

## A Comprehensive Project Analysis: A Selected Case

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### I. INTRODUCTION

**Overview :** The **Dhaka Metrorail** project is a critical development in Bangladesh's quest for sustainable urban transportation. Dhaka, the capital city, faces immense traffic congestion, pollution, and inadequate public transport systems. The introduction of the metro rail system aims to alleviate these issues by providing an efficient, reliable, and eco-friendly mode of transportation. This project, the first of its kind in Bangladesh, has been developed with the collaboration of the **Bangladesh government** and international entities, primarily **Japan International Cooperation Agency (JICA)**.

In this section, the report will outline the objectives, scope, and background of the project, providing a clear understanding of the problem it seeks to address and its broader significance. The importance of modernizing Dhaka's transport system cannot be overstated, as it not only improves quality of life but also drives economic growth by enhancing productivity and reducing pollution.

**Vision :** The vision of the Dhaka Metro is to provide a modern, efficient, and sustainable urban transportation system that helps reduce traffic congestion and promotes environmental sustainability in Dhaka.

**Mission :** The mission focuses on improving public transport accessibility, ensuring safety and reliability, and integrating the metro system with other modes of transportation to provide a seamless travel experience for Dhaka's growing population.

**Values :** The values include environmental responsibility, customer-centric service, innovation in transport solutions, and promoting economic development through improved infrastructure. The project also aims to create employment and contribute to the empowerment of women, with provisions for gender equality in workforce participation.

#### Goals:

- Economic Impact:** The metro rail system is expected to significantly reduce travel time, improve air quality, and boost economic activity by reducing traffic-related losses.
- Environmental Benefits:** By offering a reliable alternative to private cars and buses, the metro is expected to cut down pollution and energy consumption.
- Social Benefits:** It aims to provide equal access to modern transport for all, contributing to social inclusion and reducing the economic burden of traffic congestion.

**Need of the Project :** Traffic jam causes massive economic loss in Bangladesh. According to a BRAC Institute of Governance and Development study, the average speed of vehicles on Dhaka's roads in 2004 was about 21 (21.2 km/h), but it dropped to 6 (6.8 km/h) in 2015. It is anticipated that implementation of MRT would play an important role in the country's economic growth by reducing travel time and transforming people's lifestyles as well as improving productive time without any strain. This will also provide multi-faceted benefits to the residents of Dhaka.

### II. MAIN DISCUSSIONS

**Project Background and Timeline :** The **Dhaka Metrorail Project** was conceptualized as part of the **Strategic Transport Plan (STP)**. The project focuses on the development of **MRT Line 6**, which spans from **Uttara to Motijheel**, covering a distance of **21.6 km** with **16 stations**. This line was chosen for its strategic importance in connecting key areas of the city, especially those suffering from heavy traffic congestion.

- 2012:** The project was first proposed.
- 2016:** Construction began with **JICA** funding 75% of the cost, and the Bangladesh government covering the remaining 25%.
- December 2022:** The first section from **Uttara to Agargaon** was inaugurated, and full operations are expected to commence by **December 2024**.

The development of this project required careful planning, including land acquisition, engineering design, procurement of trains, and setting up of the necessary infrastructure.

**Planning :** When construction commenced in 2016, the Metro Rail was expected to open by the end of 2019. By 2018, this expectation was still held to, but by 2019, completion of phase one was delayed to December 2021. In 2018, the second phase was expected to be complete by December 2020. Eventually, these dates were pushed back, with phase one opening in 2022 and phase two expected in 2023. The main reason for the delays from 2020 to 2022 was the COVID-19 pandemic.

**Financial Structure and Funding Sources :** The total cost of the project was estimated at approximately Tk220 billion (about \$2.6 billion USD). This sum was funded through a mix of low-interest loans from JICA and contributions from the Bangladesh government. The financial structure reflects the scale of the project and the high cost of urban transportation infrastructure.

**Cost and length changes :** Originally, the project cost was Tk 219,850 million but it was later increased by Tk 114,870 million to Tk 334,720 million, although the full Project is not yet completed. The first route, originally projected to start from Uttara, a northern area of Dhaka, to Sayedabad, in the south of the capital, was eventually extended north to Uttara and truncated south to Motijheel. The original length which was 20.10 km (12.49 mi) has been increased by 1.16 km (0.72 mi) to 21.26 km (13.21 mi). It was planned to have 16 stations originally but it has been increased to 17 stations.

**Misconceptions :** The project was originally reported to be a 27 km (17 mi) underground metro rail line. It was later confirmed to be an elevated and underground metro rail project. In 2014, it was reported that 56 trains would run on the metro system. It was confirmed that 24 vehicles would run on the MRT Line-6. It was planned to have six lines.

**Trial runs :** MRT Line-6's train made its first run on 29 August 2021. It traveled from Diabari Depot to Mirpur 12. It successfully made its second run on 29 November 2021. It traveled from Uttara to Mirpur 10. The line's train made its longest trial run on 12 December 2021. It traveled from Uttara to Agargaon. The train ran for after inauguration has been run 4 stations along with Mirpur to Agargaon station after several months other stations are open 1.3 km (7.0 mi). It ran at 100 km/h (62 mph) for 9 km (5.6 mi) and ran at 15–20 km (9.3–12.4 mi) for the rest.

#### **Operational Details**

- **Technology:** The Dhaka Metrorail system employs state-of-the-art technology, with fully automated, electric trains.
- **Stations:** The metro will have **16 stations**, equipped with modern facilities, including escalators, elevators, and real-time information displays for passengers.
- **Ticketing System:** A modern, automated ticketing system based on **contactless smart cards** ensures a smooth and efficient passenger experience.  
The project will also integrate with existing transport systems, including buses and rickshaws, to provide seamless connectivity for commuters.

#### **Key Features**

- **Advanced Infrastructure:**  
Elevated tracks minimize land acquisition issues while ensuring the metro system integrates seamlessly with existing urban layouts.
- **Modern Trains:**  
The metro trains are electric-powered, air-conditioned, and equipped with automated systems, including real-time monitoring and security features.
- **Accessibility:**  
Stations are designed to be inclusive, with elevators, ramps, and tactile paving for people with disabilities.
- **Safety and Technology:**  
The system employs advanced signaling and communication technology, ensuring passenger safety and operational efficiency.

#### **Challenges Faced**

**Throughout the project's development, several challenges arose:**

- **Land Acquisition:** Securing land in densely populated areas of Dhaka led to delays and additional costs. This issue was compounded by legal hurdles and political challenges.
- **Public Resistance:** Initially, the public was skeptical about the effectiveness of the metro system, especially regarding fare affordability.
- **Environmental Concerns:** Construction in busy urban areas posed environmental challenges, such as noise and air pollution, which were managed through mitigation strategies.
- **Pandemic Disruptions:** The COVID-19 pandemic delayed construction due to restrictions on workforce availability and disruptions in the supply chain.

**Impact Analysis**

**Social Impact**

**The Dhaka Metrorail has a transformative social impact:**

- **Time Savings:** Commuters now save significant amounts of time, especially those traveling long distances. The metro line offers an alternative to the city's notoriously congested roads, making travel more predictable and efficient.
- **Improved Accessibility:** The metro system provides an affordable and reliable mode of transport for individuals in low-income communities, reducing the reliance on private vehicles and buses.

**Job Creation:** Thousands of jobs were created during the construction phase, with additional opportunities expected in operations and maintenance once the metro system is fully operational.

**Economic Impact**

**The economic benefits of the Dhaka Metrorail are significant:**

- **Productivity Gains:** By reducing commute times, the metro contributes to higher productivity across the workforce. It is expected that by reducing travel times and improving efficiency, the overall economic output of Dhaka will increase.
- **Job Creation:** Beyond construction, jobs will be created in areas such as maintenance, customer service, and ticket sales.
- **Commercial Opportunities:** The metro stations provide opportunities for commercial leasing, retail activities, and advertising, which will contribute to generating revenue for the metro system.

**Environmental Impact :** The introduction of the metro rail reduces dependence on private cars, leading to:

- **Reduction in CO2 Emissions:** By replacing car journeys with electric-powered trains, the metro system significantly reduces the city's carbon footprint.
- **Decreased Air Pollution:** Less traffic congestion and fewer private vehicles on the road will lead to cleaner air in Dhaka, improving public health and quality of life.

### **III. FINANCIAL ANALYSIS:**

**Overview of Financial Performance :** The Dhaka Metrorail project faced a number of financial challenges during its development, which is typical for large-scale infrastructure projects:

- **Initial Investments:** Heavy investments were made in land acquisition, infrastructure construction, and procurement of high-tech equipment such as trains and signaling systems.
- **Operational Expenses:** The project faced initial losses as operations began, primarily due to lower-than-expected ridership and the high operational costs involved in running the metro system.

**Funding and Expenditure**

- **International Funding:** Major financial support from JICA, with a loan agreement covering 75% of the

project costs.

✚ **Government Allocation:** Local funding and budget allocation by the Bangladesh government.

**Financial Analysis:** Last Five years

Year	Investment (BDT in Crores)	Revenue Generated (BDT in Crores)	Funding Sources	Operating Costs (BDT in Crores)
2019	5000	N/A	Govt, JICA	200
2020	7500	N/A	Govt, JICA	300
2021	8000	N/A	Govt, JICA	400
2022	9000	Partial Revenue from Trial Ops	Govt, JICA	500
2023	10500	50	Govt, JICA	600

**Revenue Generation :** In the first three months of operation (December 2022–March 2023), the Dhaka Metrorail earned Tk6.2 crore in revenue, but the operational costs amounted to

**Tk7.33 crore.** However, as the system expands, ridership is expected to grow, eventually covering the costs and generating profits.

#### Projected Financial Outlook

The financial future of the Dhaka Metrorail looks promising with:

- ✚ **Projected Growth in Ridership:** With more stations coming online, the ridership is expected to rise significantly, thereby increasing revenue.
- ✚ **Cost Management:** Improved operational efficiency and energy-saving measures will help reduce costs in the future.
- ✚ **Revenue Diversification:** The metro system can diversify its income sources by leasing retail spaces, advertising, and implementing smart ticketing systems that will streamline operations.

### IV. FINDINGS AND RECOMMENDATIONS

#### Findings

1. **Efficiency Gains:** The Dhaka Metro Rail significantly reduces travel time, providing a reliable alternative to road transport. For example, a journey from Uttara to Motijheel that previously took over two hours by road now takes under 40 minutes.
2. **Environmental Benefits:** By replacing thousands of daily car trips, the project has contributed to a reduction in greenhouse gas emissions and improved air quality in the city.
3. **Economic Upliftment:** Improved transportation has boosted local businesses and created jobs in construction, maintenance, and operations.
4. **Public Acceptance:** Despite initial skepticism, public enthusiasm for the metro has grown, with high ridership numbers recorded in the early operational phase.

### V. RECOMMENDATIONS

1. **Network Expansion:**  
Accelerate the construction of other MRT lines (MRT-1, 2, 4, and 5) to cover more areas of Dhaka and its outskirts. A more extensive network will amplify the benefits of the metro system.
2. **Last-Mile Connectivity:**  
Introduce feeder services, such as shuttle buses, bike-sharing systems, and pedestrian-friendly pathways,

to ensure seamless access to metro stations.

**3. Public Awareness Campaigns:**

Conduct widespread awareness programs to educate the public on using the metro efficiently and understanding its benefits.

**4. Sustainable Maintenance:**

Develop a robust maintenance framework to ensure the longevity and efficiency of the metro system. This includes regular inspections, upgrades, and staff training.

**5. Environmental Monitoring:**

Continue to assess the project's environmental impact and explore ways to further reduce its carbon footprint, such as integrating renewable energy sources.

## VI. CONCLUSION

The **Dhaka Metrorail** represents a significant achievement in Bangladesh's infrastructure development. By addressing the pressing challenges of traffic congestion and air pollution, the metro system will improve the quality of life for millions of Dhaka residents. The long-term economic, social, and environmental benefits of the project far outweigh the initial financial losses.

To ensure the success of the Dhaka Metrorail, it is crucial to focus on operational efficiency, public engagement, and continued network expansion. With strategic management and proper planning, the metro will play a vital role in shaping the future of Dhaka as a modern, sustainable urban center.

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