the totals are still quite small compared with the total unofficial revenues from hawkers.

Table 5.8: City Corporation development budgets for roads, drains, sidewalks and road median

	DSCC		DNCC		Total in both CCs	
Fiscal year	**Budget (in Tk.cr.)**	**Revised budget (in Tk.cr.)**	**Budget (in Tk.cr.)**	**Revised budget (in Tk.cr.)**	**Budget (in Tk.cr.)**	**Revised budget (in Tk.cr.)**
2016-17	624.7	-	180	-	804.7	-
2015-16	100	170	186	135	286	305
2014-15	120	140.2	171	146	291	286.2
2013-14	125	110.7	161	123.5	286	234.2
2012-13	115	95	135.8	150.4	250.8	245.4
2011-12 (Dec-June)	20.5	28.3	251	95	271.5	123.3
2010-11	-		-		242.5	200.5
2009-10	-		-		153	137

Note: Compiled from budget documents of DSCC and DNCC

Enforcement processes

The city corporations' headquarters initiate projects for sidewalk improvement and the zonal offices carry out repair works in emergency cases and also conduct mobile courts to free sidewalks from encroachment. These management activities are based on administrative orders; there has not yet been formulated any full-fledged policy or guidelines to manage sidewalks.[5]

Eviction of sidewalk encroachment is conducted in either of two ways. Firstly, if a roadside earmarked for sidewalk is occupied the mobile courts can remove illegal occupants in order to construct the sidewalk. The city corporation officials first issue a notice to the occupiers to remove structures. If they do not respond positively, the respective Zonal Executive Officer will conduct a mobile court and clear all types of occupation. In this situation the city corporation can file cases against the occupiers; however, since disposal of cases requires lengthy processes this approach is seldom used.

Secondly, when an already-constructed sidewalk is occupied by temporary activities these can also be evicted through mobile courts. The Zonal Executive Officer and Chief Estates Officer have magisterial authority to administer mobile courts.[6] According to interviewed officers, during the mobile courts the hawkers' goods are not seized or destroyed, nor are they fined due to humanitarian considerations. They just drive out the hawkers and demolish the makeshift structures. However, once a sidewalk is repeatedly occupied the magistrates will impose fines on occupiers.

The interviews revealed that mobile courts are conducted less frequently than what is planned. Each mobile court consists of 40-50 personnel from various departments including magistrate, police, sanitary inspector, electricity official, and waste management staff. Among them, magistrate and police are critically needed to conduct mobile courts. The magistrates from both city corporations said that they remained busy with their regular functions and receipt of police support was a time-consuming matter. Erratic occurrence of mobile court provides hawkers an opportunity to return to the site or occupy another sidewalk.

Constructing physical barriers

In addition to mobile courts, the corporations have recently erected concrete bars/iron-made grills in some areas. However, this engineering solution has not been observed an effective step in preventing illegal sidewalk occupation. Rather, it has made it easier for hawkers to hang their goods along the bars or grills. Moreover, due to concrete bars the bulldozer cannot enter inside to demolish hawkers' makeshift shops, said corporation officials.

Previous attempts at relocation of hawkers

From time to time the government has attempted 'rehabilitation' of hawkers to specially-constructed hawkers' markets, for example in Gulistan and Dhanmondi. However, this initiative did not reduce the inflow of hawkers. Furthermore, an official of DSCC said 'the rehabilitated hawkers sold the shops to the rich in highly inflated rates'. Conversely, the interviewed hawkers highlighted about irregularities (e.g. bribe, ineligible hawkers, etc.) in distribution of shops to the hawkers.

5. This is in contrast with India, which introduced the Street Vendors (Livelihood Protection and Regulation of Street Vending) Bill in 2012, though till now only three states — Bihar, Uttarakhand and Karnataka – have started implementing it. (Source: Gagandeep Kaur, 'Hard Life for street vendors of India', Gulf News Weekend Review, 31st December 2015)

6. Each Zone is headed by Zonal Executive Officer who is either Deputy/Joint Secretary level officer, posted from civil service on deputation. This officer has been granted with the authority of a magistrate. When they conduct mobile courts they play the role of magistrates. Various departments including the police assist the mobile courts.

The BIGD interviews with city corporation officials revealed that there was a divergence of opinion regarding hawkers' rehabilitation. Some argued that the government/city corporation does not have enough space/land to rehabilitate so many hawkers. If they are rehabilitated they will bring their relatives to Dhaka. So, the officials doubted the benefit of rehabilitation/relocation in freeing the sidewalks from occupation. However, DNCC is considering one option (just an idea at this stage) to rehabilitate only those hawkers who are enlisted voters in respective wards.

Recent policy approaches

Despite repeated holding of mobile courts, the sidewalks could not be kept free from hawkers' occupation, as the interviewed officers acknowledged. But they believe the magnitude of encroachment had been reduced because of the mobile courts. Two officials said they were adopting a systematic approach to deal with the issue, giving emphasis to freeing the main roads and avenues from hawkers at any cost. This would, a Zonal Executive Officer hoped, push the hawkers into housing areas that will be dealt with by local people. Furthermore, no-one other than local voters would be allowed to open shops on earmarked areas. So it was hoped that a 'zero tolerance' approach towards hawkers' shops on main roads and avenues, together with a requirement of being local voters, would ultimately bring down the numbers of hawkers.

5.4.4 Stakeholders' views regarding hawkers' rehabilitation

It was stated earlier that hawkers are desperate to capture sidewalks at any cost since their livelihoods depend on it. Because of this dependency a DSCC official thought the city corporations could not go for outright eviction. Also, political shelter in return for rents has made freeing sidewalks much harder. A DNCC official felt this necessitated rehabilitating hawkers before evicting them; accordingly, the corporation planned to set up at least one holiday market and one evening market at each ward, and formalise the traders in these markets through licencing.

Hawkers are not unaware of these initiatives. However, they are not willing to relocate, anticipating losing customers in the new locations, and also through restricted hours of trading in holiday or evening markets.

In contrast to the official quoted above, another DSCC official doubted whether hawkers' rehabilitation was a viable solution to prevent sidewalk encroachment. He elaborated that the government had built some hawkers' markets such as Dhanmondi Hawkers' Market and Gulistan Hawkers' Market, but this did not stop sidewalk encroachment. Besides, rehabilitation might be too great a task given the number of hawkers and scale of rural-urban migration.

So, recovering sidewalks for pedestrian usage is a challenging task. The hopelessness was heard from the then LGRD Minister when he stated in Parliament in 2015 that 'it was not possible to evict illegal occupiers from the capital's footpaths due to their patronisation by influential quarters and lack of interest of law enforcement agencies' (Daily Star, 2015a). Moreover, attempts to evict hawkers result in clashes between hawkers and those who evict them. A magistrate of DSCC said that their mobile court had to be withdrawn from Dhaka Medical College Hospital (DMCH) area in April 2016 due to clashes. More clashes occurred in Gulistan on June 10, 2016 when the traders of Dhaka Trade Centre evicted the hawkers from footpaths, saying they obstructed the free entry and exit of customers. But hawkers in their defence said that the previous day they had been evicted by the city corporation and police from the streets, not from footpaths (Daily Star, 2016a).

5.4.5 Conclusions and possible way forward to tackle the sidewalk problem

This case study demonstrates the comprehensive and long-established informal governance system for hawkers' shops on Dhaka's sidewalks. From the public's point of view (and also the city corporation's), the main problems is that hawkers (i) block the footway and traffic; (ii) create mess; (iii) can be unsightly at times. On the other hand, they can also provide a useful service: easily accessible, cheaper products, employment-generating at low capital cost.

From the formal shop traders' point of view, the main problems with hawkers are: (i) they siphon-off trade; (ii) they do not pay their share of rent or taxes (they do, but not formally).

Another major problem for the public is that a huge revenue is being siphoned-off illegally by the rent-seekers, which is both exploitative for the hawkers and missed revenue for the city-dwellers (who get pushed off sidewalks they have paid for with taxes).

There could be two alternative approaches to tackling the sidewalk problem. One is the 'zero tolerance' approach, with hawkers not be allowed to open shops on footpaths, enforced by frequent mobile courts. This would call for strong political determination. However, since the revenues from sidewalk encroachment are shared between hawkers and political and administrative stakeholders, this approach offers them little benefit.

An alternative approach could involve formalising the hawkers' role, as follows:

I. Allowing the hawkers to stay where they are, but in a more organised, planned and managed way: e.g. designating the hawker spaces while maintaining minimum footway widths and traffic flow, keeping the street free of rubbish, etc.

ii. Issuing licences to the hawkers to operate there, and collecting the revenue on behalf of the city corporations (instead of the illegal collections)

iii. Using some of the funds to improve conditions for the hawkers and also the public (e.g. providing better drainage, footway repairs, umbrellas for rain, toilets, etc.)

iv. Making the hawkers and their representatives responsible for maintaining the quality and upkeep of the area.

The above sounds like a win-win situation, but its implementation lies in getting the police, line men, political parties and the city corporations on board with this approach. The police and city corporation staff could be given incentives such as official bonuses and career progression, based on (i) amount of revenue officially raised from the area; (ii) quality of the area in question.

The line men could be offered incentives such as formal management jobs, paid from the collected rents. Getting the local political parties on board is the hardest challenge. Organised citizens' pressure and commitment from top level political leadership such as the Mayor, Ministers and Prime Minister could be the way-out. This approach could be tested in one area as a pilot project with big fanfare and political buy-in. If it worked, it could be a model for the rest of Dhaka, and urban Bangladesh too.

6 CHAPTER

Impacts and Costs of Traffic Congestion

6.1 Introduction

The previous chapters have examined the underlying causes of congestion; this chapter now addresses the research question: 'what are the impacts of traffic congestion in Dhaka city?' Traffic congestion has major impacts on the lives of Dhaka's citizens. People not only waste valuable working hours, but also miss important appointments. Often, emergency patients cannot reach hospital in time. Traffic congestion also affects family life: for example, parents are unable to spend precious time with their children, with potentially adverse results for the children, the family and the nation at large. Thus traffic congestion has social costs that affect the whole community.

Various studies have shown that the impacts of traffic congestion are worsening at a distressing rate. Mahmud et al (2012) estimated that about one-quarter of working hours are being lost due to congestion and that around three-quarters of Dhaka's travelers face both physical and psychological health impacts. Mahmud, Rahman and Rabbi (2012) discussed about the high air pollution of Dhaka city, and reported that motor vehicles contributed around 55% of sulphur monoxide (SO), 70% of nitrogen dioxide (N_2O) and 60% of carbon monoxide (CO) emitted in Dhaka.

Noise pollution is another huge negative impact. According to the World Health Organisation (WHO) prolonged exposure to noise levels above 100dB[1] can cause long-term hearing damage. However, in Dhaka city, recent studies have found noise levels of 100-130 dB at some major intersections, mainly due to engine noise and traffic hooting[2].

The chapter is arranged as follows: Section 6.2 discusses the research design; Section 6.3 examines the economic costs of congestion; Section 6.4 looks at some of the wider social costs; and Section 6.5 concludes with implications of the findings and policy recommendations.

1. The decibel (db) is used to measure sound level.
2. Source: Key Informant Interview. Note: the USA'S National Institute for Occupational Safety and Health (NIOSH) recommends that workers' exposures to noise should be kept below a level equivalent to 85 dBA for eight hours to minimise noise-induced hearing loss, and exposure to levels above 100 dBAof not more than 15 minutes. (Source: NIOSH, 'A Practical Guide to Preventing Occupational Hearing Loss,' Publication 96-110, 1996).

6.2 Research design

6.2.1 General approach

The impacts of traffic congestion can be grouped into three broad categories: (i) economic, (ii) social and (iii) environmental impacts. This chapter focuses mainly on the first two: i.e. economic and social costs[3].

There have been several studies of the economic impacts of traffic congestion in Dhaka city, including Mahmud et al, 2012; Khan & Islam, 2013; and the Revised Strategic Transport Strategy (RSTP), 2015. In most cases the economic impacts are estimated in monetary terms, meaning: 'what value of resources could be saved if an hour of delay due to traffic could be avoided?' The economic estimates focus particularly on two major elements:

(1) Cost of extra travel time (e.g. above that for a vehicle travelling under less congested conditions);

(2) Increases in vehicle operating costs due to congestion.

However, traffic congestion also inflicts other social and environmental costs which are less easily quantified. These include the social trade-offs people make due to congestion and various intangible factors such as stress, discomfort, dislocation and severance of communities. To consider these wider impacts the report adopts two approaches, looking firstly at 'Economic Cost' in Section 6.3 and then at the 'Social Trade-offs' in Section 6.4.

6.2.2 Theoretical method for estimating economic costs of congestion

A study of traffic congestion in Karachi by Ali et al (2013)[4] used a model for estimating economic costs which focused on the 'opportunity cost' of traffic congestion (i.e. value of time lost to congestion) and the 'vehicle operating costs'. For the BIGD study, the formulae used by Ali et al (2013) have been adapted and applied to a busy route in Dhaka extending from the Airport to Postogola via Gulshan/Mohakhali (Table 6.2). The route is 26 km long and includes some of Dhaka's busiest roads. The formulae are shown below:

1. Opportunity cost of traffic congestion

$$= \sum_{m=1}^{m} \textit{(Value of time * Delay * No. of vehicles of type 'm' per day}$$

** Average vehicle occupancy for specific mode 'm')*

2. Vehicle operating cost

$$= \sum_{m=1}^{m} \textit{(Fuel Cost}_m \textit{ * Delay * No. of vehicles of type 'm' per day)}$$

The above formulae were adapted from Ali et al (2013), and the terms used in these equations are explained in Table 6.1 below:

3. The environmental costs of traffic congestion, including noise, air pollution, greenhouse gases, visual impacts, and so on, are not studied here, but some relevant studies are included in the Bibliography.

4. Ali, M., Adnan, M., Noman, S., & Baqueri, S. (2013).Estimation of Traffic Congestion Cost – A Case Study of a Major Arterial in Karachi.*Procedia Engineering*, *77*, 37-44.

Table 6.1 Explanation of terms used in the economic cost calculations

Term	Unit	Description
Value of time	Taka per hour	A measure of how much people would be willing to pay to avoid one hour of traffic congestion
Delay	Hours	Average time lost by vehicles using the route due to congestion, measured as the difference between average peak and off-peak journey times
Vehicles per day	Number	Number of vehicles counted on the road per day
Average vehicle occupancy	Passengers per vehicle	Observed average numbers per vehicle, excluding paid drivers
Fuel cost while engine is idling	Taka per hour	Measured as average fuel consumption per hour while engine is idling (in mL/hour for petrol and diesel, or gm/hour for CNG) times the cost of that fuel (in Tk./mL or Tk./gm)

6.2.3 Data sources

The data for the above equations was obtained from various sources, both secondary and primary. The number of vehicles on the corridor for the month of January 2014 was obtained from BRTA traffic survey data collected by sub-consultants 'International Growth Center' (IGC). The data was collected remotely using sensors mounted on RFDI (Radio Frequency Identification) towers in Dhaka, and collected on an hourly and daily basis for different traffic corridors and reported as 'Vehicle Tracking' data at BRTA. For this BIGD study, one month's traffic data was obtained for one specific route.

The average delay due to congestion was obtained empirically by travelling the route by private car and comparing peak and off-peak journey times (Table 6.3).For simplicity, an average delay time was used for all vehicles, rather than a separate value for each mode.

The value of time information was collected from the BIGD socio-economic questionnaire survey of 774 transport users, which indicated how much they might be willing to pay to avoid traffic congestion (see Section 6.4 below). Again, for simplicity a single average value of time was assumed for all road users.

Fuel costs: To obtain vehicle operating costs, it was assumed that the main cost would be the extra fuel consumed due to slow running. For this, secondary data on fuel consumption when idling was obtained from a recent Indian study in Indore (Tiwari, Singh, Balwanshi, 2013), and then combined with current fuel prices in Dhaka.

6.2.4 Limitations of the approach

The results of the economic cost calculations are shown in Section 6.3.First, some limitations of the theoretical approach should be acknowledged. For example, the approach considers only traffic moving along the corridor, not cross-traffic. Secondly, the approach assumes that vehicles travel the length of the corridor, which is clearly a simplification: however, it is a useful approximation for total daily traffic volumes and the results can be adjusted pro rate to reflect average journey distances. Thirdly, the traffic data did not include non-motorised vehicles or pedestrians (who also suffer delays from congestion): however, most of the chosen route was rickshaw-free due to traffic restrictions, except for the southern-most sections. Fourthly, to simplify the approach several averages were used: e.g. average cost of delay for different users; average fuel consumption; and average vehicle occupancy.

Hence the calculations in the following pages are only approximations (though this applies to all other estimates of city-wide traffic congestion). The main benefit of these calculations is to highlight the scale of economic costs that result from the traffic congestion.

6.3 Estimating the economic cost

6.3.1 Previous estimates of economic cost of congestion in Dhaka

Several studies have previously measured the economic cost of traffic congestion in Dhaka. For instance, Mahmud et al (2012) estimated working time lost which, if monetised, was worth Tk.71.77 billion per annum (about $0.9bn) and extra fuel consumption of Tk.112.28 billion per annum (about $1.4bn).

Another study by Khan and Islam (2013) estimated that a total of $3.82bn was lost annually due to traffic congestion in Dhaka.

In 2014 consultants for the Revised Strategic Transport Plan (RSPT) carried out extensive surveys of traffic flows and journey speeds in Dhaka and using a traffic model, estimated the annual cost of time lost to congestion at Tk.2.32bn per day, while vehicle operating cost per day was estimated at Tk.174 million per day. Scaled up, this was equivalent to about $10.6bn and $0.8bn per year respectively.

These various studies show firstly, that traffic congestion in Dhaka city imposes a significant economic cost on the citizens. However, there are also large discrepancies between these estimates which probably reflects variations in methodology adopted and also inherent inaccuracies in the approaches.

With these limitations in mind, an estimate of congestion costs was made in this study for the Airport-Postogola route, to illustrate the scale of costs imposed by traffic congestion on Dhaka's citizens and the national economy generally.

6.3.2 Estimating the economic cost of congestion on the Airport-Postogola route

The total length of the route was measured at 26.05 km and various points were selected to record the time taken to travel from one point to the next (Table 6.2).

Table 6.2 Details of Airport-Postogola route used to estimate economic cost

Hazrat Shah Jalal Airport
Khilkhet
Cantonment signal
Kakoli
Gulshan 2
Gulshan 1
Mohakhali
Sonargaon Signal
Kakrail Signal
TopkhanaMor
Gulisthan Signal
Fulbaria Bus Stand (Gulistan)
Buriganga Bridge
Keraniganj
DakkinKeraniganj
Postogala Bridge

Note: This route was selected as it corresponded to the traffic volume data collected by BRTA

The travel time was recorded on five different occasions as shown in Table 6.3. The time taken on the Friday and Saturday holidays served as the counterfactual (i.e. base measurement assuming free-flowing traffic). Then, the difference between weekends and the other days gave a measure of the waiting time due to congestion. To allow for variations between peak and off-peak conditions, surveys were conducted at different times and an overall average obtained as shown in Table 6.3. For simplicity, a single average delay time was assumed for all vehicles which is 101.2 minutes (1.686 hours) according to the journey time survey. This value was then used to estimate economic costs in the study.

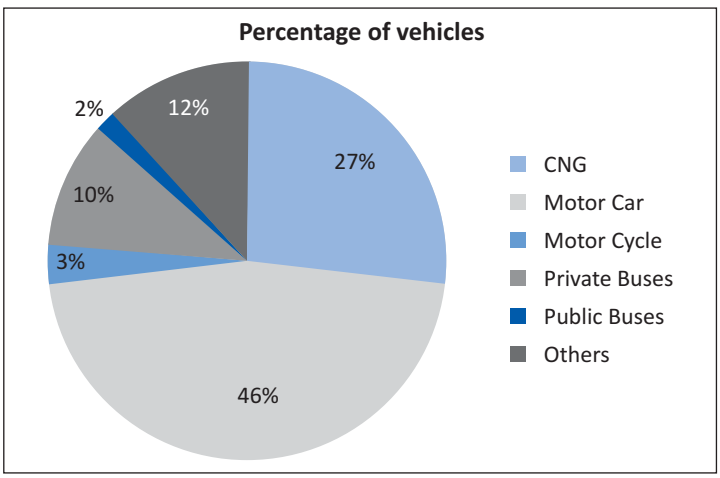
Table 6.3 Airport to Postogola Bridge: Journey times and total delay, measured at peak and off-peak times on different days

	Day and date of survey	Mode of transport used	Total distance, Airport to Postogola Bridge (km)	Total time taken to complete the journey (minutes)	Average Speed (kph)	Estimated total delay, compared with weekend (minutes)
Journey time at weekend (free-flowing traffic)	Friday, 22/4/2016	Private car	26.05	70	22.3	0
Journey time at weekend (free-flowing traffic)	Saturday, 23/4/2016	Private car	26.05	71	22.0	0
Journey time during weekday morning peak hours (9 am-11 am)	Thursday, 28/4/2016	Private car	26.05	161	9.7	91
Delay time during weekday off-peak (11 am–3 pm)	Thursday, 28/4/2016	Private car	26.05	164	9.5	94
Journey time during weekday afternoon/ evening peak hours (3 pm-7 pm)	Thursday, 7/7/2016	Private car	26.05	190	8.2	120
Average of weekday results	Average of three days	Private car	26.05	171	9.1	101.2

Source: BIGD Surveys, 2016

The next step was to find the number of vehicles travelling along the specified route. This data was obtained from secondary sources: namely, a volume count carried out by BRTA in 2014 of all motor vehicles such as private cars, motor cycles, auto-rickshaws, pickup buses, trucks and lorries. Figure 6.1 shows the modal share of vehicles for the given route for January 2014. It can be seen that motor cars had the highest share (46%) followed by CNG's (auto-rickshaws) (27%) and then buses (12%).

Figure 6.1: Modal share of motor vehicles on the Airport-Postogola survey route



Source: Traffic Volume Data, BRTA, (total for the month of January 2014)

Value of travel time: A key factor in the economic cost calculation is the value of travel time to the users. Previous studies in Bangladesh have used different values for this factor: for example, the 2014 Revised Strategic Transport Plan (RSTP) used an average value of Tk.156 per hour (average for all users and all modes). This was based on a study for Roads and Highways Division (RHD) in 2004-05 and updated to 2014 values using the cost-of-living index[5].

5. RSTP 2015, Table 13.1 – the RHD information came from RHD's 'User Cost Annual Report for 2004-2005'

Another study in 2016 assumed an average value of time of Tk.70 per person per hour for road users in Dhaka (Gallagher, 2016) – this was based on prevailing wage rates in Dhaka and also a recent transport study in India.

For the BIGD study, a value of travel time was obtained from the questionnaire survey of 774 transport users. Interviewees were asked how much extra they would be willing to pay to avoid traffic congestion: in other words, their 'willingness-to-pay' (WTP) either extra fares or a congestion tax/charge. The responses are described in Section 6.4.4 below, and from this an overall average of Tk.86 per person per hour was obtained. These numbers were then used in the equations to calculate the 'opportunity costs' and the 'vehicle operating costs' on the Airport-Postogola route. Tables 6.4, 6.5 and 6.6 summarise these results.

Table 6.4: Estimation of 'Opportunity cost of time' on Airport-Postogola route in January 2014

Modes	Number of motor vehicles counted on corridor in Jan 2014	Average vehicle occupancy (pass./vehicle)	Total passenger numbers in Jan. 2014	Average delay per vehicle (hours)	Corridor total time lost in delay per month (hours)	Average value of time (Tk./hr)	Opportunity cost of time (Tk. mill./ month)
	a	b	c = (a x b)	d	e = (c x d)	f	g = (e x f)
CNG	1,799,503	1.77	3,185,120	1.686	5,370,113	86	461.83
MOTOR CAR	3,124,789	1.77	5,530,877	1.686	9,325,058	86	801.95
MOTOR CYCLE	209,771	1.70	356,611	1.686	601,246	86	51.71
PRIVATE BUSES	695,080	36.60	25,439,928	1.686	42,891,719	86	3,688.69
PUBLIC BUSES	104,373	36.60	3,820,052	1.686	6,440,607	86	553.89
OTHERS[6]	795,202	5.42	4,311,983	1.686	7,270,003	86	625.22
Total	**6,728,718**		**42,644,570**		**71,898,745**		**6,183.29**

Table 6.5: Estimation of 'Vehicle operating cost' on Airport-Postogola route in January 2014

Modes	Number of motor vehicles counted on corridor in Jan 2014	Proportion of total motor vehicles %	Fuel Type	Average delay per vehicle (hours)	Fuel consumption while idling (ml/hr or gm/hr)	Fuel price (Tk./ml or Tk/gm for CNG)	Total vehicle fuel cost while idling, Jan 2014 (Tk. mill.)
	a	b	c	d	e	f	g = (a x d x e x f)
CNG	1,799,503	27	CNG	1.686	522	0.035	55.43
MOTOR CAR	3,124,789	46	CNG	1.686	1080	0.035	199.15
MOTOR CYCLE	209,771	3	Petrol	1.686	200	0.086	6.08
PRIVATE BUSES	695,080	10	Diesel	1.686	3210	0.086	323.52
PUBLIC BUSES	104,373	2	Diesel	1.686	3210	0.086	48.58
OTHERS	795,202	12	Diesel	1.686	773	0.066	67.94
Total	**6,728,718**	**100**					**700.69**

Sources:
1. Number of motor vehicles: BRTA
2. Fuel consumption while idling: study by Tiwari, Singh, Balwasi (2013)
3. Average delay: BIGD journey time survey
4. Average value of time: BIGD user survey

6. 'Others' includes trucks and other motor vehicles not otherwise specified. Cycle-rickshaws and bicycles not included in overall traffic count

The above figures show the estimated economic cost for vehicles travelling the full length of the Airport-Postogola route, which was 26.05km. To adjust the figures to reflect average trip lengths in Dhaka, (which was 8.8km for motor vehicles, according to the Revised Strategic Transport Plan)[7], the estimated costs were multiplied by a factor of 0.33[8]. In other words, the average delay per trip on the corridor was assumed to be 33.4 minutes. The resulting estimates are shown in Table 6.6.

Table: 6.6: Estimation of Total Economic Cost of delay on Airport-Postogola route (2014)

Annual economic costs:	Per month	Per year
Opportunity cost: lost travel time (Tk. Million)	2,040	24,485
Additional vehicle operating cost: fuel lost while idling (Tk. mill)	231	2,775
TOTAL (Tk. Million)	**2,271**	**27,260**
TOTAL (USD Million)	**$28.4m**	**$341m**

Note: Above estimates are taken from Tables 6.4 and 6.5 and adjusted according to average trip length in Dhaka.

6.3.3 Results

The results show firstly that the main economic cost of congestion in Dhaka is the value of time lost by the citizens. On the Airport to Postogola route this was about 90% of the total economic costs, while vehicle costs (measured as additional fuel consumed while idling) were only 10% of the total economic costs. This finding is similar to other studies: for example, the RSTP estimated travel delay as 93% of the total economic cost of congestion in Dhaka (RSTP, 2015).

The overall cost of congestion on the Airport – Postogola route was estimated at Tk. 227 crore per month ($28.4m per month). With 42.6 million passengers per month the average cost of delay was about Tk.53 for each passenger trip.

These figures are notional (i.e. based on many approximations), but they indicate the scale of the cost of congestion in Dhaka. For comparison, studies in other world cities have estimated the annual economic cost of congestion as high as $5bn in Jakarta, $8bn in Cairo and $10bn in New York (World Bank, 2011)[9].

In other words, congestion causes a significant monetary loss that could be avoided by taking remedial measures. It is a very high cost especially when compared to the GDP of Dhaka and the country as a whole. Furthermore, this is the loss incurred due to traffic congestion on a particular commuter stretch. This value if extrapolated for the whole city will lead to a more intense result. This is a huge drain on the city's human and physical resources and demands serious attention by institutions and stakeholders involved in traffic policy-making.

7. The RSTP estimated average trip distances in Dhaka at 7.4km for motorcycles, 8.4km for cars and CNG's, and 9.7km for buses (RSTP, 2015, Figure 11.10). Taking a weighted average gives an average trip distance of 8.8km for motor vehicles.
8. Factor 0.33 obtained by dividing 8.8km average trip length by 26.05km
9. World Bank, 'Traffic Congestion in Cairo: An Overview of Causes as well as Possible Solutions', Document 71852, 2011

6.4 Wider social costs of traffic congestion in Dhaka

6.4.1 Examining the social costs of congestion

Traffic congestion has numerous other social repercussions. These include:

- Re-location of residence or business, to avoid the delays due to traffic congestion.
- The irritation and widespread psychological stress from dealing with heavy levels of traffic.
- Reducing the efficiency or attractiveness of public transport compared with other (private) transport options.
- Reduced social activities of individuals and the effect on family lives.

These various social costs are not easily measured in monetary terms. Hence for this report they were examined in the questionnaire survey of transport users. As mentioned in previous chapters, a sample survey of 774 transport users of different income levels and occupations was conducted, and the results are presented here.Data was collected on social costs of traffic congestion and users' willingness to pay (value of time) for reducing congestion. For instance, there were questions such as 'what do users think are the direct impacts of traffic congestion?', 'How much are users willing to pay as a tax for availing private/public vehicles?', 'Does traffic condition affect their relocating decision?' The mix of respondents included people from all socio-economic backgrounds: students, businessmen, job-holders, entrepreneurs, etc.

6.4.2 High dependence on public transport in Dhaka City

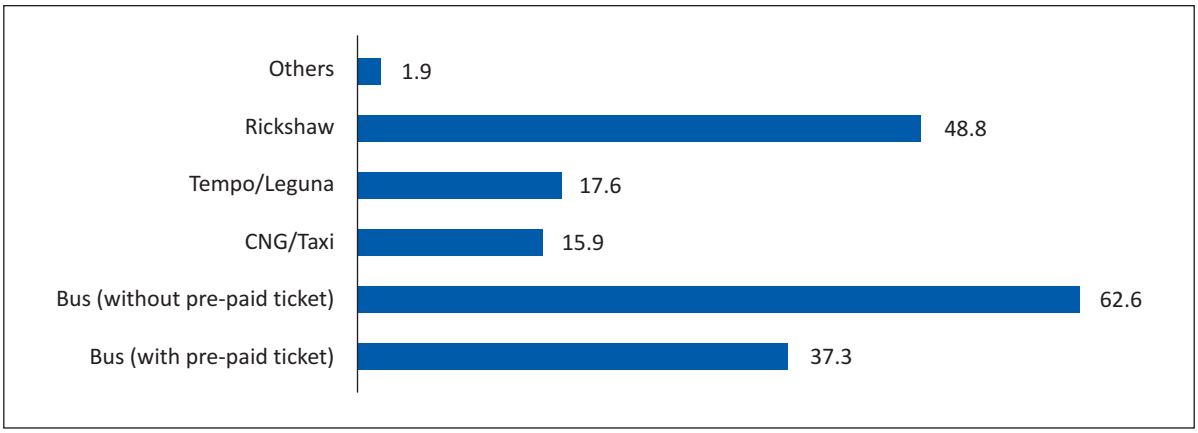
Firstly, it is worth emphasising that the great majority of passenger trips in Dhaka are made on public transport, including cycle-rickshaws and CNG's, as opposed to private modes such as cars and motor-cycles. According to the RSTP, 88% of all passenger trips in Dhaka in 2014 were on buses, rickshaws and CNG's, compared with just 12% in cars, jeeps and motor-cycles (RSTP, 2015)[10].

Within the 'public transport' sector, buses make the major contribution. Figure 6.2 shows the results in the BIGD survey to the question: 'what public transport do you use?' 62.6% of public transport users rely on bus services 'without pre-paid ticket'. The second main choice of transport is rickshaw (48.8%), followed by buses with 'pre-paid tickets' (37.3%)[11]. CNG use is relatively less due to its cost, but nonetheless is comparable with total private car usage (RSTP, op cit)

Use of rickshaw is popular, especially for short trips, due to the heavy expenses of CNG trips and inconvenience of bus services[12]. Thus it is clear that a major part of Dhaka city's population is dependant on public transport; and due to high transportation costs, reliance on bus is a viable choice for most of the urban dwellers.

10. Source: RSTP Interim Report 2, August 2015, Fig. 11-17
11. Note: pre-paid bus tickets are purchased at ticket counters before boarding the bus, and the ticket usually guarantees a seat and a faster service with fewer stops.
12. Key Informant Interview.

Figure 6.2: Users' choice of public transport



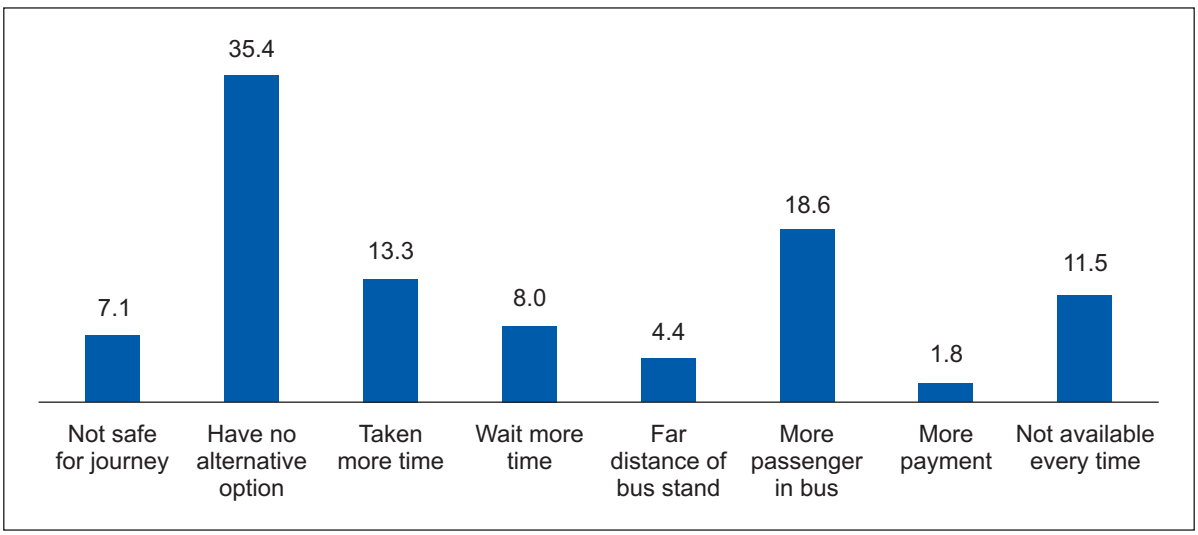
Source: BIGD Survey, 2016

6.4.3 Users' perceptions of the public transport system

A heavy reliance on public transportation could reflect either of two things: a country's public transport system is of good standard and more attractive than other modes, or else most of the citizens have low socio-economic profile which makes it substantially expensive for them to afford private transport. The previous figure showed that a high percentage of people rely on public transport, especially buses. However, this is mainly because they do not have any other alternative.

Figure 6.3 shows users' perceptions about using buses. It can be seen that the highest number (35%) think that they have no alternative to using them. The next most common feedback is negative perceptions about the (poor) quality of service: 18.6% believe the buses are too crowded while 11.5% say they are often unavailable. Other negative perceptions include loss of time using public transport, and safety concerns.

Figure 6.3: Users' perception about using buses

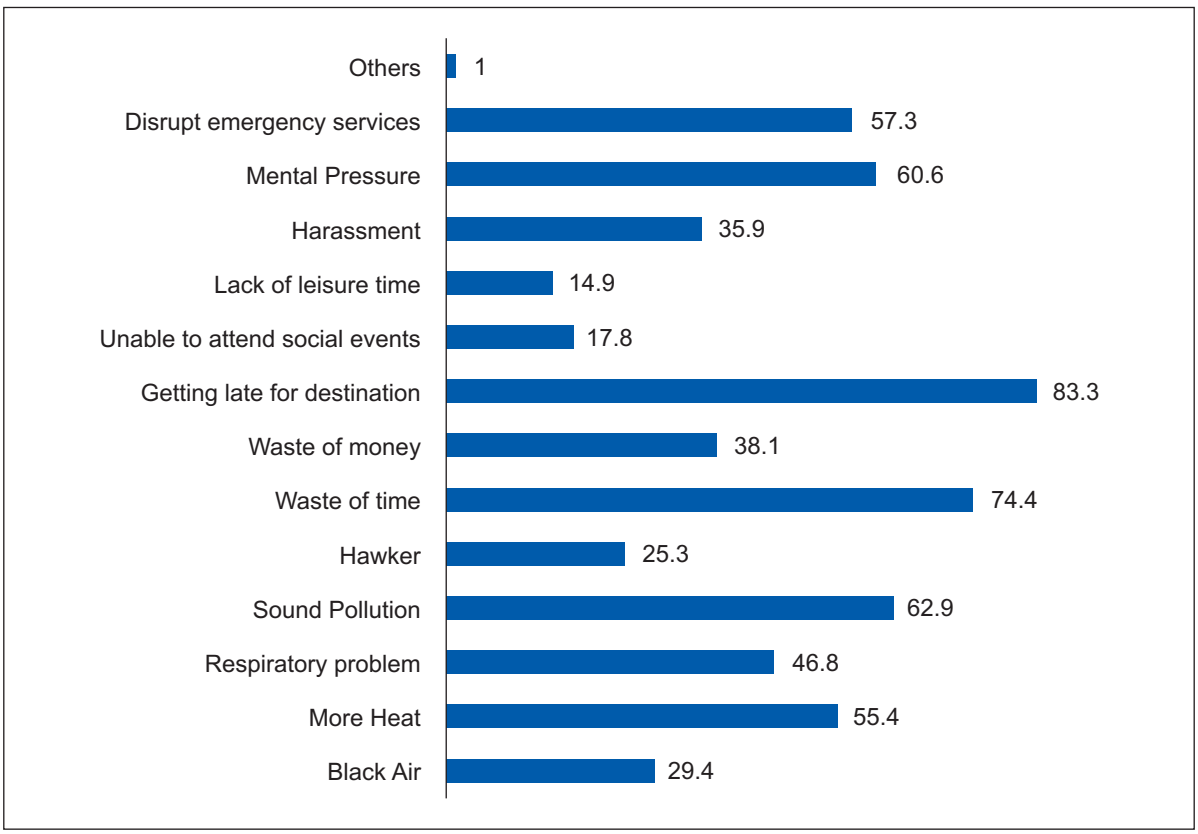


Source: BIGD Survey, 2016

6.4.4 Users' views on social impacts of congestion

The users' negative perceptions suggest management failings in the transport sector. The users, including private vehicle users, were asked about their perceptions of the various impacts of traffic congestion. Figure 6.4 shows that time-related factors (arriving late, wasted time, wasted money, disruption of emergency services) were the dominant perception, followed by environmental factors (noise, heat, breathing difficulties, black air). Personal discomfort was the third main impact (mental pressure and harassment).

Figure 6.4: Impacts of traffic congestion

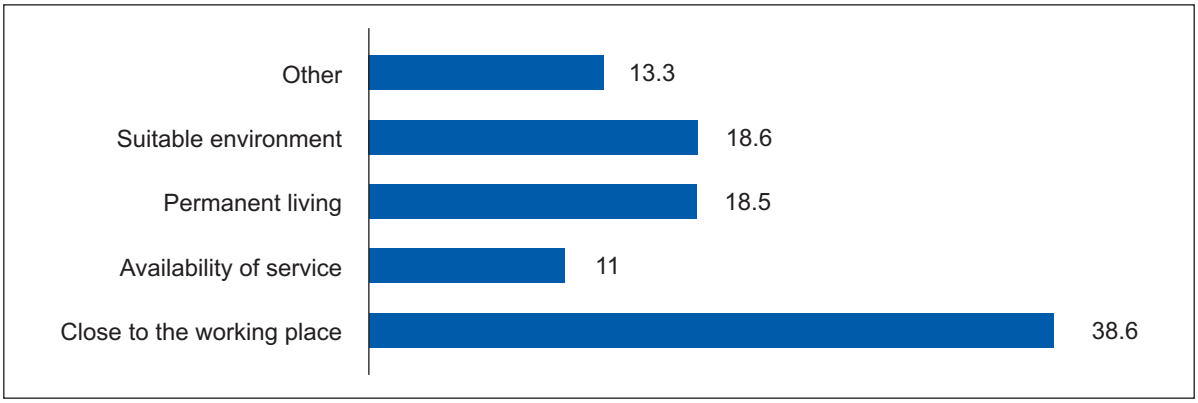


Source: BIGD Survey, 2016

The responses suggest that congestion resulted in social and economic trade-offs. On average, more than 70% of respondents claimed that their commuting time was increased three-fold during peak hours[13]. This will have knock-on effects such as income-erosion and influencing households to relocate closer to their workplaces. The social life of commuters and their choice of where to work are also constrained. Thus traffic congestion has a wider impact on the urbanisation and living standards of the city-dwellers. This is illustrated in Figure 6.5, which shows that the most important reason for choosing housing (38.6%) is to live close to the work place.

13. KII and survey

Figure 6.5: Reasons for users' choice of housing



Source: BIGD Survey, 2016

6.4.5 Impacts according to different income, expenditure and occupational groups, and willingness to pay to avoid congestion

The impacts of traffic congestion are not equally experienced by all groups. The following Tables 6.7, 6.8 and 6.9 show how the impacts affect people differently, according to their different economic status, transport expenditure and monthly income. In addition, both private and public transport users were asked how much extra they would be willing to pay to avoid traffic congestion: in other words, their 'willingness-to-pay' (WTP) either extra fares or a congestion tax/charge.

Table 6.7: Impacts of traffic congestion and users' average willingness-to-pay (WTP), by Occupation (number)

Impacts/WTP	Categories	Student/Teacher	Self-Employed/ Business	Job-holders	TOTAL (Respondents = 694)	TOTAL (%)
Loss of time	No	63	52	62	177	26%
	Yes	132	169	216	517	74%
Loss of money	No	133	143	166	442	64%
	Yes	62	78	112	252	36%
Avoiding social activities	No	169	182	229	580	84%
	Yes	26	39	49	114	16%
Average Willingness to Pay Tax	Nothing	16	8	25	49	7%
	< Tk.100	49	81	65	195	28%
	Tk.100	105	94	143	342	50%
	> Tk. 100	23	38	43	104	15%

Source: BIGD Survey, 2016

Thus, the survey shows that 'loss of time' and 'loss of money' affects all economic groups: job-holders, self-employed academics, etc. None, however, stated that their leisure activities were reduced substantially due to traffic congestion[14]. When asked whether how much they would be willing-to-pay

14. On the other hand, congestion can significantly affect leisure activities by discouraging people from making trips in the first place.

to avoid congestion, a majority of respondents across all occupational groups suggested they would be willing to pay more than Tk.100. Taking the average across all 694 respondents, the weighted average 'willingness to pay' was found to be Tk.86.

To better understand willingness to pay (WTP), the respondents were analysed according to their transport expenditure and monthly income (Tables 6.8 and 6.9). A majority of those who experienced a major loss of time and money were in the Tk.10,001-20,000 category of monthly transportation expenditure, followed by the lowest counterpart (>Tk.1,000). These findings have a major implication; on average, a majority of the users fall in the lower spending groups which reflects their use of transport is mainly public transport. These users have high opportunity cost of time as they have limited resource allocated for transport expenditure. Travelling in public transportation involves more time which is indicated by the survey data.

Table 6.8: Impacts of traffic congestion and willingness to pay, by user's monthly transport expenditure

Impacts	Monthly Transport Expenditure	1-1000	1001-2000	2001-3000	3001-4000	4001-5000	Above 5000	TOTAL (Respondents = 774)	TOTAL (%)
Loss of time	No	28	46	26	6	9	14	129	17%
	Yes	150	213	102	58	44	79	646	83%
Loss of money	No	99	144	97	43	36	61	480	62%
	Yes	79	115	31	21	17	32	295	38%
Avoiding social activities	No	150	216	105	49	44	74	638	82%
	Yes	28	44	23	15	9	19	98	18%
Average Willingness to Pay Tax	Nothing	4	7	6	12	7	32	68	9%
	<Tk.100	56	93	28	16	7	12	212	27%
	Tk.100	89	131	74	29	28	34	385	50%
	> Tk. 100	28	26	20	7	11	15	109	14%

Source: BIGD Survey, 2016

Table 6.9: Impacts of traffic congestion and willingness to pay, by user's monthly income (number)

Impacts	Monthly Income Expenditure	1-10000	10001-20000	20001-30000	30001-40000	40001-50000	Above 50000	TOTAL (Respondents = 588)	TOTAL (%)
Loss of time	No	22	39	22	7	10	5	105	18%
	Yes	64	160	118	55	41	48	486	82%
Loss of money	No	52	114	96	43	32	33	370	63%
	Yes	34	85	44	19	19	20	191	37%
Avoiding social activities	No	75	159	115	51	43	42	485	82%
	Yes	11	40	25	11	8	11	106	18%
Average Willingness to Pay Tax	Nothing	3	6	5	2	4	19	39	7%
	< Tk.100	37	63	35	17	9	6	167	28%
	Tk. 100	38	106	77	28	21	18	288	49%
	> Tk.100	8	23	22	15	17	9	94	16%

Source: BIGD Survey, 2016

Table 6.9 shows the impacts of congestion across income groups. A majority of respondents suggested that in order to avoid traffic congestion, they were willing to pay some additional fare or congestion tax, if required. In this regard, 38% were in the income group ranging between 10,000-20,000 and 20,000-30,000. Interestingly, a large proportion of the respondents in the higher income groups, (that is, Tk.50,000 and above),were not willing-to-pay congestion tax. This is consistent with the socio-economic inequality in access to transportation: the higher income strata can afford their own private transport and thus travel in comfort. For the majority of the urban population who are dependent on public transportation, inconvenience of travelling is one important reason why they are willing to pay extra to avoid congestion. This is also complemented by the responses of users regarding loss of time and money. Those who incurred loss of working hours and money also fell mainly in the same income groups, between Tk.10,000-20,000 and Tk.20,000-30,000. This suggests that there is a strong correlation between impacts of traffic congestion and user's willing-to-pay to avoid congestion.

6.5 Discussion of the findings and conclusions

This chapter aimed to identify the impacts of traffic congestion in terms of economic and social costs. The economic cost for a single main corridor in Dhaka (Airport to Potogola, 26km), was estimated to be around Tk.227 crore per month ($28.4m per month), or roughly Tk.53 for each passenger trip. The majority of this cost (90%) was due to time loss; the additional vehicle costs (mostly in additional fuel consumption) were estimated at only 10% of the total economic cost. Although the estimate was prepared for only one specific route this paves the way for further investigation into the entire city. The economic cost when compared with per capita GDP is very high and a serious concern for the country. Furthermore, if other costs are taken into account, such as environmental cost of pollution and road accident costs, the results are much more alarming.

Social costs: For this study, the social costs were measured in terms of the social trade-off of traffic congestion to the mass of the population. From the user survey it was found that a large section of the population had trade-offs in terms of 'loss of time' as they get late for their destination, and 'loss of money' as many were left with no other alternative other than to rely on private means of transport.

Willingness to pay to avoid congestion: To tackle these implicit costs of traffic congestion, one way out could be the introduction of 'congestion pricing'. Hence, the users were also surveyed on their willingness-to-pay to avoid traffic congestion (a proxy for congestion pricing). The findings suggested that around two-thirds of users (65%) were willing to pay over Tk.100 as a road tax to travel in some major congested roads of the city, while the weighted average of all users was about Tk.86 per trip. This can be compared with the economic cost of congestion calculated in this study, at roughly Tk.53 per trip.

The analysis found that the groups most affected were the students and job-holders who are the common users of public transportations such as public buses and CNG. This has important implications for the daily economic costs incurred individually and cumulatively due to traffic congestion.

The estimates in this chapter, although approximate, provide policy-makers with important feedback on the actual impacts of the traffic congestion that the society bears. These will, hopefully, influence the policy-making process towards more efficient allocation of resources to meet the country's increasing need for good quality transportation. There must be effective traffic demand management and increased investment on public transport to ensure a better quality of services and hence reduce the impacts of traffic congestion.

CHAPTER 7

Conclusions and Recommendations

This chapter summarises the main findings from the previous chapters, and puts forward recommendations for strengthening the management of Dhaka's transport system and developing stronger, more effective government institutions for reducing traffic congestion.

7.1 Scope of the study

The 2016 'State of Cities' report focused on the problems of traffic congestion in Dhaka City, their causes and how they can be tackled. The challenge is immense: Dhaka is one of the world's fastest-growing cities and also the most crowded. Its transport demand has increased dramatically, far out-stripping the capacity of the road network to accommodate everyone's wish for personal transport. Within the past two decades more than a million motor vehicles have been introduced, and almost as many non-motorised vehicles, particularly cycle-rickshaws. Not surprisingly, the city's road network has struggled to accommodate so many vehicles, and this has been compounded by poor planning and urban governance. The result has been acute and growing traffic congestion.

In the past, government agencies have responded primarily by expanding the road network with new roads, flyovers and now elevated expressways. However, experts advise that Dhaka's traffic congestion is not simply a problem of transportation engineering but also a result of ad-hoc planning and broken bureaucracy. In other words, institutional factors underlie the traffic congestion problems.

This study therefore adopted a 'governance perspective' to analyse Dhaka's transport management system and its associated dynamics, with the following research objectives:

1. To explore the transport demand and supply situation in explaining the status of traffic congestion in Dhaka (Chapter 2);
2. To understand the existing institutions and policy arrangements for traffic management in Dhaka city, particularly the institutions' roles, responsibilities and coordination gaps (Chapter 3);
3. To explore the status and effectiveness of traffic law enforcement in Dhaka city (Chapter 4);
4. To examine in depth the institutional causes of traffic congestion and explain why those factors continue to exist leading to the persistence of congestion (Chapter 5);
5. To evaluate the components of economic and social costs of traffic congestion in Dhaka city, and some policy implications (Chapter 6).

Study methodology

Geographically, the study focused on the Dhaka Metropolitan Police (DMP) area; and institutionally, on six key government agencies responsible for planning and managing Dhaka's road transport –DMP, DNCC, DSCC, BRTA, DTCA and RAJUK. Based on 'governance perspective', the investigation was conducted within a 'political economy framework', identifying the relevant stakeholders, mapping their preferences and interests, and explaining how the institutional context and constraints affected them in carrying out their functions. Data was collected from both primary and secondary sources through interviews, a 'score-card' survey of the six institutions, site observations and case studies. The study also undertook a major questionnaire survey of Dhaka's citizens (774 respondents), to obtain their views of the main traffic issues and their priorities for tackling the problems.

7.2 Summary of main findings

Chapter 2: Transport demand and supply: mis-match and management issues

Chapter 2 examined transport demand and supply in Dhaka city and how it affects traffic congestion. The demand for transport is influenced by many factors such as population, housing, employment, land use, income levels and rural-urban migration – these combine to produce patterns of travel and demand for certain types of transport. The supply of transport is related to the availability of transport infrastructure (roads, rail, water) and different transport modes (cars, rickshaws, buses, CNG, pedestrians, etc.).

The obvious cause of Dhaka's traffic congestion problems is demand fast-outstripping the availability of transport infrastructure, and the government has usually taken the view that building more infrastructure (especially roads) will solve the problems. However, policymakers have tended to overlook the management perspectives of traffic congestion. This study found, based on stakeholder interviews and the transport user survey, that institutional and management factors underlay most of the traffic congestion problems; for example:

- Dhaka's road network has not been properly planned – the network reflects short-term needs but the long-term requirements have not been sufficiently considered. This has resulted particularly in the shortage of east-west roads and secondary and feeder roads, and also narrow, haphazard local roads.
- There has been only minimal restraint on increasing car use. The normal management measures used in other world cities to reduce private car use in congested urban areas, such as parking controls, parking charges, area licencing schemes, higher fuel taxes and other management measures have been lacking in Dhaka.
- Dhaka's bus system has evolved haphazardly and is difficult to organise into a coherent and well-planned public transport system.
- There is an acute lack of provision for pedestrians, and poor maintenance and management of footways.
- Traffic rules violations by drivers are closely linked to poor management by the regulatory agencies, for example issuing of vehicle and driver licences by BRTA, with nearly 2 million fake driving licences issued, according to the Bangladesh High Court.
- Co-ordination of government organisations is a major challenge, with more than 31 agencies involved in transport in Dhaka

The study's survey of transport users found that most people identified management issues as the main causes of traffic congestion, particularly: (1) haphazard parking, (2) streets occupied by private transport, and (3) violation of traffic rules. Therefore effective traffic management, including restraining the demand for private transport, is vitally important for reducing Dhaka's congestion.

Chapter 3: Institutional and policy gaps and challenges

The traffic problem is not new to Dhaka: municipal authorities have had to deal with traffic congestion since the 19th Century if not before. However, the problem has increased dramatically in recent years, but the institutions have not sufficiently responded to the challenge. Focusing on six main organisations (DMP, DNCC, DSCC, BRTA, DTCA and Rajuk), the study found only limited coordination between the institutions in preparing their transport policies and projects. The main transport co-ordinating authority (DTCA) is significantly under-staffed and lacking authority; and all of the organisations face challenges in terms of shortages of professional staff, low skill levels, lack of suitable equipment and a general lack of realism or 'vision'. Some important transport issues tend to be 'swept under the carpet' (e.g. road safety, rickshaw management, etc.), and some plans and policies tend to lack realism (some infrastructure proposals and land use plans, for example).

There is considerable overlapping of responsibilities and duplication of functions between different agencies, which multiplies the problems of co-ordination and also results in poor utilisation of staff and resources.

Regarding skill capacity, most organisations lack the right people in place and technical positions are often filled by deputised non-technical persons, resulting in high staff turnover, their reduced effectiveness and sometimes internal tensions with permanent staff.

Regarding accountability, very few organisations have monitoring processes apart from monthly meetings, and there is no evidence that such meetings hold anyone to account. External accountability largely depends on the meeting with superiors in the line ministry. Consequently, it is a challenge to hold any particular organisation accountable for traffic congestion and related transport problems. Auditing processes are also very weak and there is very little transparency.

Overall, therefore, Dhaka's transport system is being managed by organisations that are internally challenged, as well as externally lacking in co-ordination.

Chapter 4: Enforcement of traffic laws: current status and options for improvement

The status of traffic law enforcement in Dhaka was examined, particularly the roles of the Bangladesh Road Transport Authority (BRTA) and Dhaka Metropolitan Police (DMP). The chapter looked at the pros and cons of traffic law enforcement, the role of stakeholders, the types of breaches of traffic laws, and ways to improve the situation. The research was based on feedback from the road user survey and also interviews with key informants.

There have been many infrastructural initiatives and also various new laws regarding traffic management in Dhaka city. Yet despite an extensive legal framework and plenty of daily activity by the enforcement agencies, the research found that drivers of both public and private transport vehicles have a tendency to break the rules while pedestrians also contribute to the process. On the other hand interviewees told of weaknesses and poor management of traffic law enforcement.

The survey revealed a rather patchy knowledge of traffic laws amongst ordinary citizens. The majority knew about traffic signals, designated bus stops, maximum passenger loads and observing

lanes/routes. But less than half knew about speed limits or parking rules, and very few were clear about documents required to be carried on vehicles.

However, despite some awareness of the traffic laws, actual observance was considerably less: interviewees thought that the majority (two-thirds) of road users broke the law 'sometimes' and a significant proportion (5-15%) 'always' broke the law. Bus operators were considered more likely to break the laws than private drivers.

Asked why people broke the traffic laws, interviewees said the main causes were competitive pressures on the bus operators, and poor police enforcement. Lack of knowledge of traffic laws was significantly less important.

The study asked transport users what they thought were the main challenges facing traffic management in Dhaka, and the best way forward. The respondents identified the top three challenges as:

- Increasing numbers of vehicles in Dhaka (40% of respondents)
- Weaknesses in enforcement (27%)
- Buses not using designated stops (26%)

Regarding the best way of tackling traffic congestion, the respondents' top three priorities were:

- Better enforcement of traffic rules (37% of respondents)
- Well-planned traffic management, which includes good co-ordination (35%)
- Controlling the number of private vehicles on city roads (27%)

Institutional shortcomings relating to enforcement were considered in this and other chapters. Regarding BRTA, it was noted that the driver and vehicle licence system is dominated by 'brokers', who charge substantial fees and can even arrange a licence without a test. Regarding police enforcement, it was noted that while there is plenty of official activity (for example, 8,500 legal cases registered against drivers and 793 vehicles towed away in just three days in Dhaka in June 2015), yet survey respondents said poor enforcement was the main challenge for traffic management in Dhaka.

Chapter 5: Governance of Bus Routes and Sidewalks in Dhaka

A political economy analytical framework was adopted to analyse the stakeholders' behaviour in traffic governance, focusing on two areas: (i) bus operations; (ii) management of sidewalks (footways). Data was collected from secondary sources and personal interviews with 42 key stakeholders: government officers, bus owners and employees, street hawkers and transport experts.

Bus sperations

The study found that Dhaka is under-provided with buses, even compared with Indian cities. The lack of buses attracts entrepreneurs to the sector, but informal payments and political connections are required to start and continue operating, which chases out healthy competition.

Starting Bus Operations: To start operating, a bus operator must obtain a route permit, which is issued by Dhaka Metropolitan Regional Transport Committee (RTC), headed by the Dhaka Metropolitan Police Commissioner. However, no formal road surveys or systematic analysis is carried out, so the decision is based largely on 'perceptions'. Consequently, there is no systematic bus route plan, which results in over lapping bus services on a single route.

More recently, route permits have been issued only to bus companies with a minimum of 20 buses (to reduce industry fragmentation). In theory any investor can join one of these companies, but in practice the equal opportunity is only on paper: if an influential person operates on a route, entrance for any other person is very difficult.

Before the route permit is approved the bus company must obtain vehicle registration, fitness certificate and a tax token from BRTA, and also insurance from an insurance company. These are renewed annually while the route permit is renewed every three years. For a brand new bus no extra money has to be spent (this is looked after by the bus seller as part of the purchase deal), but for renewing documents of existing vehicles an additional 30% has to be spent, according to bus operators.

Operating Bus Services: Once a bus enters service, numerous informal payments have to be made on a daily basis to keep operating. Generally, bus drivers face checking of five papers by traffic police. Cases are filed for missing or failing to have up-to-date documents, or stopping on the road other than at traffic signals. It was suggested that on average 15 cases are filed month lyper vehicle, especially for the offence of stopping other than at bus stops.

There are strong competitive pressures not to use designated bus stops, and instead pick up passengers at junctions and traffic signals. Furthermore, in most places bus stops are not clearly marked. This gives the regulatory regime immense discretionary authority to interpret the extent of law-breaking, and scope for informal settlement between bus companies and the regulators. Another example is speeding: a vehicle's speed is measured by observation rather than speed measurement tools. Bus sector operators said that if they did not settle alleged breaches of regulatory obligations on the spot, they would face at least 100 cases for each bus a month instead of the current 15 cases.

In addition to on-the-spot payments, the interviewed companies alleged that there are different rates of payment to the regulators to keep bus services operational on permitted routes. On one company's route there were allegedly eight 'bits'(unofficial checking points) and the company paid monthly about Tk.90,000 to be exempted from regular checking at those points. The amount for each 'bit' is determined through informal negotiation between the bus company and the government counterpart, and varies from Tk.7,000 to Tk.18,000 depending upon the number of enforcers working at each 'bit'.

A traffic official out-rightly denied the above spot and monthly payments, and said that valid prosecutions by police are generally labelled as 'harassment' by traffic offenders. Another senior official said that given the scale of irregularities in driving licences, vehicle fitness certificates and driving behaviour, a full-scale crack-down by the police would turn the traffic into grid-lock.

However, the absence of full checking encourages the drivers and vehicle owners to compromise with official standards and good practices, and when facing prosecution an informal settlement is preferred since it is quick and less expensive.

Other Stakeholders: There are other stakeholders who influence bus operations in Dhaka, including the Dhaka Road Transport Owners' Association (DRTOA) which looks after the owners' interests; the bus drivers and helpers who run the buses and collect the fares (pocketing some if they can); students and the general public who try to pay less and sometimes react violently.

All of these stakeholders interact to increase the costs of operating buses in Dhaka and reduce their profitability. On top of this, traffic congestion has greatly reduced the speed and output of the buses, possibly by as much as one-half or two-thirds in recent years.

Conclusion: The informal transactions constitute almost half of a company's operational costs in a month, directly affecting the investment returns. As a result, service quality is compromised since the operator's survival depends on management of informalities and their focus is shifted from passengers to patrons. In addition, if all the many driving and vehicle-related traffic law violations were prosecuted there would be a drastic reduction in buses on the roads. Therefore people allow the status quo to continue, which results in the poor quality of Dhaka's urban public transport.

Dhaka's public transport is caught in a vicious circle – poor governance leads to cost-cutting and declining standards, which in turn creates more opportunities for poor governance. How can the city break out of this 'vicious circle' and improve the transport system? Possible reforms are presented in Section 7.3.

Governance of sidewalks

Dhaka is seriously under-provided with sidewalks, and those that are available are not well managed or maintained. The user survey found the number one problem faced by pedestrians was sidewalks occupied by hawkers (78% of respondents); other obstacles included poor condition, dumping of waste, construction materials and parked vehicles. In busy locations such as Gulistan, New Market, ChadniChawk, Gausia, Dhanmondhi, Mohakhali and Mirpur, the scale of hawker encroachment leaves hardly any space for pedestrians, which defeats the object of having sidewalks.

This study found that there is a comprehensive and long-established informal governance system for hawkers' on Dhaka's sidewalks. From the public's point of view (and also the city corporation's), the main problems are that hawkers block the footway and traffic; create mess; and can be unsightly at times. On the other hand, they also provide a useful service: easily accessible, cheaper products, and employment-generating at low capital cost.

From the formal shop traders' point of view, the main problems with hawkers are that they siphon-off trade, and do not pay their share of rent or taxes (in fact they do, but informally).

Perhaps the greatest problem, which affects everyone, is that a huge revenue is being siphoned-off illegally by the rent-seekers, which is both exploitative for the hawkers and lost revenue for the city authorities and citizens (who are pushed off sidewalks they have paid for with taxes). Assuming that there are over 2.6 lakh hawkers in Dhaka paying on average Tk.192 per day, this would give a daily unofficial revenue of Tk.5 crore. On an annual basis this could be around Tk.1,825 crore per year (about $228 million), which is nearly as great as the combined budgets of Dhaka North and Dhaka South City Corporations in 2015/16.

According to both primary and secondary sources, this unofficial revenue collection is divided between police, linemen, and local political elements. This suggests that any attempt to address the hawker problem in Dhaka will have to find alternative ways of gaining the support of these main stakeholders in the process – i.e. to find ways of benefitting the participants, so that they are signed-up to a better system of hawker management. Some proposals are given in Section 7.3.

Chapter 6: Impacts and costs of traffic congestion

Chapter 6 examined the impacts and costs of traffic congestion on Dhaka's citizens. The research focused on the economic and social (behavioural) costs, while noting that the environmental costs were also serious: for example air pollution, noise, greenhouse gases, road casualties, degradation of urban fabric, severance and other negative impacts.

Economic costs

Previous studies have tried to estimate the economic costs of traffic congestion in Dhaka, and recent estimates have varied from $2.5bn per year (Mahmud et al, 2012) to $11.4bn per year (Dhaka Revised Strategic Transport Plan, 2015). For this research, a case study was taken of a single major corridor in Dhaka, 26 km between Airport and Postogola, via Gulshan, Mohakhali, Gulistan, Buriganga Bridge and Keraniganj. The economic cost was simplified to two main components: (i) additional time wasted in congestion, and (ii) additional vehicle costs (considered as additional fuel costs for vehicles delayed in traffic). Using traffic data from BRTA and journey time surveys conducted by the research team, it was found that the average speed of motor vehicles on the corridor decreased from around 22 kph off-peak to around 9 kph at peak periods . Assuming an average value of time for motor vehicle passengers of Tk.86 per hour, the monthly economic cost was estimated at around Tk.227 crore ($28.4m per month), or roughly Tk.53 for each passenger trip. The majority of this cost (90%) was due to time loss.

Although the estimate was for just one route, it highlighted the economic impact of traffic congestion for Dhaka as a whole. When compared with Dhaka's GDP, the economic cost is very high and a serious concern. Furthermore, if other costs are included such as environmental cost of pollution and road accident costs, the results are much more alarming.

Social costs

There are many social impacts of congestion: for example, irritation and stress, reduced social activities, negative influences on choice of transport and location of residence, employment or business, and so on. This study explored the social costs of traffic congestion through the questionnaire survey of 774 transport users. The most frequently reported social impacts were, in order of importance:

i. Time-related factors (arriving late, wasted time, wasted money, disruption of emergency services);
ii. Physical discomfort (noise, heat, breathing difficulties, black air);
iii. Mental discomfort (mental pressure and harassment).

Dhaka's traffic congestion also had a significant impact on people's location decisions: being close to the workplace was the most important reason in choosing where to live (39% of respondents). These social costs are additional to the 'economic costs' calculated above, and show the huge impact of traffic congestion on people's lives.

Willingness to pay to avoid congestion

To tackle these implicit costs of traffic congestion, one way out could be the introduction of 'congestion pricing'. Hence users were also asked about their willingness-to-pay to avoid traffic congestion (a proxy for congestion pricing). The results showed an average 'willingness-to-pay' of all users of around Tk.86 per trip-hour.The groups who considered themselves worst affected by congestion were job-holders and students, who are the main users of public transport such as buses, tempos and CNG's. Their negative feedback may reflect the discomfort of travelling by public transport as well as the lost income they experience from travel delay.

These findings have important implications for policy-makers in terms of increased investment in good quality public transport, and effective traffic demand management to ensure that the roads are not blocked and congestion impacts are minimised.

7.3 Policy recommendations

7.3.1 Demand management measures to balance transport demand and supply

In common with major cities around the world, Dhaka faces a challenge of increasing transport demand and limited supply of road space. There will never be sufficient road space to meet everyone's wish for personalised transport, especially privately-owned cars and motor-cycles; hence some sort of road space rationing is inevitable. In the past the rationing has focused on rickshaws (and also CNG's, trucks and buses to a lesser extent). There has never been any significant rationing of private cars or motor-cycles, and this is now a priority. Important travel demand management measures that are employed in other world cities include:

- Parking controls and parking charges
- Curbs on car and motor-cycle use, such as permitting odd or even numbers of the vehicles on alternative days of the week (e.g. Delhi), and restricted access in highly congested areas
- Area congestion charges (e.g. London, Stockholm, Singapore, Milan)
- Fiscal disincentives, for example higher vehicle and fuel taxes.

7.3.2 Priority to public transport

In addition to managing demand, priority must also be given to increasing the supply of high capacity, high quality public transport in Dhaka – namely bus and rail systems. The approach can be summarised as 'stick' and 'carrot', with good public transport being the 'carrot'.

- The bus system should be organised into a coherent and well-planned public transport system
- In policy formulation, 'public transport' and 'mass transport' should be given priority over 'private transport'.

Further measures to strengthen bus management are discussed in Section 7.3.5.

7.3.3 Strengthening transport co-ordination in Dhaka

Co-ordination of transport planning and management in Dhaka is difficult due to the large number of government agencies and their overlapping responsibilities. Possibly the most important issue regarding co-ordination is the diffusion of overall responsibility among so many different ministries, with the result that no single agency has overall responsibility.

Strengthening the Dhaka Transport Co-ordination Authority (DTCA) is therefore a top priority for improving strategic transport co-ordination in Dhaka. However, DTCA as a legal entity does not have any enforcement capacity to carry out its mandate. If the key transport organisations could be accountable to some extent to DTCA, this would empower DTCA and help to promote effective coordination. The mechanism for external accountability to DTCA could be based on the compliance and performance of responsible authorities in overall traffic governance.

7.3.4 Strengthening individual government agencies involved in transport in Dhaka

None of the government agencies involved in transport in Dhaka can function properly if they do not have sufficient staff, skill levels, equipment, funds and management procedures. The research found that these constraints were wide spread amongst all of the agencies, and some obvious remedies included:

1. Substantially increasing the number of professional staff in most agencies
2. Less use of external, non-technical (seconded) staff in senior positions, while improving the career path and incentives for internal staff
3. Greater emphasis on skill development (e.g. training), with clear incentives for personal improvement
4. Tackling the shortfalls in equipment and techniques experienced by all agencies
5. Improving the accountability and transparency mechanisms; in particular:
    i. Clearer budgeting, published on-line
    ii. Strengthening internal accountability through clearly-defined incentive and reward systems and improved record-keeping (e.g. minutes of monthly internal meetings and decisions)
    iii. Strengthening external accountability through: external (not internal) annual audits; stronger co-ordination by DTCA on transport-related issues (see above); increased publication of information on websites; increased participation in decision-making processes by civil society and stakeholders (e.g. bus route allocations, traffic management changes, vehicle licencing changes, etc.).

7.3.5 Converting the informal practices into formalised, legal systems

The case studies carried out for this research revealed the widespread extent of informal practices which dominate and undermine transport management in Dhaka, for example in vehicle and driver licencing, bus operations, and footway management. The official procedures are distorted to generate unofficial income for the main participants who control the sector, namely the government employees, middlemen/brokers and local political strongmen. The other participants in the sector, such as bus owners, bus operators, hawkers and the general public go along with this system because challenging it is too risky for the individual.

This illicit behaviour goes to the heart of 'governance' in Bangladesh and, as in other countries, is enormously difficult to tackle. The usual approach by government agencies is to launch a 'crackdown': for example clearing hawkers off the footpaths, holding mobile courts and issuing spot fines to traffic offenders, and so on. Yet none of these crackdowns have a lasting impact, and an alternative could be to try to convert the overall system from a 'vicious circle' to a 'virtuous circle'.

How can this be achieved? The approach recommended in this study is to build on the informal processes rather than try to stamp them out, and incorporate them in such a way that they become formalised and legally acceptable, and positive in their outcomes rather than negative. Two examples of this approach are given below: hawkers/footpath management, and bus management.

Alternative approaches to tackling the sidewalk problem

In many places in Dhaka there is room to accommodate hawkers to a certain extent without significantly disrupting traffic or pedestrian movement. After proper survey and consultations the authorities can specify the exact places and dimensions where hawkers will be permitted, and issue licences accordingly. The revenues will go to the city corporations, and some will be used for upgrading the footways and facilities. The main benefits of this approach are:

- Roads and footways are kept open for pedestrians and traffic, and the area's environment is improved

- Hawkers gain security for their daily livelihoods, and also better facilities
- The public benefit from easy access to lower-cost goods
- The city authorities gain sizeable revenues, which can be used for the public benefit.

The main obstacle to introducing this approach is the resistance from stakeholders who already benefit from the present system. Therefore alternative incentives must be developed so that they also benefit from the new system. For example:

- The police and city corporation staff could be given incentives such as official bonuses and career progression, based on (i) amount of revenue officially raised from the area; (ii) quality of the area in question
- The line men could be offered incentives such as formal management jobs, paid from the collected rents.
- Getting the local political parties on board will be the hardest challenge. Organised citizens' pressure and commitment from top-level political leadership such as the mayor, ministers and Prime Minister could be the way forward.

This approach could be tested in one area as a pilot project with big fanfare and political buy-in. If it worked, it could be a model for the rest of Dhaka, and urban Bangladesh too.

Improving the bus management system

To improve the management of Dhaka's bus system the following measures are recommended:

1. Undertake strategic route planning and bus operator management to streamline the current 168 routes. The revision of bus routes needs to be done through better surveys, route assessments and transparent allocation process. All stakeholders – i.e. bus owners' associations, city corporations, Dhaka Metropolitan Police (Traffic), BRTA, BRTC, and commuters' representatives – need to be brought under one umbrella under the leadership of DTCA. For steering this process the capacity of DTCA has to be strengthened. Haphazard issuing of route permits to small new operators not only discourages the existing companies from new investment but also tends to reduce bus operator discipline; therefore BRTA should encourage the existing companies to bring in new buses rather than new companies.
2. Address supply constraints to reduce excuses of traffic rule violations and hence informalities in bus route management. Creating well-designed, appropriate bus bays will lessen the random stopping of buses. Likewise, adequate number of driver training schools will reduce bus owners' dependency on informal helper-driver system. In addition, if the vehicle driving employment sector is provided with attractive benefits and standard service modalities, better-educated people will be attracted to the sector. Thus, the scope of informal settlement will be minimised due to reduced scope for law breaking.
3. Improve day-to-day operational management of buses. The previous ticket counter system should be re-established and these counters built close to bus bays. In addition, online ticketing system can be introduced. In order to stop tussles between bus staff and students the government can promulgate a clear policy regarding carrying students in private buses. To reduce pressure of on-road prosecutions, fitness of vehicles, route permit and driving licences have to be effectively controlled by BRTA. In this regard, the capacity of BRTA has to be

strengthened and its regulatory activities need to be more transparent. To improve compliance of bus staffs with traffic rules there needs to be organised regular campaigns by BRTA, Traffic Police and Bus Owners' and Workers' Associations jointly. The traffic police on the roads should adopt technology to measure the extent of violations of traffic rules such as photo capture for breaking red light, speed measurement machine, and e-prosecutions.

4. Create incentives for stakeholders to implement the reforms. In order to implement the above reforms, incentives must be created to reward the stakeholders who currently manage the system. As with hawker management, this will require formalising the existing management systems, but in a new, positive direction. For example, the persons who currently operate the 'bit' points will carry out a similar function in future, but focusing on enforcing good standards rather than ignoring bad standards. The exact nature of these 'positive' incentives is outside the scope of this study, but is recommended for future research and implementation.

5. Improve the quality of bus services. To attract good companies with better quality buses the investment returns have to be competitive with other sectors. As mentioned earlier, daily informal transactions eat up a company's profits, equivalent to half of its operational costs in a day. The above reform measures can reduce loopholes in existing operation of buses and thus reduce the burden of informal transactions. In addition, entry requirements for new companies have to be simplified and formalised and RTC meetings made more transparent. The success of DNCC's proposed city bus initiative will depend on how it tackles the partisan pressures and gains the co-operation of existing stakeholders. The foremost thing is to clarify DTCA's legal authority and build up capacity to undertake reforms in bus management system in Dhaka. Once the city commuters can be attracted to buses the congestion will reduce to a great extent which will lead to increase the daily trips of the bus fleet. In addition, road infrastructure such as bus lanes and priority in the use of road space can give buses a competitive advantage over other vehicles.

7.4 Concluding comments

This study has shown that the traffic congestion problem in Dhaka has multiple dimensions, including legal and institutional structures, public expectations relating to transport demand and supply, political economy effects of various interest groups, and issues relating to implementation and enforcement. This study has also shown that this severe condition of Dhaka's traffic can be reduced significantly and at low cost by improving the overall governance of the whole system, particularly the government institutions responsible for traffic management and enforcement.

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Annex

Table A2.1: Reason for living in current location by income group

Income Group		Reason for living in current location							Total
		Close to the working place	Low transport cost	Availability of service	Permanent living	Less rent	Suitable environment	Other	
Less than 3999	Frequency	5	0	0	2	1	1	2	11
	Percentage	45.5%	0.0%	0.0%	18.2%	9.1%	9.1%	18.2%	100.0%
4000-7999	Frequency	25	0	10	1	16	21	2	75
	Percentage	33.3%	0.0%	13.3%	1.3%	21.3%	28.0%	2.7%	100.0%
8000-11999	Frequency	15	1	9	7	13	10	1	56
	Percentage	26.8%	1.8%	16.1%	12.5%	23.2%	17.9%	1.8%	100.0%
12000-15999	Frequency	40	1	7	13	12	9	2	84
	Percentage	47.6%	1.2%	8.3%	15.5%	14.3%	10.7%	2.4%	100.0%
16000-19999	Frequency	35	3	7	20	10	20	3	98
	Percentage	35.7%	3.1%	7.1%	20.4%	10.2%	20.4%	3.1%	100.0%
20000-29999	Frequency	85	5	30	38	16	40	8	222
	Percentage	38.3%	2.3%	13.5%	17.1%	7.2%	18.0%	3.6%	100.0%
More than 30000	Frequency	91	0	22	63	4	44	4	228
	Percentage	39.9%	0.0%	9.6%	27.6%	1.8%	19.3%	1.8%	100.0%
Total	Frequency	296	10	85	144	72	145	22	774
	Percentage	38.2%	1.3%	11.0%	18.6%	9.3%	18.7%	2.8%	100.0%

Table A2.2: Use of mode by different income group and type of housing

Income Class	Mode	Apartment/ Flat	Permanent/Pucca	Semi-Pucca	Total
Less than 3999	Walking	1	0	0	1
		100.0%	.0%	.0%	100.0%
	Bus	6	0	1	7
		85.7%	.0%	14.3%	100.0%
	Car	0	1	0	1
		.0%	100.0%	.0%	100.0%
	Rickshaw	2	0	0	2
		100.0%	.0%	.0%	100.0%
4000 to 7999	Walking	4	0	0	4
		100.0%	.0%	.0%	100.0%
	Bus	44	10	4	58
		75.9%	17.2%	6.9%	100.0%
	Tempo/ Leguna	3	0	2	5
		60.0%	.0%	40.0%	100.0%
	Car	1	0	0	1
		100.0%	.0%	.0%	100.0%
	Rickshaw	7	0	0	7
		100.0%	.0%	.0%	100.0%
12000-15999	Walking	3	0	1	4
		75.0%	.0%	25.0%	100.0%
	Motor cycle	1	0	0	1
		100.0%	.0%	.0%	100.0%
	Bus	32	16	13	61
		52.5%	26.2%	21.3%	100.0%
	CNG/Auto rickshaw	1	1	0	2
		50.0%	50.0%	.0%	100.0%
	Tempo/ Leguna	0	0	1	1
		.0%	.0%	100.0%	100.0%
	Rickshaw	7	1	6	14
		50.0%	7.1%	42.9%	100.0%
	Other	1	0	0	1
		100.0%	.0%	.0%	100.0%

Income Class	Mode	Apartment/ Flat	Permanent/Pucca	Semi-Pucca	Total
16000-19999	Walking	1	0	0	1
		100.0%	.0%	.0%	100.0%
	Motor cycle	2	0	0	2
		100.0%	.0%	.0%	100.0%
	Bus	42	18	17	77
		54.5%	23.4%	22.1%	100.0%
	Tempo/ Leguna	3	1	2	6
		50.0%	16.7%	33.3%	100.0%
	Car	1	0	0	1
		100.0%	.0%	.0%	100.0%
	Rickshaw	7	4	0	11
		63.6%	36.4%	.0%	100.0%
20000-29000	Walking	2	0	0	2
		100.0%	.0%	.0%	100.0%
	Cycle	1	1	0	2
		50.0%	50.0%	.0%	100.0%
	Motor cycle	5	0	0	5
		100.0%	.0%	.0%	100.0%
	Bus	114	28	10	152
		75.0%	18.4%	6.6%	100.0%
	CNG/Auto rickshaw	12	3	2	17
		70.6%	17.6%	11.8%	100.0%
	Tempo/ Leguna	6	0	0	6
		100.0%	.0%	.0%	100.0%
	Car	8	0	0	8
		100.0%	.0%	.0%	100.0%
	Rickshaw	29	0	1	30
		96.7%	.0%	3.3%	100.0%
More than 30000	Walking	3	0	0	3
		100.0%	.0%	.0%	100.0%
	Motor cycle	7	0	0	7
		100.0%	.0%	.0%	100.0%
	Bus	95	16	1	112
		84.8%	14.3%	.9%	100.0%

Income Class	Mode	Apartment/ Flat	Permanent/Pucca	Semi-Pucca	Total
	CNG/Auto rickshaw	8	3	0	11
		72.7%	27.3%	.0%	100.0%
	Tempo/ Leguna	4	1	1	6
		66.7%	16.7%	16.7%	100.0%
	Car	47	5	0	52
		90.4%	9.6%	.0%	100.0%
	Microbus/ Zip	2	0	0	2
		100.0%	.0%	.0%	100.0%
	Rickshaw	27	6	0	33
		81.8%	18.2%	.0%	100.0%
	Other	1	0	1	2
		50.0%	.0%	50.0%	100.0%

Source: BIGD Survey, 2016

Table A2.3: Number of registered vehicles in Dhaka

Sl. No	Type of Vehicles	Upto-2010	2011	2012	2013	2014	2015	31-Jul-16	Grand Total
1	Ambulance	1,374	137	114	190	254	358	185	2,612
2	Auto Rickshaw	7,664	112	111	60	56	428	361	8,792
3	Auto Tempo	1,662	1	1	-	-	-	-	1,664
4	Bus	16,783	1,501	1,218	971	1,364	2,221	2,037	26,095
5	Cargo Van	3,231	477	278	676	603	398	464	6,127
6	Covered Van	4,277	1,910	1,170	1,850	2,352	1,855	1,359	14,773
7	Delivery Van	11,990	839	577	709	901	1,464	1,107	17,587
8	Human Hauler	2,718	569	145	115	109	502	611	4,769
9	Jeep(Hard/Soft)	19,520	1,698	1,241	1,107	1,582	3,109	2,699	30,956
10	Microbus	46,202	3,540	2,643	2,227	3,842	4,569	3,274	66,297
11	Minibus	9,490	136	103	83	135	103	99	10,149
12	Motor Cycle	210,081	34,708	32,810	26,331	32,894	46,764	28,936	412,524
13	Pick Up (Double/Single Cabin)	20,481	7,258	5,149	4,908	7,295	7,916	4,500	57,507
14	Private Passenger Car	163,004	11,423	8,187	9,231	12,972	18,422	11,273	234,512
15	Special Purpose Vehicle	759	60	28	78	50	66	147	1,188
16	Tanker	817	152	90	136	163	146	99	1,603
17	Taxicab	36,011	52	43	4	302	54	1	36,467
18	Tractor	9,923	4,169	2,841	1,634	1,443	1,637	1,509	23,156
19	Truck	26,922	4,205	2,824	3,522	5,767	4,424	2,391	50,055
20	Others	168	-	-	660	967	1,307	1,335	4,437
TOTAL		**593,077**	**72,947**	**59,573**	**54,492**	**73,051**	**95,743**	**62,387**	**1,011,270**

Source: BRTA, 2016

Table A2.4: Trip Generation by Occupation

Occupation	Trip 2	Trip 3	Trip 4	Total
Student	153	0	0	153
	100.0%	.0%	.0%	100.0%
Self employment	16	0	1	17
	94.1%	.0%	5.9%	100.0%
Day labor	1	0	0	1
	100.0%	.0%	.0%	100.0%
Government Job	26	0	0	26
	100.0%	.0%	.0%	100.0%
Non-Governmental Job	247	2	4	253
	97.6%	.8%	1.6%	100.0%
Teacher	40	1	1	42
	95.2%	2.4%	2.4%	100.0%
Business	196	1	2	199
	98.5%	.5%	1.0%	100.0%
Unemployment	3	0	0	3
	100.0%	.0%	.0%	100.0%
Housewife	64	0	4	68
	94.1%	.0%	5.9%	100.0%
Driver/ helper	7	0	1	8
	87.5%	.0%	12.5%	100.0%
Servant	1	0	0	1
	100.0%	.0%	.0%	100.0%
Other	3	0	0	3
	100.0%	.0%	.0%	100.0%
Total	757	4	13	774
	97.8%	.5%	1.7%	100.0%

Source: BIGD Survey, 2016

Table A2.5: Travel distance according to different trip purposes (For Trip 02)

Trip Purpose	Less than 5	5-10	11-15	16-20	21-25	More than 25	Total
House	435	208	70	30	5	7	755
	57.6%	27.5%	9.3%	4.0%	.7%	.9%	100.0%
Work	4	5	4	1	2	0	16
	25.0%	31.2%	25.0%	6.2%	12.5%	.0%	100.0%
Educational	1	0	1	0	0	0	2
	50.0%	.0%	50.0%	.0%	.0%	.0%	100.0%
Shopping	0	1	0	0	0	0	1
	.0%	100.0%	.0%	.0%	.0%	.0%	100.0%
Total	440	214	75	31	7	7	774
	56.8%	27.6%	9.7%	4.0%	.9%	.9%	100.0%

Source: BIGD Survey, 2016

Table A2.6: Trip Purposes by mode (Trip 02)

Mode	House	Work	Educational	Shopping	Total
Walking	16	0	0	0	16
	100.0%	.0%	.0%	.0%	100.0%
Cycle	2	0	0	0	2
	100.0%	.0%	.0%	.0%	100.0%
Motor cycle	15	2	0	0	17
	88.2%	11.8%	.0%	.0%	100.0%
Bus	496	11	1	1	509
	97.4%	2.2%	.2%	.2%	100.0%
CNG/ Auto rickshaw	28	1	1	0	30
	93.3%	3.3%	3.3%	.0%	100.0%
Tempo/ Leguna	26	0	0	0	26
	100.0%	.0%	.0%	.0%	100.0%
Car	62	1	0	0	63
	98.4%	1.6%	.0%	.0%	100.0%
Microbus/ Jeep	2	0	0	0	2
	100.0%	.0%	.0%	.0%	100.0%
Rickshaw	105	1	0	0	106
	99.1%	.9%	.0%	.0%	100.0%
Other	3	0	0	0	3
	100.0%	.0%	.0%	.0%	100.0%
Total	755	16	2	1	774
	97.5%	2.1%	.3%	.1%	100.0%

Source: BIGD Survey, 2016

Annex A4.1: Laws and penalties included in the 'Bangladesh Motor Vehicle Ordinance 1983'

Issues	Penalties mentioned in the ordinance
Driving without license	Clause 138 includes a penalty of imprisonment extending to four months, or with fine extending to five hundred Taka, or with both in case of driving without license.
Fitting and using of prohibited horns or other sound producing device	Clause 139 includes provision of punishable amount of one hundred taka for using sound producing device or horns which are not allowed for fitting or prohibited in certain spots.
Disobedience of orders, obstruction and refusal of information	According to Clause 140(1), In case of disobedience or obstruct of lawful orders, there is penalty of imprisonment for a term which may extending to one month or with fine extending to five hundred Taka, or with both. And penalty mentioned in clause 140(2) is fine extending to two hundred taka in case of driving or cause to be driven in opposite direction.
Driving recklessly or dangerously	According to the clause 143, reckless driving is punishable with imprisonment for a month term extending to six months, or with fine extending to five hundred Taka, and his driving license shall be suspended for a specified period, and for a subsequent offence if committed within three years of the commission of a previous similar offence with imprisonment for a term extend to six months, or with fine extending to one thousand Taka, or with both, and his driving license shall be suspended for a period not exceeding one month.
Driving while under the influence of drink or drug	Clause 144 describes that In case of driving or attempting to drive a motor vehicle under the influence of drink or drug, is punishable for a first offence with imprisonment extending to three months or fine extending to one thousand Taka, or with both. And for a subsequent offence with imprisonment extending to two years, or with fine which extend to one thousand Taka, or with both and suspending driving license for a specified period.
Driving when mentally or physically unfit to drive	Under clause 145, it is mentioned that, driving when mentally or physically unfit is punishable for a first offence with fine extending to five hundred Taka and suspending driving license for a specified period and for a subsequent offence with imprisonment for a term extending to three months, or with fine extending to five hundred Taka or, with both.
Punishment for offence relating to accidents	Punishment for offense relating to accidents mentioned in clause 146 is imprisonment for a term extending to three months or with fine extending to five hundred Taka, or with both or, if having been previously convicted, in that case imprisonment for a term extending to six months or with fine extending to one thousand Taka, or with both.
Racing or a trial of speed	Its mentioned in clause 148 that, in case of racing or trial of speed, punishment is imprisonment for a term extend to one month or with fine extending to five hundred Taka, or with both, and driving license shall be suspended for a period extend to one month.

Issues	Penalties mentioned in the ordinance
Using vehicle in unsafe condition	Clause 149 tells that, use of vehicle in unsafe condition is punishable with imprisonment for a term extend to one month or with fine extending to two hundred and fifty taka, or with both, or, if as a result of such defect an accident is caused, causing bodily injury or damage to property, with imprisonment extending to three months, or with fine extend to one thousand Taka, or with both.
Using of vehicles emitting smokes	According to clause150, using motor vehicles emitting smokes which causes health hazard, is punishable with fine extending to two hundred taka. The clause also mentions that 'no person shall be convicted of an offence punishable under sub-section' and 'solely on the evidence of a witness unless that opinion is based on a test by the competent person.
Sale of vehicle in or alteration of vehicle to a condition contravening this Ordinance	Clause 151sale of vehicle in or alteration of vehicle to a condition contravening the Ordinance punishable with imprisonment extending to two years, or with fine extend to five thousand taka or with both. Provided that, no person shall be convicted under this section if he proves that he had reasonable cause to believe that the vehicle would not be used in a public place until it had been put into a condition in which it might lawfully be so used.
Using of motor vehicle without registration or certificate of fitness or permit	According to clause 152, using motor vehicle without registration or certificate of fitness or permit is punishable for a first offence with imprisonment for a term extending to three months, or with fine extend to two thousand Taka, or with both and for any subsequent offence with imprisonment for a term extending to six months, or with fine extending to five thousand Taka, or with both. It also mentions that, these will not be applicable in case of using a motor vehicle in an emergency for the conveyance of persons suffering from sickness or injury or for the transport of materials for repair or of food or materials to relieve distress or of medical supplies for a like purpose. Provided that, the person using the vehicle reports such to the Regional Transport Committee within seven days.
Driving vehicles exceeding permissible weight	Clause 154 mentions that, 'driving vehicles exceeding permissible weight' is punishable for a first offence with fine extending to one thousand Taka and for any subsequent offence with imprisonment for a term extending to six months or, with fine which may extending to two thousand Taka, or with both.
Driving uninsured vehicle	According to clause 155, this type of violation of laws, the punishment is fine extending to two thousand Taka.
Taking vehicle without authority	Clause 156tells that, taking or driving away any motor vehicle without consent of the owner or other lawful authority is punishable with imprisonment extending to three months or with fine extending to two thousand Taka, or with both.

Annex A4.2: Laws and penalties included in the DMP Ordinance 1976

Issues	Offences, Penalties and Procedures mentioned in the ordinance
Penalty for wrong driving and violation of traffic regulations	According to clause 65, Whoever, when driving a vehicle along the street, without sufficient reason fails to keep on the left side of such street and when passing any other vehicle proceeding on the same direction fails to keep on the right side of such vehicle or collates any traffic regulation made by the Police Commissioner shall be punishable with fine which may extend to two hundred Taka.
Penalty for wrong parking	Clause 66 mentions that, whoever leaches or parks any vehicle in any part of a street or public place- where parking is prohibited by the Police Commissioner shall be punishable with fine which may extend to one hundred Taka.
Penalty for obstructing a footway	According to clause 67, whoever drives, rides, leads, propels or leaves on any footway any vehicle, other than a perambulator, so that the same can stand across or upon such footway shall be punishable with fine which may extend to one hundred Taka.
Penalty for causing obstruction in street or public places	It's said in Clause 68 that, whoever causes obstruction in any street or public place- (a) by allowing any vehicle which has to be loaded or unloaded, or to take up or set down passengers, to remain or stand there- in longer than may be necessary for such purposes; or (b) by leaking any vehicle standing therein; shall be punishable with fine which may extend to one hundred Taka.
Penalty for making or repairing vehicle in street or public place	Clause 72 mentions that, whoever in any street or public place makes any vehicle or part of a vehicle, or, except when in the case of an accident repairing on the spot is unavoidable, repairs any vehicle or part of a vehicle, or carries on therein any manufacture or operation or work so as to be an impediment to traffic or annoyance to the public or neigh-boring resident, shall be punishable with [imprisonment for a term which may extend to one year, or with fine which may extend to two thousand Taka, or with both, and such vehicle shall be liable to be confiscated to the Government]

Table A5.1: Reported problems of transport users when using sidewalks

Type of problems	Transport users (no.)	Transport users (per cent)
Shopkeeper/ Hawker	607	77.8
Street beggar	17	2.2
Construction materials	21	2.7
Bus counter	10	1.3
Insecure	8	1.0
Vehicle parking	20	2.6
Waste disposal	30	3.9
Narrow/ Broken	47	6.0
Bike/ Bicycle	2	0.3
No problem	11	1.4
Not response	0	0
Other	7	0.9
Total	780	100.0

Source: BIGD Survey, 2016