

Board Presentation

CBIPS

Transit and Transportation
Research Group



Board Presentation

CBIPS

Transit and Transportation
Research Group



The Team



Chi Hin Tam

2024-2025 Fellow



Camilo Ferreira

2024-2025 Fellow



Yugandhar

2024-2025 Fellow



Anvitha Yadama

2024-2025 Fellow

Key Factors for Successful PPP Project Implementation

Delivery Method

Structuring the Project for Success

Social impact

Enhancing Community and Environmental
Well-being

Financial Viability

Ensuring Economic Feasibility and Value

Challenges

Identifying and Mitigating Risks

Research Proposal

With the ever increasing challenge in expanding and operating a profitable metro in New York City, we want to look whether if different P3 projects for construction and operations can work for NYC.

We will look at 3 different P3 mass transit around the world, look at how they started, what made them successful, and what we can learn to incorporate into NYC



Case Studies

We will look at 3 different P3 projects around the world, stating its success and challenges, and comparing it with New York City

Hong Kong

The Mass Transit Railway (MTR) Case Study of Tung Chung and Airport Express Line at Tsing Yi Station

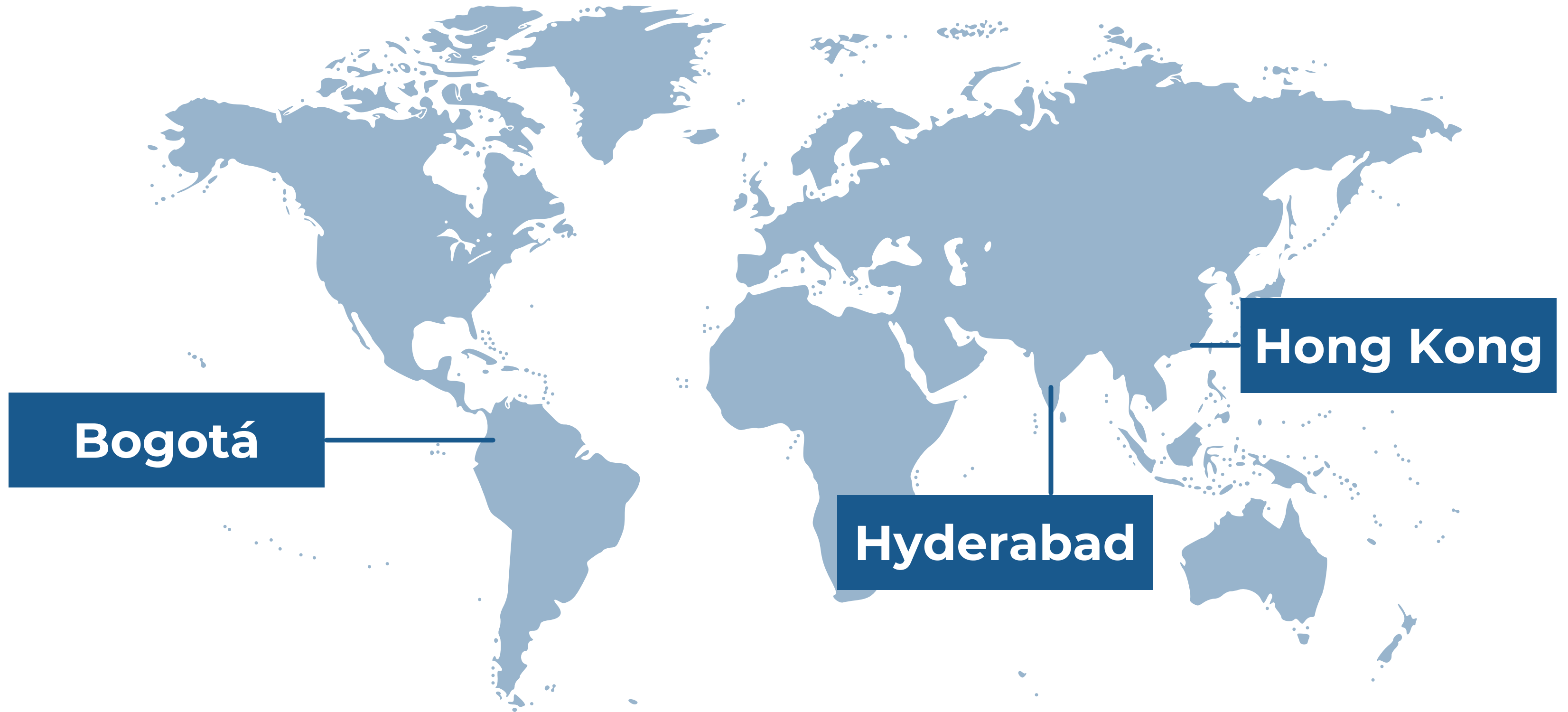
Bogotá

Bogotá's first Metro Line 23km long with a total of 16 stations that serve a population of 2 million people

Hyderabad

One of the largest PPP in the world, in the Metro rail sector, with a total network of 72Km spread across Hyderabad

Locations



Case 1

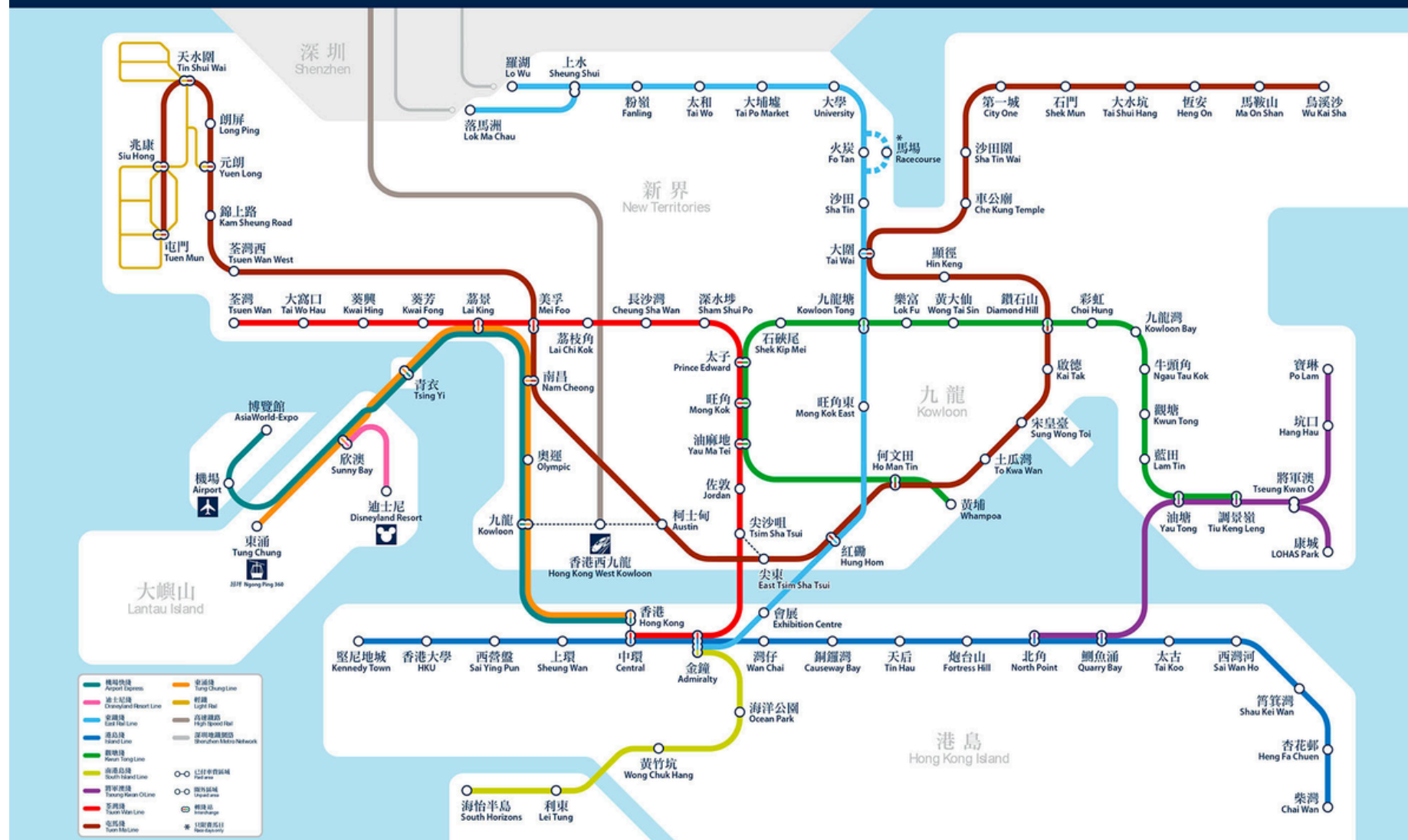
Hong Kong

A “Rail + Property” P3
Model, a Joint Real-Estate
and Transit Oriented
Development



MTR - A Short Background

港鐵路綫圖 MTR system map



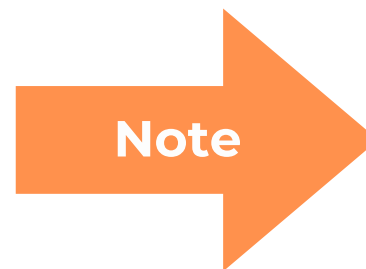
- 99 Heavy Rail Stations and 68 Light Rail Stations
- On Average 4.6 million passengers per day (2023)
- 25% privately owned, with a profit driven mindset
- Not only develops rail operations but also real estate
- MTR does not receive its significant portion of profits through rail operations, but instead from property management and rental, as well as station commercial businesses
- MTR earned \$770 Million US Dollars in Net Profit for Q1 and Q2 2024

What is the “R+P” Model?

- The rail operator works with private real estate companies to develop residential and commercial spaces when building a completely new or redeveloping a station, then renting or selling them for profit
- Requires MTR to bear long term risks in property market fluctuation and initial project financing for rail operations
- Possible due to:
 - Limited alternatives from dense and limited real estate in Hong Kong
 - Optimistic expectations of real estate market (property prices from 2014 are 15 times higher than 1980)

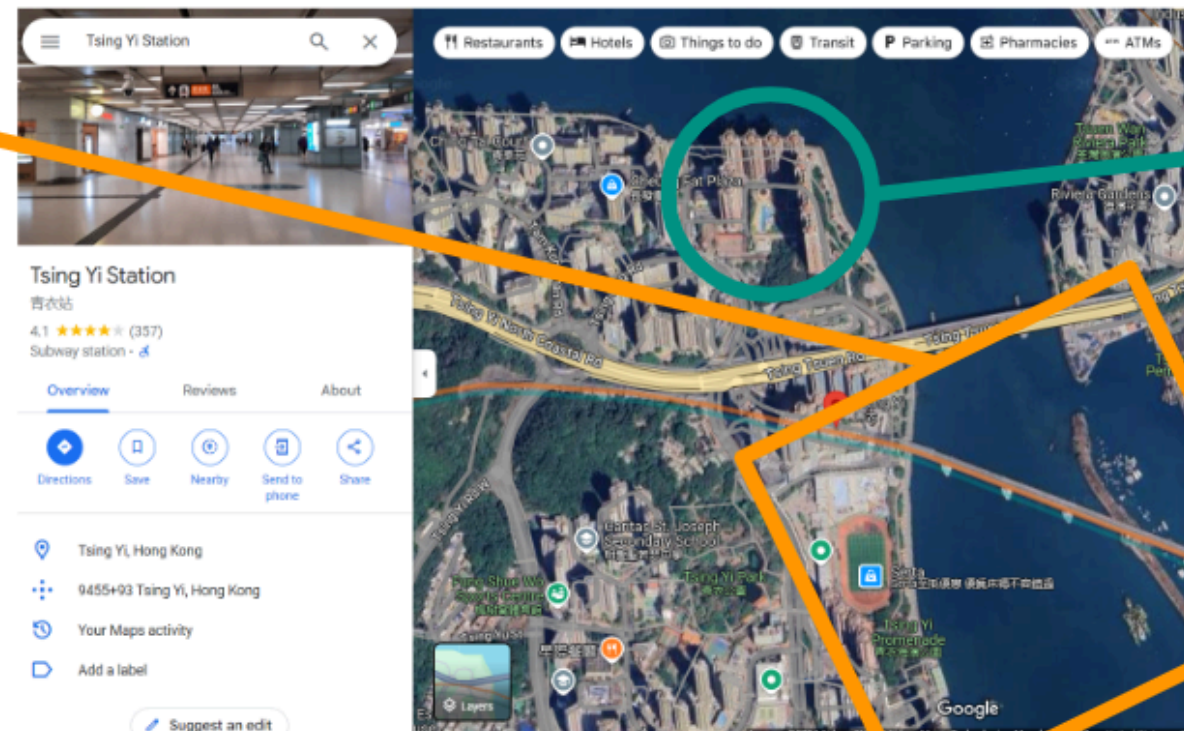
How is “R+P” Done?

- 1 Government provides MTR “land development rights” and sells the land at a premium of it’s market value
- 2 MTR builds the new rail line, partners with private developers through a competitive bid process
- 3 MTR either receives a share of profits that developers make, i.e. through percentage of total development profits or fixed lump sum, or collect rent through commercial properties built on site and in station



Significant political will and assist in acquiring land development rights made this possible!

A Visible Example - Tsing Yi Station



Red Dot is Tsing Yi Station

A Visible Example - Tsing Yi Station



How Can We Replicate the R+P Model in NYC Metro Area?

- 1 Identify an **express station** with **adequate public land** and **political will** to allow special zoning laws for denser and taller buildings
- 2 Sell the land to MTA/ NJ Transit, conduct a competitive bid with the private sector to build residential buildings and commercial real estates
- 3 Work with local government and housing authority to build low income/affordable housing **to overcome political risks**

Case Study 2 Bogotá

- 16 stations **24km** (14mi)
- Trains run at a frequency of every 90 seconds.
- **1 million** passengers per day.
- maximum speed of 80 km/h, with an average operational speed of 43 km/h.
- **US\$4 billion** DBOMT Delivery method

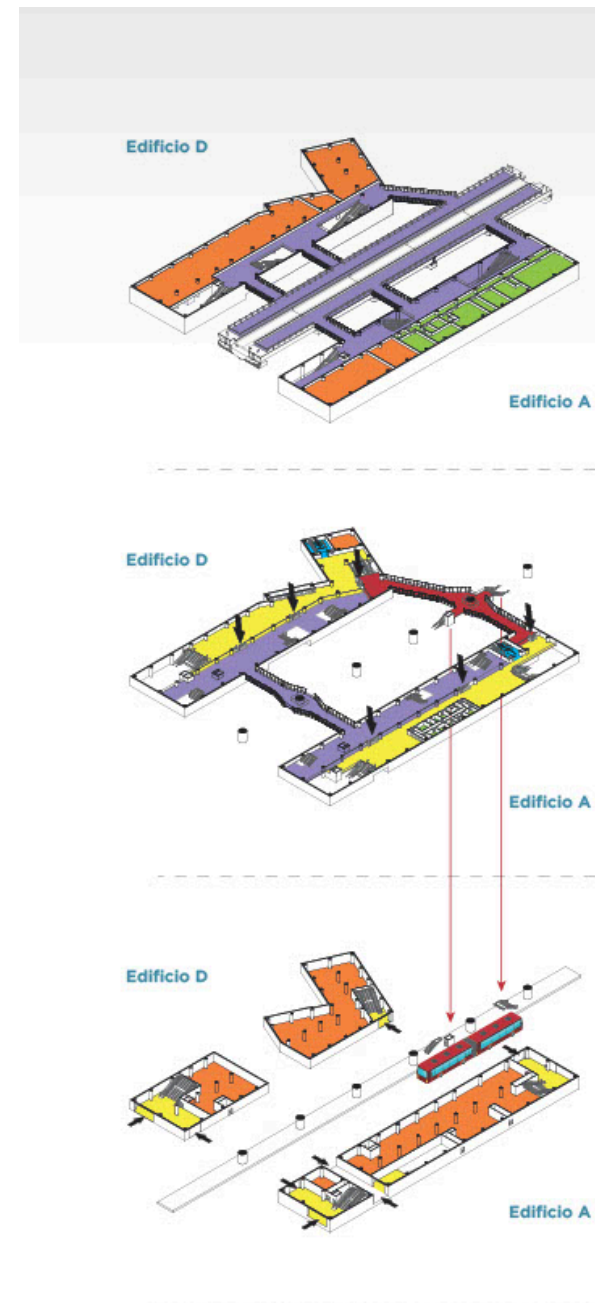
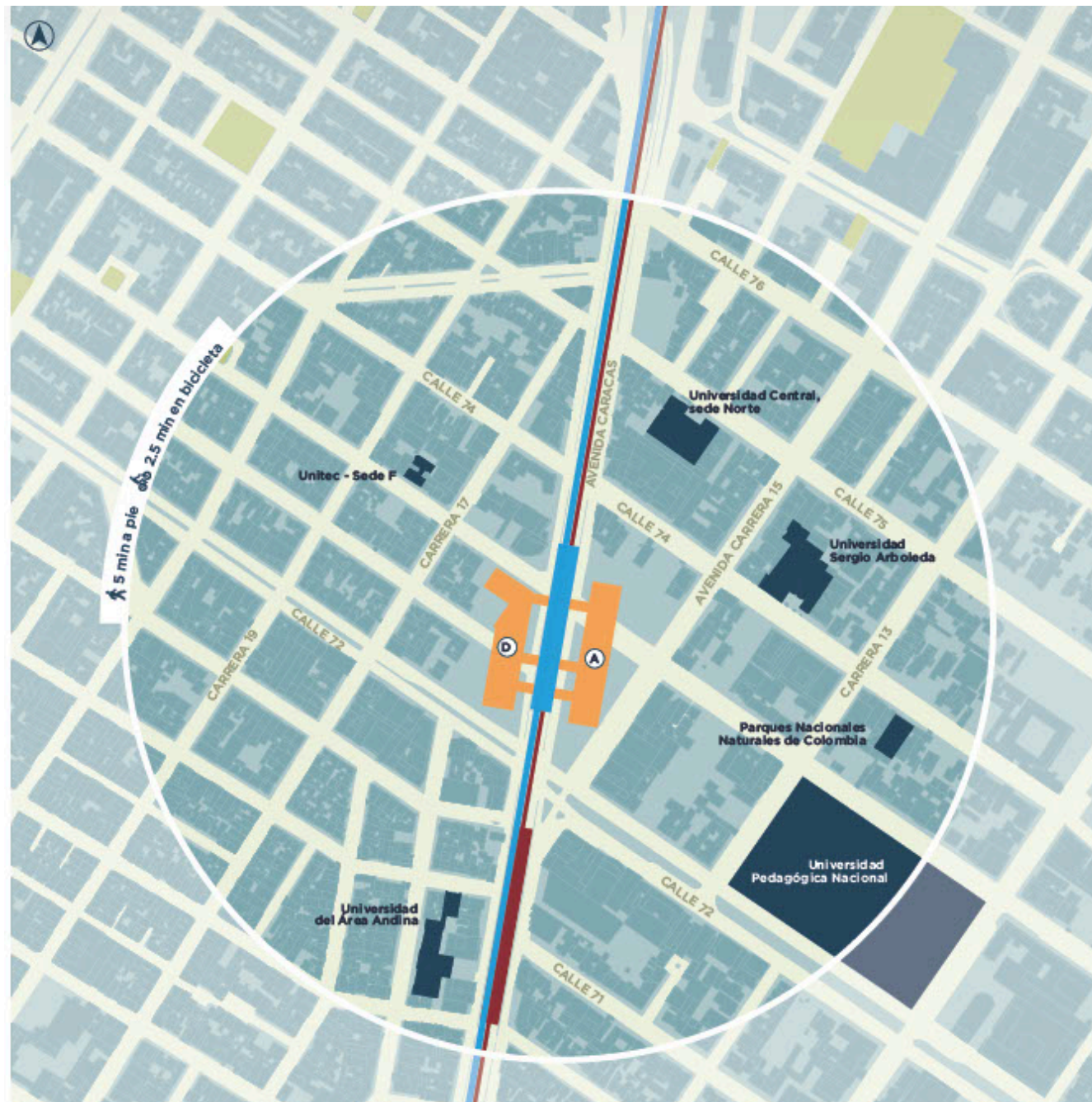


Challenges

- Integration with other systems
- Today Bogota relay on the BRT Transportation System 2.4 million travellers a day
- Contractual Relation with stakeholders



Takeaways



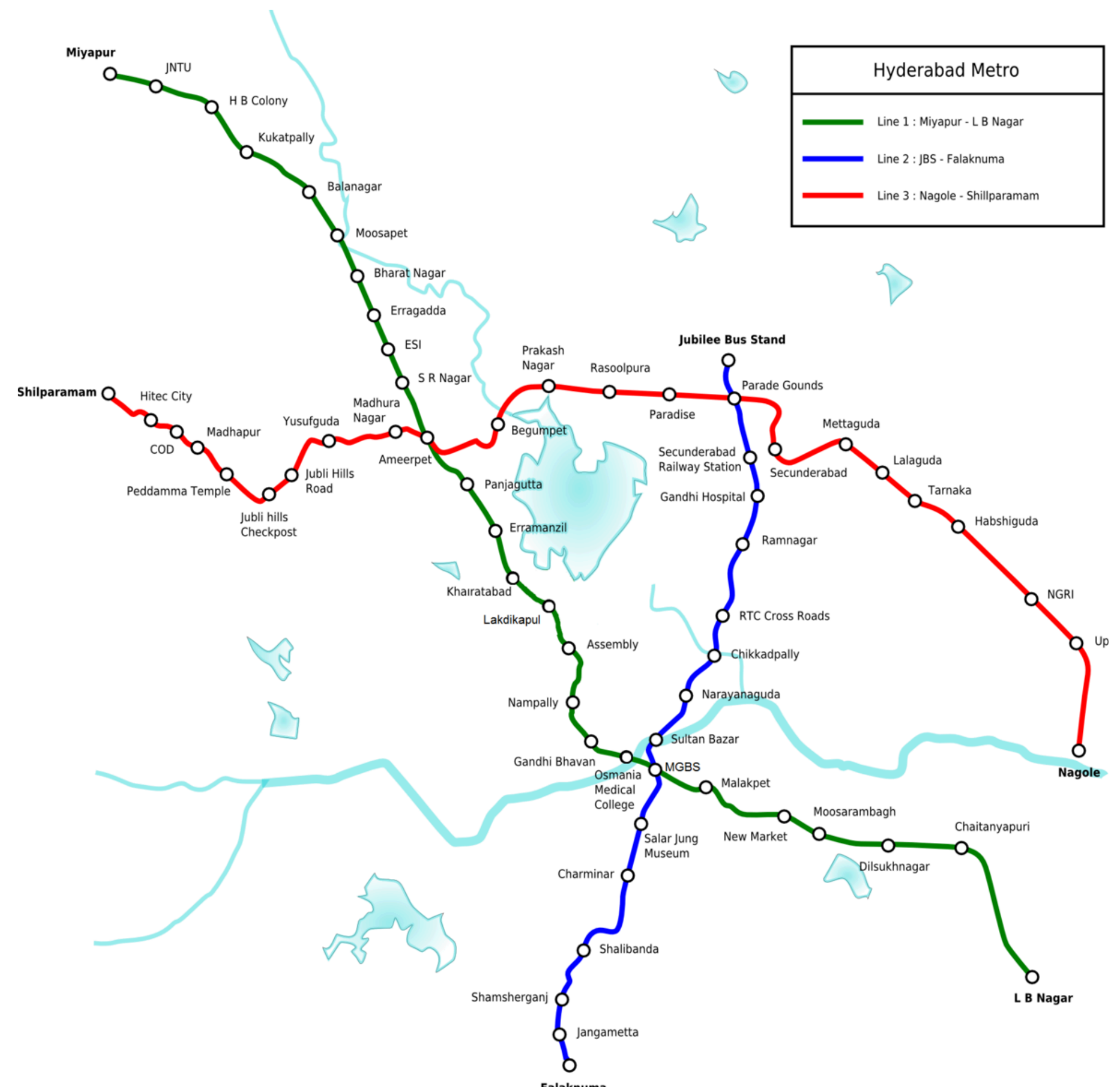
- Optimized station layout to enhance passenger flow and urban accessibility.
- Integration of commercial spaces to improve user experience and generate revenue.
- Non-fare revenue projected to increase by 15-20%.
- Stations designed as urban hubs to support local businesses and connect transport networks.
- Focus on sustainability through walkability and mixed-use development.

Case Study 3 Hyderabad



- **Route Coverage** : Covers 69.2 km across three corridors, making it India's second-largest metro network after Delhi.
- Partnership between **L&T Metro Rail Hyderabad Limited (L&TMRHL)** and **the Government of Telangana.**
- **Hyderabad Metro is the world's largest elevated Metro Rail system based on DBFOT basis**
- **The lines are arranged in a secant model**
- **Cost:** Approx. **\$2.3billion.**





Innovative Project Delivery for Hyderabad Metro Rail

1. Public-Private Partnership (PPP) Model:

- Design Build Finance Operate Transfer (DBFOT).
- Concession agreement for 30 years, extendable by 25 years.
- Private sector (Larsen & Toubro) is given the right to develop land for revenue generation (Transit Oriented Development).

2. Viability Gap Funding (VGF):

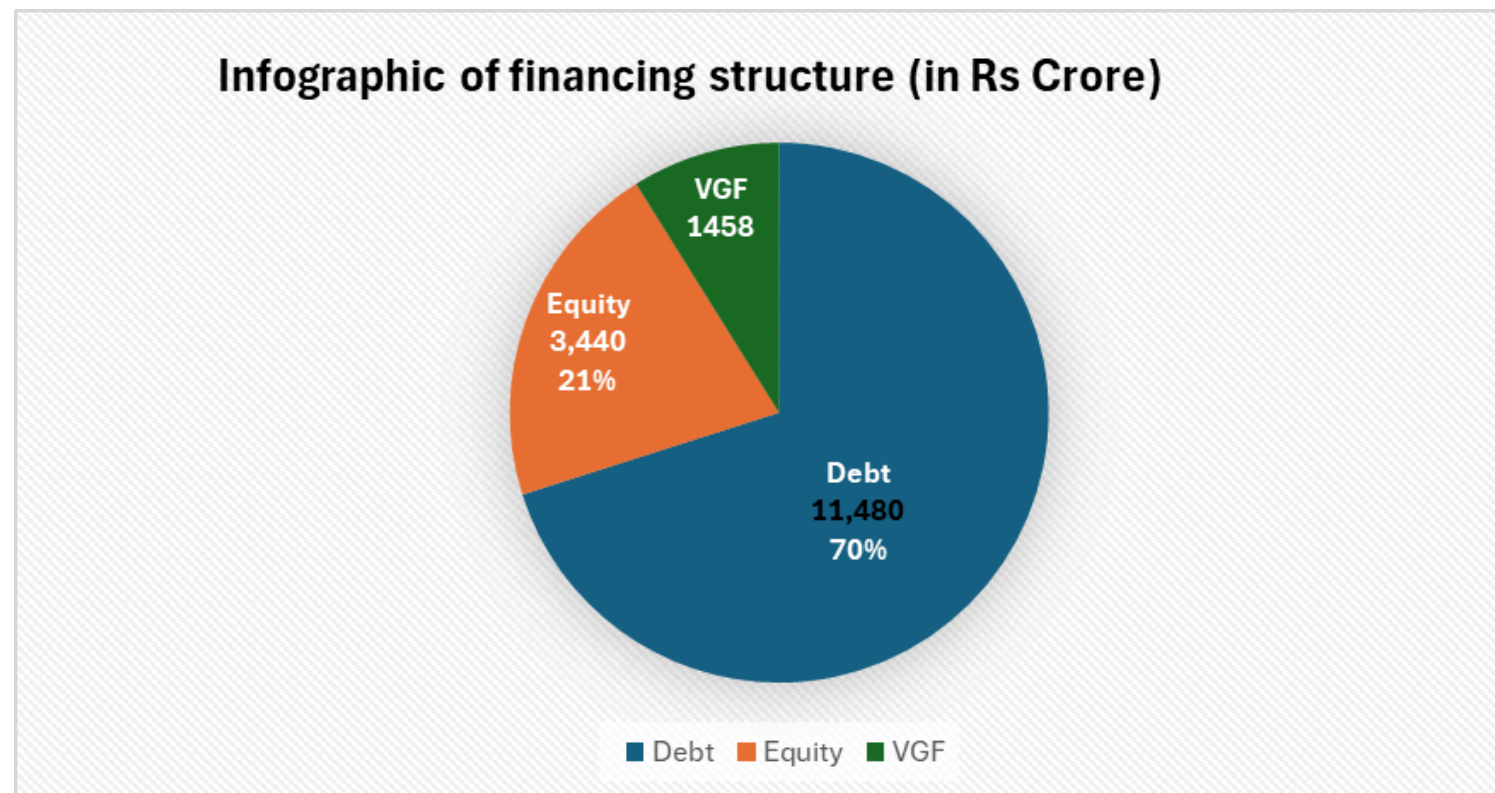
- National and state governments provided 10% of project cost as a capital grant.
- Equity by Government of Andhra Pradesh and private stakeholders.

3. Performance Standards:

- Output-based specifications allowed private innovation.
- Mandatory compliance with the Manual of Specifications and Standards (MSS).

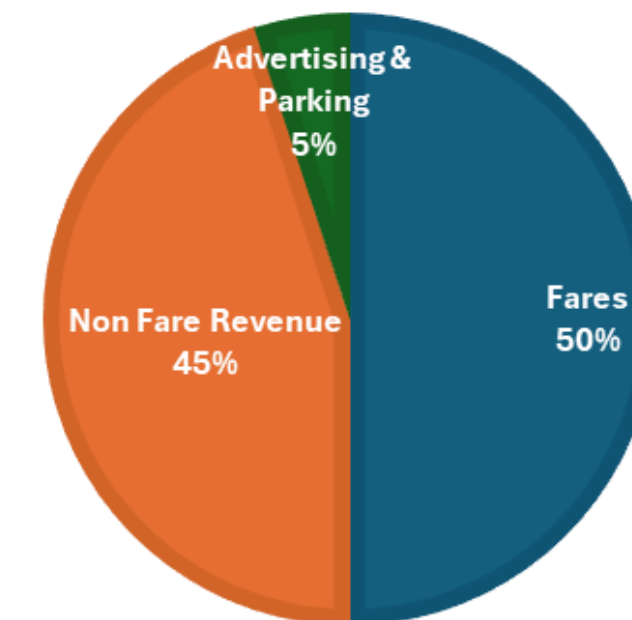


Sustainable Financing and Revenue Generation



REVENUE SOURCES

Legend: Fares (Blue), Non Fare Revenue (Orange), Advertising & Parking (Green)



Challenges Overcome:

- Avoided soft loans to encourage wider participation.
- INR3000 crore cost overrun due to land acquisition delays.



COLUMBIA | CBIPS

Center for Buildings, Infrastructure and Public Space

Transforming Hyderabad's Urban Landscape

1. Improved Mobility:

- Daily ridership grew to 475,000 by 2020.
- Reduced road congestion and pollution.

2. Inclusivity:

- Accessible design for elderly, disabled, women, and economically disadvantaged.
- Public engagement through outreach programs (e.g., poems, songs).

3. Cultural and Community Sensitivity:

- Managed 20 religious structures without conflict.
- Altered project alignments to respect community concerns.

4. Urban Development:

- Transit-oriented developments around stations.
- Aesthetic and energy-efficient depot and station designs.



COLUMBIA | CBIPS

Center for Buildings, Infrastructure and Public Space

Challenges Faced and Key Takeaways

Challenges:

- Land acquisition delays led to cost overruns.
- Inter-departmental coordination for approvals.
- Addressing public misconceptions and rumors.
- Managing concerns around religious structures and cultural landmarks without disrupting local sentiments.

Lessons Learned:

- Non-fare revenue sources reduce reliance on passenger fares.
- Early community involvement and inclusivity prevent resistance.
- Output-based specifications foster private sector innovation.
- Balancing modern engineering practices with local cultural sensitivities ensures public acceptance.
- Early drafting of technical specifications required to ensure clarity and precision for a PPP metro project.

References

- TransMilenio. (n.d.). TransMilenio official website. Retrieved November 16, 2024, from <https://www.transmilenio.gov.co/>
- Sistema Integrado de Transporte Público (SITP). (n.d.). SITP official website. Retrieved November 16, 2024, from <https://www.sitp.gov.co/>
- MTR Corporation. (n.d.). Mass Transit Railway (MTR) official website. Retrieved November 16, 2024, from <https://www.mtr.com.hk/en/customer/main/index.html>
- GovHK. (n.d.). Public transport in Hong Kong. Retrieved November 16, 2024, from <https://www.gov.hk/en/residents/transport/publictransport/index.htm>



THANK YOU!