

# PLANNING AND MAINTAINING PUBLIC TRANSPORT INFRASTRUCTURE IN EMERGING MEGACITIES



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# STRUCTURE OF PRESENTATION

- Introduction
- Highlight issues and challenges related to public transport in emerging mega cities
- Examine possible planning and maintenance options
- Discuss a best practice case from Brazil
- Conclusion

# INTRODUCTION

## Does size matter?

- There is no clear relationship between city size and some variables of city dweller's welfare or illfare. (e.g. crime, air pollution)
- It is however possible to argue that size of city does make a difference to certain city problems
- City size (spatial & demographic) matters when it comes to transport infrastructure

# ISSUES AND CHALLENGES (i)

- **Pace of motorization**

In the developed countries, cities had several decades to respond to the challenges posed by growing use of motor vehicles. In many emerging mega cities an equivalent growth is occurring over only one or two decades.

In Bangkok, for example, motor vehicle registrations increased at the rate of 12 percent a year, while even in China, one of the world's least motorized nations, the growth rate of motor vehicles was in the order of 18 percent in the nineties.

## ISSUES AND CHALLENGES (ii)

- **Patterns of urban growth**

- Concentrated or dispersed

- *Ink-on-blotting-paper growth patterns*

- Many emerging mega cities were not planned.

- Public transport infrastructure has to be provided within the confines of their present layouts

- Physical constraints and natural barriers

## ISSUES AND CHALLENGES (iii)

- **Patterns of development and land use**

Many emerging mega cities have much less space allocated to roads than was true of western cities during their initial phase of motorization

In Chinese cities, for example, the amount of land devoted to road space is often less than 10 percent, while even in 1910, when New York City was at its most dense in terms of population per hectare, roads comprised 15 percent of the urban land area in Manhattan

## ISSUES AND CHALLENGES (iv)

- **Limited resources**

Emerging megacities of the developing world must apply limited public revenues to a score of pressing public needs that include not only transportation, but also water and sanitation services, telecommunications, and power supply.

# ISSUES AND CHALLENGES (v)

- **Low levels of income**

High poverty levels in emerging mega cities bar many residents from being in a position to afford motorized public transport, let alone purchase a private vehicle

Any public investment that provides additional capacity for private vehicle use must often come at the expense of investment in public transport or non-motorized modes that could potentially benefit a far greater number of people

# ISSUES AND CHALLENGES (vi)

- **Institutional obstacles**

- overlapping and uncoordinated institutional structures
- inadequate or poorly trained technical staff for planning and implementation functions
- lack of legal capacity to enforce regulations and laws
- limited institutional support for new, and often poorly understood, policies
- political framework in which decision making takes place

## ISSUES AND CHALLENGES (vii)

- **Non pollutant modes (++)**

Residents are much less reliant on forms of transportation that pollute the environment and/or are heavily subsidized, and are more open to using different transportation modes

According to recent estimates, walking trips account for two-thirds of the total trips in large African cities such as Dar es Salaam. Walking and cycling trips account for between 40 and 60 percent of the total trips in large cities in Indian

## **PLANNING OPTIONS (i)**

- **Long term strategic planning**
  - **On past city growth pattern**
    - **Concentrated deconcentration**  
Corrective measures – politically challenging
  - **On future city growth pattern**
    - **Develop and enforce appropriate land use policies**

# PLANNING OPTIONS (i)..

## –Land use

- preservation of government-owned or -controlled corridors and right-of-ways
- Plan for regional/zonal polynucleated development patterns

## PLANNING OPTIONS (ii)

- **Traffic & demand management**
  - Deterrents to access into CBD
    - Appropriate congestion pricing
    - Park and ride
  - Segregation of different modes of transportation for system efficiency
  - Segregating slow- from fast-moving traffic
  - Reduce turning conflicts
  - Channeling traffic to enhance flow predictability

## PLANNING OPTIONS (ii)..

- Adoption of new technologies – intelligent systems e.g. GIS Tele-Automated Traffic Control systems
- Provision of multilevel (underground, ground level and overground) parking as part of the components in public transport complexes

## PLANNING OPTIONS (ii)..

- Envision technological developments and consumer trends and preferences in transportation
- Plan for one way systems for ease of traffic flow
- Reversible-flow traffic lanes

## PLANNING OPTIONS (iii)

- **High capacity infrastructure**
  - **Acquire and preserve public transport corridors and right-of-ways**
    - Enforcement
    - Public awareness
    - Explicit zoning of public right of ways
  - **Stakeholder consultations in planning, designing and construction of public transport infrastructure**
  - **Keep core network well maintained**
    - Appropriate Road or Pavement management system
    - Road furniture
    - Special attention to intersections

## **PLANNING OPTIONS (iii)..**

- **Accommodating different modes**
  - Recognizing the role of and providing for non-motorized transport modes
  - Provide for walking -- an important mode
- **Provide for combinations of technologies**
  - **BRT; LRT; Modern Street Car etc**

## **PLANNING OPTIONS (iv)**

- **Dissemination of knowledge and technology**
  - **Data Base collection, collation, preservation and dissemination**
  - **Promote research and share results with practitioners and policy makers**

## **PLANNING OPTIONS (v)**

- **Involvement of private sector**
  - **Promote private sector financing of transport infrastructure**
  - **Involve private sector in maintenance operations**

## **PLANNING OPTIONS (vi)**

### **Institutional**

- Existence of empowered and competent public service public transport management institutions**
- Manage political sensitivity - Establishment of a technical body independent of political influence with the authority and resources to create long term plans and policies for urban development**

An example of appropriate planning  
for an emerging mega-city

# **CURITIBA-Brazil**

## Curitiba - Brazil

- **Capital of Brazilian State of Parana**
- **Largest population and largest economy in Southern Brazil**
- **Population 1.8 million with 26 metropolitan areas with a combined population of 3.5 million**
- **Curitiba first outlined its Master Plan in 1965,**
- **goals of limiting central area growth and encouraging commercial and service sector growth along two structural north-south transport arteries, radiating out from the city center.**

## Curitiba - Brazil

- **The plan called for the integration of traffic management, transportation, and land-use planning**
- **Each of the five arteries contains one two-way lane devoted exclusively to express buses.**
- **This inner lane is flanked on either side by 1) a local access lane for cars and 2) a high-capacity one-way route for use by both cars and buses**

## Curitiba - Brazil

- The city created a pedestrian network, covering an area equivalent to nearly fifty blocks, in the downtown area.
- Bus terminals on the periphery provide frequent access to the area. Furthermore, the Curitiba Public Works Plan called for 150 km of bicycle paths to be built, following river bottom valleys and railway tracks and connecting the city's districts to make the entire city accessible to bicycles.

## Curitiba - Brazil

- Plan proposed that the future extension of the city be channeled and developed along public transport-based axes radiating from the city's centre. an extensive bus system was developed along five radial corridors and several circumferential corridors to serve suburb-to-suburb travel.

## Curitiba - Brazil

- “Express buses” operate exclusively on the **arteries' dedicated busways**.
- “Rapid” buses operate on both the **arteries and on other main streets** throughout the city, and their routes are changed to respond to demand. These buses stop at **tube-shaped stations** designed for protection from the weather and for quick bus entry and exit. They also accommodate the handicapped.
- A new “bi-articulated” bus, is a form of rapid bus operating on the **outside high-capacity lanes**. Bi-articulated buses - the largest in the world - are actually three buses attached by two articulations, and are capable of carrying 270 passengers.
- “Inter-district” buses bring passengers between the city's sectors lying between the arteries, and thus **provide a crucial link between the routes** of the express and bi-articulated buses.
- Finally, “feeder buses” mix with traffic on all other city streets and bring passengers to transfer stations called **“District Terminals,”** around which local urban development and commercial activity has flourished.

## Curitiba - Brazil

- **Curitiba is a thriving example of how to 'dismantle' a problem before it starts**
- **the success of curitiba's system is due, in part, to a pragmatic and incremental approach to its public transport infrastructure**
- **A rail-based system would have cost the city's administration twenty times as much as the current bus-based network**

# This is downtown Curitiba - Brazil



- **KEY CONCLUSIONS**

- While there are several challenges, single most important issue is congestion
- Congestion is not just about car ownership, *Curitiba has the second highest per capita car ownership rate in Brazil (one car for every three people), yet, its gasoline consumption per capita is 30 percent lower than that of eight comparable Brazilian cities*
- Solutions lie in the competency and degrees of freedom of emerging mega city management institutions
  - Forward plan
  - Policy formulation
  - Implementation

# Thank you!