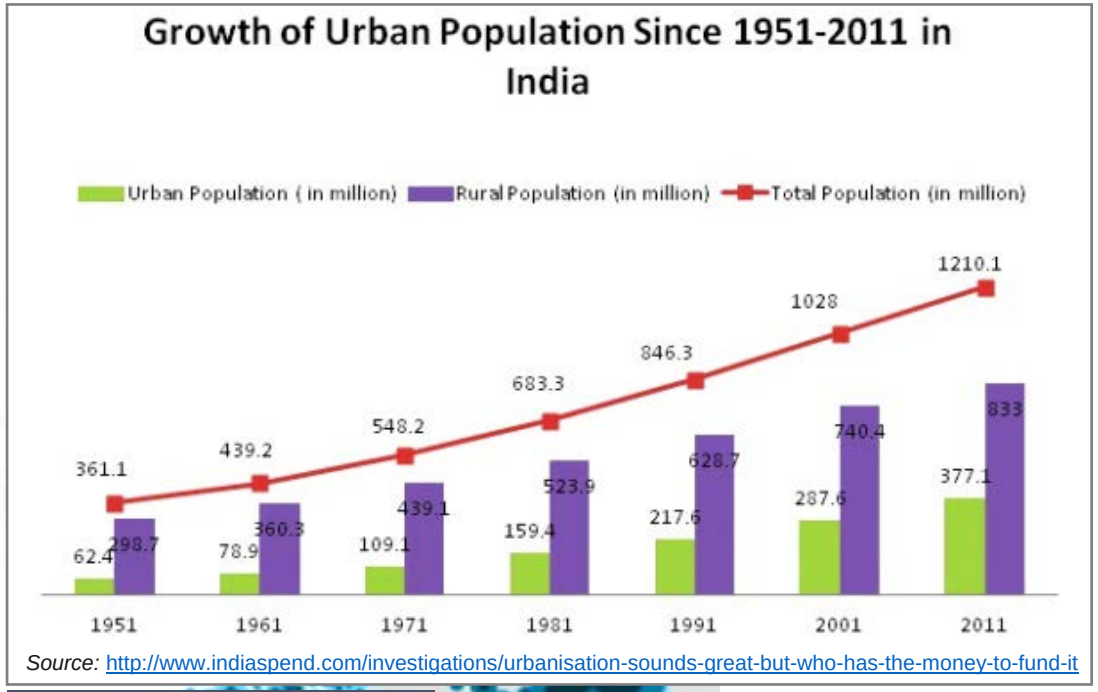
Framework for Maximizing Non-Fare Box Revenue for Metro Systems.

MENTOR: O. P. AGGARWAL

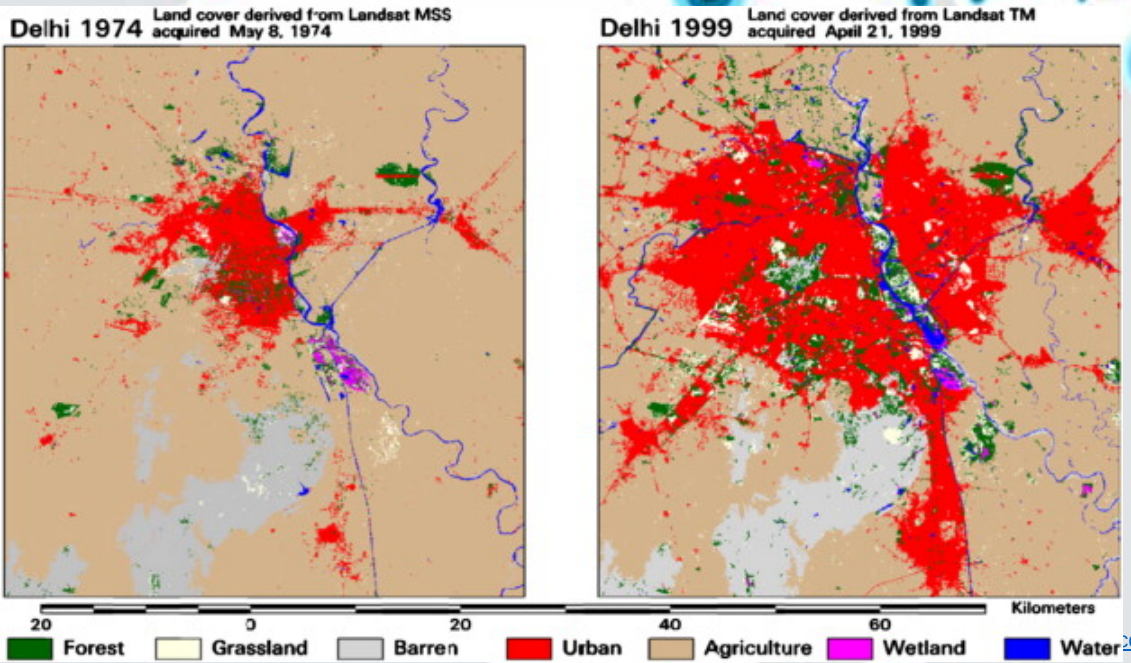
Presented by: Yash Choudhary, Karia Parth, Shafeeq Ahmed



Source: http://www.indiaspend.com/investigations/urbanisation-sounds-great-but-who-has-the-money-to-fund-it

Sprawling cities

Urbanization



ccelerated-1950-1709)

Issues of urbanization:

Congestion

Pollution

Accidents

The Times of India, New Delhi,24, June-2014

Delhi sees most road deaths in India

TIMES NEWS NETWORK

New Delhi: About 40 busloads of citizens die on the capital's roads every year but the deaths do not shock anyone and governments over the years have done little to stop it. From 2008 to 2013, more than 12,300 people died in road accidents here. Last year alone, there were a total of 1,820 deaths.

An assessment of road accidents done by the Centre for Science and Environment (CSE) reveals that not only does Delhi have the most dangerous roads in the country but pedestrians and bikers are at the greatest risk on them. On average, five people die in road accidents every day, and four of them are either pedestrians or two-wheeler riders.

The traffic police have identified 128 accident hotspots — places where three or more fatal accidents, or 10 accidents have occurred in a year — and the CSE assessment shows that northwest and southwest Delhi have the most such spots. Taken design-wise, signal-free arterial roads are the most dangerous. Ironically, roads that have received the maximum government attention and resources for widening and signal-free movement have the highest accident rates.

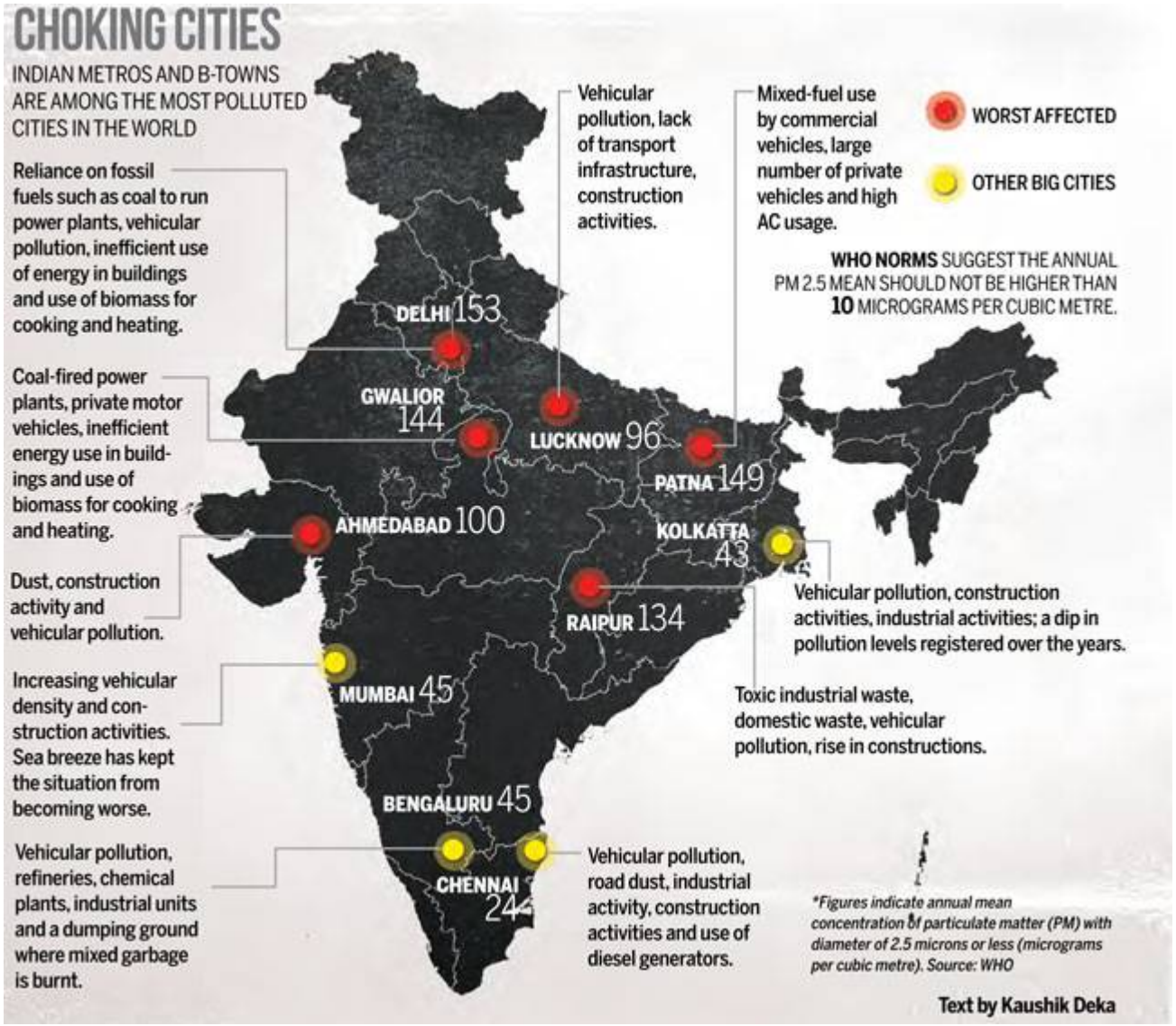
"These features have, in fact, turned arterial roads into death traps. Especially dangerous are spots where flyovers begin, such as Dhaula Kuan, AIIMS, Sarita Vihar, Mahipalpur, Rajokri, ITO or IP, and Moti Bagh," says the report released on Monday Eight key arterial roads, designed to be high-speed corridors, record nearly 75% of all deaths in Delhi alone.

▶1,820 lost their lives, P 6

MUMBAI TOPS IN ACCIDENTS

ACCIDENTS		ROAD DEATHS	
Mumbai	25,000	Delhi	1,850
Chennai	9,000	Chennai	1,300
Delhi	7,000	Bangalore	650
Bangalore	6,000	Mumbai	500
Indore	6,000	Patna	500
Kolkata	4,000	Kolkata	500

All figures for 2012 — 500 deaths in Kanpur & Lucknow too



Scenario of Metro in India

- Growing cities, growing population and growing traffic has invariably called for a **shift from private** modes of conveyance to **public transport**.
- India's first metro, the **Kolkata Metro**, started working almost 25 years ago. But, however it was not very successful and the reasons could be attributed to
  - Lack of funds planning as is known that such projects require huge capital investments
  - A long gestation period
  - Complex technology
  - Lack of integration between various systems of mass transportation
  - The absence of comprehensive traffic and transportation planning.
- While researches show that the **ideal modal share of public transport** should be around **70%**, however it is in tune to only **35% – 40% in India**'s metro cities.
- India is looking to create a world class infrastructure with its existent Kolkata and Delhi Metros with the addition of Mumbai, Bengaluru, Hyderabad, Chennai, Jaipur, and Kochi metros in the next few years while proposals for MRTS for Pune, Chandigarh, Ahmedabad, Kanpur, Ludhiana, Bhopal, Indore and Faridabad are being chalked out.

Metro Rail Projects Across India

Phase	Project Status	Project Cost (Rs crore)	Expected Completion
Delhi Metro Phase 1	Commissioned from 2002-06	10,571	Completed
Delhi Metro Phase 2	Commissioned from 2008-11	19,131	Completed
Delhi Metro Phase 3	44% Complete	35,242	–
Mumbai Metro Line 1	Commissioned in 2015	2,356	Completed
Mumbai Metro Line 2	Concession agreement terminated	42,710	2021
Mumbai Metro Line 3	10%	23,136	Unknown
Bangalore Metro Phase 1	80%, 2 tracks operational	11,609	2015
Bangalore Metro Phase 2	–	26,405	5 Years from start of work
Chennai Metro Phase 1	60%	18,370	2014-15
Hyderabad Metro	50%	14,132	2017
Kolkata East West Corridor	Approved by Cabinet, being implemented by Railways	4,874	2015-16
Kochi Metro Rail	33%	5,601	4 years from start of work
Jaipur Metro Rail Phase 1	90% for phase 1	3,149	March 2018
Ahmadabad Metro Rail	Approved by Cabinet	10,773	March 2018
Nagpur Metro Rail	Approved by Cabinet	8,680	March 2018
Pune Metro Rail	Approved 'in principle'	11,802	–
Lucknow Metro Rail	Approved 'in principle'	6,928	–

Source: RailNews.In

Kolkata

Hyderabad

Chennai

Metro Rail Projects across India

Delhi

Mumbai

Bangalore

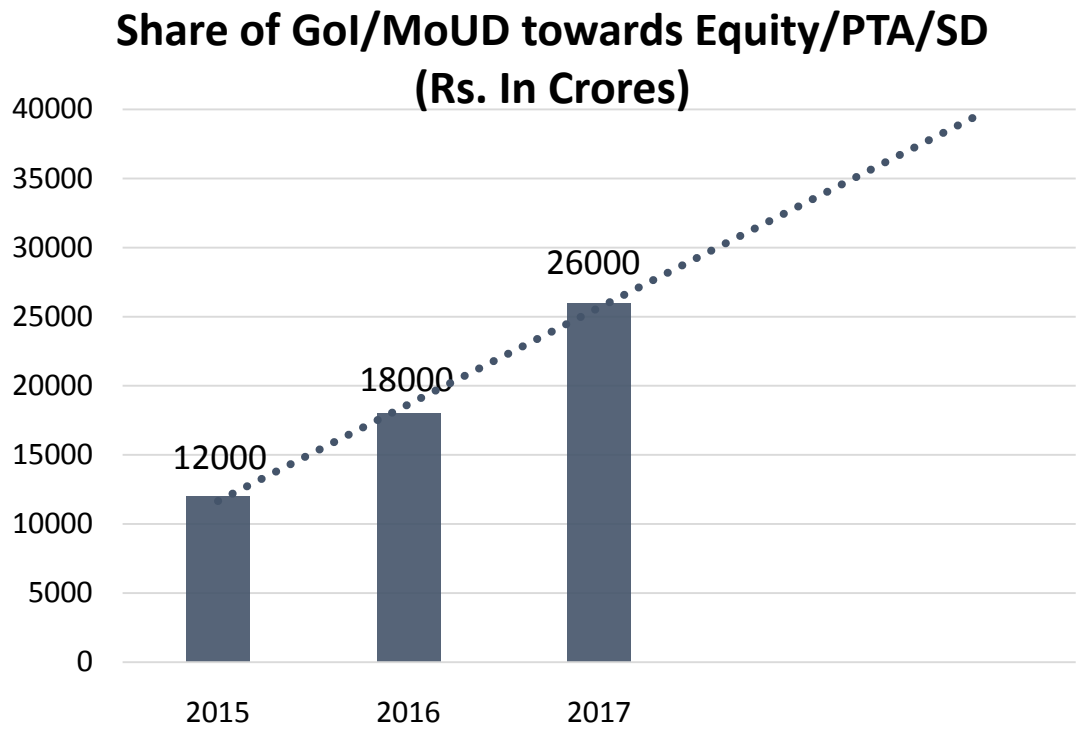
Scenario of Metro in India

Challenges

- System **planned as a corridor** rather than a network
- No **suitable bus system** to improve ridership
- Poor Public Transit in India
- Government policies are on improvement and development of roads
- **Fare is the only major** source of revenue
- **Overlapping o**f Metro on existing public transit network
- **Political willingness** and a sign of development

All this has resulted in **Low fare system** - Insufficient fund to operate and repayment of loans

- **Increasing no. of Metro projects**
- **Quantum of money required will rise/ Huge funding requirements**
- **MoUD & State governments can't bear all those costs.**
- **New streams of revenues/ funding avenues have to be tapped**



Need

This Project Aim to maximize the revenue of Non Fare box revenue and make a metro projects more economical sustainable as fare-box revenue are not sufficient to sustain the operations and repayment of loans.

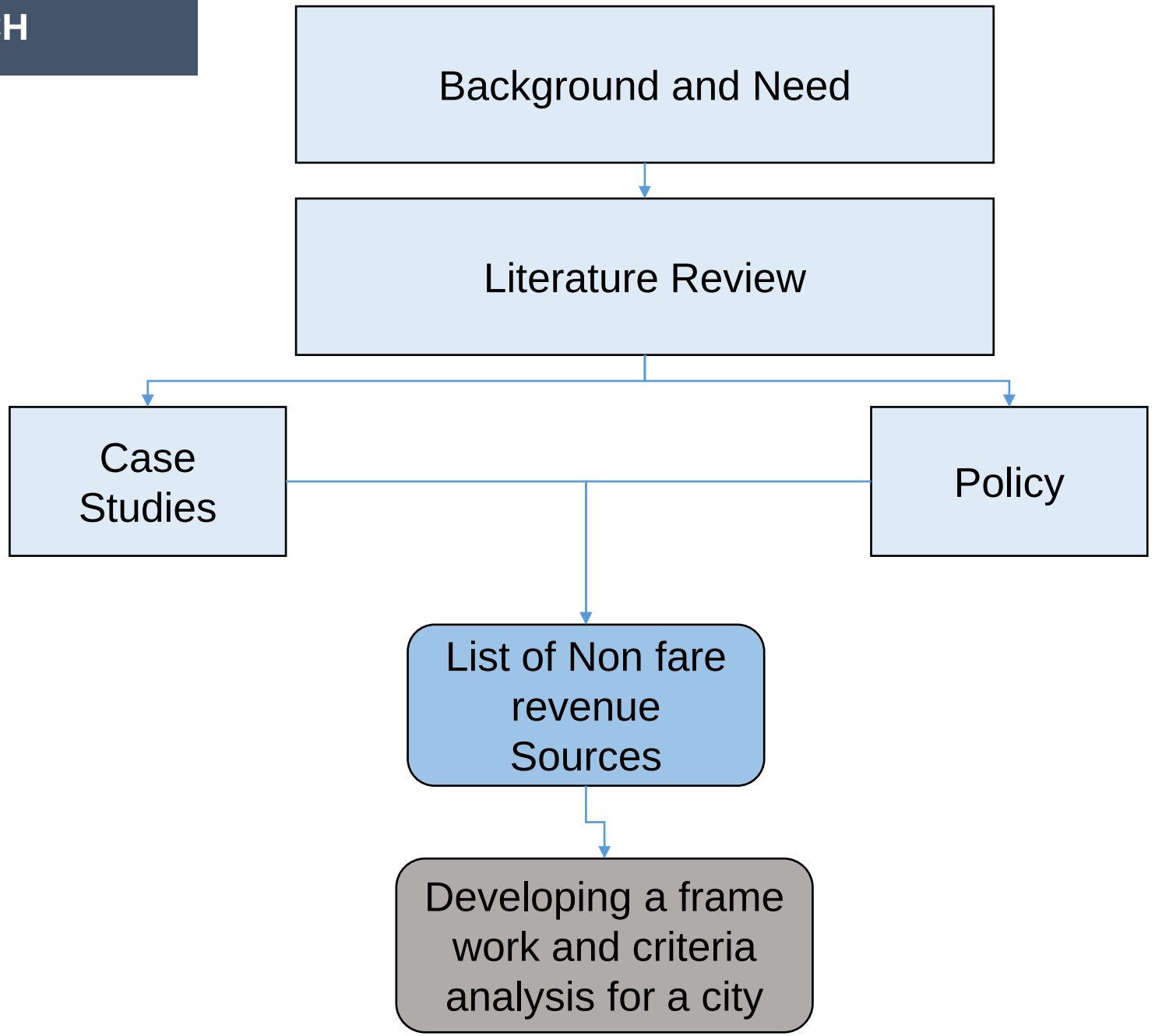
Major sources of revenue for Metro Projects are:

1. Fare Box – which accounts to almost 80-90 %
2. Non-Fare Box – which accounts to 10-20%

The problem with Fare Box System is that we are not able to recover the cost, also the actual ridership is low than that planned.
So, mostly it goes into loss.

So, there is a need to improve the non-fare box revenue share where fares are very dynamic and gesture low revenue

APPROCH


Background and Need
Literature Review
Case Studies
Policy
List of Non fare revenue Sources
Developing a frame work and criteria analysis for a city

Case Studies

International

1. Hong Kong
2. Singapore
3. New York
4. London

National

1. Rapid Metro
2. Hyderabad Metro
3. Mumbai Metro line – 01
4. Airport Express Line
5. Delhi Metro

1. Hong Kong

Population: **1,315,392**

Area: **80.6 Sq. Km**

Density: **16,320 persons/ sq. km**

Transport Characteristics:

PT Fare as share of Income: **0.81%**

Avg. Trip Length: **7.80 Km**

Avg. Journey Time: **19.50 min**

MRTS:

Length of Mass Transit (Km) : **175 Km**

Daily Ridership on Mass Transit: **4.63 Million**

Daily MT Ridership per pop.: **0.65**

MT Fare as share of Income: **1%**

Mass Transit Coverage: **2.17**

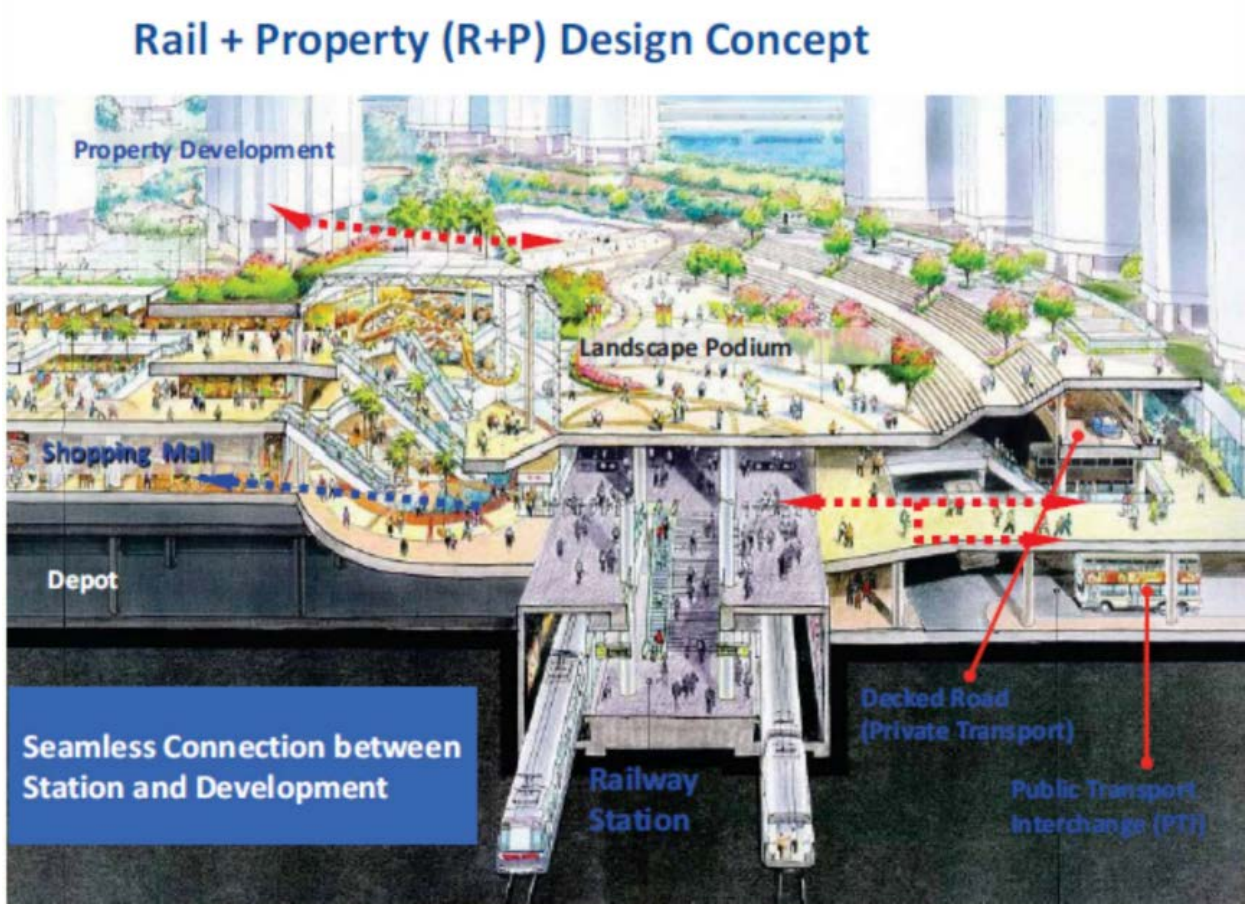
Operation Costs: 913.91 USD

Non Fare Box Revenue:

Property Rental (22%), Property Development (45%), Station Commercial (24%), Advertisement and Mis (9%)

1. Hong Kong

- Tool Adopted is **Rail + Property Development Process**
- Govt. grants **property development rights** of station & surrounding areas to MTR.
- MTR prepares **Master Plans** of “Station & Surrounding Sites”
- **Land premium** is negotiated with Govt. on a “Greenfield Basis”, prior to tendering development sites
- In property developments, the Corporation enter into partnerships with reputable developers whereby the developers bear all development costs, including land premium and construction costs, and therefore all development risks. MTR supervises construction of projects and profit sharing either in form of percentage of profits or assets in kind.
- Integrated Rail + Property Development is cornerstone of the MTR’s success in Hong Kong. **MTR is both the transit authority as well as the property owner.**



2. Singapore

Population: **532,000**

Area: **714.3 Sq. Km**

Density: **745 persons / sq. km**

Transport Characteristics:

PT Fare as share of Income: **0.76%**

Avg. Trip Length: **9.40 Km**

Avg. Journey Time: **30 min**

MRTS:

Length of Mass Transit (Km) : **138.9 Km**

Daily Ridership on Mass Transit: **2 Million**

Daily MT Ridership per pop.: **0.39**

MT Fare as share of Income: **1%**

Operation Costs: 427.28 USD

Non Fare Box Revenue:

Advertisement (15%). Rents (19%), SMART fleet operation (29%), Engineering Services (25%), Miss (12%)

3. New York

Population: **8,175,133**

Area: **783.83 Sq. Km**

Density: **10,430 persons/ sq. km**

Transport Characteristics:

PT Fare as share of Income: **2.66%**

Avg. Trip Length: **14.10 Km**

Avg. Journey Time: **39.2 min**

MRTS:

Length of Mass Transit (Km) : **419.72 Km**

Daily Ridership on Mass Transit: **4.51 Million**

Daily MT Ridership per pop.: **0.24**

MT Fare as share of Income: **3%**

Mass Transit Coverage: **0.54**

Operation Costs: 7396.02 USD

Non Fare Box Revenue:

Advertisement (25%), Property Development (70%), Miss (5%)

4. London

Population: **7,825,200**

Area: **1572.2 Sq. Km**

Density: **4,977 persons/ sq. km**

Transport Characteristics:

PT Fare as share of Income: **1.99%**

Avg. Trip Length: **5 Km**

Avg. Journey Time: **37 min**

MRTS:

Length of Mass Transit (Km) : **404 Km**

Daily Ridership on Mass Transit: **3.33 Million**

Daily MT Ridership per pop.: **0.22**

MT Fare as share of Income: **2%**

Mass Transit Coverage: **0.29**

Operation Costs: 3124.92 USD

Non Fare Box Revenue:

Advertisement (19%), Property Development (25%), Congestion pricing (12%), Grant (22%) Miss (22%)

Delhi

Population: **8,175,133**

Area: **783.83 Sq. Km**

Density: **10,430 persons/ sq. km**

Transport Characteristics:

PT Fare as share of Income: **3.75%**

Avg. Trip Length: **10.20 Km**

Avg. Journey Time: **30 min**

MRTS:

Length of Mass Transit (Km) : **189.67 Km**

Daily Ridership on Mass Transit: **1.92 Million**

Daily MT Ridership per pop.: **0.12**

MT Fare as share of Income: **5%**

Mass Transit Coverage: **0.13**

Revenue:

Fare Box: 362.68 USD

Non Fare Box: 235.73 USD

Airport Express Link - Delhi

MRTS:

PPP model of development

Capital cost: Land + Civil + Systems : Rs.5700 Crs

DMRC: Rs. 2815 Crs.

Reliance Infra: Rs 2885 Crs.

Revenue Model:

Fare based Revenue

Non Fare based Revenue – TOD & Advertising

Hyderabad Metro

Population: **6,809,970**

Area: **172 Sq. Km**

Density: **39,592 persons/ sq. km**

MRTS:

- Length of Mass Transit (Km) : **71.16 Km**
- PPP model of development
- 3 high density corridors
- Will serve twin cities: Hyderabad & Secunderabad

Capital cost: Rs 14,132 Crs

GoTS: 10% & L&TMRL: 90%

Revenue Model:

- Fare based Revenue
- Non Fare based Revenue – Huge reliance on Property Development & Advertising

Rapid Metro

MRTS:

- Length of Mass Transit (Km): **5.1 km (phase 1) + 7 Km (phase 2)**
- Metro Link from Delhi Metro Sikanderpur station on MG Road to Sector-56 in Gurgaon
- Haryana Urban Development Authority (HUDA)
- PPP model of development

Capital cost:

Phase 1: Rs. 1088 Crs

Phase 2: Rs. 2143 Cr

Revenue Model:

- Fare based Revenue – DMRC decided fare rates
- Non Fare based Revenue – Property Development & Advertising

Mumbai Metro Line-01

Population: **12,478,447**

Area: **603 Sq. Km**

Density: **20,693 persons/ sq. km**

MRTS:

- Length of Mass Transit (Km): **11.4 Km**
- PPP model of development

Capital cost: Rs. 3137.4 Crs

RInfra: 69%

MMRDA: 26%

Veolia: 5%

Revenue Model:

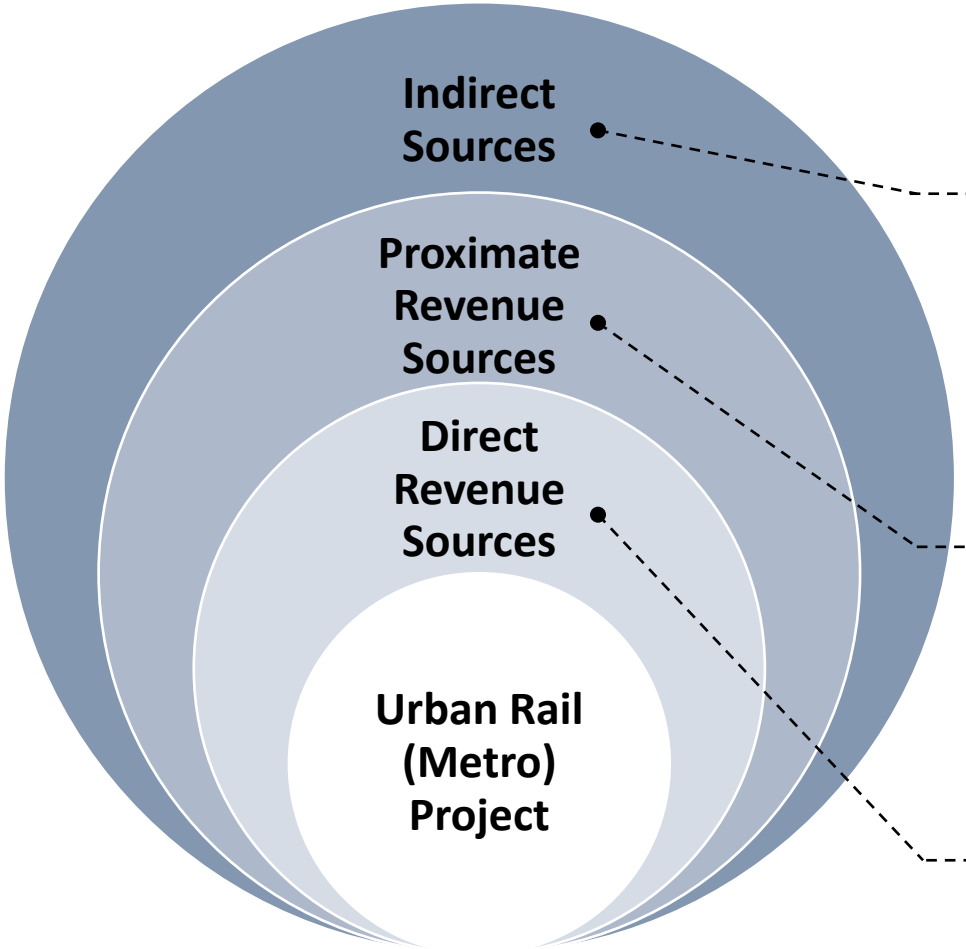
- Fare based Revenue
- Non Fare based Revenue – Limited Property Development & Advertising

Summarizing the case studies

Sr. No	Name of Cities	Area (sq. km)	Population	Density (persons/ sq. km)	Fare Box	Non- Fare Box	Metro Ridership (Million)	PT Share (in %)	Length of Metro Rail (in km.)	Revenue Sources of Non Fare Box
1	Hong Kong	80.6	13,15,392	16,320	37%	63%	4.63	37.6	175.00	Property Rental (22%), Property Development (45%), Station Commercial (24%), Advertisement and Mis (9%)
2	Delhi	1483	1,38,50,507	9,339	88%	12%	1.92	16.0	189.67	Advertisement (48%) ,ATM, Shops(14%), Telecom business (16%), Rents (10%), Mis (12%)
3	Singapore	714.3	5,32,000	744	89%	11%	2	25.2	138.90	Advertisement (15%). Rents (19%), SMART fleet operation (29%), Engineering Services (25%), Miss (12%)
4	London	1572.2	78,25,200	4,977	83%	17%	3.33	14.0	404.00	Advertisement (19%), Property Development (25%), Congestion pricing (12%), Grant (22%) Miss (22%)
5	New York	783.83	81,75,133	10,429	70%	30%	4.51	15.3	394.29	Advertisement (25%), Property Development (70%), Miss (5%)

Summing Up

Enabling mechanisms that can help to channelize funds for urban rail



Sources	Key Examples
• Fuel Taxes/ Surcharges	• Fuel surcharges in Bogota, Colombia • Cess on fuel in Bangalore
• Employer contribution	• French Versement system
• Others	• Congestion charges London • Road Pricing in Seoul, Korea
• Additional FSI/ TDRs	• Bangalore Metro
• Betterment Levy or 'Land Value Tax'	• Gold coast, Australia • Hong Kong • Copenhagen, Denmark
• Property development	• Hong Kong • Copenhagen, Denmark • Delhi Metro
• Leasing/ Commercial	• Tokyo Metro • Delhi Metro
• Advertising (e.g. station naming)	• South-eastern Pennsylvania • DLF metro Gurgaon

Land Base Tool

- Increased FSI and Joint development
- TDR& Air rights
- Impact Fees

Non Land base Tool

- Integrated Ticketing
- Higher Parking Charges
- Auctioning of vehicle ownership rights in TOD

Others

- Advertisement
- Metro ambulance
- Station naming
- Joy rides
- Solar energy

Existing Tools

- **NUTP: Focus on** Innovative financing mechanism
- **Metro Policy:** It emphasises on encoring PPP in various forms such as (i) Construction phase through DBFOT (ii) For operational phase (iii) Maintenance and Upgrading of Infrastructure through Gross Cost and Net Cost contract.
- **National TOD Policy :** TOD Policy focus on developing high density mixed use development in Transit influence zone, there by increase in ridership and improving financial and economical viability of project.
- **Value Capture finance Policy :** It focus about exploiting and generating revenue from land through various mechanisms which are as follows -:

  (i) Land Value Tax (ii) Fees for changing land use (iii) Betterment levy (iv) Development Charges (Impact fees) (v) Transfer of Development Rights (vi). Premium on relaxation of rules or additional FSI (vii) Vacant land Tax (viii) Tax increment financing and Development (ix) Land Acquisition & Development (x) Land pooling system.

Through Proper channelization and Utilization, land can be used as the major source for increasing non fare box revenue from existing 12 -13% up to 20-22% maybe higher.

Improper frame work, lack to institutional arrangement and improper understanding towards the above tools have been one of the major reasons for lower non fare box revenue in India.

Land Value Capture Principals

- Taxpayers fund infrastructure yet few receive a direct benefit or windfall profit
- Principal beneficiaries of new and upgraded infrastructure who receive a windfall profit should provide a reasonable share of project funding in return
- Value capture methodology should be sound, systematic, evidence-based, equitable and acceptable to all parties

Frame work- Methodology

Context	1. Define draft project area 2. Collect baseline data 3. Assess planning controls 4. Map market development (now against future) 5. Identify negatives and challenges (such as statutory issues) 6. Conduct gap analysis 7. Identify value capture options
Analysis	1. Finalize project area 2. Identify beneficiaries 3. Build evidence of direct and actual benefit 4. Select optimal value capture method(s)
Calculation	• Finalize value capture package (multiple mechanisms can spread costs equitably – avoid duplication) • Calculate revenue (timing, structure, quantum and termination date of revenues)
Decision	Determine feasibility of implementing value capture proposition (assess whether revenue justifies process/effort)

Methodology

1. Input Domain

Concept Master Plan Design

- FAR
- Development Density
- Land Use Mix

Transport Analysis

- Private Cars Ridership
- Metro Ridership

2. Assumptions

- Public Private Participation options.
- Population Growth estimate.
- Sales Value, based on Current rates.

Financial Calculations

- Total Area
- Area for Infrastructure
- Green Zones
- Construction Costs
- Land Value

3. Real Time Information

- Land Valuation.
- Development Costs.
- Transport Assessment.
- Infrastructure Assessment.

Calculation

	Land Value					Advertisement				Public transport			Other non fare box revenue
Description	Impact Fees	Incremental Property Tax	TDR	Higher FSI	Betterment levy	Digital	On site	Influence area	other Advertisement sources	Existing feeder network	Last mile connectivity	Accessibility to station	
Institutional Set-up/ arrangements													
Rules/Regulatory framework													
Market Assessment													
Resource													
Total													

To be implemented for one of the city as per the discussion with mentor

THANK YOU