CTCN Technical Assistance
December 2023

Development of a Framework for Real-Time Transport Information Systems for Public Transport in the Greater Dhaka Area.

Existing Conditions Report

Korea National University of Transportation (KNUT)

CTCN Technical Assistance
December 2023

Development of a Framework for Real-Time Transport Information Systems for Public Transport in the Greater Dhaka Area.

Existing Conditions Report

Prepared by:

Korea National University of Transportation
Daehak-ro 50, Chungju-si,
Chungcheongbuk-do
Republic of Korea

Prepared for:

Department of Environment, Ministry of Environment, Forest and Climate Change
Population and Health Building, E/16,
Paribesh Bhavan, Sayed Mahbub Morshed Rd, Dhaka 1207

Contents

Figures

Tables

Executive Summary

Project Objective and Scope

This Project is a Technical Assistance (TA) project facilitated and funded by the UN Climate Technology Centre & Network (CTC-N) and is entitled: **Development of Framework for Real-Time Transport Information Systems for public transport in Greater Dhaka area.**

The objective of this technical assistance is, in consultation with the Dhaka and Bangladeshi colleagues, develop all the necessary technical and functional system details and other design considerations including potential locations to implement a real-time monitoring system for the Dhaka public transport buses (Bus Management System, BMS) including potentially digital signs at stops displaying arriving times and other information (Bus Information System, BIS).

1. **Establishing a baseline by collecting the information and data required**: Review previous plans for the urban public transport network and ITS in Dhaka. Collect data and analyze, summarize it and present in an understandable fashion.
2. **Design of the Bus Management System (BMS)/Bus Information System (BIS) Architecture: Develop technical specifications for the following items**.
   - Bus Information Systems (BIS)
   - Bus Management Systems (BMS)
   - Communications and ICT architecture
   - Data and information review (BIS)
   - UX design, look and feel concepts.
   - Geographic review
   - Governance review
3. Costing: Develop costs for the following items, under different scenarios:
   - Equipment
   - Installation/construction
   - Software development/database maintenance
   - Operation, management, software maintenance

Purpose of this Report

This report details a review of the review of the baseline/existing conditions in Bangladesh. This report is divided into the following Chapters:

1. Introduction
2. Summary of Previous Reports
3. Socioeconomic & infrastructure
4. Transport

Introduction

Project Details and Objective

1.1 This Project is a Technical Assistance (TA) project facilitated and funded by the UN Climate Technology Centre & Network (CTC-N) and is entitled: Development of Framework for Real-Time Transport Information Systems for public transport in Greater Dhaka area.

Overview

1.2 This project is being undertaken in the capital city of the People's Republic of Bangladesh (referred to as Bangladesh), Dhaka. Dhaka is a growing megacity with a metropolitan area (Dhaka District, Narayanganj District, Gazipur District, Narsingdi District) population of over 21 million as of 2022 (9 million in the urban areas) in an area of 1,528 km^2.

1.3 Dhaka has experienced rapid urbanization (43% living in urban area) since its independence from the rest of Pakistan in 1971. In part because of urbanization and demand for transport, Greenhouse Gas (GHG) emissions in Bangladesh from the transport sector have been increasing since at least 2013 (In 2005, the transport sector contributed to 15% of CO_2 emissions from energy-related sectors). The government of Bangladesh has committed to reducing GHG emissions in the power, industry, and transport sectors by 5% by 2030, or by 15% if sufficient and appropriate support is received from developed countries.

1.4 Efforts are being made in the transport sector to reduce GHG emissions by 2030 by 9% or 24% if support is received from developed countries, according to estimates from the Bangladesh Ministry of Environment in 2018. Bangladesh updated its Nationally Determined Contributions (NDCs) in August 2021 with plans to improve fuel efficiency (by +5%) and tackle chronic road traffic congestion issues and improve the public transport system. As such and in line with its national and local goals for transportation Bangladesh has requested this TA from the CTCN.

Issues in the Public Transport Network

1.5 According various records and reports, there are somewhere between 4,000 – 10,000 buses (including minibuses) that operate on Dhaka's streets every day, in addition to millions of motorcycles, hundreds of thousands of cars and trucks, tens of thousands of autorickshaws (CNGs), and perhaps half a million rickshaws. The government realizes its need to incentivize the use of public transport system and control the permitted use of automobiles to materialize its mitigation goals and cater to the mobility needs of citizens. In particular, the service quality for public buses should be significantly improved by adopting information and digital technology in its operation and management. Encouraging use of the public transport system, over the use of a private transport, will require making the system more accessible, easier to use, and more convenient for users.

1.6 Against this backdrop, the government of Bangladesh has requested the CTCN to develop all the necessary technical and functional system details and other design considerations including potential locations to implement a real-time monitoring system for the Dhaka public

transport buses (Bus Management System, BMS) including potentially digital signs at stops displaying arriving times and other information (Bus Information System, BIS). The following items are listed in the (preliminary) Response Plan (RP):

Objective

1.7 The objective of this technical assistance is, in consultation with the Dhaka and Bangladeshi colleagues, develop all the necessary technical and functional system details and other design considerations including potential locations to implement a real-time monitoring system for the Dhaka public transport buses (Bus Management System or BMS) including potentially digital signs at stops displaying arriving times and other information (Bus Information System or BIS).

Outcomes

1.8 Upon completion, this technical assistance will allow Bangladesh to use the report and its details to develop documents for the acquisition. In addition, this TA, if implemented, the real-time monitoring system for buses will allow Bangladesh to increase the utility of its bus system, potentially increase its patronage, and potentially reduce its reliance on private fossil-fuel based transportation.

General Overview

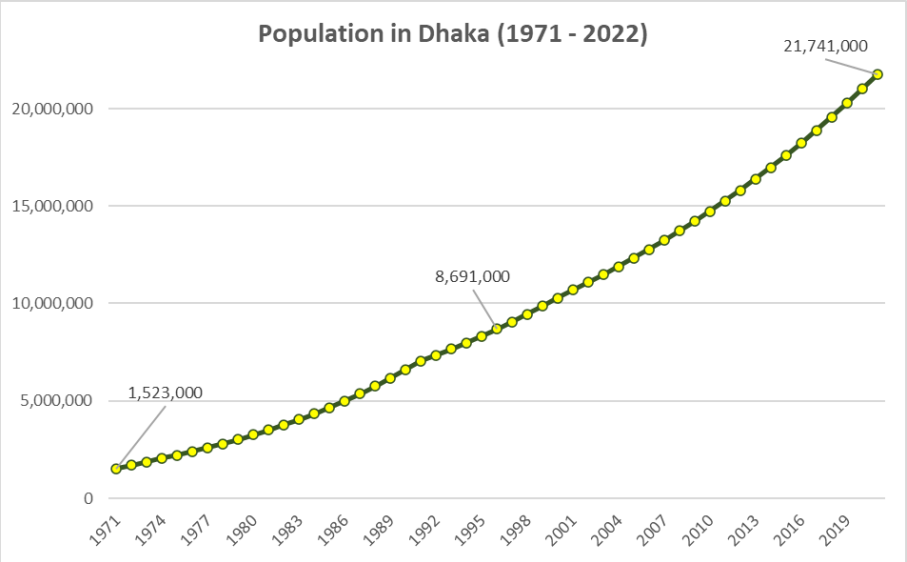
1.9 The sovereign state of the People's Republic of Bangladesh (Bangladesh) has a long history with the area having been settled for at least 2,000 years. As part of the Mughal Empire, Dhaka has been the capital of Bengal Subah province since 1610. After the division of India in 1947 by the British, Dhaka was the administrative capital city of East Pakistan between 1947 – 1971 and has been capital of Bangladesh since independence (in 1971).

1.10 After independence, the population of Dhaka has expanded rapidly into the millions. The population of Bangladesh has increased significantly since 1971 and as of 2021 stands at almost over 170 million people, with an average growth rate of between 1.3% – 2.6% per year, or 148% since 1971. However, this pales in contrast to the more than 1,300% rise in population as seen in Greater Dhaka which is now a megacity home to almost 22 million people, refer to Table 1 below.

Table 1: Population in Bangladesh and Dhaka

		1971	1981	1991	2001	2011	2021
Population (millions)	Bangladesh	68.40	86.20	109.20	131.70	150.20	169.40
	Dhaka	1.52	3.52	7.04	10.70	15.26	21.74
	% of Country	2.2%	4.1%	6.4%	8.1%	10.2%	12.8%
AAGR	Bangladesh	-	2.6%	2.7%	2.1%	1.4%	1.3%
	Dhaka		13.1%	10.0%	5.2%	4.3%	4.2%
Total Growth 1971 - 2021	Bangladesh	148%					
	Dhaka	1,328%					

Figure 1: Population in Dhaka (1971-2022)



1.11 Bangladesh is mostly surrounded by India to the east, west, and north, but also shared a border with Myanmar, to the southeast, see Figure 2 below.

Figure 2: Map of Bangladesh in South Asia

Map source: Wikimedia Commons (creative commons license)

Economy

1.12 The economy of Bangladesh is very large generating $460 billion annually, which makes it the 35th largest economy in the world (IMF estimates). The economy has increased significantly every year since its independence in 1971 and in recent years (2011 – 2021), the economy has increased at an incredible 18% per year, while GDP per capita has soared by over 22% per year, on average, refer to Table 2 below. Indeed, among it's South Asian peers (Pakistan, India, and Nepal) as of 2022 Bangladesh has the highest GDP per capita among the four.

1.13 The GDP of Greater Dhaka is estimated to be worth $160 billion annually (in 2020) or around $7,700 USD per capita. The economy of Dhaka is responsible for around 42% of the total economy of Bangladesh.

Table 2: Economy of Bangladesh

		1971	1981	1991	2001	2011	2021
Economic activity (GDP)	Total	128.00	235.00	283.40	410.00	856.40	2,457.90
	Per capita	8.75	20.25	30.96	53.99	128.64	416.26
AAGR	Total	-	8.4%	2.1%	4.5%	10.9%	18.7%
	Per capita	-	13.1%	5.3%	7.4%	13.8%	22.4%
Growth 1971 - 2021	Total	1,820%					
	Per capita	4,656%					

1.14 The economy of Bangladesh is characterized by a mix of agriculture, manufacturing, and services sectors.

1.15 Agriculture is a significant contributor to the economy, with rice, wheat, and other crops being major exports. The country is also a major producer of textiles and garments, with the clothing industry being a major source of employment and foreign exchange.

1.16 The services sector, including finance, telecommunications, and transportation, is also an important contributor to the economy. The country has a growing financial sector, with several banks and other financial institutions operating in the country.

Environmental Goals

1.17 Bangladesh is a country that is vulnerable to the impacts of climate change, with frequent flooding, cyclones, and other natural disasters causing significant damage to the country's infrastructure and economy. As a result, the government of Bangladesh has set a number of environmental goals in an effort to address these challenges and promote sustainable development. Some examples of environmental goals in Bangladesh include:

- Climate change adaptation and mitigation: Bangladesh is committed to reducing its greenhouse gas emissions and increasing its resilience to the impacts of climate change. This includes efforts to increase the use of renewable energy and to improve the management of natural resources, such as forests and water (See Below).
- Biodiversity conservation: Bangladesh is home to a diverse range of plant and animal species, many of which are threatened by habitat loss, pollution, and other environmental challenges. The government is working to protect and preserve these species through the development of national parks, wildlife reserves, and other protected areas.

- Environmental education and awareness: The government is working to promote environmental awareness and education among the public, with the goal of promoting sustainable practices and behaviors.

Nationally Determined Contributions (NDCs)

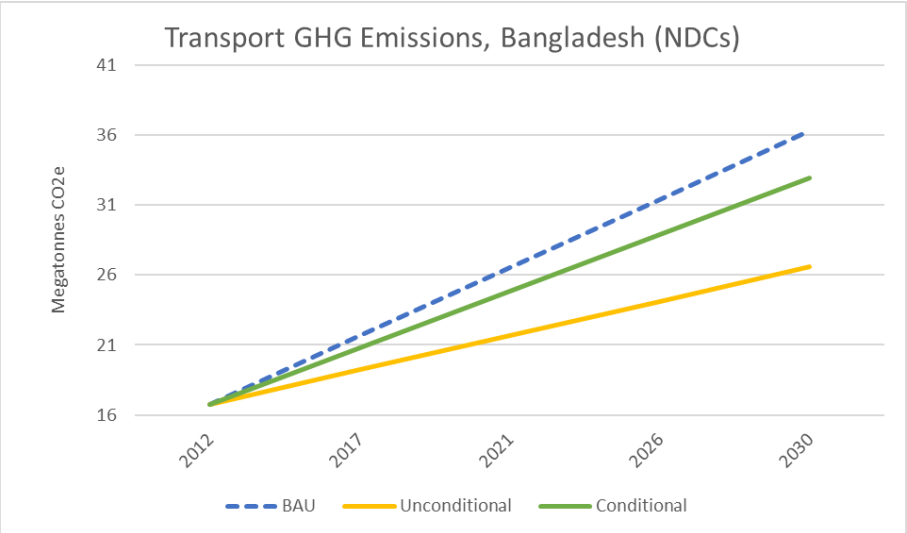
1.18 NDCs, or Nationally Determined Contributions, are commitments made by countries under the United Nations Framework Convention on Climate Change (UNFCCC) to reduce their Greenhouse Gas (GHG) emissions and address the impacts of climate change. These commitments are part of the Paris Agreement, which is an international treaty signed by countries around the world to combat climate change.

1.19 Bangladesh is a signatory to the Paris Agreement, and it has submitted its NDCs to the UNFCCC. Bangladesh most recently updated its he Nationally Determined Contributions (NDCs) in 2021. In terms of mitigation, Bangladesh has developed two scenarios for NDCs (unconditional and conditional):

- Unconditional:
  - Reducing GHG emissions by 6.7% below the business-as-usual (BAU) scenario by 2030,
  - 26.3 Mt $CO2_e$ from Energy
  - 0.64 Mt $CO2_e$ from Agriculture
  - 0.60 Mt $CO2_e$ from Waste
- Conditional upon receiving aid:
  - Reducing GHG emissions by 15.12% below the BAU scenario by 2030
  - 59.7 Mt $CO2_e$ from Energy
  - 0.40 Mt $CO2_e$ from Agriculture
  - 1.84 Mt $CO2_e$ from Waste

1.20 Transport is forecasted to account for a 32.89 Mt $CO2_e$ reduction (12.30% of unconditional) and 26.56 Mt $CO2_e$ reduction (10.23% of conditional), please refer to Figure 3 below.

Figure 3: GHG Emissions from Transport, Bangladesh (NDCs)



Source: Bangladesh Government (Ministry of Environment), 2021

Sustainable Development Goals (SDGs)

1.21 To achieve the above-described reductions (NDCs), Bangladesh intends to:

1. Increase the share of renewable energy in the country's energy mix to 5% by 2030, with the goal of reaching 10% by 2050.
2. Enhancing adaptation and resilience to the impacts of climate change, including through the implementation of climate-resilient infrastructure and the development of early warning systems for extreme weather events.
3. Promoting sustainable land use practices and protecting forests and other natural ecosystems, which play a key role in carbon sequestration and climate regulation.

1.22 However, together, these policies are not enough for Bangladesh to achieve its targets; **additional policies and projects are needed.**

2 Summary of Other Works

Overview

2.1 Numerous other national and international agencies have been involved in the planning of the future of Dhaka, including its transportation network. In this Section of the report, we will summarize the main findings of the following Reports for Ongoing and Completed planning works in Dhaka.

Figure 4: Reports to be Reviewed

		
2035 Structure Plan for Dhaka	Open Transport Development and Integration of ICT and Transport	The Project on the Revision and Updating of the Strategic Transport Plan for Dhaka, Pre-Feasibility Report for MRT Line
July 2015	August 2015	2016
Asia Development Bank (ADB)	World Bank & Integrated Transport Planning (II)	Japan International Cooperation Agency (JICA)

2035 Structure Plan for Dhaka

2.2 This plan is a Regional Development Plan (RDP) which is a revision of the existing Structure Plan for Dhaka (1995 – 2015), extending it an additional 20 years to 2035. The project to update it was launched in 2012/2013 and completed in March 2015. The Structure Plan is an urban plan for the Dhaka Metropolitan Region (DMR) and includes items like transport, drainage, social services, utilities, economy, energy, natural environment/ecosystems, and governance. Overall, this plan sets a Vision for the future of Dhaka to be "… A Livable, Functional & Resilient Metropolis Respecting Local Socio-Cultural Fabric & Environmental Sustainability."

2.3 In this overview of the Structure Plan, we have summarized Chapter 1 and Chapter 5, Transport, which is the most relevant chapter for the TA.

Overview of Transport

2.4 It is estimated that the urban population of Dhaka has been increasing at the rate of 4% per year, but previously it was limited to 2% per year. This rapid urban growth is partly due to the reclassification of the urban area to a rural area and natural urban population growth. From the recent studies, it can be concluded that just 16% of Dhaka urban residents were born in the city. Dhaka alone has 37% of the total national urban population. Urbanization not only helps in the economical development of the country but also causes negative impacts like heavy demands on urban utilities and services like electricity, gas, water, sanitation, sewerage, garbage disposal, transport, telephone, and cables, and social services like health and education, etc.

2.5 Transportation is one of the major sectors that reflects the development of the nation. A Strengths Weaknesses Opportunities Threats (SWOT) analysis of transport in Dhaka found the following:

Table 3: Results of SWOT Analysis for Transport, Dhaka Structure Plan

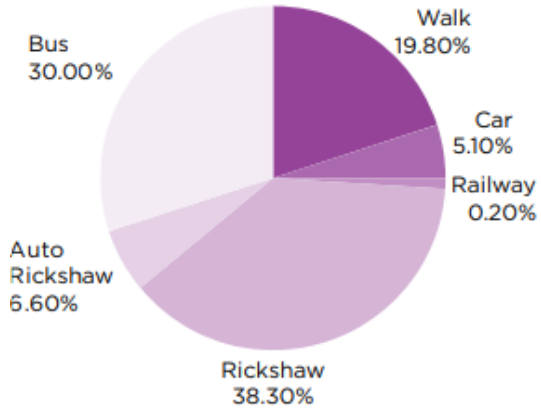
Strengths	Weaknesses	Opportunities	Threats
High rate (about 20%) of pedestrian traffic.	Absence of Mass Transit facility.	way line passing through the heart of the city.	Huge growth of population leading to growth of vehicular traffic and congestion.
Strong private sector involvement in transport sector.	Absence of continuous east-west connectivity in the core city area.	Scope of transport network development in the sub-urban area.	Uncoordinated development of flyover and expressway.
Adequate number of passengers to support mass transit.	Absence of Ring Road to diverse traffic which has no business in the core city area.	Provision of Transit Oriented Development (TOD) along Mass Transit Stations may	Failure to timely development of sub-urban connectivity.
Existence of circular waterway around Dhaka City.	Absence of updated technology to reduce traffic congestion for smooth movement traffic	Promotion of compact development will reduce travel demand;	Overconcentration of population in the core city area.
	Mismanaged traffic system.		Increasing cost of development of transport infrastructure.
	Poor Public transport system, including bus services;		
	Absence of adequate parking facility.		

Mobility & Analysis

2.6 From the mobility analysis, carried out recently by the consultant of Dhaka Bus Network Study, it was concluded that on an average working day **about 21 million trips** take place in the planning area (greater Dhaka), and of those trips, about 0.5 million are external to the Dhaka area to other areas in Bangladesh.

2.7 Additionally, this study measured the mode shares in the Dhaka Greater area. Dhaka has a high mobility rate is due to the high population density, estimated at around 45,000 persons/sq.km. From the modal share data, the highest modal share percentage is for **rickshaw (38.30%)** and the second highest percentage is for **bus (30%).**

Table 4: Dhaka Mode Shares



2.8 It is estimated that the modals share percentage for rickshaws will be decreased to 20% by the year 2035. The average length of a bus trip is 5.6 km, and the rickshaw trip is 2.1 km.

Public Transport

2.9 The bus network serves **5.5 – 6.5 million customers every day** through a network of length 3,800 km. Out of 152 bus routes, only 5 bus routes operate east-west. The existing public transport facility is of poor quality, there are lots of problems related to public transportation like uncoordinated and weakly regulated bus operation, Significant disregard for passenger safety and comfort, and Lack of safety and respect for female passengers. The current buses are not environment friendly, almost 82% of buses operate from diesel.

2.10 Other very serious issues are noted:

- Multiple, uncoordinated and weakly regulated bus operation;
- Significant disregard to passenger safety and comfort;
- Lack of safety and respect for female passengers, and;
- Non existence of adequate infrastructure (bus stops, dedicated lanes, and depots);
- Disregard to the rules and regulations by the bus drivers;
- Incapable and non-professional attitude of drivers;-

2.11 There are three inter-district bus terminals (Gabtoli, Mohakhali, and Saidabad) that provide some facilities for interchanges from inter-district buses to city buses. The existing bus stop facilities are also ineffective due to the presence of vendors. Many of the intercity routes overlap with city routes creating a problem for bus route planning. In Dhaka, there is the

problem of parking There is a lack of parking space for vehicles in the commercial/ business districts in Dhaka City.

2.12 There is approximately 40 km of waterway within DMA area with 13 inland waterway terminals on the banks of Buriganga, Shitalakhya, Turag and Balu River operated by Bangladesh Inland Waterway Transport Authority (BIWTA). From the point of importance, as a major connecting gateway Sadarghat and Narayanganj waterway terminals play an important role. Both the terminals are used for passenger and freight transport.

Private Transport (Taxi, Rickshaw, Auto-rickshaw)

2.13 It is noted that Dhaka is probably the only capital city in the world having extremely limited provision of taxis. Taxi service started in Dhaka in 2004 with 2000 taxis but due to poor government policy, they went out of service. The motorcycle population is increasing by more than 10% annually. The registered motorcycle in Dhaka till 2013 is 304,000 which 50% may not be in use due to old age.

2.14 Manually driven rickshaws are the most prominent mode of transportation there are almost 500,000 registered rickshaws within Dhaka city. Rickshaws in Dhaka city are one of the major causes of traffic flow disturbance and congestion. There are four major railway stations in the DMR area. These are, Tongi, Kamlapur, Gazipur and Narayanganj. But there are many problems with railway transportation.

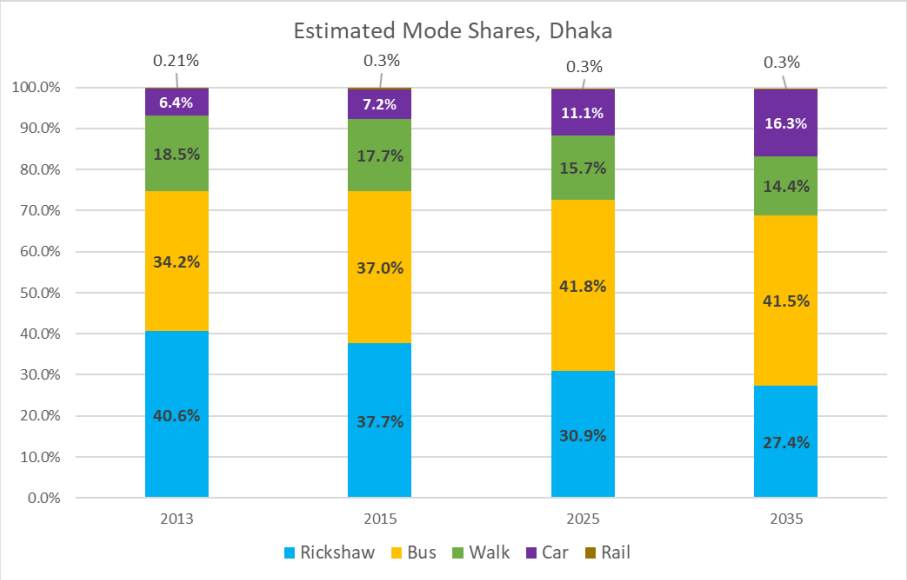
2.15 In Dhaka its also difficult for pedestrians for walking most of the sidewalks in the CBD area is occupied by vendors forcing the pedestrians to take to the carriageway, thereby creating traffic congestion and safety hazard. Out of about 4167 km of paved road, only about 500 km is of primary standard and suitable for bus operations.

Future -

2.16 During the next 20 years, there will be a substantial increase in population, number of vehicles, and number of trips for Dhaka which will increase traffic congestion and reduce traffic speed at peak hours (from 8 km/hour at present **to about 4 km/hour by 2035) which is about a 50% decrease in speed.** This report is found that the present number of trips for a all purposes is 29.58 million per day in 2013 which is estimated to increase to **54.34 million per day in 2035.**

2.17 The mode shares in Dhaka are estimated to change significantly over the next 20 years, especially, the rickshaw mode share which is estimated to reduce to less than 28% by 2035**.** The bus mode share will increase to be the largest at over 41% of trips which the car mode share will increase significantly as well and could represent 16% of trips in Dhaka by 2035, which is more than double the 2015 rate.

Figure 5: Estimated Mode Shares in Dhaka, 2013 - 2035



2.18 Now Dhaka is preparing different policies and objectives for the safe, efficient, economic operation of vehicles and people. There are three objectives and each objective has a number of policies.

2.19 The first objective is **'To Prepare Long Term Transport Network Plan'** with following policies.

- Enhancing the Linkage between Land Use and Transport Network
- Construction of Ring Road (outer,middle and inner)
- Incremental Road Network Development
- Establishment of Hierarchy of Roads
- Encourage the development of Sidewalk and Bicycle Route for Both Mobility and Recreation Purposes

2.20 The second objective is, 'To make the public Transport Efficient And Sufficient' with following objectives.

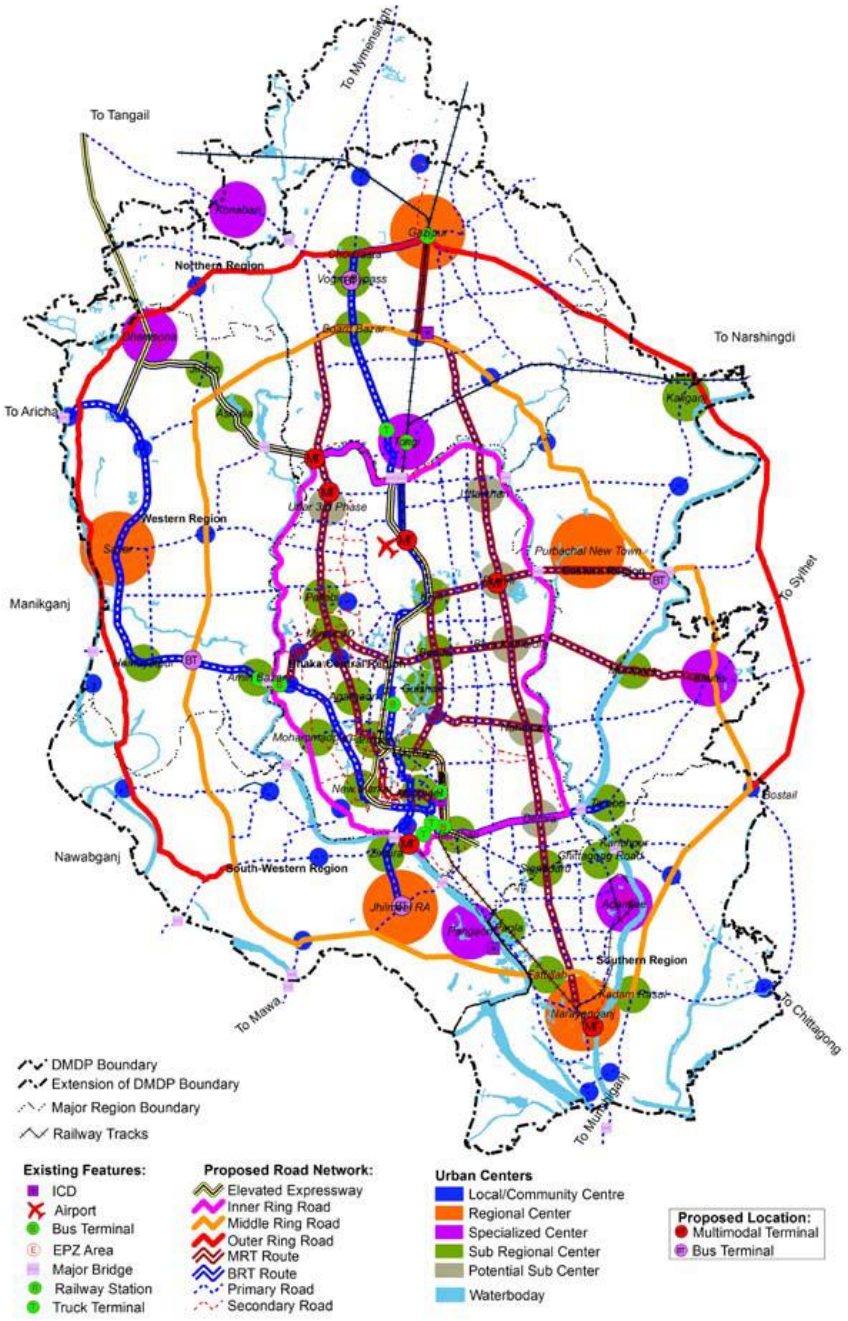
- Introduction of Mass Rapid Transit (BRT and MRT)
- Promote Improved Bus Transport System, Network Restructuring and Route Franchising
- Integration of Waterway Transport with Bus Network
- introduction of Commuter Trains
- Introduction of Efficient and Affordable Taxi Cab Service

2.21 The third objective is**, 'To Ensure Efficient Traffic Management'** with the following objectives.

- Integration of Travel Demand Management (TDM) in Planning Process
- Management of Rickshaw-based Transport (Rickshaw, Rickshaw-van, Carts etc.)
- Ensure Parking and Management for RAJUK Area
- Ensure Traffic Impact Assessment (TIA) for Large Scale Physical Development Projects
- Ensure the Road Facilities Fit for the Future
- Bringing Reduction in Fatalities and Serious Injuries on Roads
- Tackle Traffic Congestion Introducing Advanced Technologies

The general plan for transport in Dhaka is shown below

Figure 6: Future (2035) Plan for Transport in Dhaka, Dhaka Structure Plan



Open Transport Development and Integration of ICT and Transport

Overview

2.22 This project was funded through the World Bank: Integrated Transport Planning Ltd. (ITP) was appointed by the World Bank to work with the Dhaka Transport Coordination Authority (DTCA) and support its efforts to take on new organizational responsibilities for transportation policy, regulation, coordination, planning, and management for Greater Dhaka. The start date of this project was January 2015, and the end date was August 2015.

2.23 Three interrelated sub-objectives were set out in the World Bank's Terms of Reference for the project. They were1. to assist DTCA with data management and transport planning and provide technical tools and training to build capacity among colleagues at DTCA and deploy an accessibility-mapping tool for pilot use in Dhaka. This project particularly aims in developing knowledge, understanding, and skills around evidence-based approaches to coordinating, planning, and managing public transport services in the region. There were some activities done for the achievement of different objectives which are mentioned earlier For the first objective.

- A review of DTCA's transport data and ICT capacity needs to inform the remainder of the study.
- Develop and implement a Transport Data Hub to aid local transport data storage and sharing.

2.24 For the second objective.

- Workshop training sessions on using transport data for evidence-based transport planning
- Set-up GTFS Editor tool for DTCA and provide training to DTCA colleagues so they could use the tool independently to maintain GTFS data.

2.25 For the Third objective

- Set up Transport Analyst tool for Dhaka and provide accessibility mapping training to DTCA.
- Use Transport Analyst to estimate accessibility impacts of planned BRT and MRT investments.

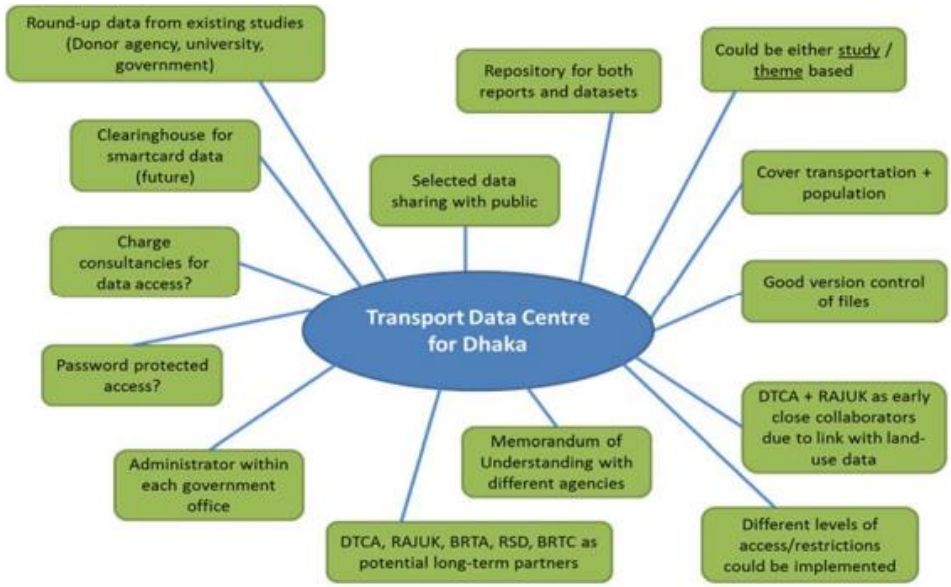
2.26 There are set of learning objectives which were defined for DTCA and RAJUK colleagues in relation to the capacity building aspects of this project. They had been used as the basis for determining the impact of the project in order to understand the outcomes they enable colleagues at DTCA and RAJUK to achieve using transport data stored in the Data Hub created through this project.

2.27 Before travelling to the Dhaka, the different documents were revied by the project team received from the DTCA via colleagues at the World Bank. The documents studied were Dhaka Bus Network and Regulatory Reform Implementation Study and Design Work Final Report (2012) and previous World Bank gender equality studies related to transport (2000 & 2003) along with different GIS data files. A collaborative review of DTCA's transport data and ICT capacity needs was completed early in the project. strategic transport planning objectives were related to the proposed BRT and MRT lines And DTCA focused on becoming responsible for Strategic planning and business case development for new public transport systems, Operational monitoring, management, and oversight of new mass transit systems Strategic

reorganisation of existing public transport routes, Regulation of reorganised public transport routes and services and strategic traffic management and road network planning. There mass transit projects were led by the international donor banks and consultants and the knowledge and datasets created in Dhaka are spread across multiple agencies.

2.28 Transport Data Hub requirements were determined. Different options (5 in numbers) for developing a Transport Data Hub in Dhaka were setup and Cloud-based storage (Option 2) was selected by DTCA and jointly implemented through the course of the project. Then Developing and implementing the Dhaka Transport Data Hub was done and the project team worked with colleagues at DTCA to establish a cloud-based Transport Data Hub for Dhaka in line with their jointly-defined priorities and requirements.

Figure 7: Overview of Transport Data Hub for Dhaka



2.29 The Hub was subsequently designed to accommodate thematic datasets related to transport infrastructure (water/road/railways, pedestrian routes, parking), freight, Non-Motorised Transport (NMT - walk, cycle, pedicab), and trip-generation arising from new land uses/developments. To store the Data Hub's contents, ITP set up a Dropbox Pro account (1Tb storage) on behalf of DTCA. Compilation and validation of GTFS dataset for Dhaka, Creating GTFS Scenarios for GTFS Editor software set-up were done. Interactive training session to familiarise and train DTCA on GTFS Editor, Using Transport Analyst software for accessibility analyses, Transport Analyst training for the DTCA team were also conducted.

2.30 Impact of BRT and MRT on accessibility in Dhaka was also studied, this work focused on assessing transport accessibility in Greater Dhaka to make comparisons between accessibility for the general population and females. Data inputs and outputs were used to Transport Analyst. Map (open street map), transport data (GTFS) and population data (shapefile) were used as input data and maps (accessibility maps and accessibility comparison maps) were output data. Different scenarios were tested by the project team using the data set mentioned above. There were 5 main scenarios named as Base scenario, Base + BRT, Base + BRT + MRT, Base scenario (females), Base + BRT (females), Base + BRT + MRT (females). The base scenario considers the current situation with Existing bus routes only Network speed of 8.75 km/h. these scenario had some limitations that The population data used relate to the 2011 Census and were not projected into the future for the MRT and BRT delivery scenarios

2.31 The results obtained from the analysis of different scenarios is summarized in Table 5 below.

Table 5: Future Estimated Public Transport Travel times, using GTFS

Scenario	People living within 90 minutes PT travel of Motijheel		
	Number	%	Increase (from base scenario)
Totals	*8,292,007*	*100%*	
Base scenario	5,226,461	63.0%	
Base scenario + BRT	6,503,827	78.4%	1,277,366
Base scenario + BRT + MRT	6,780,366	81.7%	1,553,905

2.32 With the introduction of BRT lines the accessible population was increased by 25% over the baseline scenario. With the introduction of both BRT and MRT the population that can access Motijheel within 90 minutes travel time was increased by 30% compared to the baseline.

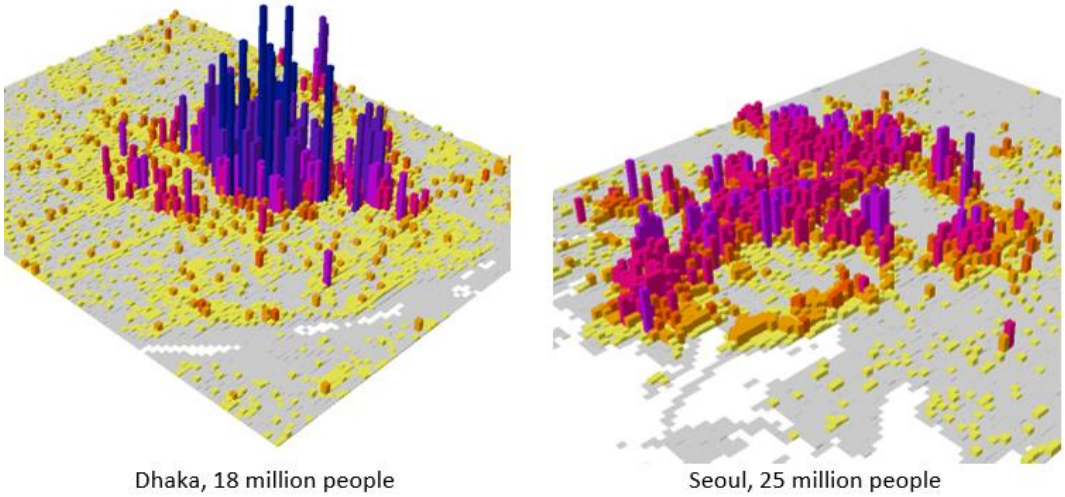
2.33 From the previous two World Bank studies it was concluded that women don't want to use public transportation because of the overcrowding and harassment. Instead, they use the private transportation like auto-rickshaws (CNGs) and bicycle rickshaws.

3 Socioeconomic & Infrastructure

Population and Growth

3.1 Dhaka, the capital and largest city of Bangladesh, has experienced rapid population growth in recent decades. The city has a population of more than 21 million people, making it one of the most populous cities in the world. It is also one of the densest, with most estimates of the urban area of Dhaka having more than 40,000 persons per square kilometre, which is more than double the average density of metropolitan area of Seoul.

Figure 8: Relative Densities of The Seoul and Dhaka Metropolitan Areas

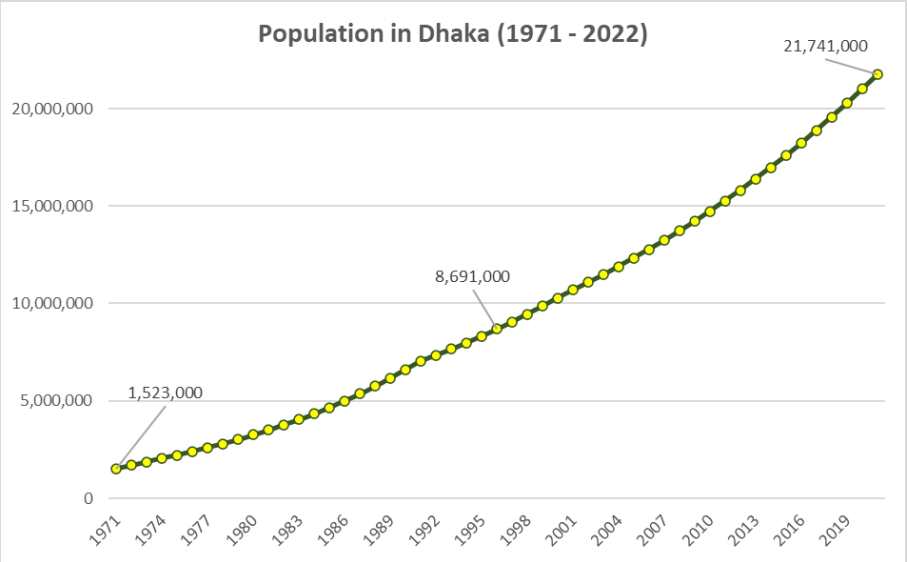


Source: Annie Daiphan, Blog of the World Bank. Based on 2012 data (LandScan Global Population Database 2012. Each cell is approximately 1 square kilometer)

3.2 The population of Dhaka has grown significantly since independence in 1971, when it had a population of around 1.5 million. This growth can be attributed to several factors, including urbanization, migration, and a high fertility rate. The city has also seen an influx of people from rural areas seeking economic opportunities and a better quality of life.

3.3 The rapid population growth in Dhaka has had both positive and negative impacts on the city, to be discussed in this report. On the one hand, it has contributed to economic development and a thriving business community. On the other hand, it has also put a strain on the city's infrastructure and resources, leading to issues such as overcrowding, traffic congestion, and pollution.

Figure 9: Population, Greater Dhaka (1971 – 2022)



Data Source: WorldBank, MacroTrends

3.4 The population is primarily composed of ethnic Bengalis, with Muslims being the largest religious group, followed by Hindus and Buddhists. The city has a youthful population, with 34% under the age of 15. The male to female ratio is roughly equal, with 50.4% of the population being male and 49.6% being female. In terms of education, 65.3% of the population is literate, with male literacy being higher than female literacy.

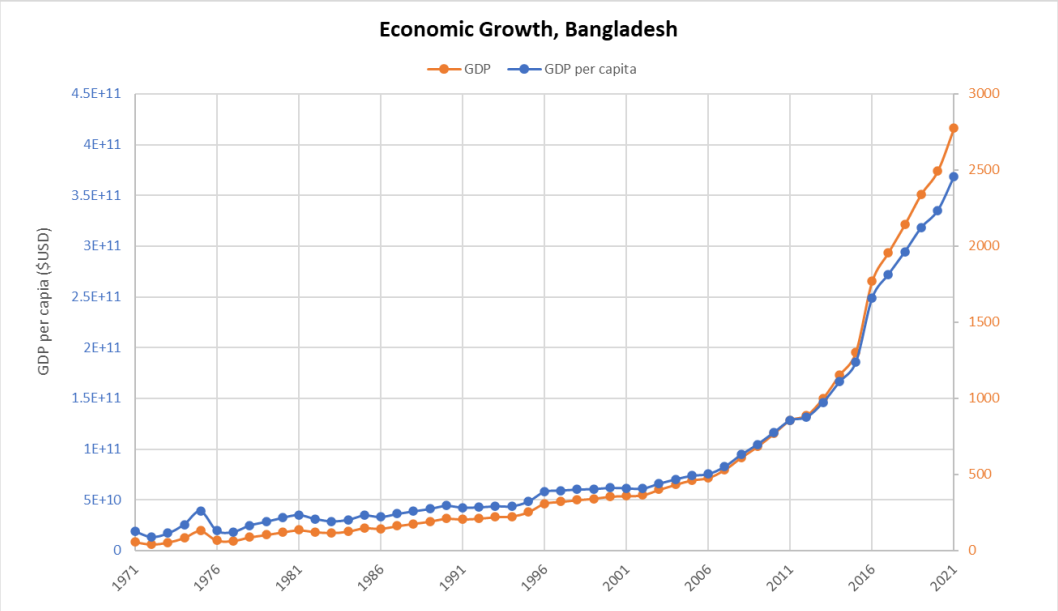
Economy

3.5 The economy of Bangladesh is very large generating $460 billion annually, which makes it the 35th largest economy in the world (IMF estimates). The Bangladesh economy has increased significantly every year since its independence in 1971. In recent years (2011 – 2021), the economy has increased at an incredible 18% per year, while GDP per capita has soared by over 22% per year, on average, refer to Figure 10.

3.6 The GDP of Greater Dhaka is estimated to be worth $160 billion annually (in 2020) or around $7,700 USD per capita. The economy of Dhaka is responsible for around 42% of the total economy of Bangladesh.

3.7 However, Bangladesh is still a developing country, and it is estimated that the average salary in Dhaka is around 0.3m Taka (BDT) per year, or just over $3,185 USD.

Figure 10: Economic Growth in Bangladesh



Data Source: World Bank

		1971	1981	1991	2001	2011	2021
Economic activity (GDP)	Total	128.00	235.00	283.40	410.00	856.40	2,457.90
	Per capita	8.75	20.25	30.96	53.99	128.64	416.26
AAGR	Total	-	8.4%	2.1%	4.5%	10.9%	18.7%
	Per capita	-	13.1%	5.3%	7.4%	13.8%	22.4%
Growth 1971 - 2021	Total	1,820%					
	Per capita	4,656%					

3.8 The economy of Bangladesh is characterized by a mix of agriculture, manufacturing, and services sectors.

- Agriculture is a significant contributor to the economy, with rice, wheat, and other crops being major exports. The country is also a major producer of textiles and garments, with the clothing industry being a major source of employment and foreign exchange.
- The services sector, including finance, telecommunications, and transportation, is also an important contributor to the economy. The country has a growing financial sector, with several banks and other financial institutions operating in the country.
- In recent years, Bangladesh has made significant progress in reducing poverty and improving living standards. However, the country faces ongoing challenges including political instability, corruption, and limited infrastructure. Despite these challenges, Bangladesh has made progress in improving its economic prospects and is considered a potential emerging market.

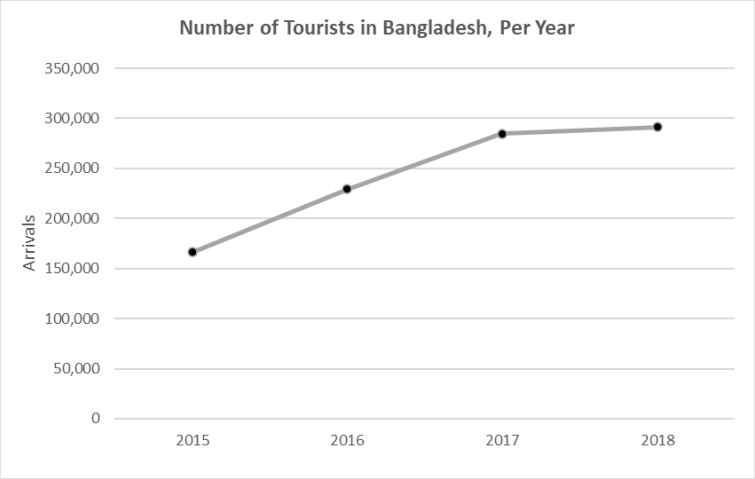
Tourism

3.9 Dhaka is not a popular tourist destination for international tourists in South Asia. According to data from the World Bank, the city received just over 320,000 international visitors in 2019, pre-pandemic.

3.10 Tourism in Dhaka is centered around the city's rich cultural and historical heritage, with popular attractions including the Lalbagh Fort, the Ahsan Manjil Museum, and the Baitul Mukarram Mosque. The city is also known for its bustling markets, such as the Nurjhahan Market, which is one of the largest wholesale clothing markets in the world.

3.11 In recent years, the tourism industry in Dhaka has been growing, along with the construction of new hotels, restaurants, and other amenities. However, the city faces challenges in terms of infrastructure and transportation, with congested roads and limited public transport options. **Overall Bangladesh remains one of the least-visited countries on Earth, on a per-capita basis**.

Figure 11: Tourist Arrivals in the Bangladesh



Data Source: Bangladesh Bureau of Statistics (BBC) Ministry of Planning, 2019

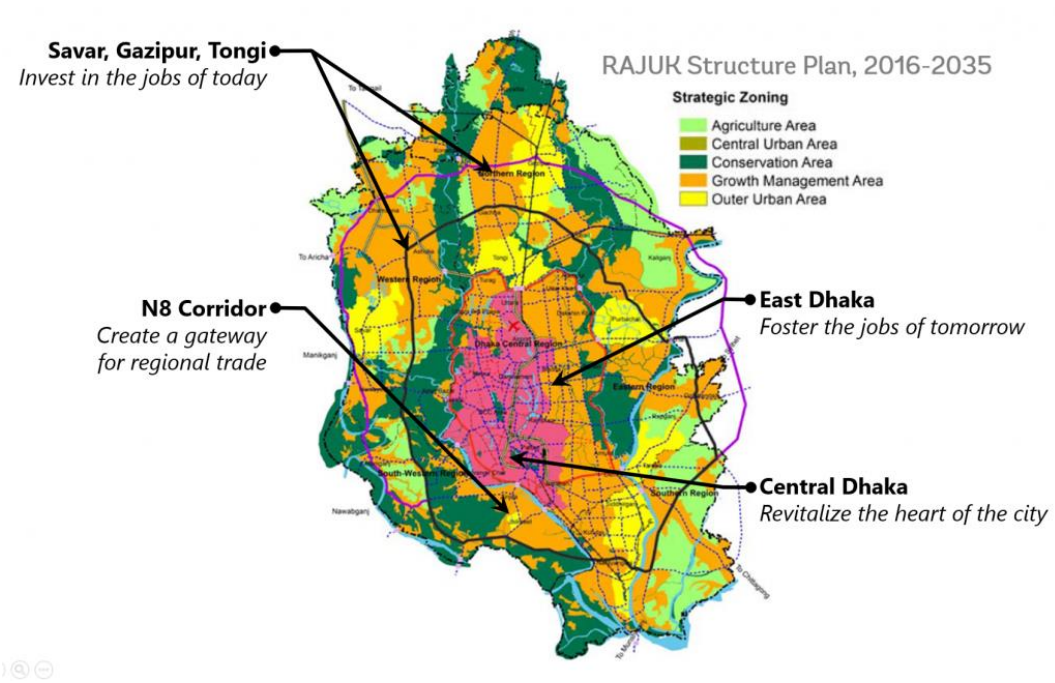
3.12 However, a large number of non-resident Bangladeshis visit the country every year. In total, non-resident Bangladeshis account for 80% of international arrivals.

Land Use and Urban Development

3.13 There have been several urban planning projects aimed at addressing the challenges of rapid urbanization in Dhaka, Bangladesh, the most well known of which is the 2035 Structure Plan for Dhaka (the transportation section from this plan is summarized in this report) These plans aim to improve the quality of life for the residents of Dhaka by addressing the challenges of rapid urbanization and promoting sustainable and efficient development.

3.14 Overall, Dhaka is planned to continue to grow at an impressive rate, with an estimated 10 million additional people to move to Dhaka by 2035. In the past, urban development and the built-up area of the Dhaka metropolitan area has been haphazard, with slum areas forming on the outskirts. The incredible rate of population increase has resulted in a significantly larger portion of area being used for urban development, refer to Figure 12 below.

Figure 12: Urban Plan for Dhaka, 2016 - 2035



Map source: World Bank Study (RAJUK 2016-2035 Structure Plan for Dhaka

3.15 The Structure Plan emphasizes the importance of making Dhaka more livable and competitive, including the following major objectives/policies:

1. Utilization of diverse methods of financing
2. Stratified development control

    i. To potentially use the underdeveloped land across the RAJUK boundary, it is necessary to encourage selective vertical expansion, since the average residential building is just 2 stories.

    Compact urban development: Planned Unit Development (PUD) is a method of compact land development which promotes large scale, mixture of compatible land uses and dwelling types.

Telecommunication Infrastructure (Mobile/Cellular & ISP)

ICT Usage

3.16 According to data from the Association of Mobile Telecom Operators of Bangladesh (AMTOB) from October 2022 there are more than 180 million mobile subscriptions in Bangladesh, which is a rate per capita of over 1 subscriber per person, indicating that many users have more than one subscription. Reports from the Bangladesh Telecommunications Regulatory Commission, as of their 2021 report, estimate approximately 176 million mobile phone subscribers in the country, which is again more than one subscription per capita.

3.17 According to estimated from the Global System for Mobile Communications Association (GSMA), In terms of SmartPhone ownership, it is estimated that the total SmartPhone penetration is around 41% of *connections* in 2020, which is projected to rise to around 62% in

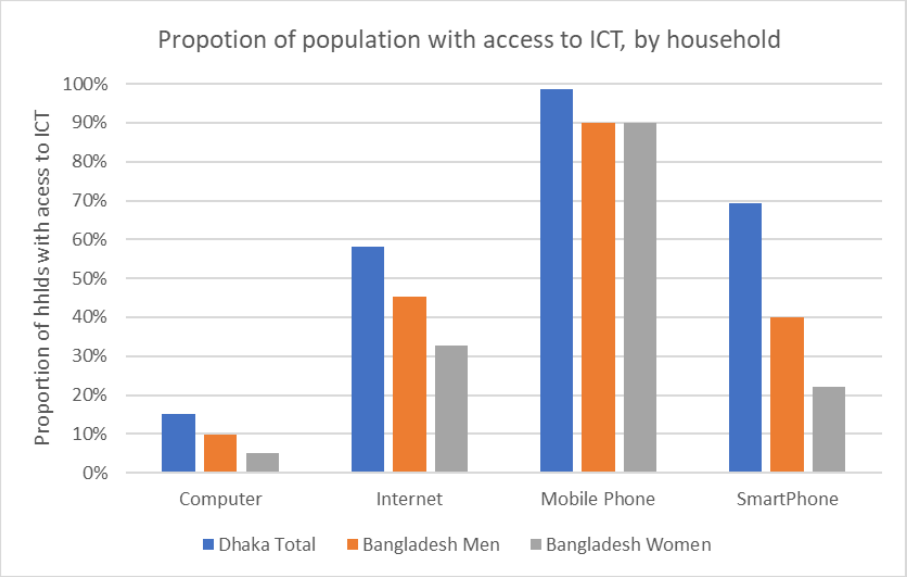
2025 by the GSMA. According to the GSMA, Bangladesh has the lowest overall usage of SmartPhone in 2020 of any country in Asia.

3.18 In 2022, Bangladesh undertook a census of the population which included data on ICT (including SmartPhone) usage. According to this census, total penetration of internet use and SmartPhones is still relatively low compared to peer countries in Asia. However, a very high proportion of households in the country have access to mobile phones of some kind, at around 97% of households. Conversely, just over 61% of the population reported actually *owning* a mobile phone, with men (72%) being far more likely to own a mobile phone than women (51%). Further, only about 38% of households had access to internet (mobile or fixed), countrywide.

3.19 In urban areas, especially Dhaka, usage of ICT is higher than in rural areas. In Dhaka, **58% of the population had access to the internet, with nearly 70% of households having access SmartPhone** and **99% having access to a mobile phone of some kind.**

3.20 Countrywide, women tended to have less access and usage of ICT than men. Around 40% of men in the country used a SmartPhone, while just over 20% of women reported using one. Similarly, overall, 45% of men had had access to internet, while just over 30% of women reported having access.

Figure 13: Proportion of Population Having Access to ICT



Data Source: Bangladesh Bureau of Statistics (BBS), 2022 Census

3.21 A study from the Asia Development Bank (ADB) from 2018 confirmed there to be significant gender gaps with both internet access and smartphone ownership in Bangladesh, with women being significantly less likely to have access to a SmartPhone than men.

Providers

3.22 Telecommunications, including mobile telecommunications in Bangladesh is regulated by the Bangladesh Telecommunications Regulation Committee (BTRC), based in Dhaka. According to the BRTC, their responsibilities include operating, regulating, maintaining telecommunication establishments and providing various telecom services in the country are the major ones. Besides, fixing charges on the subscribers, ensuring the services for the subscribers and to

ensure people's right are also tasks of BTRC. The social and economic behavioural pattern of the telecom service providers are also monitored by the BTRC to ensure that the users are not subjected to harassment and not indifferent in nature[1].

3.23 Data is very cheap in Bangladesh, and as for retail, customers can expect to **pay an average of $0.32 USD per Gigabyte[2].** There are five main mobile telephony providers in Bangladesh using four separate networks:

- GrameenPhone
- Banglalink
- Robi/Airtel
- Teletalk (fully state-owned)

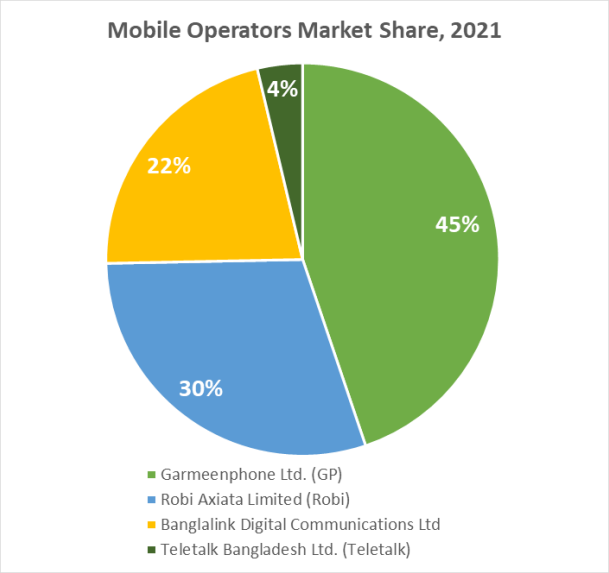
3.24 Garmeenphone is by far the largest operator by subscribers and market share with over 81 million subscribers, or a 45% market share, followed by Robi with 30%, Banglalink with 22%, and finally Teletalk with just over 4%.

3.25 Total internet use of Bangladeshis comes to around 75% as of 2021 with 95% of those internet users being mobile internet users. The country hosts just over 11.5 million ISP (physical) internet connections.

Figure 14: Mobile Operators Market Share and Internet Subscribers in 2022

Type of Internet	Subscribers (millions)
Mobile Internet	114.6
ISP + PSTN	11.58
Total	**126.18**

Figure 15: Mobile Operators Market Share (Graphic)



[1] http://old.btrc.gov.bd/history-and-vision

[2] https://www.cable.co.uk/mobiles/worldwide-data-pricing/2022/2022_global_mobile_data_price_comparison.xlsx

Summary

3.26 Internet speed data from Ookla and dPerf is available for Dhaka. As of November 2022, report from Ookla, the average download speed for mobile internet was 17.67 Mbps, with 10.31 MBps for upload. For fixed ISPs, the average download and upload speeds are 43.12 Mbps and 42.70 Mbps respectively. Gremeenphone provides the fastest minimum and maximum speeds, however, the highest average speeds in Q3-Q4 for 2021 according to Ookla is awarded to Banglalink.

Table 6: Network Speeds by Carrier, Bangladesh

Carrier	Networks	Minimum	Average Speed	Maximum Speed
Banglalink	2G, 2,5G, 3G, 3.5G, 4G LTE,	8	20.04	35
Robi/AirTel	2G, 2,5G, 3G, 3.5G, 4G LTE,	5	14.50	31
Grameenphone	2G, 2,5G, 3G, 3.5G, 4G LTE, 5G	9	14.49	40
TeleTalk	2G, 2,5G, 3G, 3.5G, 4G LTE, 5G	-	7.85	-

Table 7: Bangladesh Frequency Bands

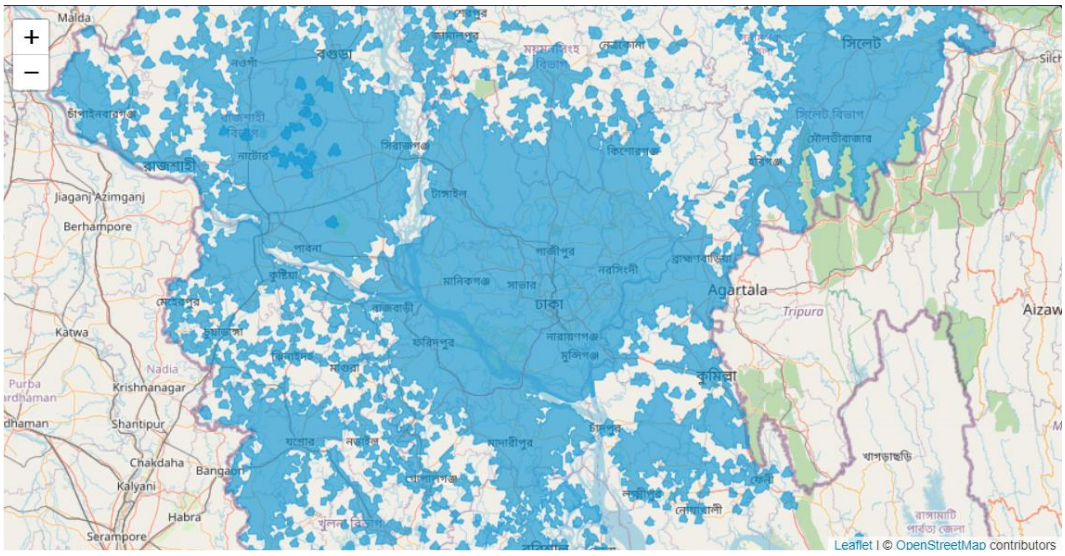
2G (GSM)	2.5G	3G (UMTS)	3.5G	4G (LTE)	5G
900 MHz (E-GSM)[1,2,3,4]	GPRS[1,2,3,4]	B1 (2100 MHz)[1,2,3,4]	HSPA[1,2,3,4]	B1 (2100 MHz)[1,2,3,4]	n78 (3600 MHz)[3,4]
1800 MHz (DCS)[1,2,3]	EDGE[1,2,3,4]	B8 (900 GSM)[3]	HSPA+[1,2,3,4]	B3 (1800+ MHz)[1,2,3]	
				B8 (900 MHz)[1,2,3]	
				B40 (2300 MHz)[1,4*]	
				B7 (2600 MHz)[2*,3]	

1=Bangalalink 2= Robi/Airtel, 3 = Grameenphone, 4 = TeleTalk
* Not yet widely used

Coverage and Infrastructure

3.27 Mobile network coverage in Dhaka, Bangladesh is generally very good, with all four major mobile operators offering services in the city. 100% of the Dhaka urban area is covered with 2G, 3G, 4G/LTE networks for all four mobile operators.

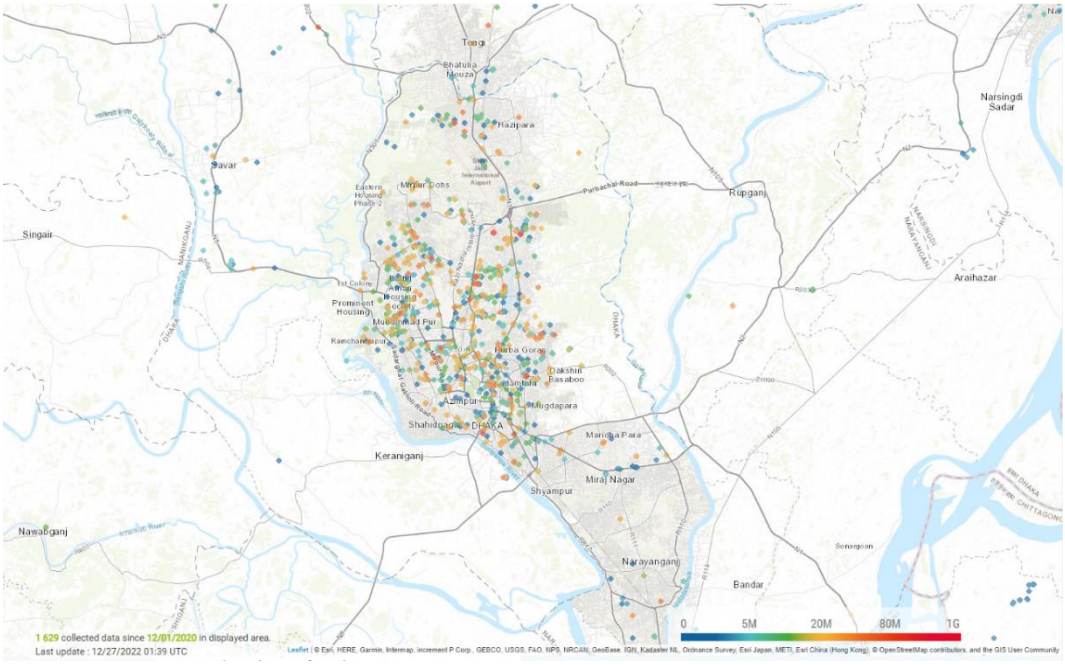
Table 8: 4G Coverage, Dhaka Area (Grameenphone)



Data source: Grameenphone Inc. Website

3.28 The mobile network infrastructure in Dhaka has undergone significant improvements in recent years, with the deployment of advanced 4G+ (LTE) and work underway for 5G networks. However, like in many other developing countries, there may be some areas in Dhaka where mobile network coverage is patchy or non-existent, particularly in more remote or rural areas of the city. Overall, however, most residents of Dhaka have reliable mobile network coverage for calls, text messaging, and data services.

Figure 16: Crowdsourced Speed Data by Location (Grameenphone)



Data Source: nPerf Crowdsourced data

5G and Future

3.29 Bangladesh is laying the groundwork for future commercial 5G deployments. The Bangladesh Telecommunication Regulatory Commission (BTRC) ran a 5G spectrum auction in March 2022. The regulator has already assigned 60 MHz in the 3.5 GHz band to state-owned operator Teletalk, to support 5G deployments — and Teletalk has begun trial 5G services in December 2021. Currently, 5G trials are restricted to very small areas in Dhaka, and 5G capable devices are not widely available in Bangladesh. Carriers continue to focus on expanding and improving their 4G LTE networks.

Electrical

3.30 Dhaka's electrical is operated by the state-owned Bangladesh Power Development Board (BPDB). The national grid is interconnected with neighboring countries such as India and Bhutan, and it supplies power to Dhaka and other cities in Bangladesh through a network of transmission lines and substations. The distribution of electricity in Dhaka is managed by two distribution companies: Dhaka Electric Supply Company (DESCO) and Dhaka Power Distribution Company (DPDC). Both companies purchase electricity from the national grid and distribute it to consumers in their respective service areas.

3.31 The government of Bangladesh is investing in renewable energy sources such as solar and wind power, upgrading transmission and distribution networks, and promoting energy conservation and efficiency measures. The government of Bangladesh has developed a comprehensive plan called the *Power System Master Plan (PSMP) 2016-2041* to ensure reliable and sustainable electricity supply throughout the country, including in Dhaka. The PSMP focuses on increasing the share of renewable energy sources, upgrading transmission and distribution networks, and improving the efficiency and performance of the power sector.

3.32 Some of the specific initiatives planned for Dhaka include the construction of new power plants, upgrading of existing substations, installation of smart grid technologies, and expansion of renewable energy sources such as solar and wind power. The government is also promoting energy efficiency and conservation measures to reduce the demand for electricity and increase the efficiency of energy use in homes and businesses.

3.33 In addition to the PSMP, there are also plans DESCO and DPDC to upgrade their distribution networks, install new meters, and improve billing and customer service. These initiatives aim to improve the reliability and quality of electricity supply in Dhaka and ensure that the growing demand for power can be met sustainably.

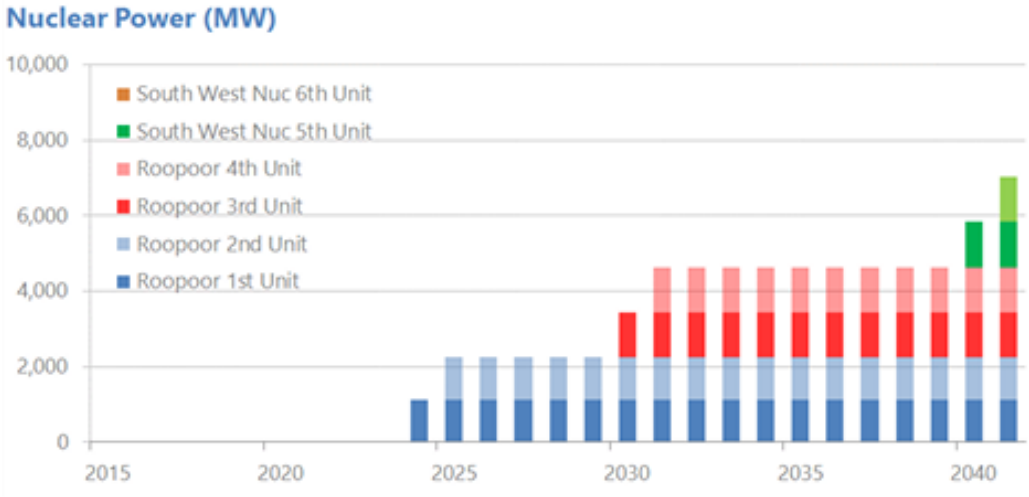
Sustainability

3.34 AS of 2014, the sources of electricity generation in Bangladesh vary, but majority of electricity is generated from natural gas (56%), biofuel/waste (23%), followed by oil (17%), coal (5%), renewables including hydro (1%), and imported power (1%). There are also some small hydroelectric power plants in the country.

3.35 Bangladesh does have plans to reduce the carbon footprint their electrical grid as well as increase total production. According to the PSMP, domestic production of electricity will increase from 2,470 MW (in 2021) to 3,864 MW (in 2041). However, total energy imports (from neighbouring countries like Nepal and Bhutan) will need to be around 9,000 MW by 2041 to sustain the needs of their parge population.

3.36 Green energy production potential is relatively low in Bangladesh at an estimated total of around 3,600 MW. Despite having many rivers, lacks any possibility to produce electricity with hydroelectricity due to its geography in a low-lying Delta. However, one potential domestic energy source for future development will be Nuclear power, according to the PSMP. This may mean that in the future, up to 9% of domestic energy is produced from green nuclear power. However, overall, the Bangladesh power grid and energy consumption in general may continue to rely on fossil fuels for most of the total electric generation.

Figure 17: Nuclear Power (MW) Potential Generation



Source: Power System Master Plan (JICA)

Municipal Utilities

3.37 In Dhaka, the municipal utilities responsible for providing essential services to residents, including water supply and sanitation, are primarily managed by the Dhaka Water Supply and Sewerage Authority (DWASA) and the Dhaka North City Corporation (DNCC) and the Dhaka South City Corporation (DSCC).

3.38 DWASA is responsible for managing the water supply and sanitation services in Dhaka city and its surrounding areas. It operates and maintains several water treatment plants, pumping stations, and distribution networks to provide safe drinking water to the city's residents. DWASA is also responsible for managing the city's sewerage system and the treatment of wastewater.

3.39 DNCC and DSCC are responsible for managing the municipal services in their respective jurisdictions, including the collection of solid waste, maintenance of roads and footpaths, and provision of street lighting. Both organizations also provide essential services such as public health, education, and recreational facilities to the residents of Dhaka.

3.40 **Underground electrical utilities are not common in Dhaka**, however there are ongoing works to increase the number of underground utilities, spearheaded by the DNCC.

4 Transport

4.1 Dhaka has been characterized as a rickshaw transport city due to a major prevalence of this mode in this city. Indeed, Dhaka is often called the “city of rickshaws”, and estimates put the number of rickshaws in the city within the hundreds of thousands, perhaps 500,000. Motorization of the population and the number of cars on the streets is relatively low for a megacity of its size, accounting for less than half a million registered vehicles. For some comparison, in the Seoul Metropolitan Area which has a comparable population to Dhaka, there are around 10 – 12 million registered vehicles.

4.2 The mode share for cars is around 10% of trips in Dhaka meaning, generally of 2023, Dhakabashis usually get around by either walking, taking public transport (buses or minibuses), or by using taxi-like vehicles including the ubiquitous rickshaw and autorickshaw, which account for around 30 – 40% of trips. Trains also account for a small (<1%) portion of trips within the city, but with the construction of the Metro Rail Transit (MRT), this is sure to rise.

4.3 The mix of transport in Dhaka has changed significantly over the years, with estimates of transport mode shares in the 1980s putting the rickshaw mode share at 60 – 80% of trips [3]. This is no longer the case, and today, Dhaka is characterized by its noisy and chaotic streets where all road-based modes mix and mingle, resulting in traffic jams and general chaos. Dhaka may also be the major city with the slowest average traffic speeds in the world, perhaps as slow as 6.4 km/hr according to some studies[4].

Figure 18: Street Scenes in Dhaka, 2023

[3] Ahmed (1980), Shankland Cox Partnership et al. (1981)

[4] World Bank, 2017; Gallagher, 2016

Image sources: © Korea National University of Transportation, 2023

Public Transport Modes

4.4 In Dhaka, numerous ground transport modes are widely available. Private ownership of cars is still relatively rare, although motorcycles are more popular. In Dhaka, public transport systems include the following modes:

Table 9: Public Transport Modes in Dhaka

Buses, including those operated by the state-owned operated, BRTC. Buses provide fixed route services serving intra-city routes.	
Auto-rickshaw/CNG (Acronym of Compressed Natural Gas) which are sometimes referred to as Tuk-Tuks in other countries. CNGs provide point-to-point services for 1 -2 passengers, generally over medium distances.	

Licensed Taxi/ Ridesharing (Uber)

Taxis or Ridesharing (Uber) provide point-to-point services for up to 3-4 passengers, which are more comfortable to ride in than CNGs and charge higher fares.

Cycle rickshaw or rickshaw

Cycle rickshaws are extremely common in Bangladesh and offer point-to-point services for 1 or 2 passengers, generally over short distances.

Boat/water transport

Based on the city's rivers, some speedboat services are available in limited areas.

Metro (as of January 2023)

The Dhaka Metro (MRT) Lin e6 opened to passengers in January 2023 and is a modern and advanced metro system, the first in Bangladesh.

Suburban railways

Dhaka is served by suburban rail lines, offering commuter services in several classes.

Image sources: Creative Commons Licenses

Registered Vehicles

4.5 In 2019, there were about 1.65 million registered vehicles in Dhaka, of which 49% were motorcycles, followed by private cars (pick-ups, cars, and jeeps) at around 27%, by commercial vehicles (vans, trucks etc.) at around 10%, buses (large, micro, minibuses, and human haulers) at around 8%, and commercial vehicles at around 3%. All other types of registered vehicles account for approximately 2% of registered vehicles.

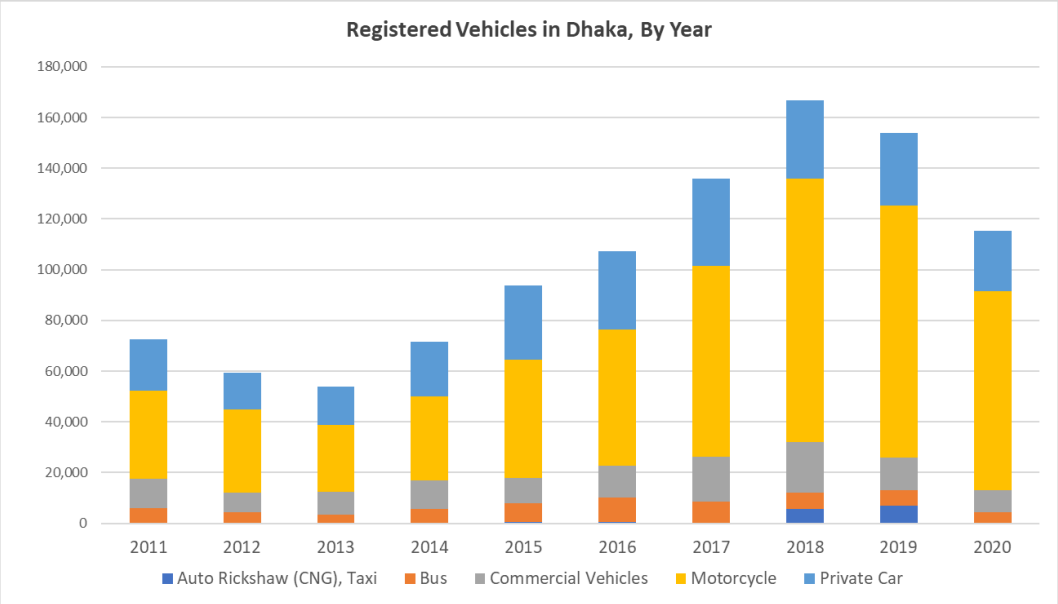
4.6 Most registered vehicles in Dhaka are motorcycles, at just over 800,000 followed by private cars at around 450,000. While the share of registered cars and motorcycles has been increasing in recent years, as shown in Figure 19.

4.7 Overall, these values represent extremely low levels of motorization considering the population of Dhaka. With a total of 1.26 million private vehicles, compared to a population of around 10.2 million residents in the Dhaka district, equals an auto ownserhip rate of just under 0.12 per capita. **Note that, it is likely that many vehicles are unregisered and thefore not counted in these statistics.**

Table 10: Total Registered Vehicles (as of 2021)

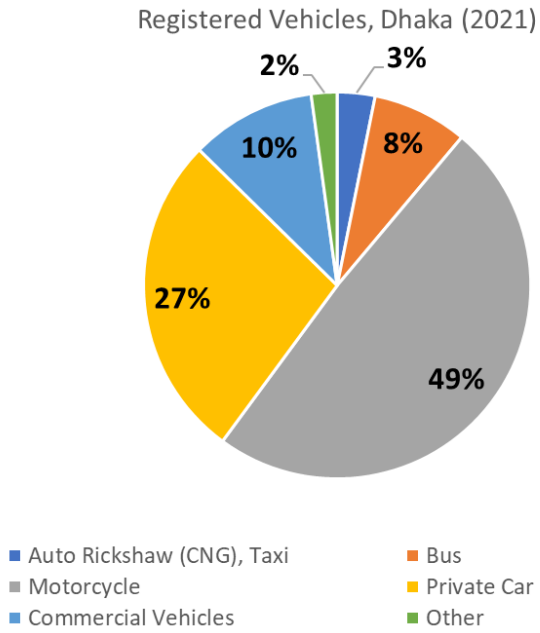
Type of Vehicle	As of 2021
Auto Rickshaw (CNG), Taxi	52,151
Bus	131,574
Motorcycle	809,189
Private Car	450,735
Commercial Vehicles	172,975
Other	35,699
Total	**1,652,323**

Figure 19: Registered Vehicles in Dhaka, By Year



Data source: Bangladesh Road Transport Authority (BRTA), 2021 Bangladesh

Figure 20: Registered Vehicles in Dhaka (2019)



Data source: Bangladesh Road Transport Authority (BRTA), 2021 Bangladesh

Traffic and Congestion (2023)

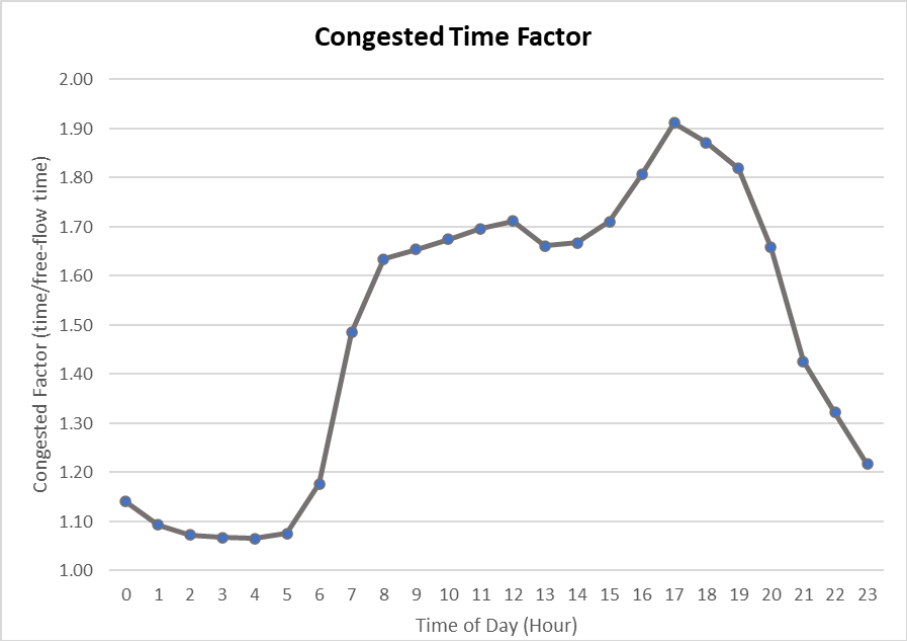
4.8 Despite relatively low levels of motorization, traffic congestion in Dhaka is one of the worst in the world. The city's narrow and poorly maintained roads, lack of proper traffic management, and high population density all contribute to the problem. The daily commute in Dhaka can take several hours, and traffic jams are common, even on minor roads. The gridlock on the streets can lead to increased air pollution, noise pollution, and mental stress.

4.9 The city's inadequate public transportation system makes the problem worse. High demand for private vehicles and the lack of proper infrastructure for public transportation have resulted in an overburdened road network. The situation is further exacerbated by the high number of vehicles on the road, including cars, buses, trucks, motorcycles, and bicycles, all competing for limited space.

4.10 This is evidenced by the particularly unusual daily graphs of travel times gathered from the Google Maps API (data gathered in January 2023). In the following graphics (Figure 21) time and speed is represented as a factor of the free-flow (minimum) travel time or speed, which generally occurs at the hours of 3AM – 4AM when demand is lowest.

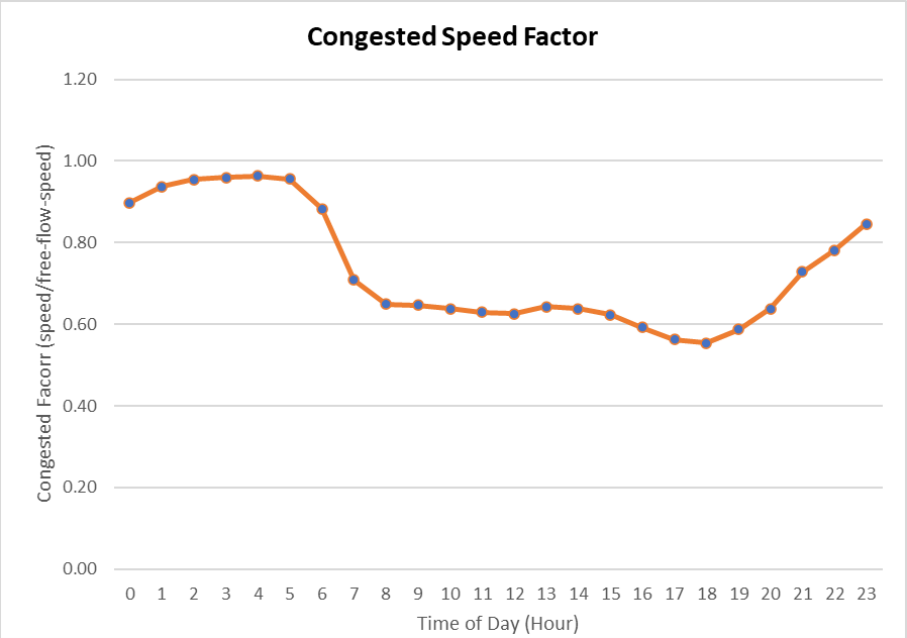
4.11 In many other cities around the world, congested takes the form of “rush hours” which are very slow during the morning and afternoon commutes, and generally outside of these hours, congestion is less severe. However, in Dhaka this is not the case, after approximately 5AM, travel times and speeds slow down and essentially do start to recover until well into the evening, approximately 8PM – 2AM.

Figure 21: Congested Time and Speed in Dhaka, Google Maps API



Data source: Google Maps API, 2023

Figure 22: Congested Speed Factor, Google Maps API



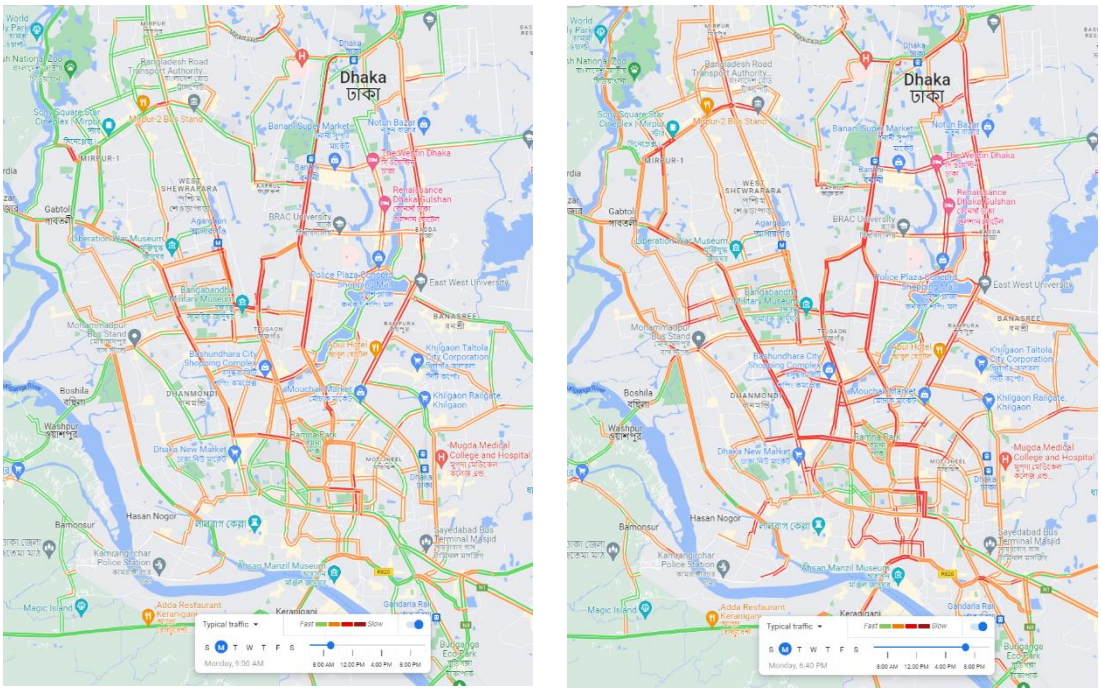
Data source: Google Maps API, 2023

4.12 Our data uses a total of approximately 40 points spread throughout the city, generally conforming to wards. A total of 1,560 origin-to-destinations over 24 hours were examined, and we found the average speed within the city to range from approximately 26 km/hr at approximately 3AM – 4AM, to around 16 km/hr at approximately 5PM-6PM.

4.13 Other sources have estimated the average speed in Dhaka to be even lower, notably the 2035 structure plan which estimates the average speed could be as low as 4.6 km/hr by 2035 – about the same as a normal walking speed.

4.14 In Dhaka, the afternoon period is the slowest and travel times are on average the longest, increasing by up to 90% on average over the minimum (free-flow times). The following map depicts the congestion factors, specifically as the maximum daily congestion factors for each of the 40 points measured, as an average of the value by origin and by destination. This indicator shows, geographically, approximately where congestion is most severe.

Figure 23: Dhaka Congestion (Google Maps API), 9:00 AM (Monday)



Data Source: Google Maps

Bus System in Dhaka

4.15 As of 2023, buses are perhaps the main form of public transport in Dhaka. Around 4,000 – 7,000 vehicles ply the streets of Dhaka every day moving hundreds of thousands of passengers. Over each day, bus departures follow the demand patterns in Dhaka, which follow a familiar pattern of higher demand in morning and afternoon peak periods as seen in many other urban areas.

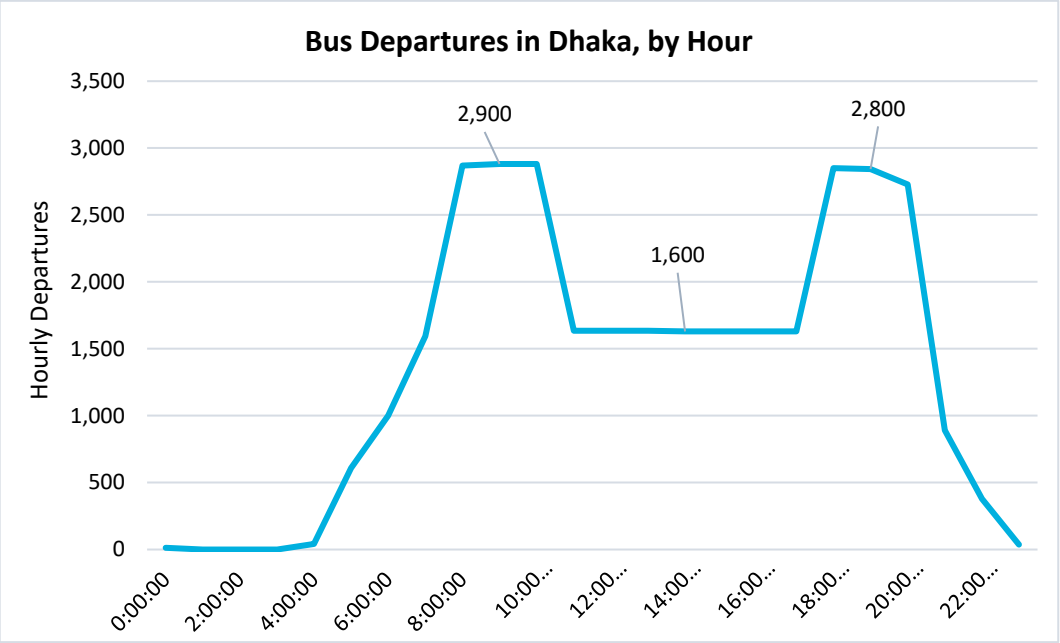
Routes, Service, and Stops

4.16 As is the case in many developing nations with mostly privately-run public transport systems, data and information for the bus systems of Dhaka are not readily available. These include schedules, maps, fare tables etc. According to the DTCA, Dhaka is currently served by 388 "routes", many of which overlap with other "routes" of other operators. In part due to the profit-maximizing private sector component of the system, buses generally will only run on routes which the owners believe are profitable.

4.17 One of the only accessible ways of understanding the Dhaka public transport network is the General Transit Feed Specification (GTFS) database, which is utilized by a Google Maps to provide transit directions. Dhaka has had transit directions available in Google Maps since 2021. The GTFS database for Dhaka was developed by and maintained by a private company based in India. This database provides only a rough guide of the bus services that are available in Dhaka as in reality, services are not scheduled, and travel times are highly variable making any kind of scheduling virtually impossible anyways. The data in this section comes from the GTFS database and should therefore understood to be a rough guide of the service only, albeit the most accurate and up to date database available.

4.18 In Dhaka, the morning peak period occurs from **07:00 – 10:00** which the afternoon peak period occurs from **18:00 – 20:00**. In peak periods, there are up to 3,000 departures per hour, refer to Figure 24 below.

Figure 24: Daily Bus Departures in Dhaka, by Hour



Data source: General Transit Feed Specification (GTFS), licensed from private entity

4.19 In Dhaka, the concept of a bus stops as in Korea or in the west is not the same. In Dhaka it is possible to flag a bus down more or less anywhere along its route. However, there are some areas especially along major corridors where buses tend to congregate, and people generally can catch the bus. These locations also function as major or minor urban transport hubs, with rickshaws, CNGs, or other transport modes tending to congregate there as well. The following images depict typical Dhaka scenes of busy bus stops where bus activity occurs.

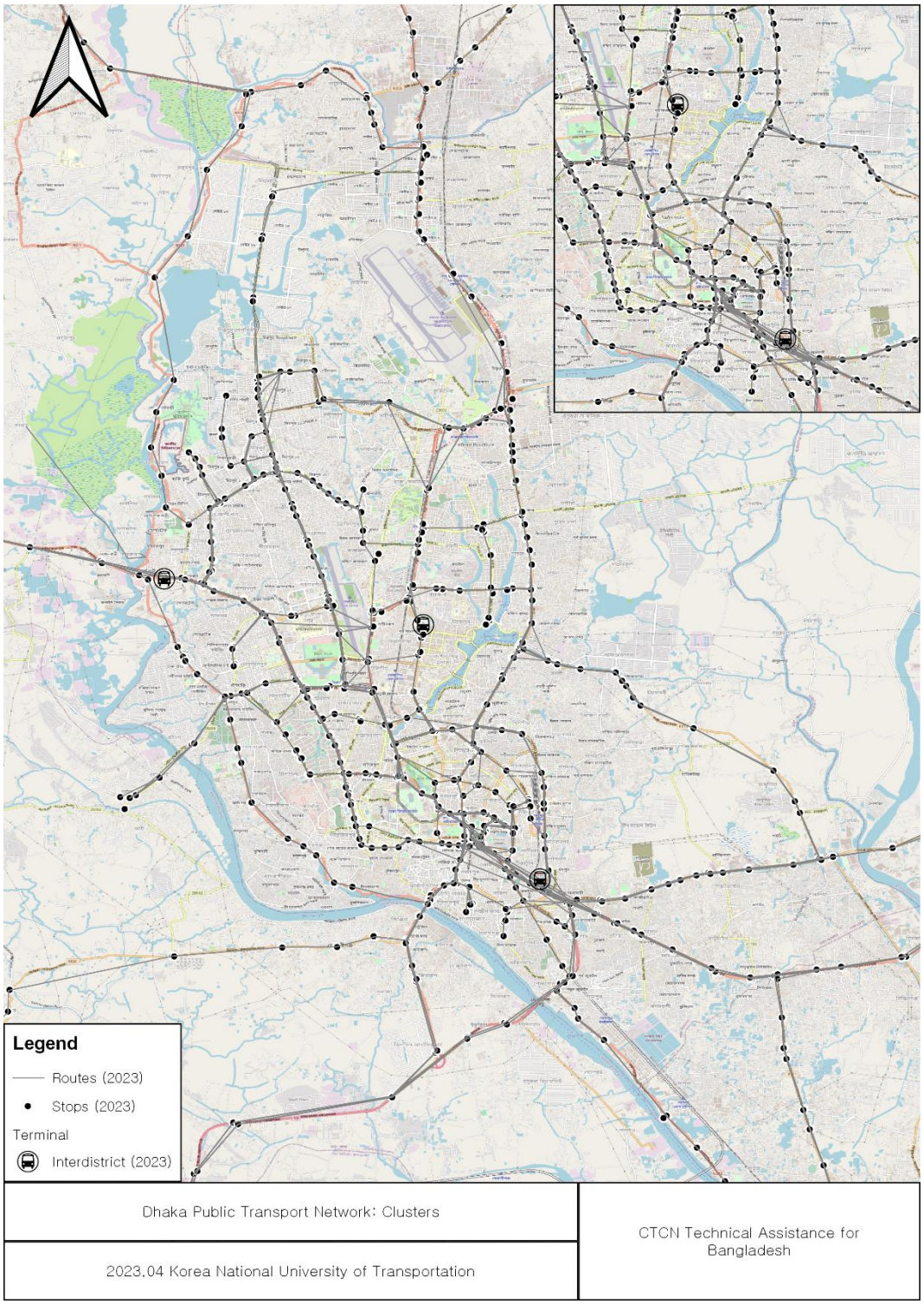
Figure 25: "Bus Stops" in Dhaka

Image sources: © 2023, Korea National University of Transportation or Creative Commons Licenses

4.20 The map on the following page depicts the current bus and rail public transport network, including the bus routes and stops, as of March 2023. Bus routes connect most major areas of the Dhaka metropolitan area, also extending into neighbouring jurisdictions. Further, the bus frequencies by corrdir are also presented in Figure 27 and Figure 28. The most frequent corridors generally converge in the CBD (Motijheel) area where a large proportion of bus routes start and end in. The Motijheel area is also where you will find the most “bus stops” with high densities also being observed in Banani, Mirpur-10, near Shyamoli (refer to Figure 29).

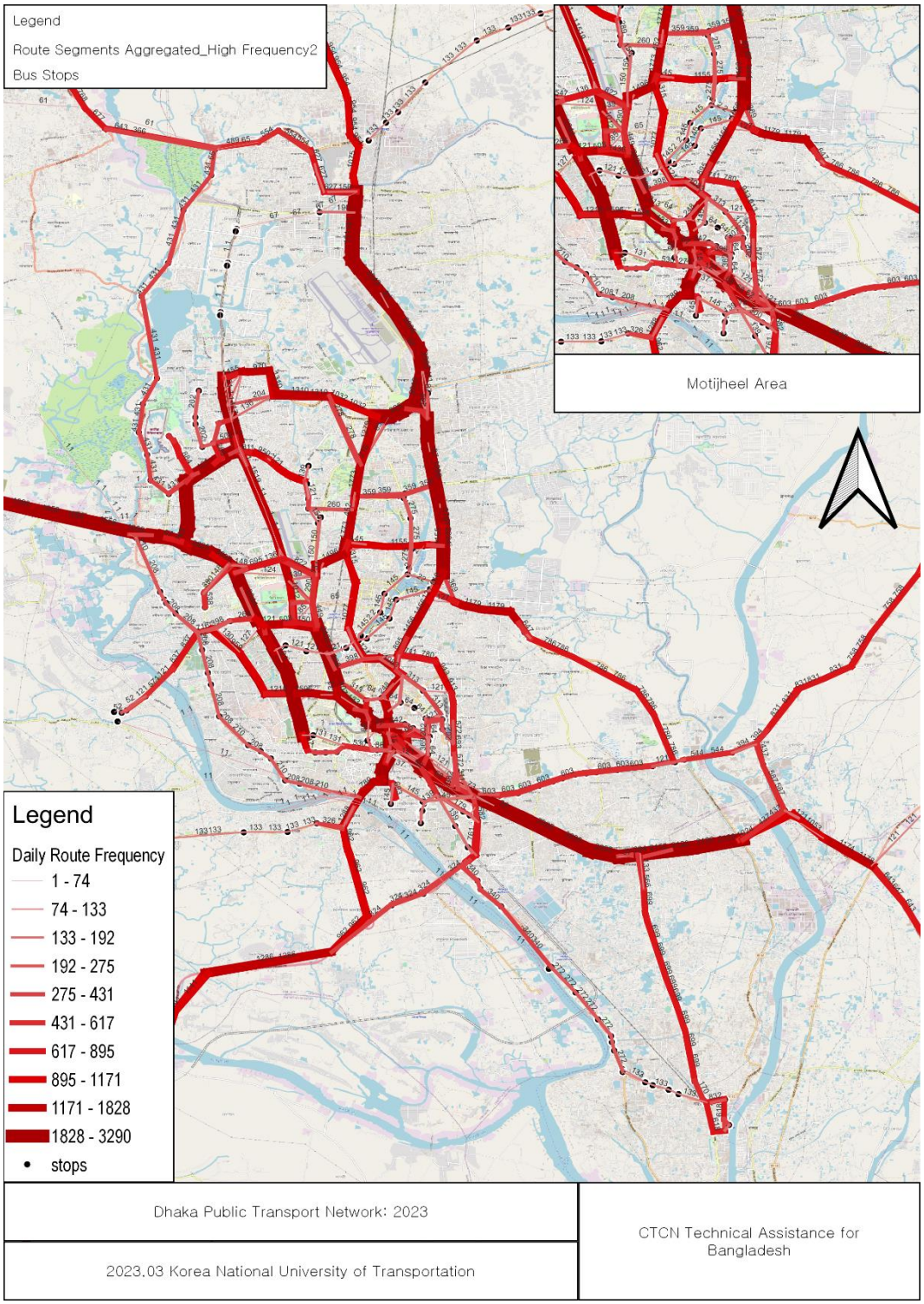
4.21 On some corridors there exists quite high route frequency, with frequencies as high as 3,000 buses per day. However, the majority of frequencies on specific corridors are lower than 1,200 per day (average of one bus every 1.5 minutes, higher during peak times).

Figure 26: Dhaka Public Transport Network (2023) – Routes and Coverage



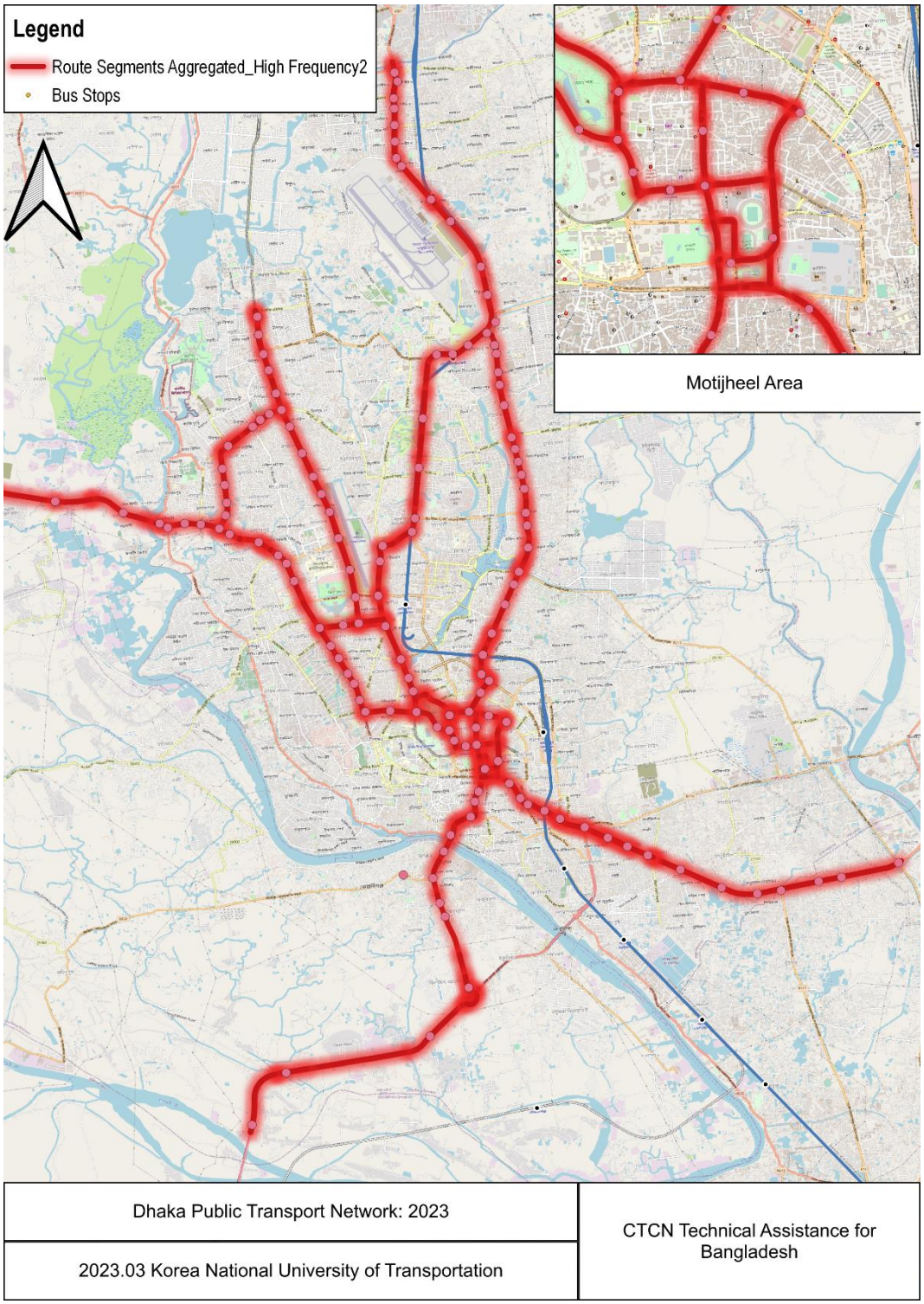
Data source: General Transit Feed Specification (GTFS), licensed from private entity

Figure 27: Dhaka Public Transport Network (2023) – Routes and Frequencies



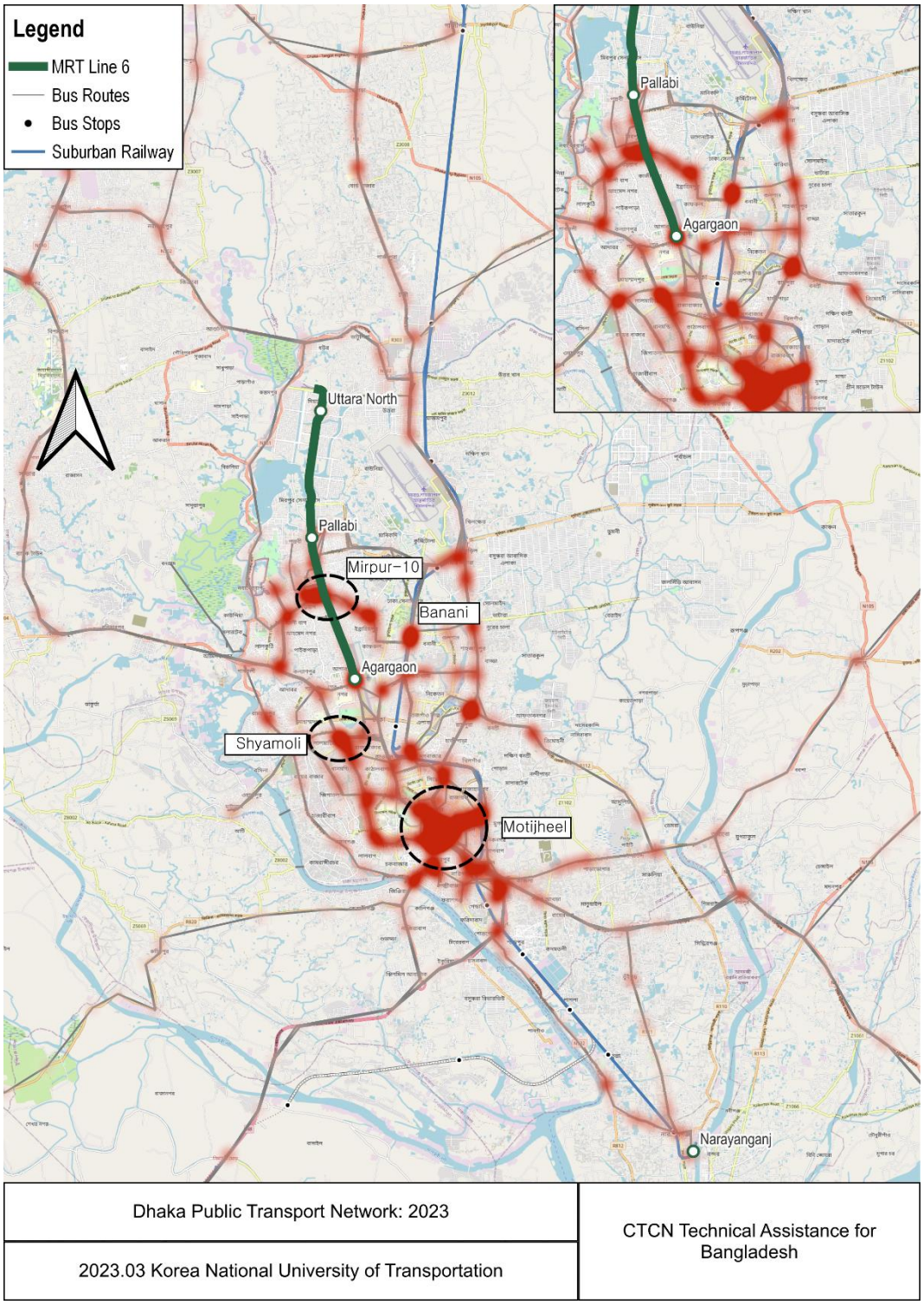
Data source: General Transit Feed Specification (GTFS), licensed from private entity

Figure 28: Dhaka Public Transport Network (2023) – Frequent Corridors



Data source: General Transit Feed Specification (GTFS), licensed from private entity

Figure 29: Dhaka Public Transport Network – "Bus Stop" Density

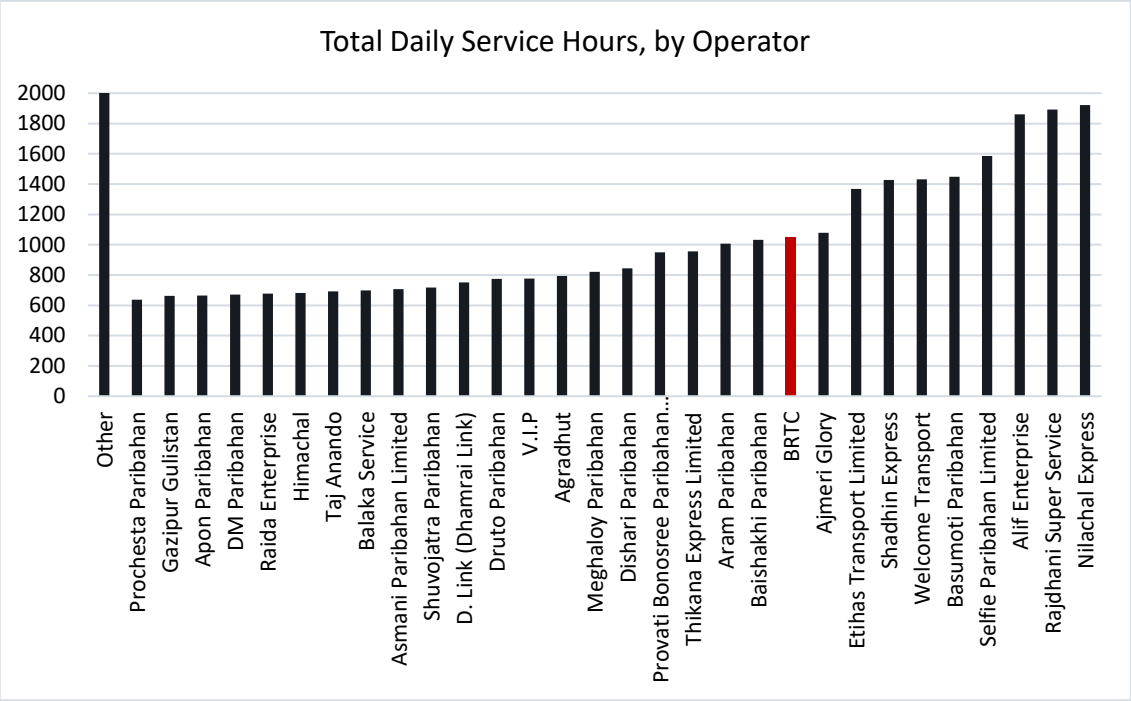


Data source: General Transit Feed Specification (GTFS), licensed from private entity

4.22 In Dhaka, there are many different private bus operators. One state-owned company, BRTC, does have a sizable fleet and service, but most routes, vehicles, and services hours are provided by the private sector. As of 2023 there are an estimated 128 operators of bus services in Dhaka. Many operators operate small fleets of just a few buses and routes, but there are some large ones too. Just 30 operators (or 23%) provide a total of 50% of all daily

service hours. The largest operators are Nilachal Express, followed by Radhaji Super Serivce and Alif Enterprises. BRTC, the state operator, is the 10th largest operators in Dhaka, refer to Figure 30.

Figure 30: Total Service Hours, by Operator



Data source: General Transit Feed Specification (GTFS), licensed from private entity

4.23 Together these operators operate 296 routes, most of which are bidirectional, the overall statistics for the cities' bus routes are shown below in Table 11.

Table 11: Dhaka's Bus Network Statistics (2023)

Figure	Value
Total routes (bi-directional)	296
Total corridors served	128
Total operators	127
Total daily trips	32,313
Total service hours	60,291
Estimated fleet *	Minimum 4,017

Data source: General Transit Feed Specification (GTFS), licensed from private entity

Fleet & Operators

4.24 A variety of bus types are operated in the Dhaka area. BRTC, the state-owned operator, operates several different bus types in their distinctive red and green livery, refer to Table 12 below. As of June 2022, BRTC operated 1,108 buses out of a total of 1,600 buses. Approximately 300 (or 27%) were operated in and around the Dhaka area. A significant portion of their buses are under repair or are beyond economic repair (BER). In Table 12 we summarize the various bus typologies that are typical in Dhaka, including those of private operators.

Table 12: Buses in Dhaka

Bus Type	Operator	Manufacturer	Image
Standard	BRTC	Pragati, others	
Articulated (not common any more)	BRTC	Volvo, others	
Double-decker	BRTC	Ashok-Leyland, others	
Highway coach	BRTC	Volvo, others	 .
Standard	Private	Many	 
Minibus	Private	Many	

Bus Type	Operator	Manufacturer	Image
			
Human hauler /laguna (miscellaneous vehicles that have been converted to transport humans) – **Banned in Dhaka since 2018**	Private	Tata, others	

Image Sources: BRTC; © 2023 Korea National University of Transportation; Creative Commons Licenses

4.25 Buses in Dhaka are generally in poor shape, inside and outside. Numerous studies of passenger satisfaction in Dhaka have found that passengers are generally unsatisfied with the conditions, service quality, and safety of buses in Dhaka, including those listed in Table 13 below.

Table 13: Summary of Dhaka Bus Quality Studies

Name of the Study	Year	Summary of Findings
Dhaka Structure Plan (2016 – 2035), Link	2015	… the present bus service is quite far below a level of satisfaction.
Analyzing Customer Satisfaction of Bus Service In Dhaka City, Link	2015	… more than half of the respondents believed that the present condition of bus service is unsatisfactory…. three [main] reasons of dissatisfaction of passengers' are unsafe driving practices, poor boarding and alighting facilities and lack of law enforcing agencies surveillance.
The Assessment of Customer Satisfaction on Public Transportation Services in Dhaka, Link	2017	… overall satisfaction with bus service quality was low. The study identified issues such as inadequate seating, long waiting times, and poor bus condition as major sources of dissatisfaction.
Attributes involving bus service quality in Dhaka City by discrete choice model, Link	2017	… [t]he result investigates that important service aspects such as mode of transport, reliability, travel time, availability of seat, cost, availability of female/disable/elderly people seat, cleanliness, overcrowding condition and safety are the important attributes
BRT in Metro Dhaka: Towards Achieving a Sustainable Urban Public Transport System, Hoque et al., Link	2016	Concluded that buses are generally considered unreliable, unsafe, and time consuming to reach the destination.
Assessment of Public Transport Services in Dhaka City: A Passenger Perspective, Link	2018	Passengers were dissatisfied with the quality of bus service in Dhaka. The study identified issues such as overcrowding, irregular service, and poor bus condition as major sources of dissatisfaction.

Name of the Study	Year	Summary of Findings
Analysing bus passengers' satisfaction in Dhaka using 2 discrete choice models **Link**	2018	results indicate that the inhabitants, as expected, are 11 dissatisfied with their bus services (less than 10% rated SQ as either excellent/good … service attributes such as comfort level and driver skills were found to be the most important contributors
Assessing Bus Service Quality in Dhaka City from the Perspective of Female Passengers, **Link**	2022	… safe and secured environment have the highest influence on the bus service quality in accordance with the perceptions of female passengers.

4.29 The current, typical, state of buses in Dhaka is shown below in Figure 31.

Figure 31: Interior of Private Bus

Conditions in the interior of a typical private bus

Money is exchanged on the bus from the ticket seller

Image source: © Korea National University of Transportation, 2023

Ridership & Number of Vehicles

4.30 In general, public transport data is not available for Dhaka. According to a variety of estimates from different studies, there are around 5,000 - 10,000 buses operating daily in Dhaka, probably around 7,000, which carry an estimated 5.5 – 6.5 million passengers daily. Estimates of the number of buses vary widely, see Table 14 below.

4.31 As part of the Bus Rationalization Committee and planning, it was proposed that all minibuses (estimated to be 3,152) would be purchased by the government, and replaced with 3,600 to 4,000 new (large) buses.

Table 14: Estimates of the Number of Buses in Dhaka

Source	Year	Value (Number of Buses)
Dhaka Bus Rationalization, early studies	2016	**14,000** (bus and minibus)
Dhaka North City Corporation Study	2016	**6,116**
		3,212 (full size)
		2,904 (minibus)
DTCA Bus Rationalization	2021	**9,021**
		3,152 (minibus)
		5,869 (full size)
Dhaka E-Ticketing Article	2023	**5,650**
DTCA Estimate, 2023 (verbal)	2023	**~7,000**
Dhaka GTFS (in operation in January 2023) – estimated from schedule data	2023	**4,017**

Payment/Ticketing

4.32 In general, bus customers pay their fare, with cash, to the money collector who roams the bus and also tries to attract additional customers when the buses are stopped. Starting in Fall 2022, E-Ticketing was added to numerous buses in Dhaka area. According to some reports of the Dhaka Road Transport Owners Corporation (DRTOC) "the e-ticketing system is now in use on 2,354 buses of 45 different companies in the capital" [5]. By 2023, there were many reports of some operators refusing to use the point-of-sale (POS) terminals, or POS terminals being broken, and reverting back to the old cash-only system. It was also reported that some bus operators were charging non-standard (higher) rates for some routes which were supposed to have standard/regulated fares.

Figure 32: Example of Bus Point of Sale (POS)

Image Source: bdnews24

Regulation and Bus Route Rationalization

4.33 The regulation of bus services is rather complex in Dhaka. A Route Permit is required to operate buses on certain route and must be approved by a 21-member committee, called the

[5] https://www.dhakatribune.com/business/2023/01/10/bus-owners-association-and-jatri-to-bring-more-bus-companies-under-e-ticketing-system

Regional Transport Committee (RTC). Members of the RTC board include the commissioner of the Dhaka Metropolitan Police (DMP). RTC has final say over whether the applicant is permitted to operate the route, or not, and must also meet certain minimum requirement for fleet and other items. In this manner routes were "planned" in a piecemeal/ad hoc fashion based on whichever operating company was interested in a new route.

4.34 However, other agencies which regulate bus transport in Dhaka include the Dhaka Transportation Coordination Authority (DTCA) and the Bangladesh Road Transport Authority (BRTA). Recently, the DTCA has spearheaded the Bus Route Rationalization project, which aims to reform the Dhaka bus system. The purpose of the project, is to

- bring order to the public transport network; and
- reduce congestion.

4.35 This will be accomplished by

- improving the management of the operating companies;
- updating the planned networks; and
- preparing an implementation plan for route rationalization and operation.

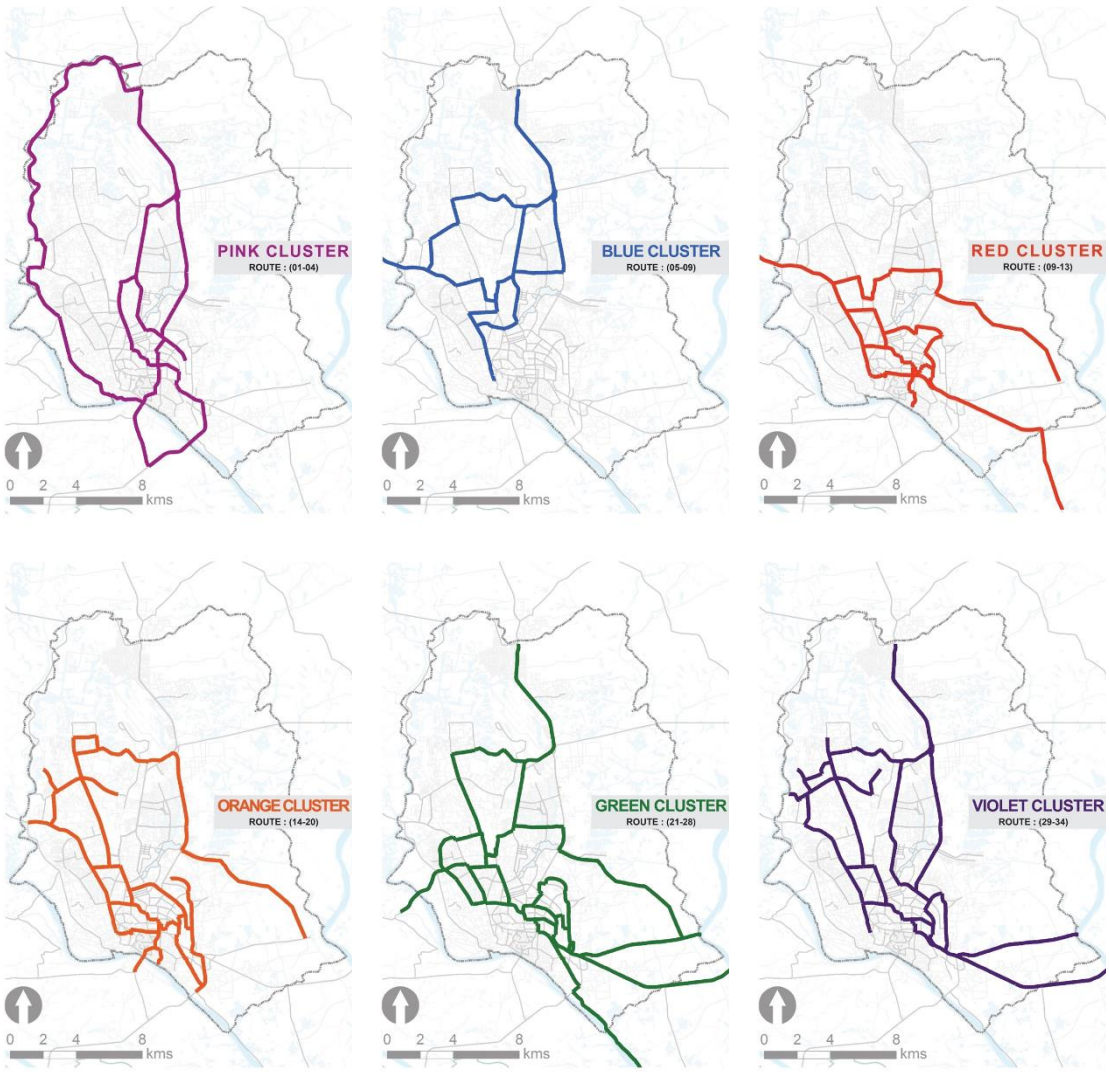
4.36 As such, a committee was formed to spearhead the project, which was started in 2018. This committee is made up of a variety of stakeholders including members from the City Corporations, BRTA, BRTC, Police, and crucially of the Bangladesh Road Transport Owners Association, and Workers Federation. So far, several new policy measures have been policy measures have been decided, including:

1. A move to centrally planned route arrangement, rather than ad hoc arrangements
2. Reduction of overlapping routes from 174 → 21 (now 42);
3. Reduction of bus companies to just 6 (now 22), based on partial ownership (shares) and based on market value of the buses;
4. Purchase of all minibuses by government
5. Vehicles older than 5 years old to be purchased by; the government;
6. Government to order buses on behalf of companies;
7. Provide government-backed loans at low interest rates for refabrication and purchase of new buses;
8. Repairs and purchase of new vehicles to be under management of government and the owners association
9. Try to implement an electronic fare collection system;
10. Take measures to construct bus stops with modern facilities
11. Construction of new bus depots, bus terminals, training centres, ;nd other matters, under the supervision of the City Corporation;
12. Development of 4 new inter-district bus terminals;
13. Bus departs at Abdullahpur, Mirpur, Basila, Fulbaria, and Kachampur to be urgently constructed.
14. **An agency or organization, to be established that will be responsible for the management and accountability of bus services in Dhaka – there should be participation of the Dhaka Road Transports Owners Association.**

Routes and Clusters

4.37 One of the main purposes of the rationalization project was to plan the future routes. DTCA has created groups of routes termed “clusters” which generally operate in a specific geographic area, and may operate out certain bus depots and terminals, or groups of bus depots. Six clusters (Pink, Blue, Red/Maroon, Orange, Green, and Violet), covering 42 (previously 34) routes, have been proposed, see below.

Figure 33 Six Proposed “Clusters” in Dhaka



Source: DTCA, 2023

Bus Depots and Terminals

4.38 In 2021, DTCA had completed the Bus Depot Feasibility project. The main objective of the project was to find suitable locations for inter-district and city bus terminals in Dhaka and its surrounding areas. From this work, an initial 10 sites were considered:

Table 15: Proposed Bus Terminals in Dhaka

Terminal	Type	Major Connection	Phase
Gabtoli	**Change to city bus**	MRT-5	Existing
Mak…	**Change to city bus**	MRT-1	Existing
Sayedabad	**Change to city bus**		Existing
Baghair	New Interdistrict	-	Phase 1 (2025)
Kanchpur South	New Interdistrict	MRT-2	Phase 1 (2025)
Gram Bhatulia	New Interdistrict	Circular Railway, Circular Waterway, MRT-6, MRT-4	Phase 1 (2025)
Bhulta	New Interdistrict	MRT-1	Phase 2 (2030+)
Hemayetpur	New Interdistrict	MRT-5 (North)	Phase 1 (2025)
Atibazar / Bhawal	**City bus (depot)**		Phase 1 (2025)
Kanchan	City bus (depot)	MRT-1	Phase 2 (2030+)
Gazipur	Future depot	BRT (3)	-
Baipal	Future depot	-	-

4.39 In this report, it is described that in the future, bus terminals should have passenger information displays (including apps and web services) that "keeps track of arrival and departure time and also informs about the bays used by each bus route", indicating that a Bus Information System (BIS) should eventually be implemented. Figure 34 and Figure 35 below show the locations of the rationalized routes as well as the bus terminal locations.

Figure 34: Map of Proposed Rationalized Routes & Bus Terminals

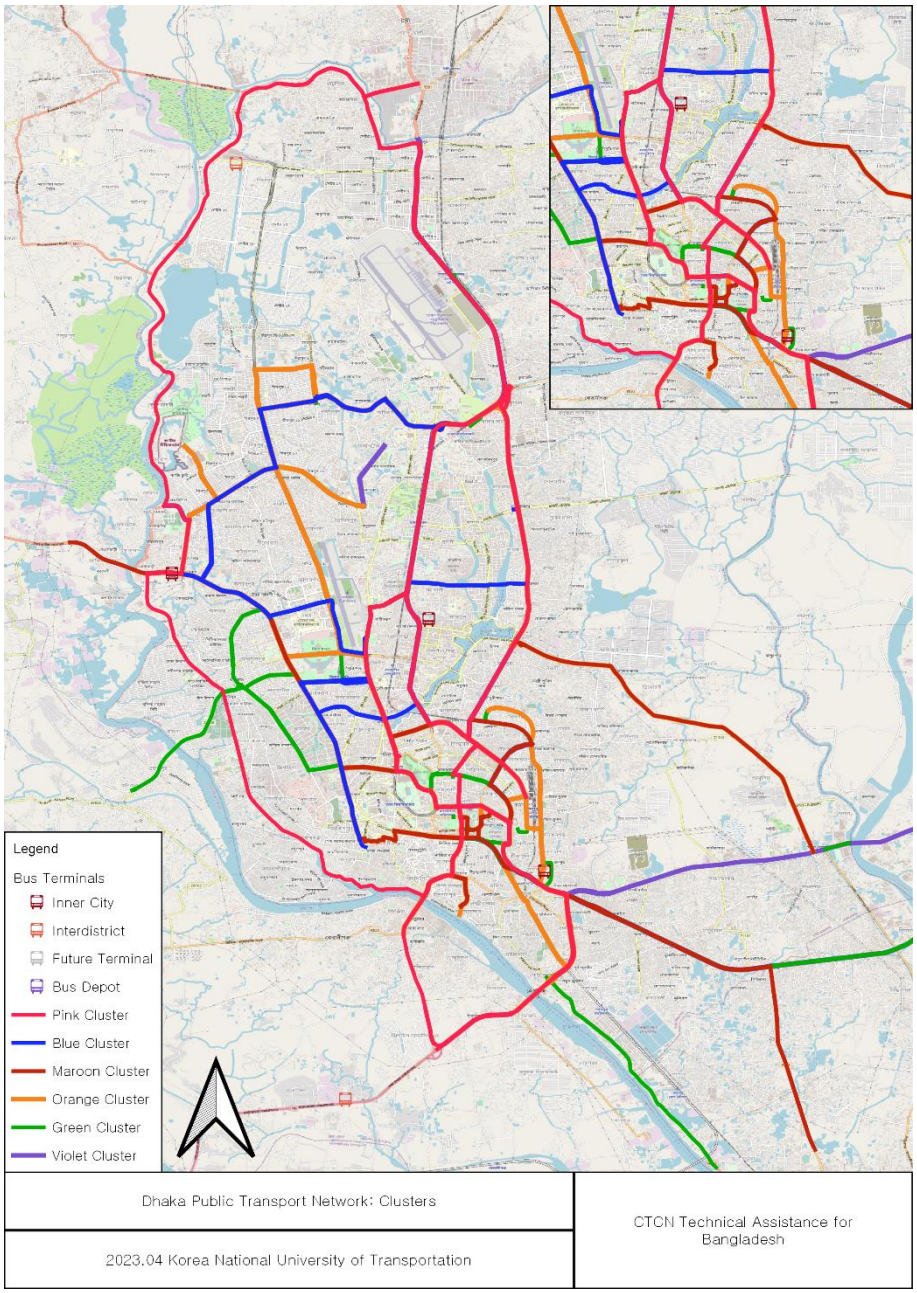
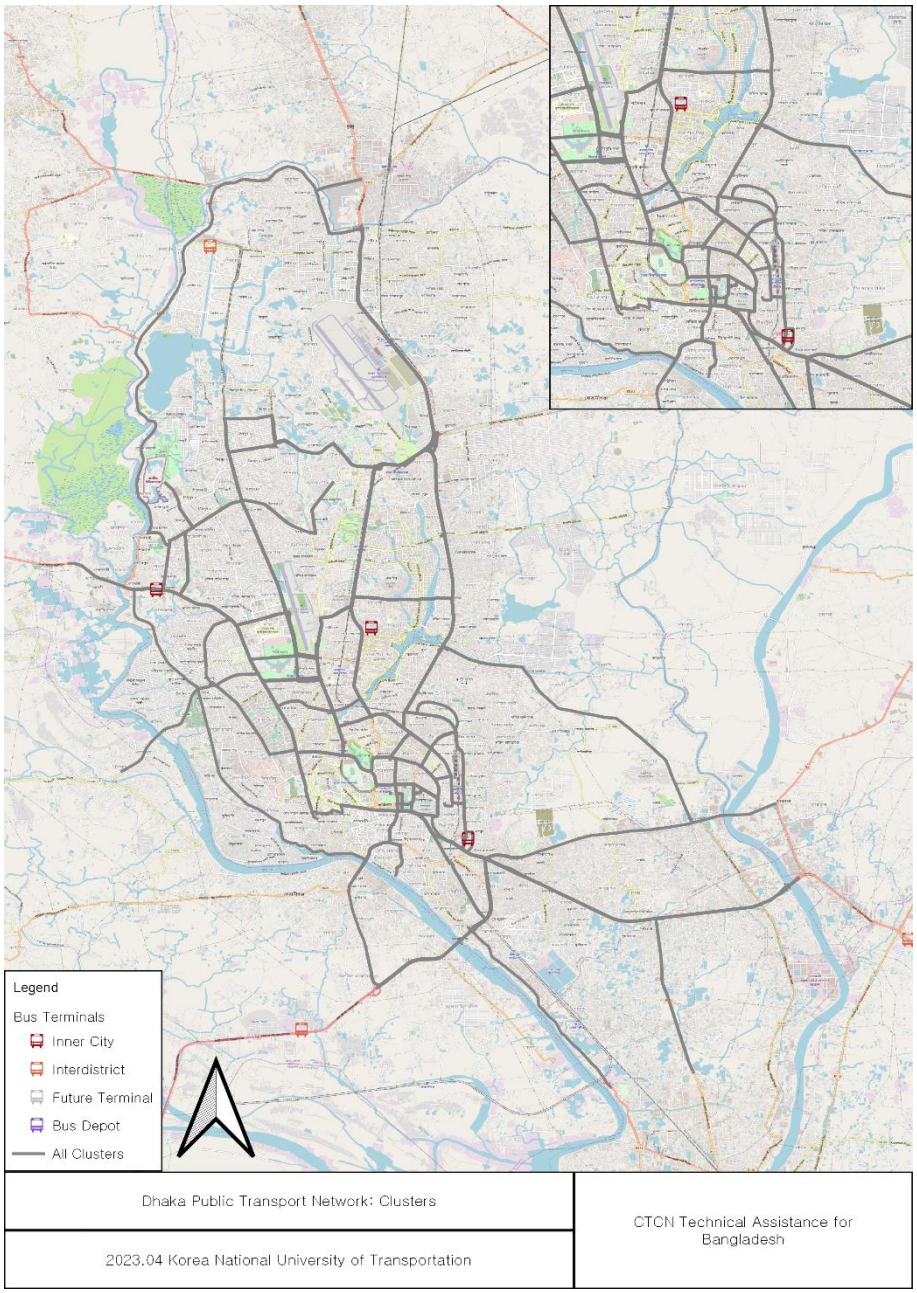


Figure 35: Map of Proposed Bus Terminals



BRTC (Bangladesh Road Transport Corporation)

4.40 BRTC is the state-owned public transportation system in Dhaka, Bangladesh. BRTC operates a fleet of buses that serve the city and its surrounding areas, providing a convenient and affordable mode of transportation for millions of commuters. The buses are equipped with modern amenities like air conditioning and comfortable seating arrangements, making the journey more pleasant for passengers.

4.41 However, BRTC buses in Dhaka often face criticism for their slow and unreliable services, as well as their poor maintenance and lack of safety measures. Overcrowding is a common issue, with passengers often seen hanging out of the doors or sitting on the roof of the bus. Despite these challenges, BRTC buses continue to be a vital part of the city's transportation network, connecting different parts of Dhaka and providing a vital lifeline for those who cannot afford

more expensive modes of transportation. As of 2023, BRTC operated 22 routes, see Table 16 below.

Table 16: BRTC Routes (Summary)

Route	From	To
1	Saidabad	Gabtoli
2	Azimpur	Jatrabari
3	Gabtoli	Mohakhali
4	Mohakhali	Narayanganj
5	Gabtoli	Sadarghat
6	Azimpur	Abdullahpur
7	Azimpur	Narayanganj
8	Uttara	Sadarghat
9	Azimpur	Azimpur
10	Narayanganj	Narayanganj
11	Azimpur	Uttara
12	Uttara	Badda
13	Azimpur	Badda
14	Azimpur	Beraid
15	Azimpur	Dhanmondi

Source: BRTC Website, 2023

Automatic Vehicle Location (AVL) & Computer-Aided Dispatch (CAD) Systems

4.42 There are no universally established automated vehicle locations (AVL), bus management systems (BMS), or other real-time passenger information (RTPI) systems that work across multiple operators in Dhaka. However, BRTC commissioned a Bangladeshi company called Impressive Securities, to develop an AVL for their fleet, which is referred to in Bangladesh as Vehicle Tracking System (VTS). The VTS is called the Safety GPS Tracker Service or just VTS.

4.43 BRTC Vehicle Tracking System (VTS) that allows to track the location vehicle in real-time using GPS technology. This is valuable tool for ensuring the safety and security of This service is provided by the BRTC in Bangladesh. BRTC has 239 buses in total and there is provision of this feature in every bus. For the operation of these buses there are 29 local routes and 197 intercity routes.

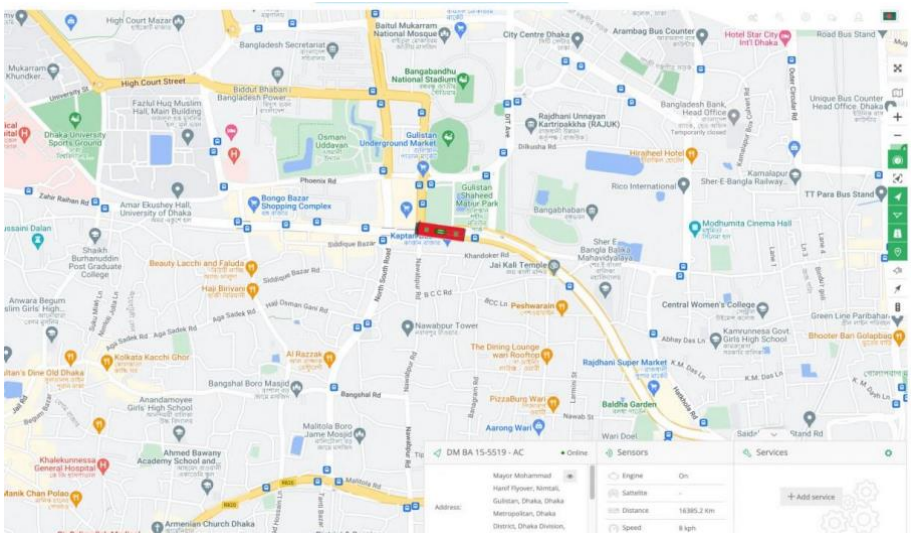
Figure 36: Realtime GPS Tracking

Sly	Depot Name	Division	Routes/Local	Routes/Inter-city
1	Mirpur	Dhaka	4	5
2	Kallyanpur	Dhaka	1	1
3	Motijheel	Dhaka	1	13
4	Joarshahara	Dhaka	5	4
5	Gabtoli	Dhaka	2	5
6	Mohammadpur	Dhaka	2	2
7	Jatrabari	Dhaka	3	4
8	Narayanganj	Dhaka	3	5
9	Gazipur	Dhaka	2	0
10	Narsingdi	Dhaka	3	7
11	Tungipara	Dhaka	0	17
12	Mymensingh	Mymensingh	0	6
13	Sylhet	Sylhet	0	9
14	Bogura	Bogura	0	18
15	Pabna	Bogura	0	16
16	Rangpur	Rangpur	0	14
17	Dinajpur	Rangpur	0	10
18	Cumilla	Chattogram	0	10
19	Sonapur	Chattogram	0	5
20	Chattogram	Chattogram	3	11
21	Khulna	Khulna	0	19
22	Barishal	Barishal	0	16
	Total		197	29

4.44 The main features of this service are,

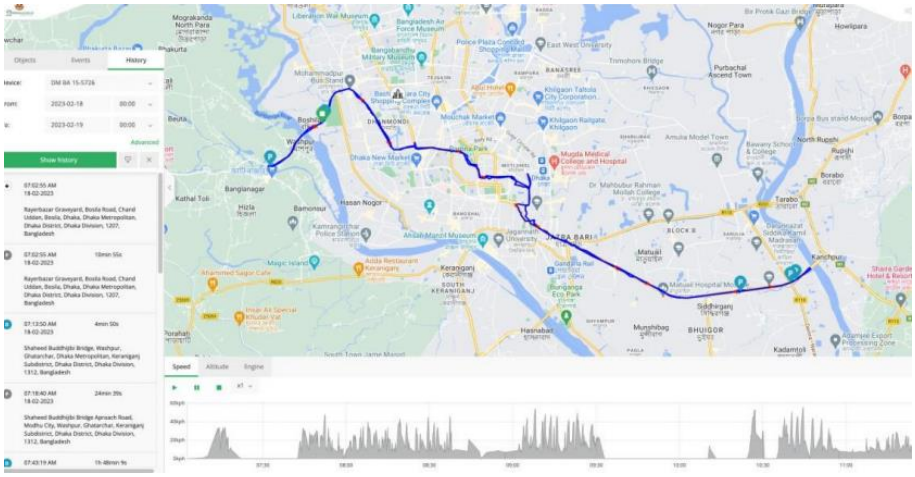
- **Realtime GNSS/GPS tracking:** With this feature, user can do tracking of their vehicle. Current speed of speed, engine status, address can be known from this service. User can monitor multiple vehicles from one account.

Figure 37: VTS Live Tracking



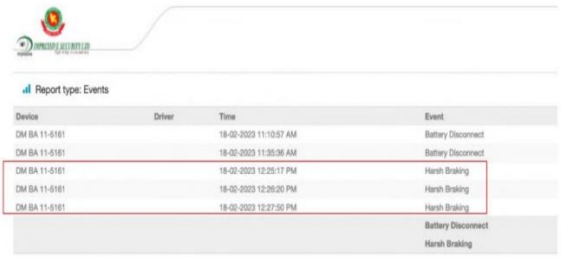
- **History Map Replay:** previous route history on animated map of the vehicle can be observed. Use can select the specified time and view also. History can be backed up up-to 3 years.

Figure 38: VTS Daily Routes Logs Summary

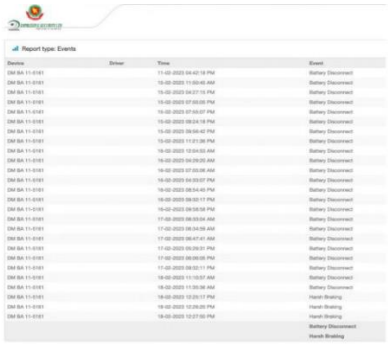


- **Data analysis**: all vehicle data, can be analyzed from the software and speed reports, drivers driving patterns can also be analyzed.
- **Engine on/off**: engine on/off can be operated by using app or web application and engine on/off features can be provided.
- **Violation alert**: This feature is related to the vehicle and passenger safety. If the driver crosses the limit of speed performs the harsh braking, harsh acceleration this event can be recorded with device, and time.

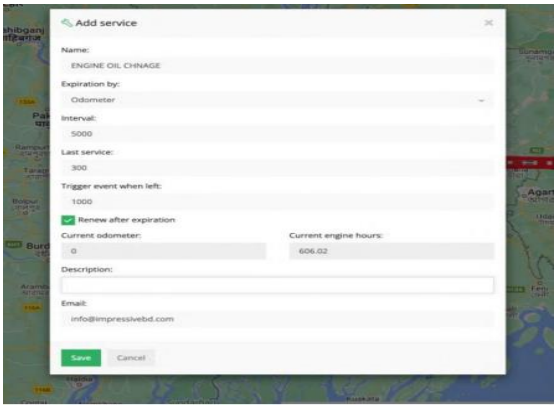
4.45 Other alerts like car maintenance BRTA paper renewal alert, Battery disconnection alert fuel filling alerts after certain duration are also provided.



Harsh Braking



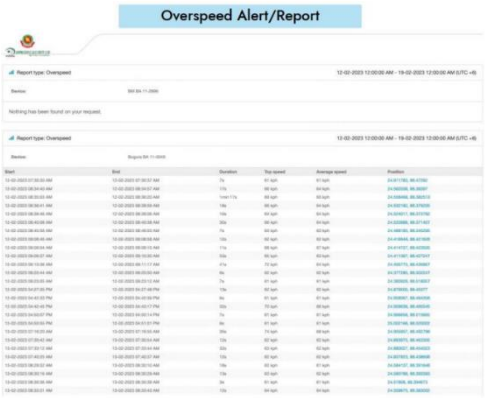
Battery Disconnect



Maintenance Alerts

Geofence Alerts

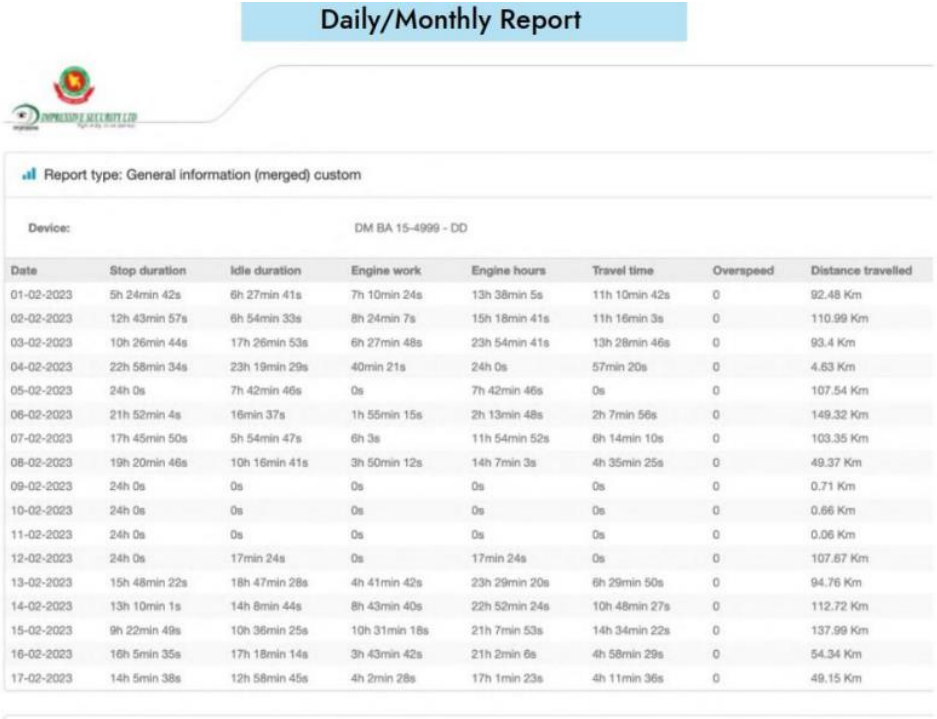
- **Unlimited geo-fences:** Geofencing is a common feature in GPS trackers designed for safety and security purposes. In this context, geofencing can be used to create virtual boundaries or "safe zones" around certain areas. Geofence can also be used to improve safety, as fleet managers can be alerted when a vehicle enters or exits a restricted area or a dangerous location.



- **Live traffic Update:** Live traffic update is a useful feature in safety GPS tracking services. this feature provides real-time traffic data information. This information is then processed and displayed on a map interface, which allows users to visualize traffic patterns and make informed decisions about their routes and helps to reduce the risk of delays or accidents.
- **Panic button:** panic button is an important safety feature in vehicle safety GPS tracking services. this feature allows drivers to quickly send an emergency alert to the monitoring center or fleet manager in case of an emergency or distress situation. This is useful in high-risk situations, such as accidents, carjacking, or medical emergencies, where the driver may not be able to call for help or communicate their location. In these situations, the panic button can provide a fast and reliable way to send an emergency alert and notify the relevant authorities or emergency services.
- **Share location:** This feature helps to share the real time location of the vehicle and enhance the proper communication in between drivers and their stakeholders.

Providing the real time location in safety GPS tracking service. This feature also allows users to view the historical location data of their vehicles. This can be useful for monitoring the movement of vehicles over time, tracking their usage patterns, and identifying areas for optimization and improvement.

- **Destination reaches notification:** this is a feature which alerts the drivers and fleet managers when vehicle reaches to the destination. This feature works by setting geofenced area around the destination or a specific location, and when the GPS tracking device detects that the vehicle has entered that area, it sends an automatic notification to the fleet manager or driver. The notification can be delivered via email, text message, or a mobile app, depending on the preferences of the user.
- **Trip Report**: This feature provides the trip reports to the drivers or fleet manager including the trip length, trip time, start time, route taken, stops made, and any incidents or events that occurred during the trip etc. after finishing the particular trip.



Daily/Monthly Report

Report type: General information (merged) custom

Device: DM BA 15-4999 - DD

Date	Stop duration	Idle duration	Engine work	Engine hours	Travel time	Overspeed	Distance travelled
01-02-2023	5h 24min 42s	6h 27min 41s	7h 10min 24s	13h 38min 5s	11h 10min 42s	0	92.48 Km
02-02-2023	12h 43min 57s	6h 54min 33s	8h 24min 7s	15h 18min 41s	11h 16min 3s	0	110.99 Km
03-02-2023	10h 26min 44s	17h 26min 53s	6h 27min 48s	23h 54min 41s	13h 28min 46s	0	93.4 Km
04-02-2023	22h 58min 34s	23h 19min 29s	40min 21s	24h 0s	57min 20s	0	4.63 Km
05-02-2023	24h 0s	7h 42min 46s	0s	7h 42min 46s	0s	0	107.54 Km
06-02-2023	21h 52min 4s	16min 37s	1h 55min 15s	2h 13min 48s	2h 7min 56s	0	149.32 Km
07-02-2023	17h 45min 50s	5h 54min 47s	6h 3s	11h 54min 52s	6h 14min 10s	0	103.35 Km
08-02-2023	19h 20min 46s	10h 16min 41s	3h 50min 12s	14h 7min 3s	4h 35min 25s	0	49.37 Km
09-02-2023	24h 0s	0s	0s	0s	0s	0	0.71 Km
10-02-2023	24h 0s	0s	0s	0s	0s	0	0.66 Km
11-02-2023	24h 0s	0s	0s	0s	0s	0	0.06 Km
12-02-2023	24h 0s	17min 24s	0s	17min 24s	0s	0	107.67 Km
13-02-2023	15h 48min 22s	18h 47min 28s	4h 41min 42s	23h 29min 20s	6h 29min 50s	0	94.76 Km
14-02-2023	13h 10min 1s	14h 8min 44s	8h 43min 40s	22h 52min 24s	10h 48min 27s	0	112.72 Km
15-02-2023	9h 22min 49s	10h 36min 25s	10h 31min 18s	21h 7min 53s	14h 34min 22s	0	137.99 Km
16-02-2023	16h 5min 35s	17h 18min 14s	3h 43min 42s	21h 2min 6s	4h 58min 29s	0	54.34 Km
17-02-2023	14h 5min 38s	12h 58min 45s	4h 2min 28s	17h 1min 23s	4h 11min 36s	0	49.15 Km

- **API Access**: API stands for Application Programming Interface, which allows third-party developers to integrate the GPS tracking service with other software applications or systems. This feature helps to developers by providing real time vehicle tracking data, location history, event notifications, and trip reports through web protocol location history, event notifications, and trip reports through web protocols such as HTTP or HTTPS and the developers can use the programming language to develop the applications or tools.
- **Email Report:** With this feature user can get vehicle report by email automatically.

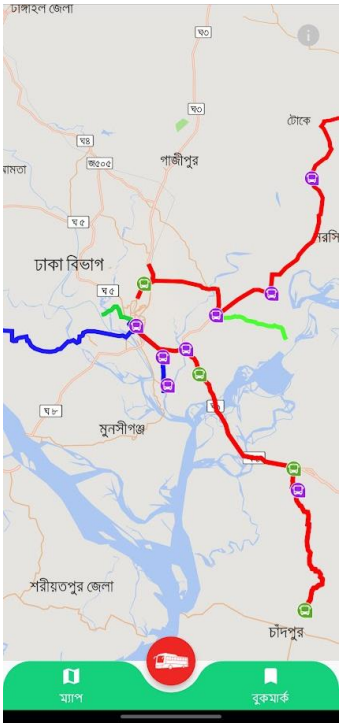
Information Dissemination

4.46 With the AVL installed and thus GPS data available, BRTC can supply some Real-Time Passenger Information (RTPI) for passengers, for an initial **6 routes**. These routes are all inter-city routes which are operated by BRTC. Customers can see the location of vehicles and their estimated arrival times along their route by utilization the BRTC Amader application (available for Android[6]). Although currently, six Dhaka intercity routes are available, BRTC plans to expand the service to all their routes, in the future. From the description

- Commuters can view all incoming or outgoing buses for a particular stop or his/her current location with this application. Users can also view all the buses operating on a particular route in real-time on map along with expected time of arrival (ETA).

4.47 The application has been downloaded between 5,000 – 10,000 times as of April 2023.

Table 17: BRTC Amader Application



[6] In Bangladesh, iOS has a 95% mobile phone marketshare.

Metro and Rail

4.48 The new MRT Line 6 of Dhaka, also known as the Dhaka Metro, is a highly anticipated addition to the city's public transportation system. With a total length of approximately 22 kilometers, this new metro line will connect the northern and southern parts of the city, providing residents with a fast and convenient mode of transportation. The line is designed to have 22 stations, with a few elevated stations and the majority underground.

4.49 As of January 2023, the MRT Line-6 is operating from Uttara North to Agargaon, a total of about 11.7 km of elevated or underground track. In total, 128 km of grade-separated metro are planned for the Dhaka metropolitan area, to be completed by 20230. However, not all lines are fully funded or under construction.

Table 18: Agargaon Station (MRT Line 6)

Figure 39: Dhaka Metro Car (Agargaon Station)

4.50 One of the key features of the Dhaka Metro is its modern infrastructure, which has been designed to meet international standards. The metro uses Japanese-made Kawasaki trainsets and has half-height platform screen doors, the type that are common in Japan. The trains are equipped with the latest technology, including real-time information displays and automated

systems for ticketing and passenger management. This will provide passengers with a smooth and efficient travel experience. In addition, the metro line will be fully air-conditioned, making it a comfortable option for passengers during the hot and humid summers of Dhaka.

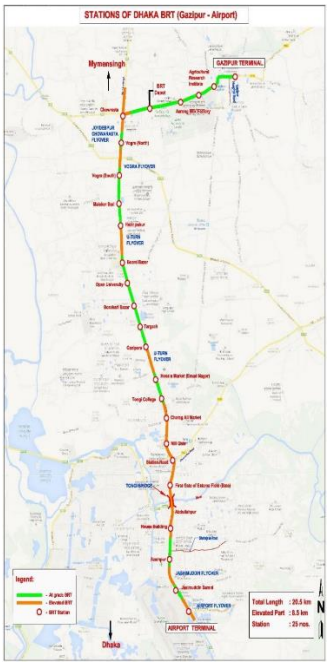
Bus Rapid Transit (BRT)

4.51 First proposed in 2012, the first Bus Rapid Transit (BRT) line for Dhaka will connect from Gazipur to Dhaka Airport, entirely on an elevated, dedicated roadway, known as BRT Line 3. The BRT will be around 20.2 km long with 25 stations. The BRT is planned to be fully segregated from general purpose lanes, with proper BRT stations including platform screen doors, passenger information and other amenities.

4.52 Approximately 130 buses will be used on the BRT system which features platforms, dedicated stations. BRTC will initially be contracted to run the system, with a private operator expected to eventually take over once the service matures. The total cost of the project, as of 2022, was estimated at Tk 4,268.3 crore ($402.38 million USD). The project was designed, and partially funded through the Asia Development Bank (ADB).

4.53 The BRT project is estimated to be complete in 2023 or 2024, however its opening date has been delayed many times in the past.

Figure 40: Dhaka BRT Stations (Gazipur - Airport)



Data Source: Dhaka BRT, Dhaka Rapid Transit Company Ltd.

4.54 Dhaka BRT has been described as having numerous ITS features including some form of real-time tracking, and digital signage which will display arrival times. In a recent procurement of 130 rigid, air-conditioned buses, there was no mention of ITS features. Indeed, it is unclear which, if any systems, have been planned for the Dhaka BRT based on available data.

Future Plans for Mass Transit

4.55 Mass transit projects are continuing to be built and funded in the Dhaka metropolitan area. As of 2023, MRT Line 6 is complete from Uttara (North) to Agargaon, and in each subsequent year new extensions and lines will continue to open, refer to Table 19 below and maps (Figure 43 to Figure 46) on the following pages.

Table 19: Funded and Planned MRT Lines

No.	MRT Line Name	Stage	Year (Probable)	Status	Length
1.	MRT Line-6 (Uttara – Agargaon)	1	2023	Complete	Elevated
2.	MRT Line-6 (Agargaon – Motijheel)		2023/2024	Under construction	Elevated
3.	BRT Line 3	1	2023	Under Construction	Elevated (BRT)
4.	MRT Line-6 (Motijheel – Kamalapur)		2026	Under construction	Elevated
5.	MRT Line-1	2	2026	Under construction	Underground
6.	MRT Line-5: Northern Route		2028	Approved/funded	Elevated & Underground
7.	MRT Line-5: Southern Route	3	2030	Approved/partially funded	Elevated
8.	MRT Line-2			Approved/unfunded	Elevated
9.	MRT Line-4			Approved/unfunded	Elevated
10.	MRT Line-6 (Uttara – Tongi)	4	?	Proposed	?
11.	Dhaka Circular Railway	4	?	Proposed	?

In 2016, the Japan International Cooperator Agency (JICA) undertook a transport modelling and forecasting exercise for the planned rapid transit lines in Dhaka, see Table 20, Figure 41, and Source: JICA Report, 2016

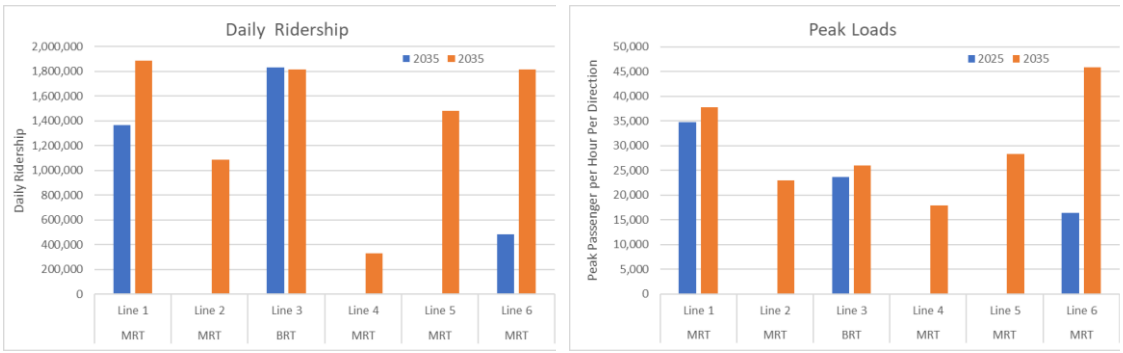
4.56 Figure 42. According to these forecasts, the Dhaka rapid transit lines will be amongst the busiest in the world, with average daily ridership in 2035 of up to almost 2 million passengers on some lines and daily ridership of 6.6 million. Additionally, the BRT (Line 3) system is also forecasted to be amongst the busiest in the world.

Table 20: Forecasted Ridership on Rapid Transit Lines in Dhaka

Line		2025 Daily Ridership	2025 PPHPD	2035 Daily Ridership	2035 PPHPD
MRT	Line 1	1,365,800	34,740	1,887,200	37,770
MRT	Line 2	-	-	1,084,600	23,020
BRT	Line 3	1,832,700	23,730	1,814,100	25,960
MRT	Line 4	-	-	332,000	17,930
MRT	Line 5	-	-	1,478,600	28,340
MRT	Line 6	483,200	16,440	1,816,700	45,860
Total		**3,681,700**		**8,413,200**	

Source: JICA Report, 2016

Figure 41: Forecasted Daily Ridership and Peak Load



Source: JICA Report, 2016

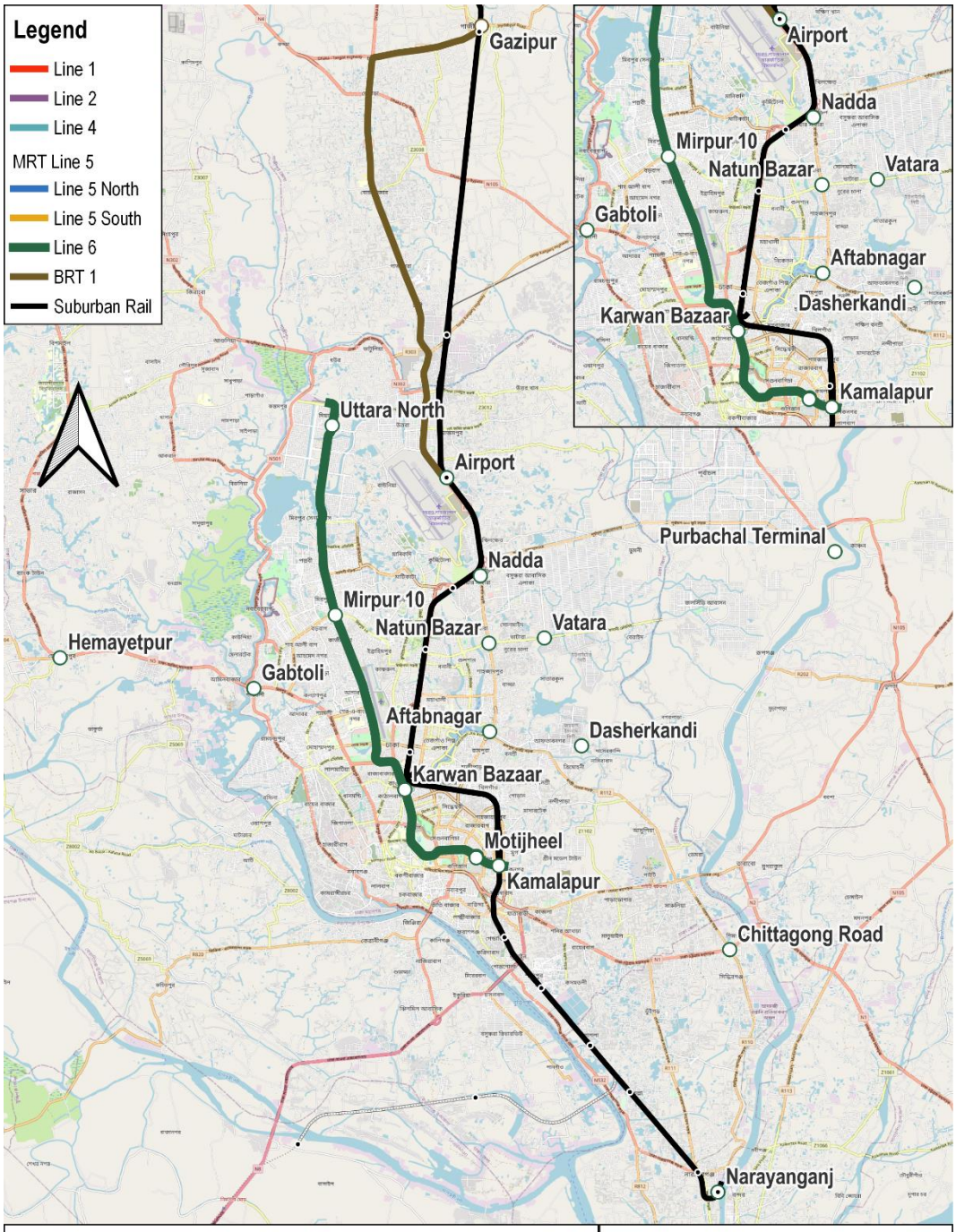
Figure 42: Forecasted Peak Loads (JICA, 2016)

2025 Master Plan

2035 Master Plan

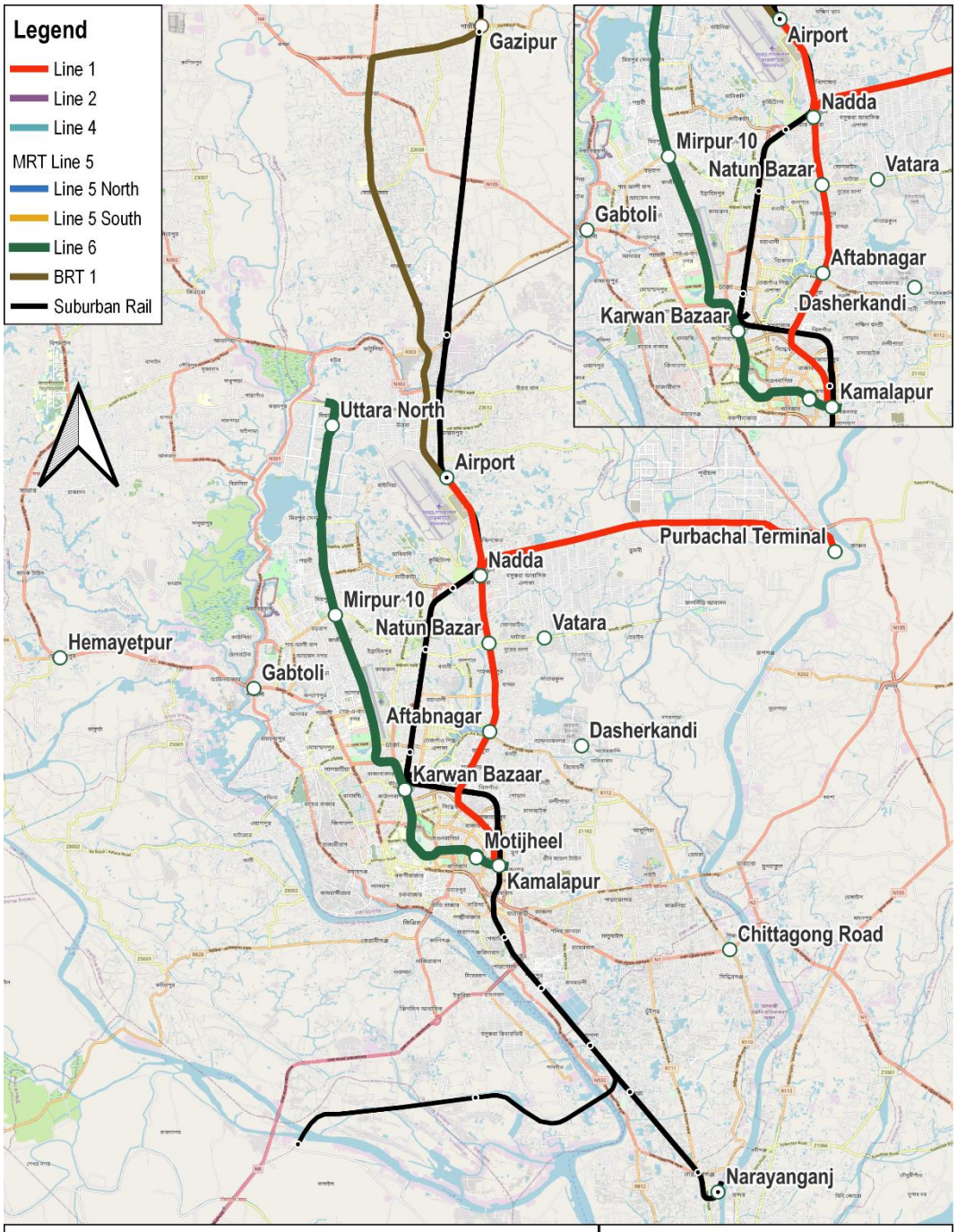
Source: JICA Report, 2016

Figure 43: Dhaka Mass Transit Network, 2024 (Approved)



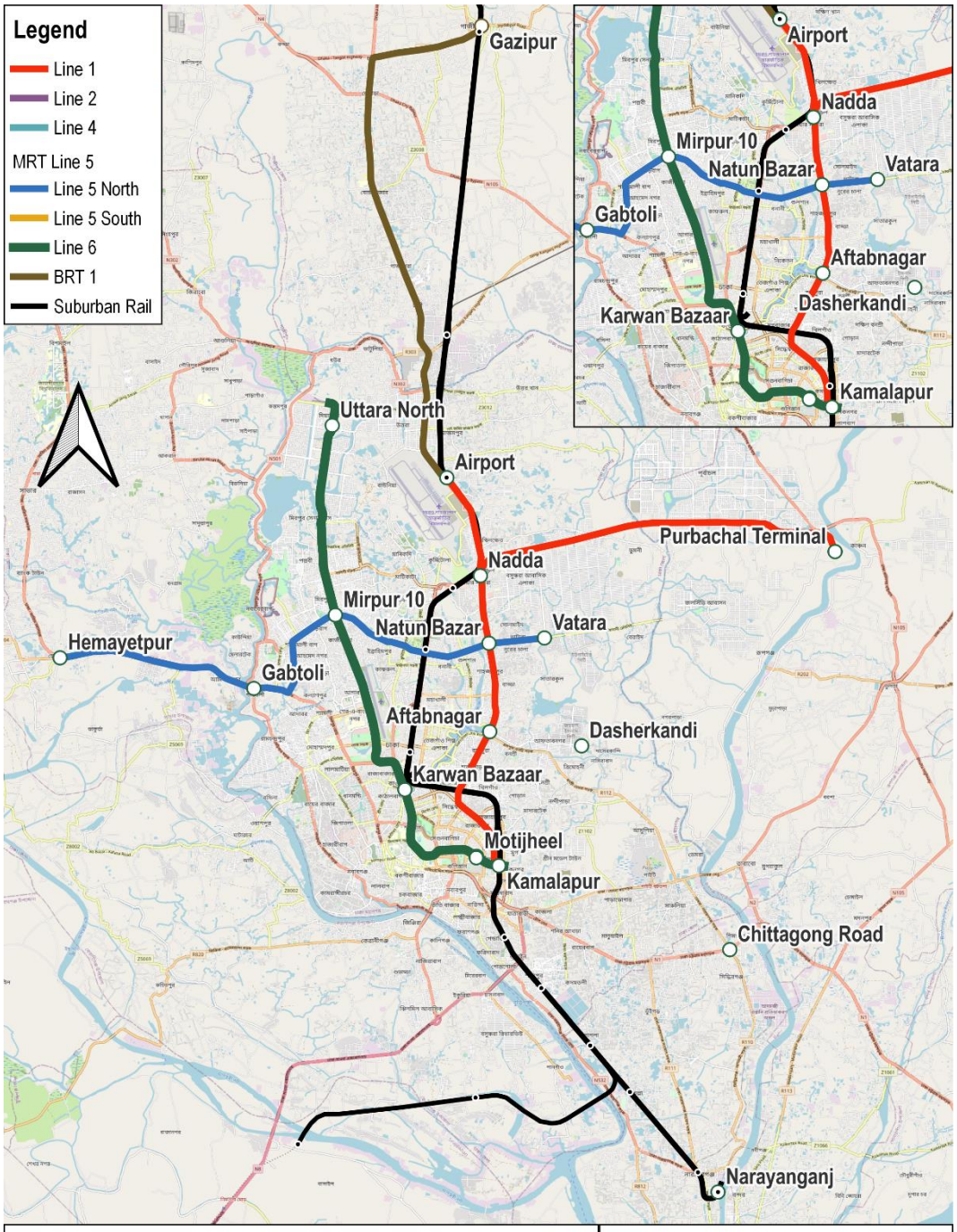
Dhaka Public Transport Network: 2024	CTCN Technical Assistance for Bangladesh
2023.03 Korea National University of Transportation	

Figure 44: Dhaka Mass Transit Network, 2026 (Approved)



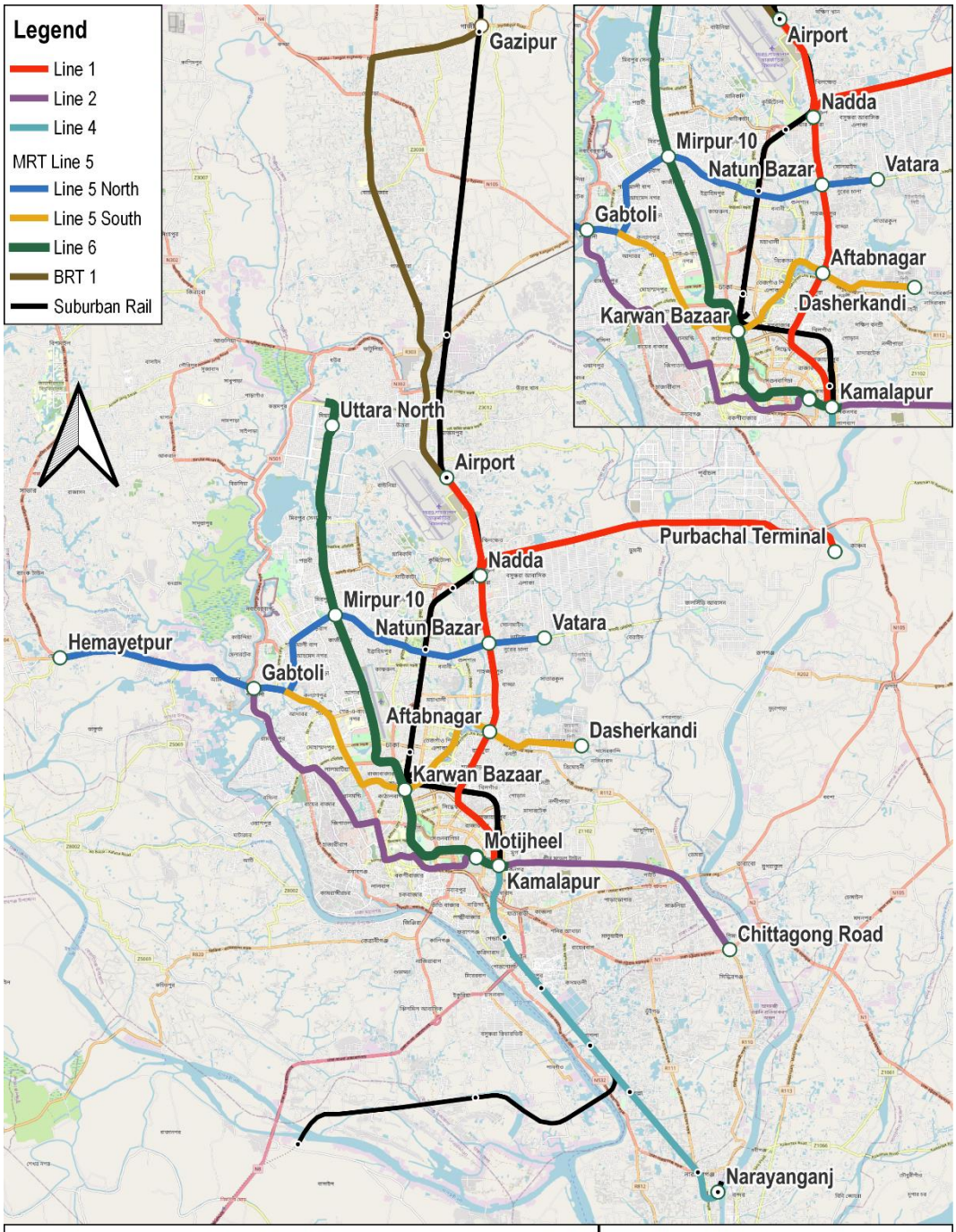
Dhaka Public Transport Network: 2026	CTCN Technical Assistance for Bangladesh
2023.03 Korea National University of Transportation	

Figure 45: Dhaka Mass Transit Network, 2028 (Approved)



Dhaka Public Transport Network: 2028	CTCN Technical Assistance for Bangladesh
2023.03 Korea National University of Transportation	

Figure 46: Dhaka Mass Transit Network, 2030 (Approved)



Dhaka Public Transport Network: 2030	CTCN Technical Assistance for Bangladesh
2023.03 Korea National University of Transportation	

Rickshaws & Autorickshaws (CNGs)

Rickshaws

4.57 Dhaka, being a large and densely populated city, has a variety of transportation options to choose from, including rickshaws and CNGs. Rickshaws are a popular mode of transportation in the city and are mainly used for travelling short distances within the city. They are cheap, easily available and can navigate through the city's narrow lanes, making them a convenient option for the locals and tourists alike. However, safety concerns such as possible theft and falling out should be kept in mind while using them. Rickshaws are extremely popular in Dhaka. There are no accurate numbers for the number of rickshaws in the Dhaka, but many estimate that are as many as 400,000 – 600,000 rickshaws in Dhaka. Perhaps millions of Dhakabashis use rickshaws every day.

Figure 47: Examples of Rickshaws

Image source: Creative commons licenses

4.58 Rickshaws are also often used as first-mile/last-mile rides in Dhaka. The cost of using a rickshaw is variable, but the following is a rough guide:

- Short journey within a few kilometers: 20-30 BDT
- Longer journey: up to 50 BDT
- Rush hour and night fares: higher

4.59 Rickshaws are often blamed for causing traffic congestion in Dhaka as they are slow moving and tend to move around the street haphazardly. Rickshaws are banned on major corridors and roads, but this is rarely enforced in practice.

Autorickshaws

4.60 CNGs, or compressed natural gas vehicles, are also a popular mode of transportation in Dhaka. The government regulates CNGs, making them a safer option compared to other modes of transportation]. They are marginally more comfortable than rickshaws and can travel a longer distance compared to them. However, their cost is higher than rickshaws, and they can be affected by the city's traffic congestion, making the journey times longer.

Figure 48: Examples of Autorickshaws

Image source: Creative commons licenses

4.61 CNG prices are technically regulated in Dhaka, and as of 2023 are set to 12 Taka (0.11 IUSD) per kilometre, but in reality, must be haggled with the driver. The market rate for CNG trips may be around 40 – 50 Taka for a relatively short trip.

4.62 There are an estimated 15,000 CNG autorickshaws in Dhaka as of late 2022.

Control Information

Prepared by	**Prepared for**
KNUT Daehak-ro 50, Chungju-si, Chungcheongbuk-do Republic of Korea	Ministry of Environment, People's Republic of Bangladesh Population and Health Building, E/16, Paribesh Bhavan, Sayed Mahbub Morshed Rd, Dhaka 1207
Author/originator	**Reviewer/approver**
Devon Farmer (KNUT)	Hyun Kim (KNUT)
Other contributors	**Distribution**
Jaecheol Kim (KNUT)	
Version control/issue number	**Date**
1.0	December 22, 2022