Intellecap
SHAPING OUTCOMES

THE ROCKEFELLER FOUNDATION

Catalyzing the New Mobility in Cities

30th March 2012

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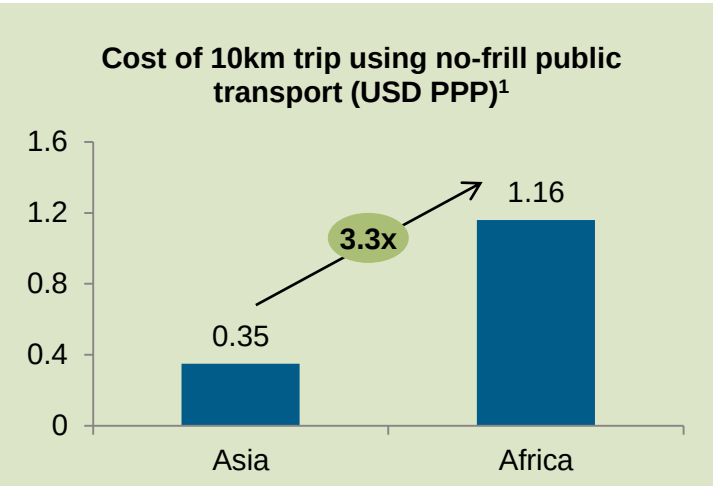
Agenda

- **Executive Summary**
- **Context and Key Definitions**
- **Current state of urban transport**
  - Public Transport
  - Paratransit
  - Walking and Cycling
- **Issues for Entrepreneurs and service providers**
- **Solutions to solve urban transport issues**
- **Deep Dives**
  - Delhi, India
  - Manila, The Philippines
  - Nairobi, Kenya
- **Annexures**

Urban poor commuters mostly walk/cycle or use affordable public transport; lack of affordable options and poor infrastructure makes commuting tough

	Extreme poor (below poverty line)	Low income
Travel Behavior in cities with no affordable public transport modes	Irrespective of the affordability of public transport, the majority of the poor who fall below the poverty line walk or cycle to access goods and employment opportunities. As they cannot afford transportation they live in informal settlements close to their employment opportunities by compromising on proper housing, sanitation etc.	In cities with no affordable public transport modes the low income commuters either walk or cycle and live in informal settlements
Travel behavior in cities with affordable public transport modes		In cities with affordable public transport modes some low income commuters use public transport by staying in formal settlements far away from their work place. Others live in informal settlements and hence walk/cycle

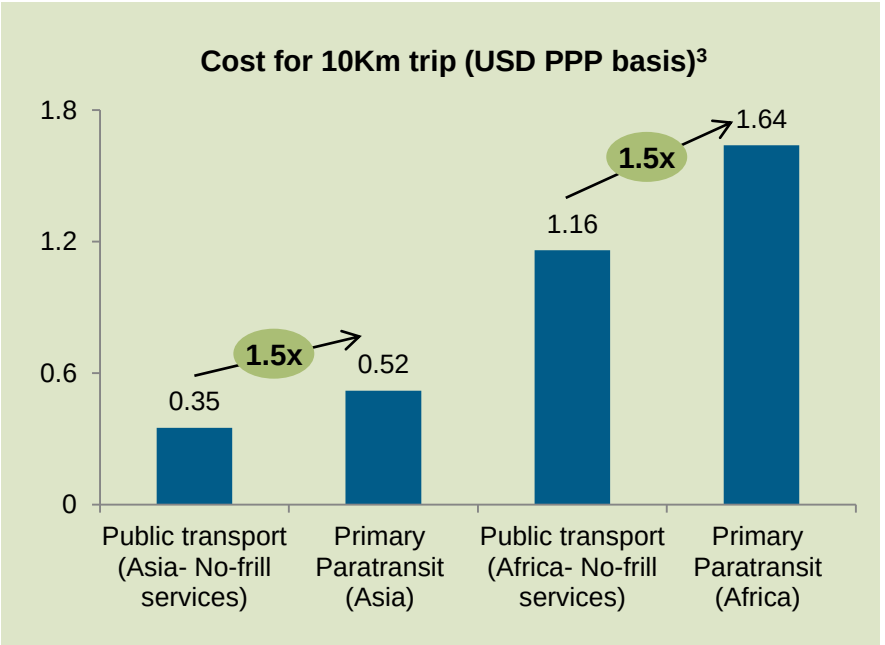
- The poor resort to walking or cycling for short distance trips, though sometimes walk up to 10-20kms everyday in cities with poor transport options . The modal shares of walking/cycling in the low income section is very high (It is in between 50-60% in cities with good public transport and in cities with poor transport facilities it is over 90%)
  - Poor infrastructure makes the environment not so conducive for the pedestrians and cyclists to use
  - Majority of the fatal accidents involve non-motorised transport (NMT) users
- Long distance trips are generally done using **public transport** modes such as metro, buses, ferries etc. In cities with effective public transport systems, the modal share of public transport options is high even amongst low income commuters:
  - The poor use no-frill or basic public transport services, not use luxury services such as high speed AC metros, buses etc.
  - The poor use buses more than the rail system because buses are more accessible when compared to trains. The trip times in buses are much higher when compared to that in trains because of congestion on roads
  - No-frill or basic public transport modes are 3.3 times less expensive in Asia when compared to Africa



Paratransit modes are less affordable for the urban poor, but generate livelihoods for 7-20% of families in major cities

- In cities where public transport infrastructure is weak long distance trips are done using **primary paratransit** modes such as Matatus, Danfos, Jeepneys etc.
  - Primary paratransit modes are 1.5 times more expensive than no-frill or basic public transport modes in both Asia and Africa
  - Over speeding and crowding makes commuting in paratransit modes very unsafe. The high number of old vehicles being used as paratransit has adverse effects on the environment (there are over 60,000 old (>30 years) Jeepneys that ply in the metro Manila
- Paratransit **feeders** are used for short distance commuting, generally modal shares of feeders in the low income sector is very low
  - Feeders are not affordable across Asia and Africa. A 3km trip in a feeder costs more than what it costs for a 10km trip using public transport modes across Asia and Africa[2]

- **Paratransit operations** generate livelihood opportunities for many, although the sector is extremely unorganized
- Amongst the owners, drivers, support staff (such as conductors, etc.) and other stakeholders involved, the drivers and the support staff members are the most vulnerable
- There are three ownership structures possible, based on the relationship between the driver and his owner. The driver can either work on a fixed salary, take the vehicle on rent and make profit, or own the vehicle
- Drivers who own the vehicles earn the most and the drivers who operate non-motorized modes (such as cycle rickshaws) are the most vulnerable
- Most drivers have long work days as they end up working for 14-18 hours in a day. This also leads to rash driving and over filling the vehicles which makes commuting in paratransit modes an unsafe and unpleasant experience



Other key trends in funding, private sector activity & city plans

- **Across Asia and Africa, transport jurisdiction and city management structures are fragmented**
  - This makes policy change and implementation tougher
  - Very few cities have comprehensive city-level plans for urban transport
  - Often, plans are designed for car users and very few cities have inclusive plans which cater to all commuters

- **Rail Mass Rapid Transit (MRT) systems are attracting funding**
  - Cities tend to ignore more optimal solutions such as the Bus Rapid Transit (BRT) for more fancy and cost inefficient rail systems

- **Green initiatives are increasingly popular,** such as eco-friendly fuels.
  - For example, the ADB is interested in funding a project to convert diesel paratransit vehicles in Manila into electric vehicles

- **Limited attention to exclusive non-motorized transit (NMT) projects from both city managements and funders**
  - NMT projects are typically implemented along with large projects such as BRT; the World bank is especially interested in promoting BRTs along with NMT lanes

- **Paratransit remains largely informal; few private sector models exist which help organize the sector**
  - Current models empower the entrepreneur through technologies such as call centers or financial institutions which provide access to finance services to the entrepreneurs

Potential pro-poor public transport solutions

- Constituting a **unified body** (an urban transport authority) to handle urban mobility issues in a city. With the city boundaries increasing rapidly and the area moving beyond the boundaries of single local government it is import to have an authority to handle the entire metropolitan area
- Creating a separate **transport fund** to help cross subsidize various services in transport; ex: parking fees can be used to subsidize public transport fares or to increase the network
- Deploying **Public Private Partnership (PPP)** models whenever necessary to scale transport operations. When privatization is being promoted it is important to promote limited competition. This can happen by keeping high barriers of entry such as high fleet size, selection based on company that promises lowest fare etc.
- Promoting **efficient public transport** systems which are **accessible, affordable and that reduce congestion** :
  - Create public transport for all; i.e. it is not only important to have affordable no-frill solutions for the poor but it is also important to have luxury services for the more affluent in order to reduce congestion in cities and improve travel times for those using public transport
  - Develop rail based rapid transit systems for large cities such as Delhi and Manila which have the potential to attract lot of commuters that use private vehicles. These modes currently do not attract the poor as they are relatively more expensive and are not accessible as buses but would indirectly reduce the congestion on roads which would make commuting pleasant for bus users
  - Implement ‘Right of way’ for buses by building BRT corridors which drastically reduce the travel time for bus commuters and improve efficiency; for the cost of building a kilometer of a metro line, over 12kms of BRT lines can be built
  - Offer subsidies and innovative pricing mechanisms for sensitive groups. For example most transport services across India provide subsidies for school going children, elderly citizens etc. Some governments also provide subsidies for the poor.

Paratransit solutions to improve commuter & driver experiences

- **Regulate paratransit** in cities with weak public transport:
  - Enforce regulated fares across the city for all paratransit operators. If not regulated, operators over charge the commuters based on demand. While regulating the fares the interests of the service providers (who are often poor) also must be kept in mind
  - Promote the usage of high capacity vehicles, especially in high traffic roads
  - Design comprehensive route plans based on traffic demand especially for primary modes in the city; multiple switches between vehicles has been identified as an issue which makes commuting less affordable for the poor
  - Implement robust safety and emission control mechanisms
- **Organize the sector:** Very few entrepreneurs have come up with solutions to organize the space there is still a huge need for organizations that can streamline the operations by keeping the commuter and service provider needs in mind. Some examples include G Auto, Fazilka, Go-Jek etc. which provide technological support (such as call centers) to paratansit operators or take care of other benefits such as healthcare, education, etc.
- **Provide access to finance services:** As the drivers who own the vehicles earn the most perhaps providing access to finance for drivers to buy their own vehicles can be a good solution to improve their earnings in a longer run. Currently such models are seen in non-motorized modes which have very low capex and financial institutions typically do not require collateral to provide such loans. Rickshaw bank in Guwahati, India is one such example which uses the group lending concept to give loans to cycle rickshaw drivers
- **Use advertising as an alternate revenue source:** This is a largely untapped opportunity. Given the right planning paratransit modes can be used as an effective mode to publish local advertisements. This in turn can generate additional revenues to the driver. Currently in most cities the advertising policies are not conducive for ads on paratransit or public transport modes

Potential pro-poor solutions to improve walking and cycling

- **Build appropriate infrastructure**
  - Create dedicated infrastructure for walking, cycling and other non motorized transport to support poor commuters
  - Allocate adequate budget based on infrastructure development/strengthening plan, aligned with policy commitments
  - Move from “tiny” pilots to “substantial” ones that have a modicum of scale and thus demonstration effect; include in city plans
  - Integrate the creation/strengthening of walking/cycling infrastructure with BRT wherever the latter is being implemented coupled with efforts at keeping the implementers alive to the need for quality walking cycling infrastructure with BRT
  - Give priority to strengthening walking/cycling infrastructure in areas (residential, commercial, educational areas and around transport terminals) where the city management/authorities are more amenable to change
  - Advocate for recasting unfavorable regulations if they come in way of improving walking/cycling infrastructure
  - Improve approach and manage externalities better by:
    - Promoting walking/cycling as both pro poor and green agendas simultaneously
    - Improving externalities such as law and order and street lighting
    - Developing and implementing a sensitized hawker’s policy to ensure their sidewalk presence without creating obstructions
- **Promote Public Bike Sharing (PBS)**
  - Attract the affluent and the influential people of the society in order to influence the policy and decision makers
  - Do not wait for the infrastructure to happen before bike sharing programme is initiated
  - Plan exposure visits for policy makers, planners and implementers to successful initiatives at scale like Hangzhou PBS system
  - Raise awareness on biking; organize events and publicize widely
- **In Africa, promote the availability of bicycles**
  - Waive /reduce import duty on bicycles
  - Innovate new models of bicycles that can be locally manufactured
  - Build commuters and service provider capacities to cycle, build and maintain cycles

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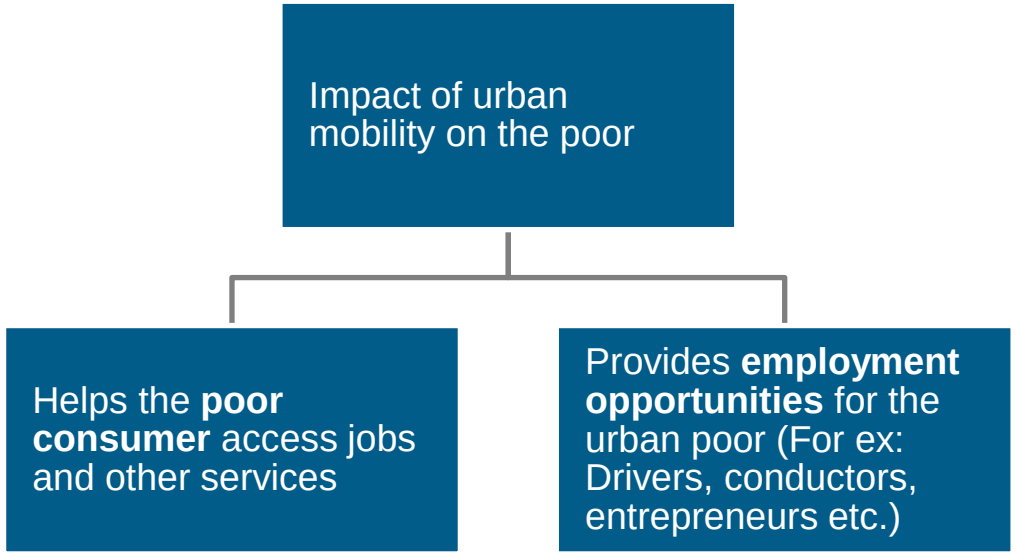
Context and scope of the project

One of the key challenges for urban agglomerations or cities have been to improve the mobility for the urban poor, who are the most marginalized in the face of rapid urbanization, population explosion and congestion due to the increase in the number of private vehicles. In this regard Intellecap has been mandated to understand how to improve mobility for the urban poor, by identifying innovative business/service models, good practices and policy level interventions that maximize mobility for the urban poor across Asia and Africa. As part of the study we looked at innovations in the areas of public transport, paratransit and walking and cycling across the Asian and African cities and identified best practices and solutions that would improve the value proposition for the urban poor commuters and entrepreneurs.



Key Definitions

- **Public transport:** Government run transportation systems for the public, usually based on high capacity vehicles such as trains, buses with a capacity of more than 40 seats
- **Paratransit:** Informal, privately run transportation systems for the public, such as Jeepneys (Manila), Rickshaws (Dhaka), etc.
- **Primary Mode:** Any transportation mode (public or paratransit) which is majorly used for long distances (>8km length) commuting
- **Feeder :** Modes which connects people to the primary modes. Generally the feeders are privately run paratransit modes . The average trip lengths assumed for feeders is 3-8 kms
- **Modal Share:** Percentage of trips using a particular type of transportation to total number of trips

Value Propositions for the poor commuters:

- **Affordability:** The affordability is calculated as the ratio of monthly expenditure on a mode of transport to the average income (per capita) in the city
- **Accessibility:** Degree to which the transport mode is available when needed based on anecdotal and secondary evidence
- Other value propositions such as safety, trip time, comfort etc. were also taking into consideration for analysis

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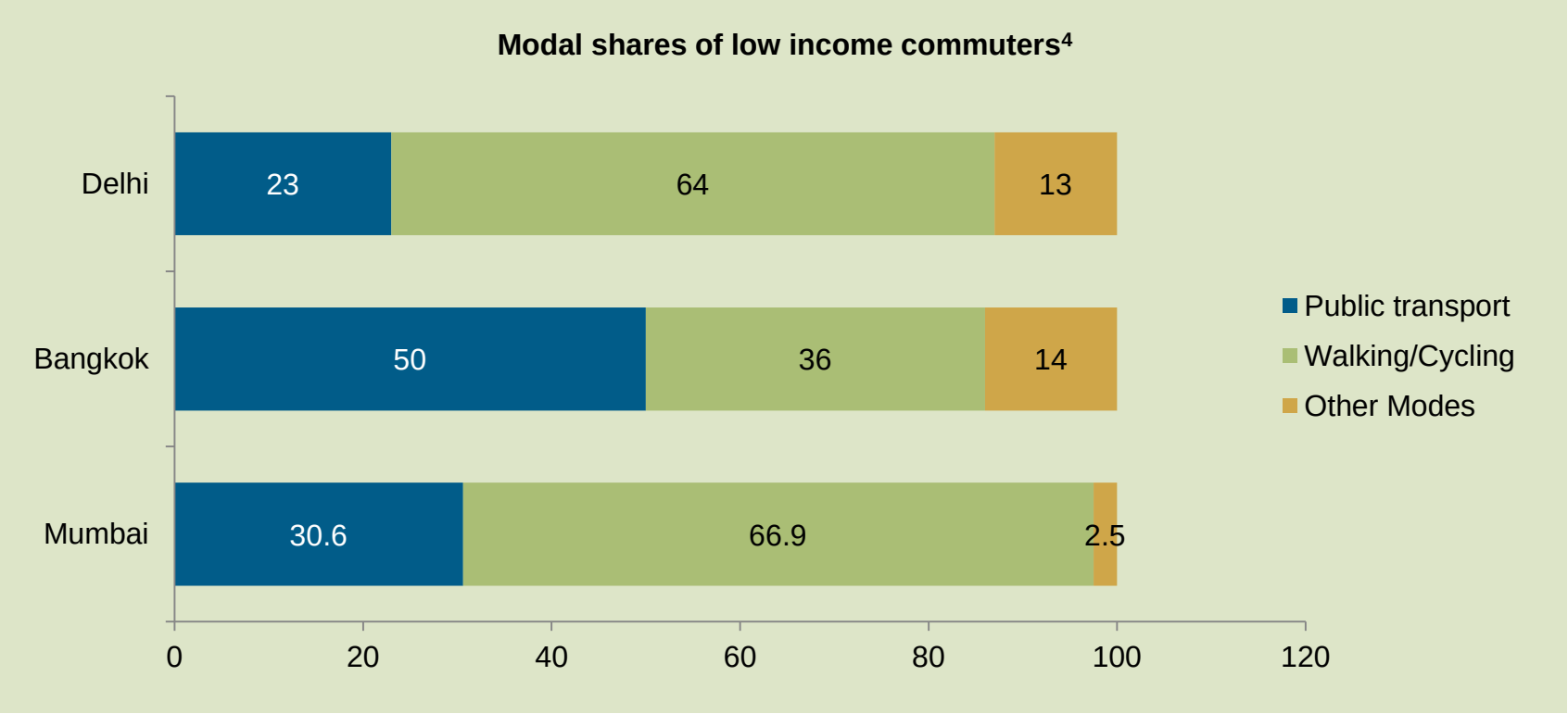
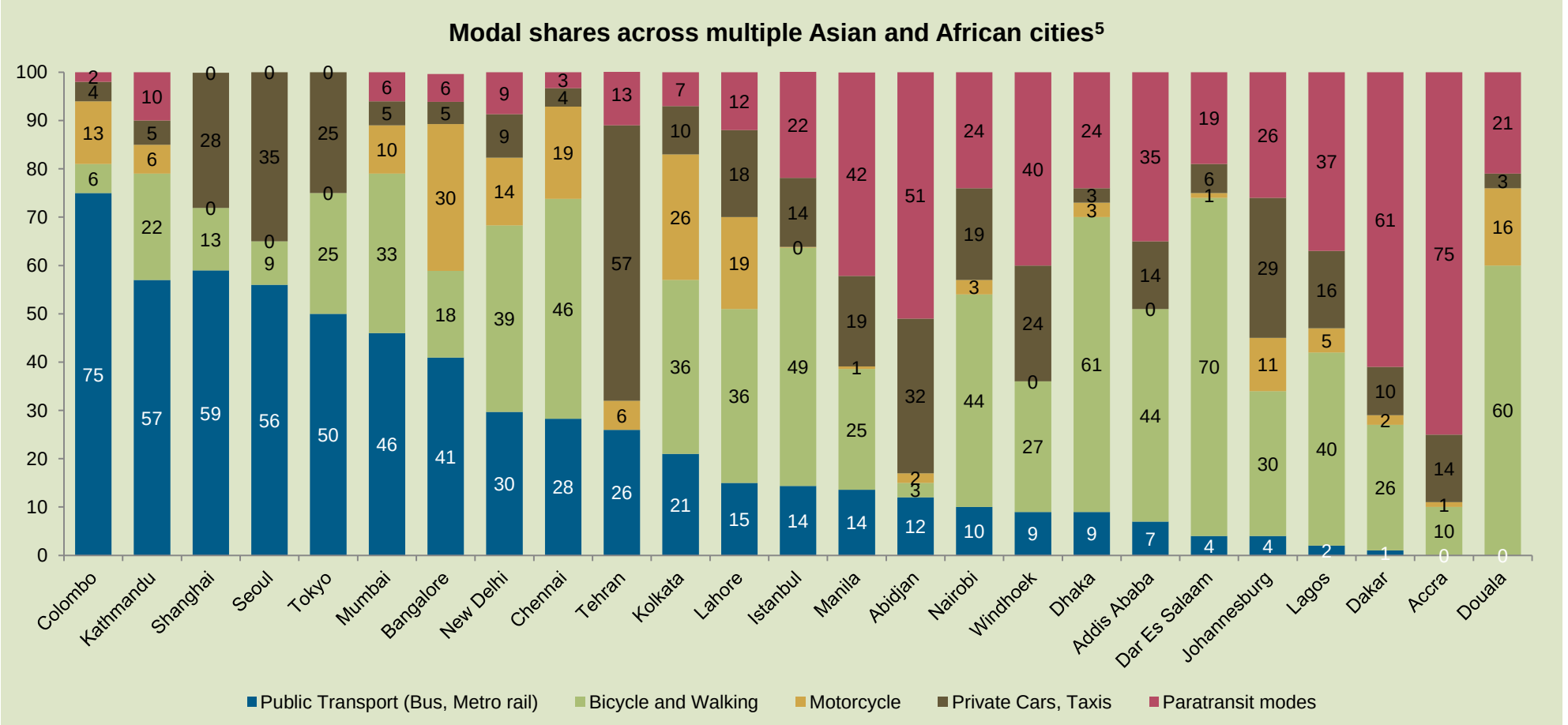
The urban poor mostly use public transport, walk or cycle

- Long distance trips are generally done using public transport modes such as metro, buses, ferries etc.
- In cities where public transport infrastructure is weak long distance trips are done using primary paratransit modes such as Matatus, Danfos, Jeepneys etc.
- Paratransit feeders are used for short distances, though the modal shares of feeders among the low income sector is low
- The poor resort to walking or cycling for short distance trips, the modal shares of walking/cycling in the low income section is very high



Most Asian and African cities have weak public transport; paratransit fills the gap left by public transport in most cities

- Public transport is relatively more developed in Asian cities when compared to their African counterparts
- In cities where public transport is weak, paratransit fills the gap left by public transport. For example: The modal share of public transport in Manila is 14% and that of paratransit is 42%

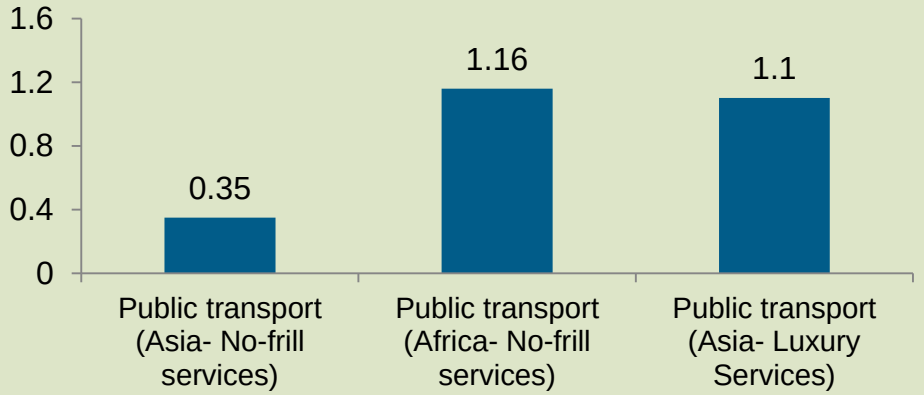


Public transport is 3.3 times more affordable in Asia when compared to Africa

No Frill services cater to the poor:

- Public transport modes can be classified into two broad categories a) no-frill services b) luxury services . No-frill public transport modes are basic services while the luxury services provide value adds such as air condition, comfortable seats etc.
- No frill public transport modes are the most affordable public transport modes. No frill public transport modes are 3.3 times more affordable in Asia when compared to no-frill services in Africa ; in fact they are as expensive as luxury services in Asia
- Luxury public transit modes (such as low floor AC buses, AC trains and metros) are 3.1 times more expensive when compared to no-frill modes in Asia

Cost for 10Km trip (USD PPP basis)[1]



Poor use buses more than metros, despite higher transit time

- With the exception of cities like Mumbai which have strong no-frill rail networks, the poor mostly use buses for commuting
- The modern day metro trains are not catering to the poor both from affordability and accessibility perspective. For example: 77% of the commuters who use the metro in Delhi are people with monthly incomes of USD 378[6] or more whereas the per capita monthly income of Delhi is USD 104
- On the other hand building efficient mass rapid transit systems on rail is an expensive affair
- Buses are more accessible when compared to trains as trains are built for commuting in the heart of the city (where high capacity commuting is required) and most of the poor stay in suburbs
- Commuting in buses is relatively more time consuming when compared to trains

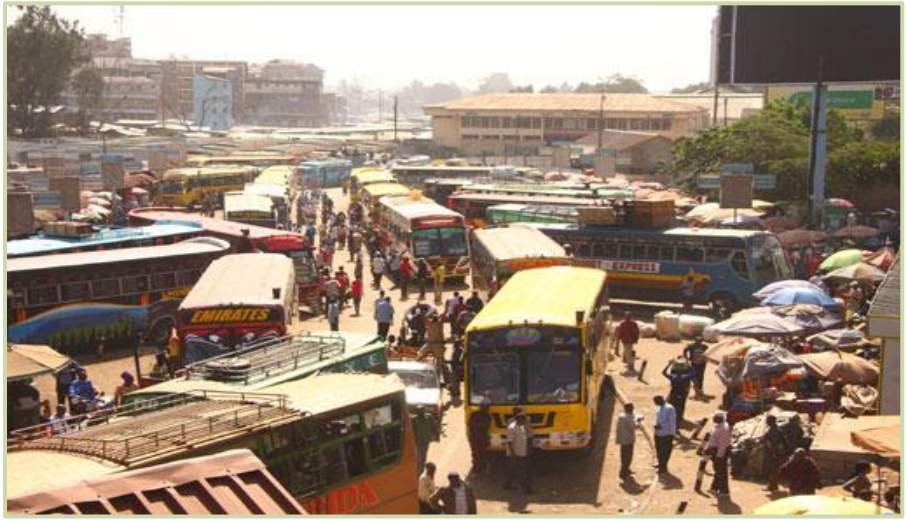
Policies are in the right direction:

- Focusing on luxury public transport for the non-captive users (middle class and the rich) to reduce congestion on most city roads
- Some cities have enacted pro poor policies such as subsidies for no frill services
- Policy makers have also recognized the importance of giving 'right of way' for public transport and NMT commuters

Non compliance of regulations by private bus operators results in bad commuter experience

- In some cities bus operations are outsourced to private players who run the fleet on the regulations which are pre determined by the government agencies such as the Road Transport Authority (RTA)
- In most cities these private players do not comply with the guidelines which negatively impacts the overall commuter experience. Here are a few issues with privatizing buses.
  - **Overcharging**: In some cities the private players do not comply with the fare regulations by the government. For example, in Nairobi, private buses charge higher fares during peak hours. This deters them from using public transport
  - **No Schedule or route planning**: One of the main features that differentiates public transport from paratransit is scheduled operations. In most cities private buses do not run on fixed schedules and most of them do not have proper route planning as most of them end up plying in the arterial routes and neglect the internal routes impacting the accessibility of commuters
  - **Over speeding**: Oversupply of buses on some roads results in competition between various private bus operators who end up driving rashly to both pick up more passengers and to do more trips. This makes it very risky not only for the commuters traveling in the bus also for pedestrians and other road users.

Case of blue line buses in Delhi: The Blue line buses were operated by the private players in Delhi. The owner of the bus would take a route license from the government and gave out the bus to drivers on rent. The licenses were not capped and hence there were many buses plying the same route which created a huge demand supply mismatch. This not only encouraged the driver to drive fast to do more trips per day, but also created cutthroat competition among bus operators for picking up more commuters. This made the commuters experience quite unpleasant.



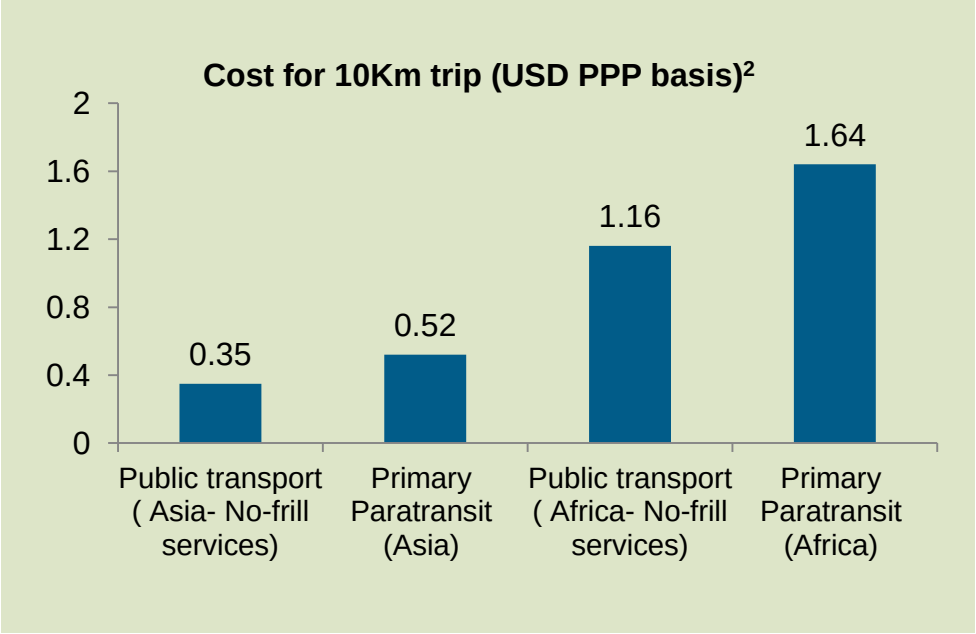
Over supply of buses at a bus terminal in Nairobi

Primary paratransit modes are more expensive than public transport across Asia and Africa

In cities with weak public transport, paratransit acts as a primary mode

In cities with weak public transport, paratransit acts as a primary mode:

- Primary paratransit modes are 1.4 times more expensive than public transport modes in both Asia and Africa
- All paratransit modes are no-frill services
- The capacity of primary paratransit modes is relatively lower than public transport modes and is one of the reasons why paratransit modes are more expensive



Other issues with primary paratransit modes

Other issues with primary paratransit modes:

Low capacity of the mode increases congestion: With rapid motorization, the use of low capacity primary paratransit modes will only worsen the congestion levels in the city.

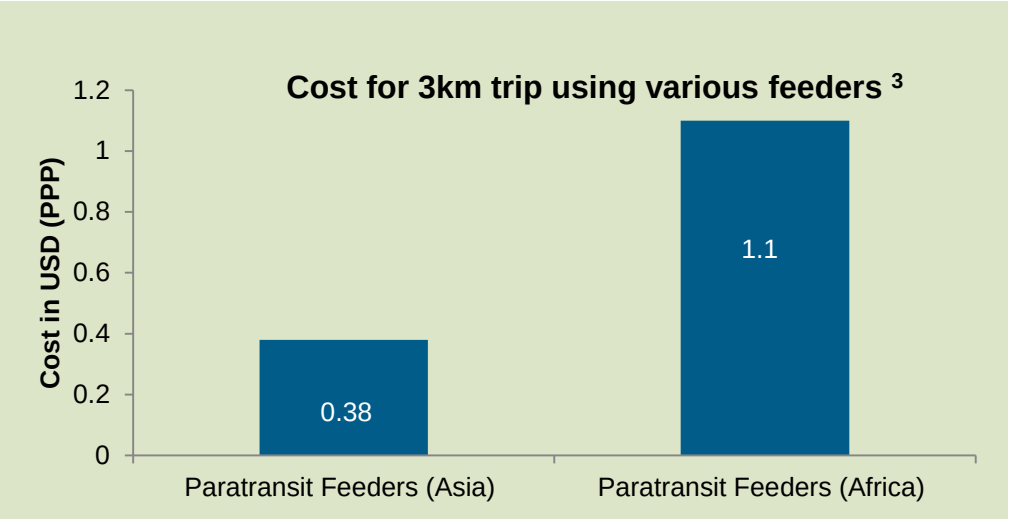
- Congestion a curse to the poor: In cities like Nairobi and Lagos where the price of the Danfo and Matatus fluctuates with the amount of traffic on the road, congestion becomes a curse to the poor. For example in Lagos a peak hour 10km ride in a Danfo would cost 100 Naira, whereas the same distance for a private car owner would cost only 65 Naira (1 liter of petrol). This encourages more cars to come on the road, further increases congestion and impact the poor adversely

Use of old vehicles increases pollution: In Lagos, Nigeria the average age of Danfos is 15 years, these are generally used vehicles which are imported from the United Kingdom. Entrepreneurs buy older vehicles because the import duty on older vehicles is much lower, creating misaligned incentives

Speeding and Rash driving:
Speeding and rash driving has been a common trend observed across multiple primary paratransit modes. Sometimes the owner-ship structure is a major reason for over speeding, for example a driver who takes a vehicle on rent tends to driver rashly (as its not his vehicle) when compared to driver who owns the vehicle

Paratransit feeders (used for short trips) can be classified into three major types; typically not used by the poor

	Non Motorized	Motorized (Non Shared)	Motorized (Shared)
Definition	These are modes which do not have a motor and run on man / animal energy	These are vehicles that run on a motor, non-shared modes are the ones where the cost is borne by single commuter	These are vehicles that run on a motor, shared modes are ones where the cost is borne by more than one commuter
Examples	Rickshaws (pedal powered three wheeler), animal carts, rented cycles and the like	Okada (Bike Taxis), unshared Autos and taxis	Shared autos, Tricycles (bike with a cabin attached) ,
Capacity (Seats)	2-3	1-4	3-8
Average trip length	2-3 kms	Okada: 3-5 kms Non shared taxis: NA	3-8kms



Feeders are expensive across Asia and Africa:

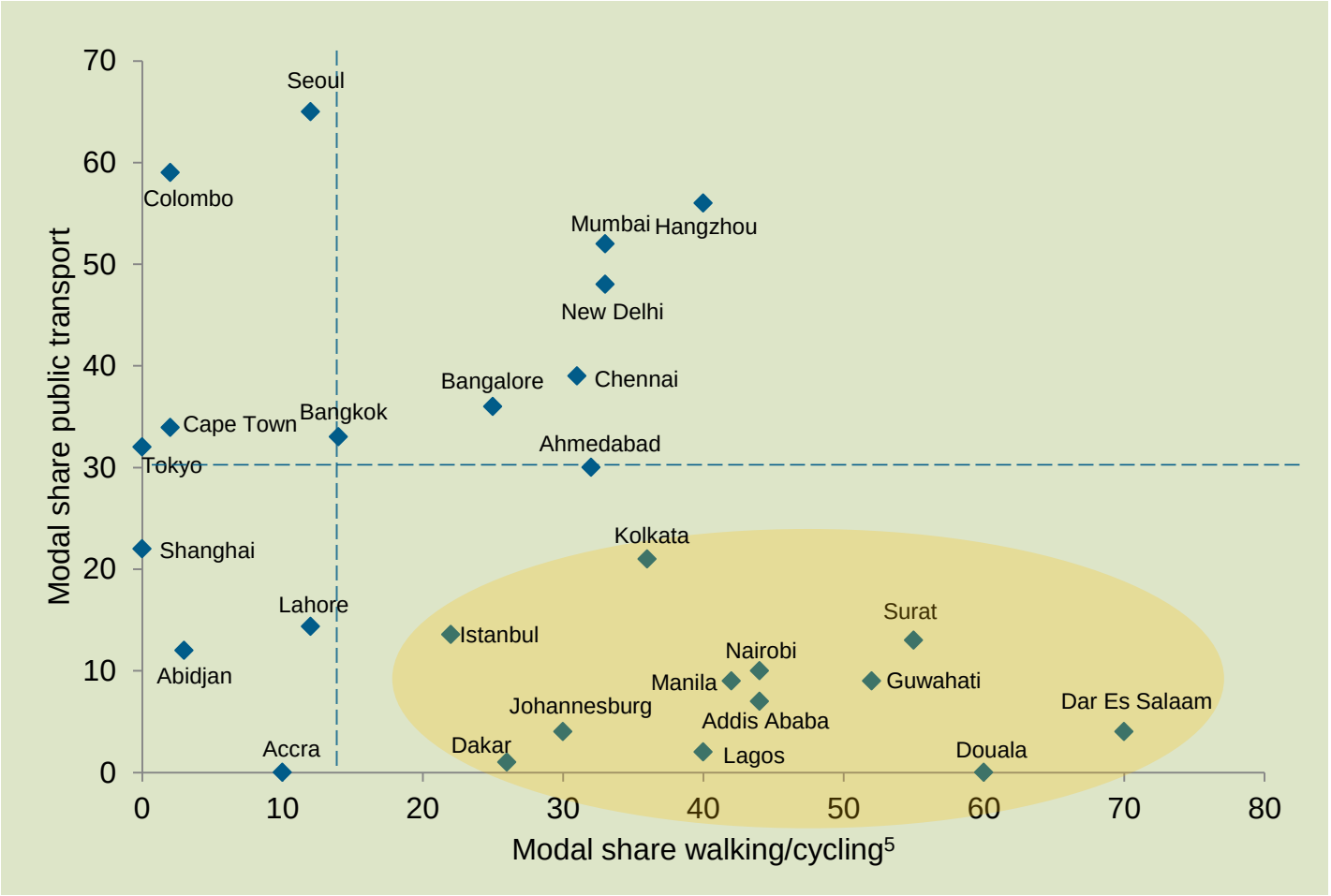
- A 3km trip using a feeder in Asia and Africa would cost roughly 70% of the cost of using a primary paratransit mode for a 10km trip
- On an average a consumer spends 4-17% of his monthly earnings to use the feeder, which is high considering feeder would only connect him to a primary mode and doesn't complete the trip

Paratransit feeders: unsafe, cause congestion and pollution

- **Large number of feeders cause congestion:**
  - Large number of low speed, low capacity vehicles cause congestion in the city and hence feeders are being banned from main roads in the cities and can only operate in internal roads. Like in case of Tricycles and Pedicabs in Manila, the cycle rickshaws are also banned from major roads in Dhaka. There are more than 600,000 such cycle rickshaws which impact the livelihoods of 2.4 million people (assuming 4 people per family), banning rickshaws creates huge amount of unemployment and its an highly political issue to implement such laws effectively in cities like Dhaka.
  - The policy makers recognize the same and are planning to use the rickshaw as an efficient feeder which is integrated into the public transport system that they aim to develop. In the past the rickshaw acted as a primary mode as the average trip lengths that commuters used to travel were low, but as the city is expanding rapidly the average trip lengths have also increased and hence the rickshaws can no more act as primary modes

- **Feeders such as Okadas and Tricycles are extremely unsafe:** The Okadas (Bike taxis) and the tricycles are very unsafe for passengers as the unique selling proposition (USP) for such modes is speed and swift maneuverability the Okada and tricycle drivers are thus forced to drive rashly and are involved in lot of fatal accidents. (over 14% of the accidents that Okada drivers meet with are fatal accidents)
- **Pollution:** Paratransit feeders are one of the major sources of pollution especially in cities which are predominately dependent on motorized feeders, for example Manila has over 100,000 tricycles. Use of old technologies (such as two stroke engines) and non-ecofriendly fuels such as diesel and petrol worsens the scenario in such cities.
- **Drivers overcharge commuters and do not follow regulations:** Though paratransit rates are regulated in most Asian cities it is often observed that drivers do not comply with the regulations and tend to over charge commuters. The paratransit space is very unorganized and hence maintaining discipline in terms of fares charged and the way the drivers drive is extremely difficult

Weak public transport and unaffordable paratransit result in high numbers of captive walking/cycling commuters

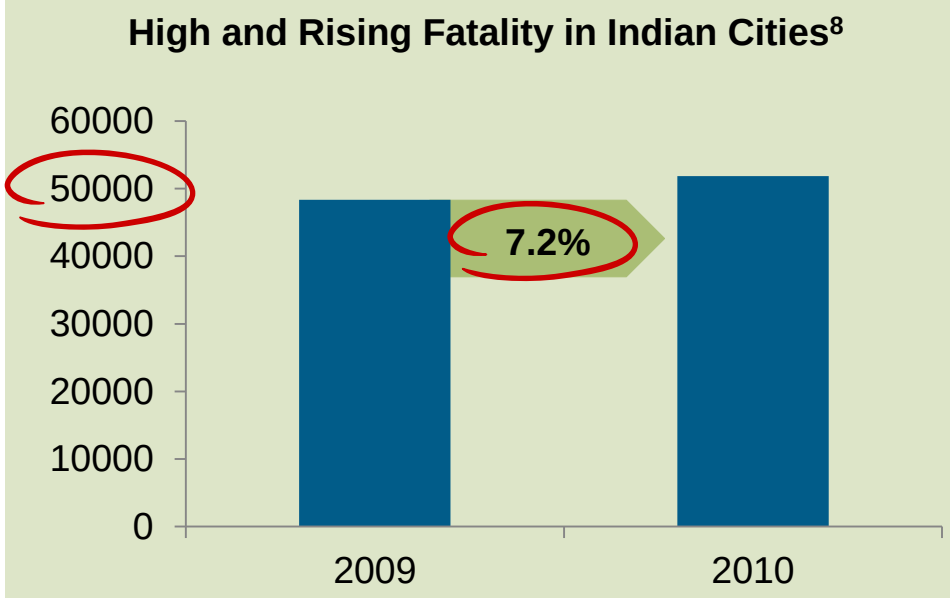


The policy environment for promoting cycling is more conducive in Asia and Anglophone Africa than in Francophone Africa

- Walking and cycling are used mostly by the poorest of the poor in both Asia and Africa
- African cities heavily favour walking over cycling unlike their Asian counterparts
- While Asian Cities were always high on cycling, its modal share has declined over time[7]
- Despite the decline of the modal share of bicycling over the years, Asian cities are comparatively much higher even now on their modal share of bicycling over their African counterparts that have always had and still have a negligible modal share of bicycling
- Promotion of bicycling in African cities is harder as they need development of cycling skills and efforts to make bicycles available at a large scale

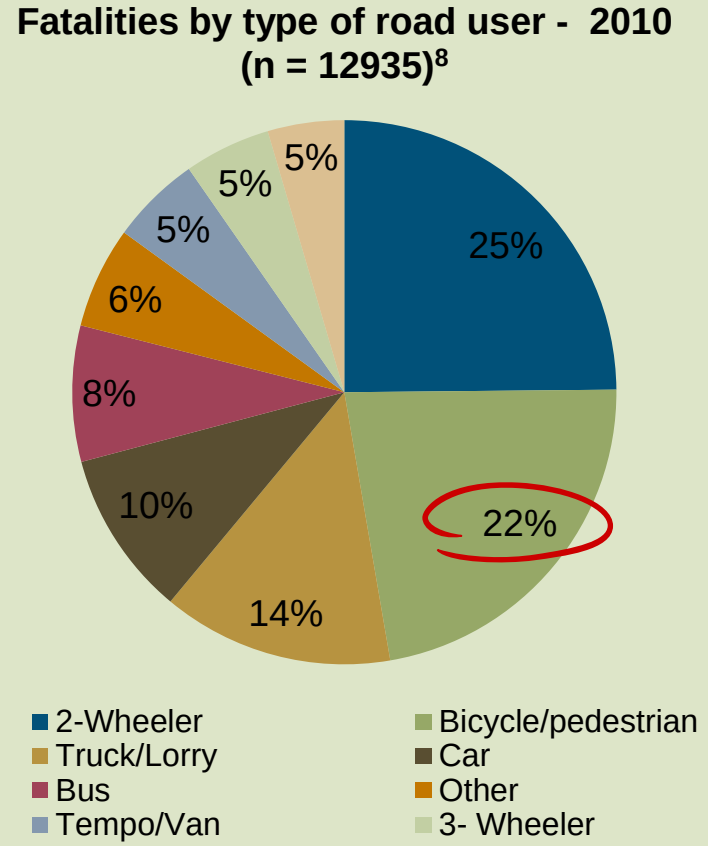
The urban transport environment is hostile to pedestrians and bicyclists

Example –fatality data from 35 Indian cities suggest that the fatality rates are on rise

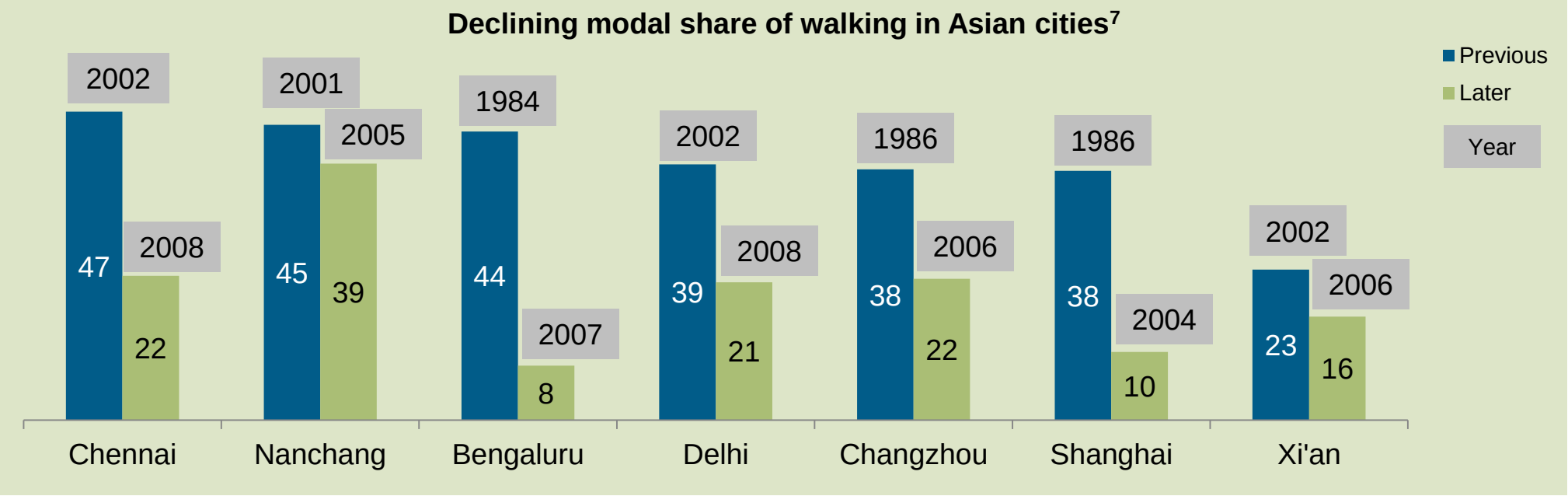


- Between Bicyclists and Pedestrians, the latter are the worst hit among fatalities
- Bicycle is perceived as poor man's transport in many Asian cities

Pedestrians and cyclists comprise a major share of fatalities in 35 Indian cities



Poor urban transport environment for walking/cycling increases privately owned motorized transport leading to negative externalities for all commuters



Cities	Mode with Greatest Gain
Bengaluru	Two Wheeler and Car
Changzhou	Two Wheeler and Car
Chennai	Two Wheeler
Delhi	Two Wheeler and Car
Nanchang	Car

- Most of those walking/cycling are “captive users” who would readily shift to privately owned motorized transport as soon as they can afford to
- Shifting to privately owned motorized transport leads to negative externalities like congestion, pollution and safety hazards

Policy to promote walking/cycling has left much to be desired both in Asian and African cities

Policy on promoting walking/cycling is weak in Asia with very few cities having planned and executed on them:

- Primarily driven by the low carbon agenda of the funding agencies like UNEP, GEF, etc.
- Difficult to push through policy changes across all cities in any country owing to diffused responsibilities across geographies
- Very few cities across Asia have robust policies on promoting walking/cycling
- Multiplicity of institutions with lack of clarity on the institutional level roles and responsibilities results in poor planning and implementation of walking/cycling policies
- Cities that are quite congested already often do not have enough space for dedicated walking/cycling tracks, leading to a general reluctance on their part to push the walking/cycling agenda

Policy on promoting walking/cycling is weaker in Africa than in Asia with few cities being able to even begin planning and execution

- Barring South Africa, policy to promote walking/ cycling in Africa is in its rudimentary stage
- Most policy for walking and cycling is being pushed as part of low carbon agenda
- Most of the cities in Africa are under the diktat of one national level authority and therefore pushing policy reforms across multiple cities in the same nation is a relatively easier proposition in comparison to Asia
- Most African cities are still in process of implementing a pilot project featuring their first dedicated cycling track so that the same may prove to be an example for other cities in the nation and even to cities located in other African nations
- As Africa is very high on walking and quite low on cycling, numerous examples of policies facilitating projects that promote cycling have been observed in Africa
- Reluctance to promote dedicated cycling tracks is stronger in Africa than in Asia as the former are seen settling for or advocating mixed traffic with speed limits of 25-30 kmph with heavy policing

Traffic engineering, limited budgets and lack of champions limit political will for promoting walking/cycling

- It is the poorest of the poor who walk and cycle and their ability to sway policy making, planning and implementation in their favour is rather limited
- The “traffic engineering” paradigm of urban transport development that focus on the mobility of the vehicles rather than “integrated transport” paradigm that focuses on the mobility of the people results in policy on walking/cycling being neglected. The former paradigm results in
  - No policy that focuses on walking and cycling
  - Commitment of resources for creating infrastructure for privately owned motorized transport
- Champions of policy making in favour of privately owned motorized transport are many with strong lobbying to further their agenda
- The genuine need for providing infrastructure for public transport often crowds out funding of walking and cycling related infrastructure

Some bright spots:

- People’s Republic of China (PRC), the world’s most populous nation accounting for nearly one fifth of the humanity and once known as “Cycling Kingdom” of the world have decided to promote walking/cycling across its cities in order to arrest the decline and increase the modal share of walking and cycling
- India, the second most populous nation of the world accounting for one seventh of the humanity in its National Urban Transport Policy (NUTP) seeks to adopt the “mobility” paradigm as against earlier paradigm of “traffic engineering” in urban transport development
- African cities have been approached by agencies like UNEP who have initiated pilot projects in important cities like Nairobi (Kenya) on promoting walking/cycling, so that the same may have the much needed demonstration effect across other cities in Africa
- Asian cities other than China and India have also shown similar enthusiasm in moving towards “mobility” paradigm from the “traffic engineering” paradigm (example – Bangkok in Thailand, Changwon in South Korea and Manila in The Philippines)

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Three ownership structures are possible in paratransit space

Dual entrepreneur model

Owner
Owns a fleet of vehicles and gives them out for rent, the revenue source for the owner is only rent

Entrepreneur/Driver
Takes the vehicle on rent and does business

Owner – Driver Model

Owner
Owns the vehicles and hires drivers/other staff to run the operations

Driver
The driver/other staff work on fixed salary often with a variable component

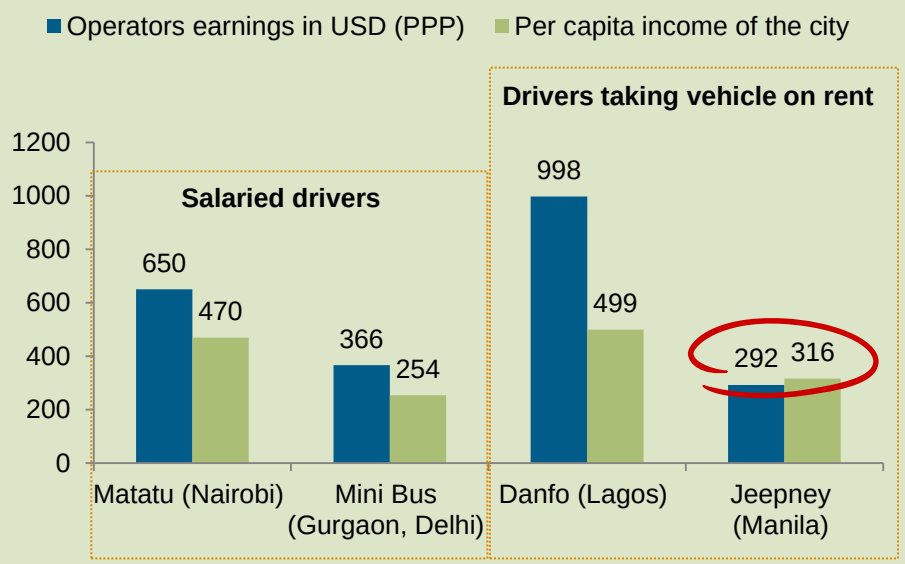
Owner is the Driver Model

The owner is the driver in this model, there are no additional costs such as rent or salary

- **Dual Entrepreneur Model:** Common in both feeder and primary paratransit modes. For example the model is seen in case of cycle rickshaws in Asia as well as in case of Danfos in Nigeria. In this model the driver and conductor (primary modes) are more vulnerable. The owner earns rent from a fleet of vehicles. The driver is generally responsible for all the operational costs while the owner takes care of periodic costs such as licensing, maintenance etc
- **Owner-Driver Model:** In this case the owner hires his staff to run his fleet of vehicles. The staff, which includes the driver and his assistant (conductor) often belong to the low income groups (public transport modes also operate on this model)
- **Owner is the Driver Model:** This model is largely seen in paratransit feeders where the driver can afford to buy low capacity paratransit feeders as the capex is low. In this case the owner is the driver and he is likely to be from low income segment

Operators who run Non-Motorized modes are most vulnerable; drivers who run their own vehicle earn the most

In primary paratransit, drivers who take vehicles on rent earn more[9]

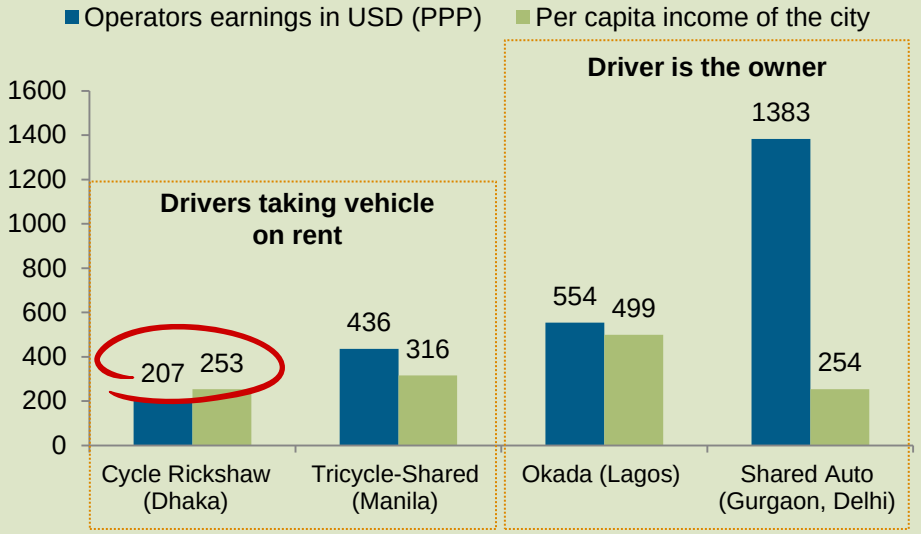


For Nairobi low income expenditure was taken into account

- The drivers who work on a salary earn less than the drivers who operate the vehicles on rent
- In the case of Jeepneys in Manila, the drivers earn less than the per capita income because of an oversupply of Jeepneys in the city. The rent of the Jeepney is often twice the daily earning of the driver
- Drivers often cannot afford to buy the vehicles because of the high capital expenditure required

In paratransit feeders operators who own their vehicle earn more [10]

- The monthly earnings of motorized modes are at least 2-5 times greater than that of non-motorized modes. Rickshaw pullers in most cities earn less than the percapita income of the city
- The monthly earnings of drivers who run their own vehicles is higher than that of drivers who take the vehicle on rent



Rickshaw drivers are mostly migrant farmers who migrate to cities from rural areas in non-farming seasons. Hence most of them prefer to take the vehicle on rent. In Indian cities almost 95% rickshaw pullers take rickshaws on rent[11]

Long work hours and pressure to recover rent/ earn additional income pushes paratransit operators to break rules

Lifestyle of typical paratransit operator:

A typical paratransit driver spends 14-16 hours working everyday. Most of them are addicted either to alcohol, tobacco or other harmful items. Many rickshaw pullers are migrants who come to the city for employment and live out on the rickshaw as they do not have housing. In the case of Jeepney in Manila, housing is provided by the owner (all Jeepney drivers under a particular owner go back to the garage and spend their nights there). Even Okada drivers are addicted to drugs, and often drive the Okadas because of high levels of unemployment in Lagos.

Over speeding/ rash driving :

In both the dual entrepreneur and the owner-driver based model the drivers are under pressure either to recover the rent that they owe to the owner and to earn more to take home, which results in over speeding. In the case of owner cum driver model the chance of over speeding is lower because the driver owns the vehicle and is likely to be more conscious while driving

Over charging: Over charging is not uncommon especially in African cities where the fare of the Matatu ride changes with the amount of traffic on the road and the time of the day, Sometimes it also changes based on the weather conditions, for example on rainy days they charge more. Over charging happens because the driver wants to earn an extra buck and most of the times the money doesn't eventually reach the owner of the vehicle. Even when the prices are regulated drivers overcharge in high demand periods as the sector is completely unorganized it is tough to maintain discipline across various operators

Not complying to licensing norms: There are a lot of cases where paratransit operators run their vehicles without a license. This is especially seen in the case of rickshaws where most operators are migrants and do not have proper identification or a permanent address on which is mandatory to procure a license. For example in case of Dhaka there are more than 600,000 cycle rickshaws that ply in the metropolitan area and only roughly 90,000 of them have licenses.

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Solutions to improve urban mobility of the poor – a snapshot

	1 Public transport	2 Paratransit	3 Walking/Cycling	4 Stakeholders (Paratransit)
Issues	1. Affordability 2. Long travel time 3. Non compliance of rules by private operators	1. Affordability 2. Lack of safety 3. Highly polluting	1. Lack of safety 2. Poor Walkability in cities 3. Accessibility	1. Lack of organization 2. Access to formal finance
Best Practices	1a. Provide subsidies for the poor and design innovative pricing mechanisms 1b. Build infrastructure to provide 'right of way' to public transport users 1c. Operate buses under single authority or promote limited competition	2a. Regulate pricing 2b. Use high capacity vehicles 2c. Use eco-friendly technologies	3a. Create appropriate infrastructure 3b. Promote public bike sharing (PBS) 3c. Promote bike ownership 3d. Promote cycling in regions with low cycling modal share	4a. Organizing the sector 4b. Providing access to finance

5 Efficient city planning and management a key to implement most best practices (Best Practices)

5a. Single urban transport authority
5b. Urban transport fund

1a Transport policies support subsidies and innovative pricing mechanisms

Providing subsidies to the poor and improving ridership on public transport modes through innovative pricing mechanism is part of most country level transport policies, to state a few:

- The Indian National Urban transport policy clearly states that the government would always provide basic services (no-frill) to the poor at a subsidized price
- The Dhaka policy states that the government will plan a public-private partnership (PPP) to improve the public transport levels in the city and will plan to provide subsidies to the poor as stated in the “Poverty Reduction Strategic Plan” (PRSP) even if the public transport is privatized
- The Johannesburg city policy clearly states that the state will aim to provide transportation which would not cost more than 10% of the monthly earnings for any income group customer. The policy also aims to cross subsidize services to the poor by using innovative pricing mechanisms
- The Philippines national policy is pro subsidies for sensitive groups such as women, disabled, etc. The policy is however against subsidies for all and cross subsidies. The policy also recommends PPP if necessary and guides the transport authorities to design tariffs by taking all costs and operators margins into account

Most governments plan to use Public Private Partnerships (PPP) to address the funding gap and improve the speed of executing public transport projects. Some governments are raising money through multilaterals. For example; the BRT project phase 1 in Lagos received financial support from World Bank and they are in talks with French Development Agency (AFD) for raising credit for phase 2

1a Innovative pricing and subsidies make public transport more affordable to commuters

Innovative pricing mechanisms for all commuters:

Innovative pricings can make public transport more affordable for all commuters and indirectly also impacts the poor

Case Study 1 : (Mumbai Local trains- Monthly packages)

Route	Distance (Kms)	Monthly expense on daily fares (USD)	Monthly package price (USD)	Savings (USD) /% Saving
Andheri-Vile Parle	4	4.52	1.32	3.2 (71%)
Andheri-Churchgate	28	7.8	2.35	5.3 (70%)
Andheri- Virar	54	12.3	2.92	9.5 (76%)

The Mumbai local trains are one of the most affordable means of public transport modes across Asia. The regular fares itself are quite low but monthly packages make them even more affordable. For example Andheri-Virar-Andheri, a 108 km stretch on a daily basis would cost only USD 2.92 per month[12] for the consumer if he takes the monthly pass. As per the comparison above irrespective of the trip length consumers save 70% on average by choosing the monthly package. The quarterly packages would make commuting even more affordable

Case Study 2 : TransJakarta BRT (Government bears 50% of the operational expenditure to provide affordable transport)

- In the TransJakarta BRT service in Jakarta, Indonesia the government bears 50% of the operational expenses every year to make commuting more affordable. In the year 2011 the bus services only generated 39 million USD through ticket sales while the overall operating expenses were 76 million USD. The government has borne the remaining amount and currently provides the service to consumers at Rp 3,500 (which is approximately 40 cents per trip)

1a Pro poor pricing and subsidies go a long way in making public transport affordable for the urban poor

Pro poor pricing mechanisms and subsidies:

These are pricing innovations that are specially targeted towards the poor and have a direct impact on the poor

Case study 1: Fixed fare, Johannesburg :

- Some services have fixed fares irrespective of the distance you travel (For example: No-Frill buses in Bangkok), these services are pro poor assuming the poor travel the farthest. By having a fixed price indirect cross subsidizing is happening as the rich who travel shorter distances pay more than the poor who travel farther

Case study 2: Subsidized monthly packages for the poor and sensitive groups in Delhi buses:[13]

- Apart from providing a better price for all consumers who procure a monthly package the Delhi Transport corporation (DTC) also provides special monthly fares for the poor and other sensitive groups such as senior citizens, students, disabled etc.

Passenger type	Fare (INR)
Regular Passenger	800
Poor user (the poor will have to provide a below poverty line (BPL) card to avail this offer)	500
Students	100
Senior citizens	50
Disabled	Free

1b Providing ‘right of way’ for public transport users would reduce trip times; most policies are looking at it

Rapid motorization is causing congestion in most large cities and the users of public transport are penalized for the rapid growth in public transport. For example : buses in Delhi carry 44% of the vehicular passengers (excluding passengers who walk/cycle) but buses account for only 1.55% of the total vehicles on the roads of Delhi. This clearly means that commuters who use public transport are being penalized for congestion caused by private vehicles. Policy makers have identified this as an issue and are creating policies focused towards providing ‘right of way’ for public transport users

On the other hand cost of building the metro rail system is much higher when compared to building mass rapid transit systems with buses (for a kilometer of rail system 12 kms of bus systems can be built)

Policies focused on providing ‘right of way’:

- The Indian National Urban Transport Policy (NUTP) clearly states that transport planners in other federal states in India must focus on equitable distribution of space for public transport and non motorized transit users. The policy clearly calls for a focus on creating lanes for high occupancy vehicles.
- The polices of various cities such as Delhi, Ahmedabad, Mumbai etc. focus on the need of developing a bus rapid transit system on the city roads
- The city policy of Dhaka also clearly calls for the need of BRT in the city and also states that the government would use the ‘Build operate and transfer model’ with a private player to fund the project

There are three types across the world, segregated bus ways through painted lines, segregated lanes and comprehensive BRT lines (with fare integration etc.)

1b Bus Rapid Transit lanes improve the trip times for bus passengers: BRT Lite - A case study of Lagos

Context:

- Lagos is the 6th largest city in the world in terms of population and the largest city in Africa with a population of 17 million. It is a city which is predominantly dependent on paratransit and private vehicles for commuting, while 25% of the population used buses (which contributed to 4% of the vehicles on the road) transit is time consuming and expensive

The BRT Project:

- The Lagos Metropolitan Area Transport Authority (LAMATA) in 2008 decided to invest in a BRT-Lite system which required a cost of $1.7million per km when compared to $6 million per km for a comprehensive BRT
- **Key takeaways:**
  - **Stakeholder engagement:** LAMATA ensured that it kept all key stakeholders in mind while planning the BRT corridor. LAMATA was also successful in forging partnerships with key organizations such as the National Union of road transport workers, which formed a cooperative to run the BRT system
  - **Strong inter-agency coordination:** coordination between multiple agencies was the key for the implementation of the project

Project Impact:[14]

Currently the BRT operates 220 buses, moving 200,000 passengers on a daily basis

- The journey time reduced by 25 minutes from one end to the other end of BRT
- The rates have fallen from 230 Naira per person to 100 Naira per person post the BRT

1b Bus Rapid Transit lanes improve the trip times for bus passengers: Comprehensive- BRT Guangzhou

Context:

The city of Guangzhou, with a population of 11-15 million people and 32% modal share (as of 2007) for bus commuting was highly critical to provide a right of way for buses and relieve them from congestion. In 2010, the first 23km BRT lane with 26 stations was implemented in Guangzhou and was immensely successful

Impact:[15]

Today, over 800,000 people use the BRT buses on a daily basis and it carries 23,000 passengers / hour in a single direction. This is 4 times greater than the next big BRT in Xiamen, China which carries 7400 passengers/hour. The Guangzhou BRT is second only to TransMilenio

Key features for success of the BRT:

- Pedestrain foot over bridges for pedestrian crossing at every station which makes the entry and exit from the station very safe
- Electronic ticketing system where the passenger just needs to tap a smart card (which is known as Yang Cheng Tong) while entering and while exiting a station for the amount to get deducted directly. This card is a multi purpose card which is not just used for transport related costs
- Multi-modal connectivity: The BRT lanes are connected to three metro stations and have public bike sharing systems (PBS) integrated to the BRT lanes

Key design elements make this rapid transit system the world's longest BRT stations - around 260m (in city centers) including bridges - with bus volumes of 1 bus every 10 seconds or 350 per hour in a single direction. In suburban areas the station is 60m wide and has lesser volume. The BRT system has two new lines and two extensions planned

Planning for pedestrian safety and implementing consumer friendly systems make the Guangzhou BRT the efficient system that it is today. The Guangzhou system is known for providing metro like services over buses

1c Operate buses under single authority or promote limited and healthy competition

Some city governments choose to privatize the bus operations which creates many problems like the private players not complying with various rules set by the government. This non compliance results in a bad commuter experience across cities where bus operations are privatized. Ideally, all public transport systems whether managed by public sector or the private must comply with certain rules like

- Maintaining fixed fares
- Adhering to a predetermined schedule
- Complying to safety norms (not over speeding and so on) and
- Plying only in the prescribed routes

Some possible solutions to solve these issues could be:

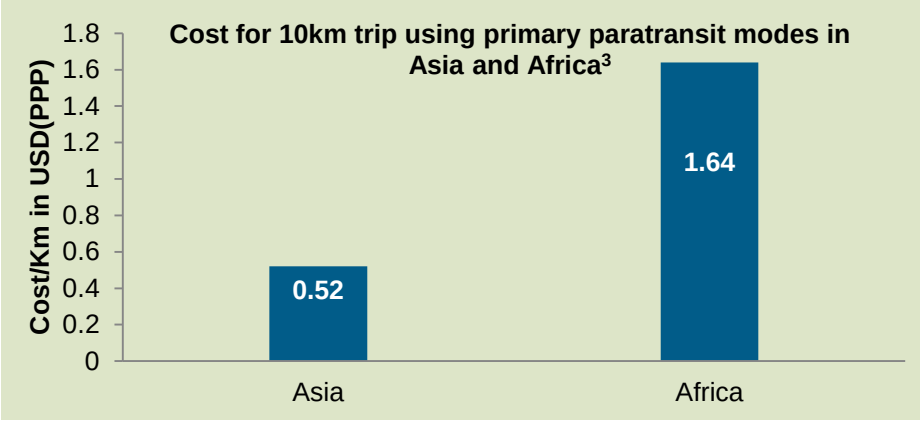
- **Regulating licensing based on travel demand:** The city governments may issue licenses in a particular route based on travel demand in that route. Over issuing of licenses would create unnecessary competition which would force the bus drivers to over speed to make extra revenues. Proper route planning and issue of licenses should be implemented in an efficient manner to solve this issue.
- **Operating the entire bus fleet under a single bus management agency:** If many private players are involved in bus operations, the standards of the service would vary across different players and as all players compete with each other they prefer to operate on the high demand routes alone. To solve this problem if all the fleets are managed by a single agency and the revenues are shared with multiple players in a transparent manner at the end of each month, it would help organize this sector better, resulting in all routes being covered and effective fare regulation being implemented.
- **Promote limited competition**: By creating higher barriers for entry (for example requirement of a larger fleet size, lowest fare bid and so on), large corporates can be attracted to operate the bus services in an efficient manner. As majority of the fleet would be owned by fewer players resulting in healthy competition and the commuter would be benefited when such competition is promoted.

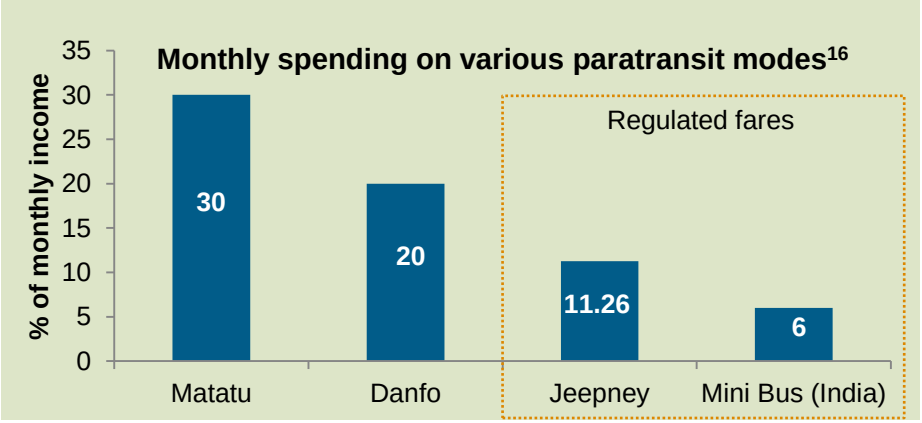
2a Price regulations make primary paratransit more affordable

- The rates are regulated in Asia and hence the modes are more affordable. **Regulation of rates** make the cost/km in Asia 3 times lower than that of Africa

Case Study: Manila Jeepney price regulation: The Land Transportation Franchising and Regulatory Board (LTFRB) in Manila is responsible for regulating the prices of Jeepneys and paratransit modes to make them more affordable to the consumer. The prices are fixed in such a way that it is a win-win for the consumer and the entrepreneur who owns the Jeepney. For ex: In Feb 2009, when the diesel prices where P23 per liter the tariff was fixed at P7 per passenger for the first 4 kms, in the year 2011 the price of diesel almost doubled to P45.5 but the tariff only increased to P8 per passenger for the first 4 kms. The Department of Energy (DOE) offered smart cards to Jeepney drivers with P1050 which can be used to purchase fuel. By taking care of the entrepreneurs interests, the government is successfully able to regulate the prices of primary paratransit modes

- A consumer has to spend 20-30% of his monthly income in Africa to use paratransit primary modes. This is because the sector is completely unregulated and fares fluctuate with the demand. For example in the case of Matatus in Nairobi, a onward trip which costs Ksh 100 during peak hours would cost only Ksh 20 during the return trip during non-peak hours
- To make the commuter experience better, it is also important to implement safety norms and promote route planning either through licensing or through self regulation

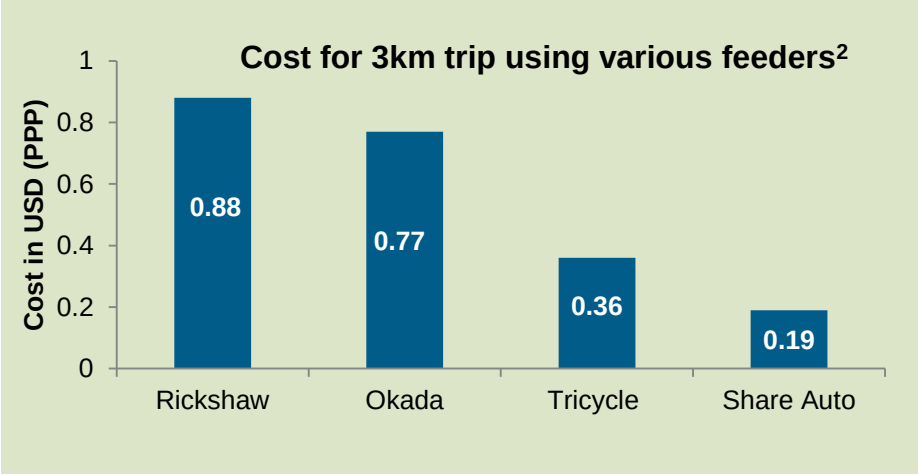


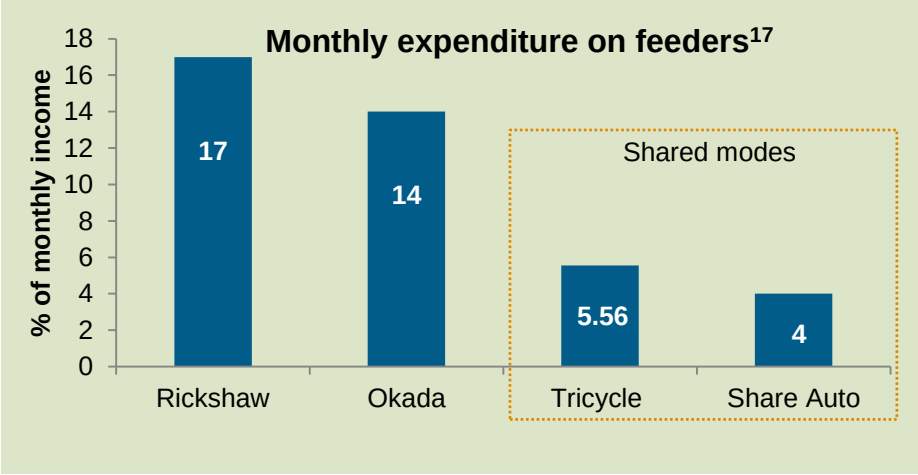


2a Price regulation make feeders more affordable in Asia, Shared modes are more affordable than non shared modes

- A consumer has to spend anywhere between 4-17% to use feeders . This is very high because feeders just act as connectors to primary modes
- Of the feeders analyzed shared modes are most affordable to the poor (example: Share Auto and Tricycle). The rates of tricycles and share autos are also regulated which makes them even more affordable.

Case study: Regulated rates and routes in Manila: The rates are regulated by the Land Transportation Franchising and Regulatory Board (LTFRB) in Manila. The current tariff rate for the tricycle is P8 for the first km and P1 for every km after that. The Metropolitan Manila Development Authority (MMDA) recently warned the tricycle operators and reminded them to follow 1990 Metro Manila Council (MMC) ordinance which prohibits pedicabs and tricycles along major roads in Metro Manila. All tricycles have specific franchise routes in which they can operate as per law. This will ensure that all the 120,000 tricycles are well organized and operate in their own territories. Regulations not only ensure that the tricycle acts as feeder but also ensures that the fares are affordable





2b High capacity vehicles will improve affordability and reduce emissions

Low capacity of the mode increases congestion: With rapid motorization, the use of low capacity primary paratransit modes will only worsen congestion levels in the city.

Case of Matatu's HCV – The Nairobi transport planners are aiming to convert all low capacity Matatus in the city to high capacity vehicles which would not only make paratransit more affordable but also would reduce the congestion in the city and reduce overall travel times. The process of moving from a 14 seat Matatu to a 50 seat bus, would create job losses of an average 6 persons per conversion. Hence, the transport planners in the city want to phase out Matatus from the main areas in the city and use them as effective feeders in the suburbs. There is a lot of resistance the government is phasing from the Matatu drivers as they anticipate that this move would lead to major job losses in the city

2c

Use of more efficient fuels to reduce emissions:

As many paratransit modes are either ill maintained or have a very old engine it is very critical to promote better technologies or fuels to make them less harmful to the environment, here are a few ways to do it:

- **LPG Conversion:** As part of government efforts to promote fuel efficiency and reduce air pollution, the Philippines government announced in 2008 a program to replace the engines of old jeepneys with new LPG engines. The challenge with this scheme was the high cost of conversion P250,000 (which is 50% of the initial capital expenditure of Jeepney**).** Larger size vehicles require more capital to convert into efficient fuels when compared to smaller vehicles, for example a taxi conversion would cost only P20,000
- **Retro fitting engines (converting 2 stroke to 4 stroke) a potential solution for feeders:** An organization called Envirofit is installing retrofitted engines in a few cities in the Philippines. By technological additions the engines can be made more environmentally friendly, apart from the health and environmental benefits, the fuel efficiency offered by retrofits can mean big savings for drivers of two-stroke tricycles , and thus a big boost for their livelihoods. The retrofit kits pay for themselves in fuel savings within 10 months. To make the upfront costs affordable, however, the cities provide micro-financing, recognizing that many local taxi drivers have little disposable income.

3a Improving infrastructure for walking/cycling

Desirable features of infrastructure to improve walking and cycling

- Walkability – improving/creating walkways / footpaths / sidewalks that are continuous, clean, spacious, non encroached with resting spaces/benches (preferably shaded) and drinking water facilities. Construction of adequate FOBs, crossings and subways
- Cycling – Building dedicated cycling tracks that are continuous, spacious, non-encroached with crossings and subways

Successful Case Example - Guangzhou, China

For decades many Chinese cities have provided dedicated roads for walking and cycling. Most Chinese cities provide pavement, crosswalks, bike lanes and traffic signals for bicyclists and pedestrians. An important reason was adherence to the urban road transport plan and design code (GB-50220-95) which necessitated construction of pavements (along main and subsidiary roads) that could also be used by the bicycles. The city of Guangzhou witnessed a fall in the modal share for walking/cycling when use of privately owned motorized modes increased at the cost of walking/cycling, until the city of Guangzhou banned motorcycles in 2007. Local lawmaker Chen Zhongqian first proposed the city do more to accommodate bicyclists during the annual session of the city's people's congress in January. Since that time, Guangzhou urban planning bureau has reopened many of the closed cycling lanes along major urban roads where the conditions allowed. Besides, it decided to build bicycle roads along with all the new roads and required new residential buildings, especially near metro stations to set aside space for bicycle parking lot. The initiatives not only helped increase once again the number of bikers in the city but also relieved some pressure from the public transport system.

Lessons from the example:

- Need for a strong political will to build infrastructure that favours biking and cycling
- Pre-existing infrastructure and pre-existing cycling culture in the city supported the change in favour of walking cycling
- A progressive urban transport plan and design code
- Planning for supporting infrastructure like cycle parking lots to make the feeder trips possible
- Providing interconnectivity with public transport modes like metros

3a Improving infrastructure for walking/cycling

Unsuccessful Case Example – Pune, India : Pune has the highest walkability index in India as per a recent study conducted by Clean Air Initiative (CAI) – Asia funded by Shakti Sustainable Energy Foundation. Pune, was fast losing its reputation as the cycling capital of India, when the NMT cell of the Pune Municipal Corporation (PMC) decided to develop 300-km long dedicated cycling tracks. By early 2011, the city had built 132 kms of dedicated cycle tracks on 20 roads which together made 18 cycling tracks in Pune. As per Parisar, an organization working for improving cycling in Pune, they decided to take stock of the performance of 12 out of the 18 tracks as they did not consider the remaining 6 tracks "even fit to be called cycle tracks". They surveyed 12 tracks that were 87.5 km long and discovered that they were in "terrible condition". "Research found encroachments like slums, hawkers, electric poles, garbage bins, traffic and CCTV poles. Lights, signages, differentiation between a footpath and cycle track, ramps and shades and connectivity between tracks were also missing. If obstructions are added up, they come to a whopping 3,900 on tracks studied." (Times of India, 26th December 2011). The study inferred that the PMC failed to focus on continuity while designing the tracks. They assessed that policy needed to be put in place to assess and maintain the tracks. The Municipal Commissioner has taken action to rejuvenate the NMT cell by making appropriate budgetary allocations and mooting the idea of appointing a cyclist to take care of the cell.

Lessons from the example

- Designing of the track needs to be done keeping the principles of continuity, spaciousness, comfort and safety of the commuters under consideration
- Maintenance of tracks is necessary to keep them commutable
- Anticipation of possible encroachments and building in mitigation measures such as spaces for the hawkers is also necessary

Note: Asia has a pre existing biking culture and this goes in favour of promoting cycling. In India however, there is a social stigma attached to biking and this perception needs to be changed if modal share of cycling were to grow significantly

3b Asia is the fastest growing market for Public Bike Sharing

Rationale for promoting Public Bike Sharing

- Expands the choice of mode for the poor who can reduce their travel time and afford the cost of transport
- Provides feeder services to and disbursal services from the primary modes of transport and helps the poor commute longer distances
- Eliminates the threat to loss of cycles through theft as usually it provides for secure parking for bikes that are owned and are taken care of by either the government (example-Hangzhou, China) or by a private enterprise (example-Rajkot, India)

Examples of Public Bike sharing in Asia (fastest growing market for bike sharing)

- TownBike programme of Singapore (1999-2007) – A first in Asia
- Taito Bicycle sharing Experiment in Taito, Japan – 2002-03, 130 bicycles at 12 locations
- Nubija bike sharing programme in Changwon, South Korea – 2008 – 430 bicycle, 20 terminals
- C-Bike in Kaohsiung City, Taiwan – and the Youbike programme with 500 bicycles at 10 locations – 2009
- Public Bike sharing system in Hangzhou, China – 2008, IT based systems comprising 40,000 bicycles with 1600 stations with plans of expanding to 50,000 bicycles across 2000 stations by 2009.
- The Chinese cities of Beijing, Tianjin, Hainan, and Suzhou launched pilot programs in 2008 and 2009.
- Ministry of Urban Development in India is preparing to launch a 10-city public bike scheme as part of its “Mission for Sustainable Habitat”

Successful Public Bike Sharing – Hangzhou, China[18]

- Provides seamless connection of bicycle based slow speed traffic with metro and bus based public transport
- Affordable at free first hour, @ 1 Yuan and 2 yuan in the 2nd and 3rd hours respectively and 3 Yuan per hour for fourth hour onwards for 24 hours
- Little theft or vandalism of bikes owing to the provision of black listing the errant commuters and denying them access to the facility for life
- Hiring hassles reduced owing to installation of POS system that enables ending rental by parking at the stall, swiping the transportation card over the bike itself and walking away

3b Public Bike Sharing services providers and business models

- The Public Bike Sharing facilities May be provided by Advertising Agencies (no example in Asia); Public Transport Agency (example-Hangzhou Public Bicycle, China); offered by the Local Government and Public Authority (example – Nubija in Changwon, North Korea); For Profit Agency (example – proposed in Pune, India) and Non Profit agencies (example – Wuhan Public Bicycle, China)
- The main sources of revenue for all providers comprises of member and non-member user charges and advertising on the bikes, bike sharing stations, billboards and street furniture. Models run by public transport agencies depends additionally upon government subsidies, the ones run by local government and public authority additionally depend on Municipality funding and the ones run by non profits additionally depend upon loans from banks, public-Private partnership funding and local funding.

Provider	Standard Operating Model
Advertising Agency	Provide bike sharing services in lieu of rights for advertising on bill boards, street furniture, etc.
Public Transport agency	Provide bike sharing under guidance of public authority for enhancing the public transport system
Local Government and public Authority	Directly design and operate a bike sharing scheme or purchase it from other agencies providing these services
For Profits	Provide bike sharing with minimal government involvement
Not for Profit	Provide bike sharing services under support of public agencies or city councils

3b Public Bike Sharing problems and solutions (Good practices)

Problems experienced	Solutions devised
Bicycle theft and vandalism	Third generation bike sharing programmes have introduced smart cards that have significantly reduced the problem of theft and vandalism as the subscriber anonymity is no more an issue. Technologies like global positioning systems and radio frequency tracking greatly help reduce theft but tend to increase programme implementation costs. Programmes are also employing membership based lending process to reduce theft. Hangzhou bike sharing employs inexpensive bikes (400 RMB) to avoid theft. A high density of bicycles that are available for free in the 1st hour help obviate the need for stealing the bike. The fourth generation bike sharing programmes are planning to introduce robust bicycles necessitating low maintenance cost and strong locking systems to deter theft/vandalism.
Bicycle redistribution	Efficient redistribution of bicycles to locations with high demand, once the bicycle has been used, improves the efficiency of the programme. Hangzhou bike sharing programme uses 20 natural gas fuelled trucks for bicycle redistribution. Further, attempts are being made to equip redistribution vehicles with computers to provide online information to the drivers on the location wise bicycle shortage and station crowding. This would lead to fourth generation bike sharing programmes that are “Demand-responsive Multi-modal systems”
Information System	Third generation bike sharing programmes are providing the users with internet based real time information on availability of bikes and location of bike sharing stations, thereby helping it make more user friendly and therefore their use needs to be encouraged.
Insurance and liability consideration	Hangzhou bike sharing system provides insurance against any injury that occurs through their programme. Insurance raises the cost of providing the services but the accident data indicates low risks that may keep the premiums low as well.
Prelaunch consideration	Success of bike sharing programmes is linked to its ability to meet the needs of its target segment before and after deployment. As bicycle availability prediction is a complicated issue to address, programmes have responded by deploying mobile bike stations, that may be relocated based on the usage pattern. Pre launch marketing and appropriate pricing too have been identified as critical factors that contribute to the success of business models.

3c Promoting bike ownership programs

Rationale for promoting bike ownership programme

- Promoting bike ownership programme is relevant in African context where modal share of cycling is insignificant
- Anglophone Africa is better placed than the francophone Africa in terms of modal share of cycling
- Promoting bike ownership is necessitated by the fact that African cities have a relatively weak bicycling culture
- To facilitate door to door trips for short to medium distances (upto 8 kms)

Successful example (Johanessburg and other cities, South Africa)

From 1995 to 2000 ITDP funded its project named Afribike which went on to become an independent organization. Afribike trained numerous children and women in riding bicycle, maintaining and operating it while providing the same to the beneficiaries. The Department of Transport in South Africa realized that it was cheaper for them to offer bikes than school buses. Therefore, they started the programme called Shova Kalula to upscale the bicycle use across various cities in South Africa. In 2000, ITDP entered into a partnership with PEER Africa and B. Slotar & Sons, to import continuous shipments of new, specially-designed low cost bicycles and distribute them through PEER's Eco-Housing dealerships and local bicycle retailers. Large employers and public agencies are participating with payroll deduction financing. The demonstration effect created by the programme led to the rise in modal share of bicycling in many cities of South Africa.

Do's from the Afribike Programme

- Carefully targeted bike ownership programme can create demonstration effect that may lead to increased modal share of cycling in cities
- Arrangements for supply of good quality affordable cycles would help the programme
- Capacity building at cycling skills of the prospective commuters using bicycles as a mode of transportation would help the uptake of the programme
- Capacity building of vendors who may provide maintenance services and helping strengthening the maintenance infrastructure would help the sustainability of the programme
- Institutionalizing the programme would help it to sustain over a period of time leading to continued effort at promoting cycling by promoting bike ownership programme

Don'ts from Shova Kalula

Gender mainstreaming for better uptake , Decentralized programme implementation to ensure that the responsibility is distributed across institutions and their respective suppliers and jettisoning the idea of importing in favour of indigenous production of bikes so that outreach is not deterred by non availability of spare parts

3d Promoting cycling in regions with low/negligible modal share

- A plethora of institutions have come up with an objective to promote cycling in “cycling poor” regions like Africa
- The relevance of promoting cycling in these regions comes with the objective of promoting low cost mobility (personal as well as public transport) and environment conservation

Examples of cycling promoting institutions in Africa[19]

- Pan Africa Bicycle Promotion Network (PABIN) – Promoted by International Bicycle Fund, the organization works to ”improve opportunities for bicycle transport and low-cost mobility to improve productivity, the quality of life and the environment in Africa”. Apart from running a e mail discussion group on bicycles and non motorized transport, it also provides information on various other network members active across Africa for promotion of cycling.
- Bicycle Aid – Provides a list of organizations that recycle bicycles to various projects across African countries
- Cycling Out of Poverty – It helps local African NGOs to start a bicycle micro credit programme with funding
- Bamboosero – Ghana based organization working on producing and promoting bamboo bikes
- Mozambikes – They not only produce bicycles but also run a not for profit that purchases bicycles at costs and distributes it across Mozambique
- Qhubeka – A South Africa based organization that runs a programme that helps african children to grow trees to earn a bike
- Jugendhilfe Ostafrica – A Germany based NGO promoting the use of bikes in Uganda
- Zambikes – Zambia based organization involved in production of Bamboo Bikes
- Bicycling Empowerment Network – Based in Cape Town, South Africa, the organization aims to adress poverty and mobility through the promotion of bicycles in all its forms. It “imports used bicycles from overseas and distributes them to low income areas, trains recipients of the bikes in safety and maintenance, establishes Bicycle Empowerment Centre's (BEC's) and encourages cities to implement bicycle planning and infrastructure. BEN also assists the planning of events to help promote the use of the bicycle as a form of mobility”
- Banboo Bike Project – Based out of Kumasi, Ghana, the project that began in 2007 with seed funding from the Earth Institute, has adapted its bamboo bike design to suit the road conditions of Sub-Saharan Africa, has established systems to utilize local raw material, management and labour and in 2010 became the first organization in Africa to run a bamboo bike production facility. Working with the Earth Institute’s Millennium Cities Initiatives (MCI), the programme is now in process of scaling up from feasibility project to routine production.

4a Organizing the paratransit sector is a win-win for the entrepreneur and the consumer (Ecocabs India)

Organizing the sector would streamline the paratransit operations which would not only improve the lifestyle and earnings of the operators but also would improve the commuter experience

Case Study: Ecocabs, Fazilka, India:

The Model:

The Ecocab project is a “dial a rickshaw” service which is operational in a small town in Fazilka, India. The commuter needs to dial his zonal call center and a rickshaw would be available at her doorstep within 10-15 minutes. Currently they have 5 call centers operational in various zones in Fazilka. The call center is run by a not-for-profit organization called Graduates Welfare Association, Fazilka (GWAF). The model has been replicated across many other cities of The Punjab.

Benefits to the rickshaw puller:

- **Health:** The organization tied up with local doctors to help provide free medical consultation to the Fazilka rickshaw pullers. They also tied up pharmacies in the area to provide medicines at discounted rates
- **Education:** The organization provides free school bags to all school going children in the Ecocab owner families
- **Legal aid:** The organization tied up with lawyers in the Fazilka area who provide free legal services to the rickshaw pullers
- **Lifestyle:** The Ecocab rickshaw pullers operate out of a shed which provides them shade and has television sets for entertainment. Now the rickshaw pullers do not have to brave the vagaries of weather

Benefits to the society:

- Organized informal public transport service
- Reliable and safe service at the door step
- Ecofriendly mode
- The new design of the rickshaw is relatively more comfortable and provides more luggage space than before

4a Organizing the paratransit sector is a win-win for the entrepreneur and the consumer (Go-Jek Indonesia)

Case Study: Go-Jek, Indonesia:

The Model:

The motorcycle taxi is called Ojek in Indonesia. Go-jek is a call center based service that helps organize the Ojek operations. The unique aspect of the this service is the diversification in services provided in order to increase the earnings of the Ojek drivers and improve their life styles

Diversified service offerings:

- **Basic transport service:** The go-jek drivers are scattered across various locations and are coordinated through a GPS tracking system and provide basic commuting services
- **Instant courier:** With most cities struggling with the issue of congestion, the Ojeks are a good mode for fast commuting in cities and can help with on-time deliveries.
- **Corporate services:** The operators of the service design customized services to corporates from whom they can generate repetitive business
- **Shopping and Delivery:** This unique service helps customers buy basic groceries and other services even while sitting at home. Go-jek has tied up with 12 retail stores and as soon as the consumer places an order they pick up the product and deliver the same

Note: There are other similar models such as G-Auto, Ahmedabad, dial-a-rickshaw, Gurgaon that have not been covered in this report

Innovative service offerings provide better lifestyle for the operators

4b Access to finance to enable ownership could increase earnings for paratransit operators in long run

Drivers who earn the vehicles and drive it themselves earn the most and providing access to finance to paratransit drivers would improve their lifestyles and increase their daily earnings

Case Study (Rickshaw Bank, Guwahati, India):

The cycle rickshaw, a non-motorized means already has its limitations as it cannot be used for trip lengths greater than 3kms and it is time and energy consuming. In addition, most rickshaw pullers take the rickshaw on rent as they cant afford to buy and rickshaw and end up paying 15% of their daily income on rent. Rickshaw bank an innovative loan product run by Center for Rural Development (CRD) a not for profit in Guwahati provides loan for the rickshaw pullers to buy their own rickshaws.

The product:

A group loan product given to groups of 5 members each

Capex: INR 13000 (which is 60% higher than a traditional rickshaw as CRD sells a specially designed rickshaw which has more space for commuter seating, its easier to ride and has advertisement space)

EMI per day: INR 25 per day (same as daily rent)

Term: 20 Months

After 20 months the daily earnings of the rickshaw driver would directly increase by 15% as he would earn the vehicle then

'Ad Space' an alternate revenue source:
Having ad space behind the vehicle can be a very good alternate revenue source. Rickshaw bank (CRD) is currently using this space to promote their sponsors . In large cities this space could potentially generate additional income not only for the operators but also to the model operators (such as Fazilka etc) who can sustain their operations through the revenues generated through advertisements

5 Few best practices in city management that would help plan and implement things better

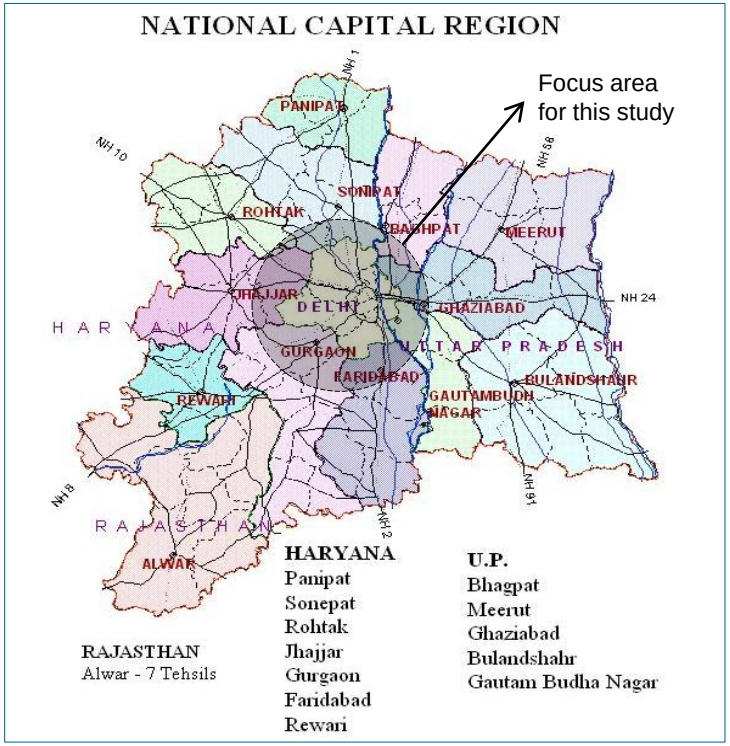
- **5a. Unified Metropolis Transport Authority (UMTA) :** Multiple agencies being responsible for various aspects is a big challenge that many cities face today. With extending metropolitan areas and increasing sprawls in most big cities it becomes very critical to have a unified authority that takes care of various transport related planning be it land use planning or mobility planning. The initiative of forming unified transport authorities have been taken up in various Indian cities such as Hyderabad, Bangalore, Delhi etc

Case of the Hyderabad Metropolitan Development Authority (HMDA):[20] The HMDA was setup in the year 2008 which also has to establish the UMTA in Hyderabad. As per the proposed plan the UMTA would constitute various heads of departments ranging from the municipal corporation to the head of APSRTC (the institute that runs the bus service) to various experts in the transport space. The committee has a special fund allocated for development, an initial seed fund of USD 20 million was allocated to the committee and the committee would be responsible for planning and implementation of various activities such as CNG for paratransit, setting up SPV for BRTS etc

- **5b. Urban Transport fund:** Not just having a unified body it is also critical that the body has enough funds to fund its expansion plans etc. Developing transport infrastructure is not a one time activity and as it needs repetitive investments it would be critical to setup a dedicated fund where all the revenue generated through transport related activities such as revenue through parking, advertisements, real estate space etc go into the fund and they are further invested into public transport development such as BRTs and metros. As per a primary interview with an expert from ITDP the city of Chennai has a potential of raising 700 crores rupees just by collecting parking fees and creating a fund, the money raised is 7 times the money spent on subsidizing the bus service, this way giving subsidies would become sustainable as car users are charged and the benefits are cross subsidized to public transport users

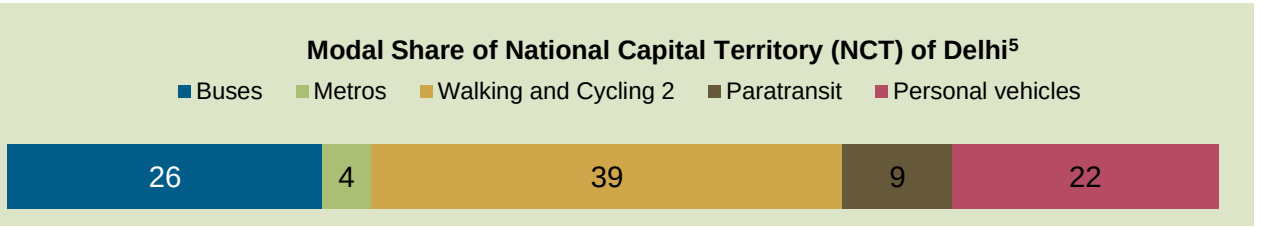
Agenda

The urban poor largely resort to walking/cycling, followed by public buses which are affordable



- National Capital Region of Delhi does not have an effective and unified urban development authority
- The study focuses mostly on National Capital Territory which does not include areas falling in Haryana, UP and Rajasthan

Note: Most of the data in this section has been compiled through interviews with list of key informants (Refer to Annexure 3)



General

- The NCT region had a population of 11 million with a population density of 11,297 persons per km² in 2011

Public Transport

- In Delhi public transport trips are multi modal , usually involving walking/cycling at either end of the journey to reach the final destination
- According to a Transport Demand Forecast study commissioned by DMITS on behalf of Transport Department, the NCT requires an additional 148.5 kms of Metro rail, 40.3 kms of Mono rail (currently there is no mono rail in Delhi) and 394.9 kms of BRT

Paratransit

- The major modes deployed under the category are 3 wheelers (shared and non shared) autos, taxis and cycle rickshaws which together have a modal share of 9%
- Paratransit is mostly used for feeder purposes and are not affordable to the poor
- The Delhi government has succeeded in converting the entire paratransit fleet to run on Compressed Natural Gas (CNG)

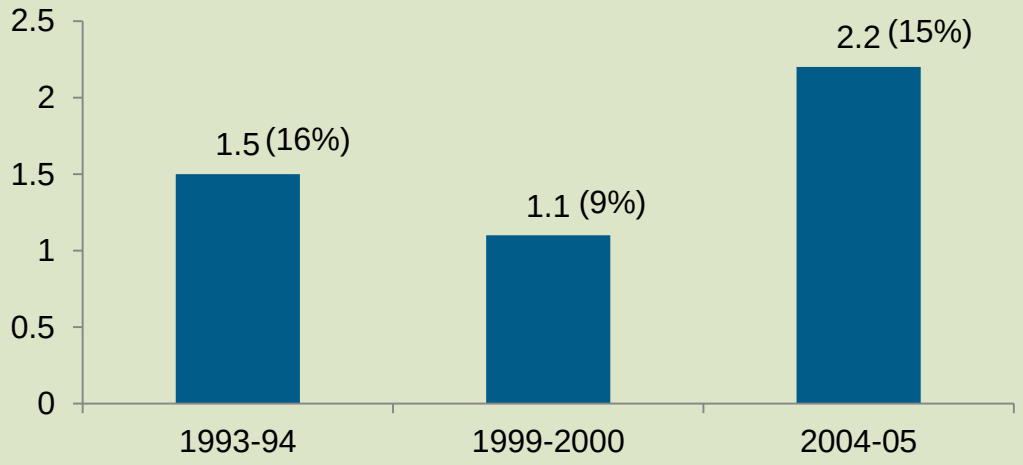
Walking/cycling

- Delhi has the second highest number of walk trips among Indian cities after Mumbai at about 5 million trips and has the highest number of cycling trips at 2.8 million trips among Indian cities
- Walking and cycling has not received proportionate attention from the policy makers, planners and implementers

In Delhi nearly 2.2 million people are below the poverty line ($0.45 per day), constituting 15% of the total population

- The per capita income of Delhi was INR 1.17 lakh in 2009-10[21]
- Monthly Per Capita Expenditure (MPCE) as per the survey conducted by National Sample Survey Office (NSSO) 66th round in urban Delhi was INR 2905 in 2009-10
- The Gini coefficient of income in urban India is on the rise as it has gone up by 15% from 0.39 to 0.43 between 1994-95 to 2004-05
- The Planning Commission of India estimates the monthly per capita poverty line for urban Delhi to be INR 309.48 in 1993-94, INR 454.11 in 1999-2001 and INR 612.91 in 2004-05

People below poverty line (in Millions), (% of population)[22]



The informal settlements of Delhi

In 2001, nearly 1.8 million people lived in the slums of Delhi. The 2011 slum population figures are yet to be released but despite a broadening of slum definition, it is likely either to stagnate or increase only marginally owing to resettlement program

Characteristics of Delhi's urban poor

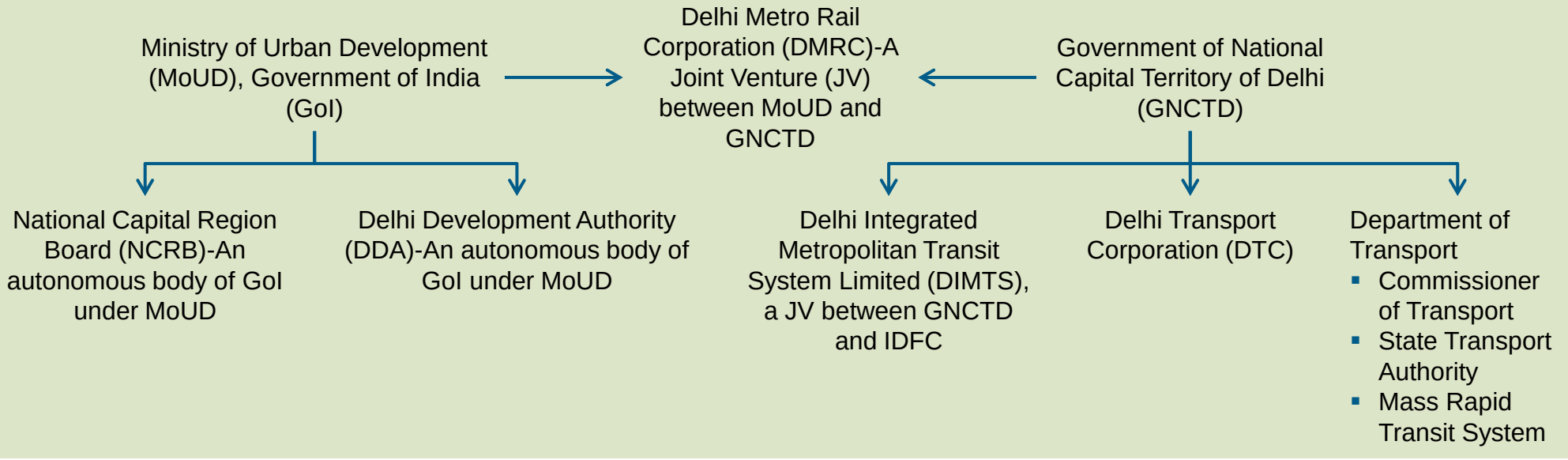
The poor of urban Delhi often engaged in casual labour, usually migrants from the rural landless or small and marginal farmer households, with low or no education or skills

Commuting pattern of the urban poor

- In 2011 the employed poor of Delhi mostly walked (49%), cycled (15%) or used bus based public transport (23%)
- In 2011 the unemployed poor of Delhi mostly walked (87%), cycled (2%) or used bus based public transport (8%)

A relatively streamlined city management structure; better coordination between union and state governments required

Entities Impacting the Urban Transport Landscape in Delhi



Refer to Annexure – 4 for functions of some of the agencies mentioned above

- Most of the agencies have their functions, jurisdiction and powers defined through various Acts and statutes with little overlap
- The Delhi Municipal Corporation has recently been subdivided into three Municipalities of North, South and East Delhi
- In the New Delhi parliamentary constituency of NCT, New Delhi Municipal Council (NDMC) *inter alia* looks after the building approval, estate commercial, estate housing and enforcement, each of which impact the land use and urban transport planning
- DIMTS has been set up as a special purpose vehicle to tackle the problem of ineffective transport delivery and to provide expert services in the field of urban transport to GNCTD
- NCRB was constituted under the NCRPB Act, 1985. Its key rationale was to promote balanced and harmonized development of the Region, *and to* contain haphazard and unplanned urban growth by channelisig the flow and direction of economic growth along more balanced and spatially-oriented paths
- Delhi Police comes under the jurisdiction of Ministry of Home Affairs, GoI

In Delhi buses are more accessible and affordable than metros; paratransit modes are not affordable for the urban poor

Delhi has great public transport infrastructure with various modes such as high speed mass transit metros, no-frill buses, low floor air conditioned buses etc. Each mode solves a particular purpose:

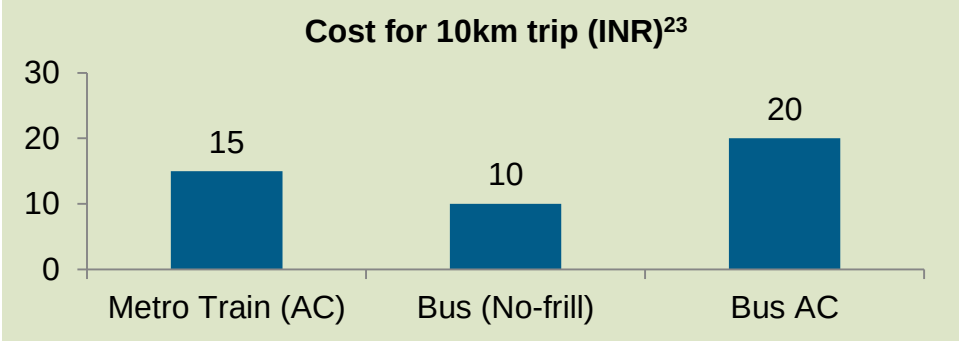
The Delhi Metro:

- The Delhi metro is the largest metro rail project in India with 6 lines covering 190km stretch
- It is the fastest and most effective means of transport for long distance trips, especially commuting between Delhi and its suburban satellite cities such as Gurgaon and Noida
- On an average a ride in a metro would cost INR 1.5 per km, with average trip lengths of 10km in Delhi it would cost INR 15 per trip or INR 30 per day
- With an assumption that no household should spend more than 10% on travel the Metro is an affordable mode only for households who earn more than INR 18000 per month ($12 per day) (assuming two people in a family travel)

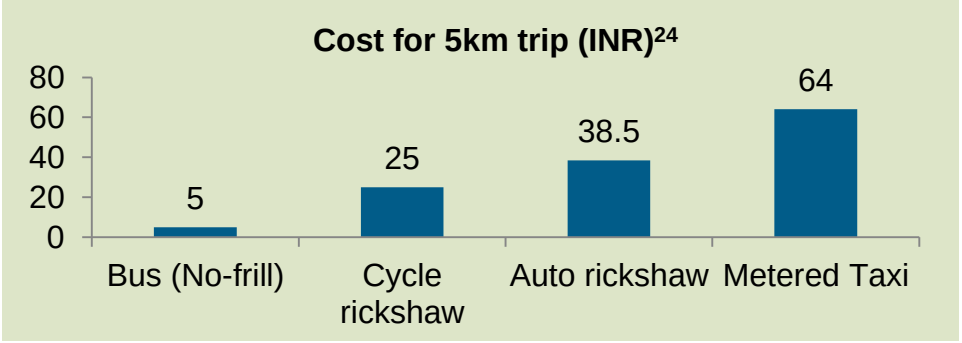
The Delhi buses:

- No-frill buses cater to the poor, these buses cost on an average INR 1 per km, which means it would cost INR 20 per day for a round trip and INR 600 per month for the commuter.
- These buses are affordable means for all families with household income greater than INR 12,000 per month ($8 per day) (assuming two people in a family travel)
- The Delhi government also provides a monthly **bus card** for families below the poverty line by which one person in a family can travel any distance for only INR 500 per month
- These cards are not affordable for the poor because they do not possess that surplus amount as most are daily waged workers

Between the buses and metros, the buses are more accessible. The distance between each metro station is 1-2kms whereas the distance between bus stations is 500m-1km



There are many paratransit modes in Delhi, such as the metered taxis, auto rickshaws and the cycle rickshaws. Most of them work on fixed meter rates (other than the cycle rickshaw) and the prices do not cater to the poor. These modes are for the higher middle class or the more affluent. For example a 5km ride in an auto rickshaw is almost 2 times what 15% people below the poverty line earn per day



Delhi BRT lane is not of a substantial size to show the benefits to the commuters; negative media hampered its further growth

Context:

Delhi has a modal share of around 30% for public transport and buses contribute the most to the high modal share. With constantly increasing modal shares of private vehicles such as cars and motorbikes the congestion levels in the city are also rapidly increasing. With this scenario it becomes important to implement a right of way for buses and rightly so the government of Delhi implemented a pilot BRT line of **5.6 Kms** from Chirag Delhi to Adarsh Nagar. This system is an open BRT system with the segregated lane provided for all buses (not just for special BRT buses) plying in the route

Impact:

The Delhi BRT carries on an average 12,000 passengers / hour in a single direction which is high given its size but the average speed of the buses is only 13kmph which is low when compared to most BRTs across the world.

Fatalities and the negative media:

15 fatal accidents happened on the BRT lane in its first year of operation and this got a lot of negative media attention. It also became a major campaigning point for the opposition during the Delhi elections. With political pressures and constant media negative reports the BRT project took a back seat and didn't expand beyond the 5.6km stretch in Chirag Delhi. Indian Institute of Technology, Delhi professors, (designers of the Delhi BRT) ensured that rights steps such as building speed breakers and implementing effective traffic management systems were taken in the subsequent years which brought the fatalities to zero in recent years

'BRT is not pedestrian friendly as it is in the middle of the road. If it was on the left people will get out on the left directly on to the walking/cycling path. Currently all people who get out of the bus have to cross the road as it is in the center' – a bus conductor on the Chirag Delhi BRT

The central BRT lane was built to end Bus-cyclist conflict which was the major reason for fatalities earlier before the BRT. Currently the BRT corridor in Delhi also has a separate cycle lane which is world class and the central lane removes the conflict completely. But the central bus lane means that 100% of the passengers using the Bus need to cross certain part of the road with mixed traffic in it and hence providing better pedestrian crossing infrastructure such as over bridges or subways would have been more effective . Some of the transport experts say that the major problem with Delhi BRT is not the crossing area but it is with passengers entering the corridor in non terminal areas

A comprehensive NMT lane and pedestrian paths make the Delhi pilot BRT corridor an inclusive corridor

The comprehensive NMT lane in the BRT corridor has been specially designed for high number of cycle users in Delhi. Currently 1200 cyclists use the lane in peak hours which is second only to Chinese cities. The cycle lane has been designed by keeping the requirements of the cycle rickshaw drivers and it is wide enough to comfortably accommodate the rickshaw. These design elements make the Delhi BRT corridor not only friendly to the bus commuters but also to the NMT users who together constitute to over 44% of modal share in Delhi

The 'Grade A' pedestrian facilities have set high standards for other BRT corridors in India. Wide and comfortable pedestrian ways have been built on either side of the road in the BRT corridor

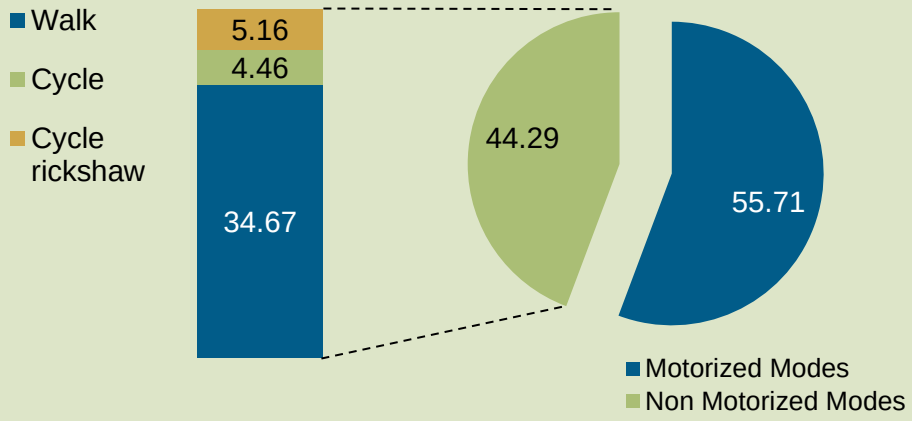
Accommodating hawkers: The BRT planners have surveyed hawkers and understood their needs before planning the BRT. They have left green spaces on the corridor as legally they cannot provide space for hawkers (because currently there is no mechanism to allocate spaces). In India the policy makers are hostile towards Hawkers. Currently many hawkers use the BRT corridor without actually blocking the pedestrian way

With many more corridors planned and feasibility studies completed the Delhi government is unable to start the projects because of the initial negative media attached to the pilot corridor. With the success of the Ahmedabad BRT there might be a positive impact on the Delhi government officials to implement the Delhi BRT in a more optimal scale

Delhi has a high modal share, 44% of non motorized modes, but the environment is not conducive for commuters

- Delhi has a very high modal share of non motorized modes. Cycles and cycle rickshaws have a modal share of around 10% while walking has a modal share of 35%
- Inadequate infrastructure for pedestrians and cyclists makes it very difficult for commuters, as do blockages such as hawkers and parked cars on pedestrian and cycle ways
- Over 66% of all fatal accidents involved a non motorized mode user, around 53% of them were pedestrians[25]
- Very little is being done to improve the infrastructure for NMT users. A 680km stretch of walking and cycling paths have been planned along with the BRT system but its implementation depends on the implementation of BRT. Currently the expansion of BRT network has been stalled because of all the negative media attached to the pilot corridor

Modal shares of Motorized and non-motorized modes[5]



There are a few organizations that have implemented public bike sharing (PBS) pilots:

Delhi Cycles Pvt Ltd. - Metro Cycle Feeder program:

- The company has a pilot near the Rohini Metro station
- Currently this service helps passengers cover home/office to metro trips or vice versa
- This service currently doesn't cater to the poor, as most commuters using the metro are people from the middle class or above. With more affluent users using the system it would gather the policy makers attention towards providing better infrastructure for cycling
- The fares a quite affordable it costs INR 3 for 15 minutes (assuming most short distance trips take approx. 15mins)

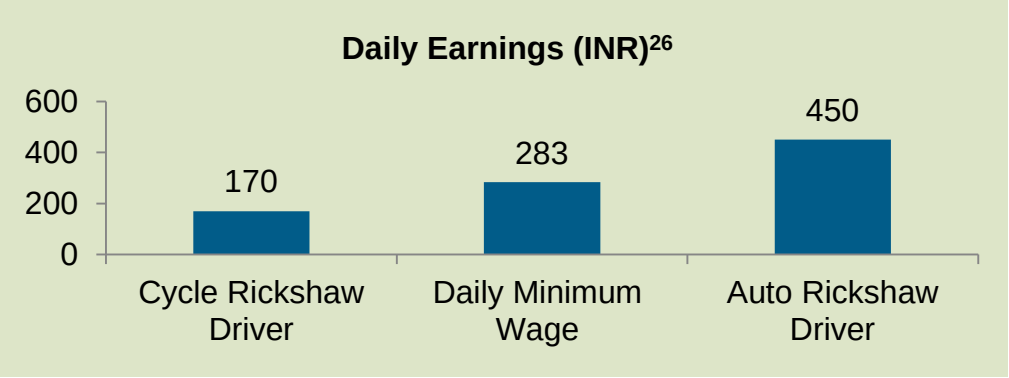
Delhi Integrated Multi-Modal Transit Sytem (DIMTS) – Delhi BRT PBS pilot:

- DIMTS has implemented a PBS system on the BRT corridor, as the BRT corridor has not yet scaled up to an optimal level the usage of this system is also very low
- The cost of hiring a cycle is INR 10 per hour, for the first time the user would need to produce an identity proof and deposit INR 100 to get a card done but later on he can just produce his DIMTS card to hire a cycle
- The infrastructure on the BRT lane for cycling is world class (see next slide), if BRT scales up this model would have a huge impact on attracting more citizens to cycle

The cycle rickshaw drivers earn lesser than the daily minimum wages of Delhi

Profile of a typical cycle rickshaw driver:

Cycle rickshaw drivers are the most vulnerable of paratransit operators or drivers. The fact that the cycle rickshaw is a non-motorized vehicle, it is generally for short trips of 1-2kms, which take time. Hence, the earnings of the cycle rickshaw driver are low. They typically earn INR200-220 per day and ends up paying INR 30-50 on rent. Most of these drivers are immigrants who move too the city in the post harvest seasons and hence prefer taking their vehicles on rent. The earnings of these drivers is lower than the prescribed mini-mum wage and it is also lesser than the per capita income of Delhi



Profile of a typical auto rickshaw driver:

The earnings of auto rickshaws driver are 2.6 times greater than of cycle rickshaw drivers. Most of the drivers own their vehicles (even as per law a person cannot own more than one auto rickshaw). After taking care of daily expenses on fuel and other costs the driver saves close to INR 450 per day. With ownership split across multiple owners this is a much tougher segment to organize

Key issues with organizing the sector:

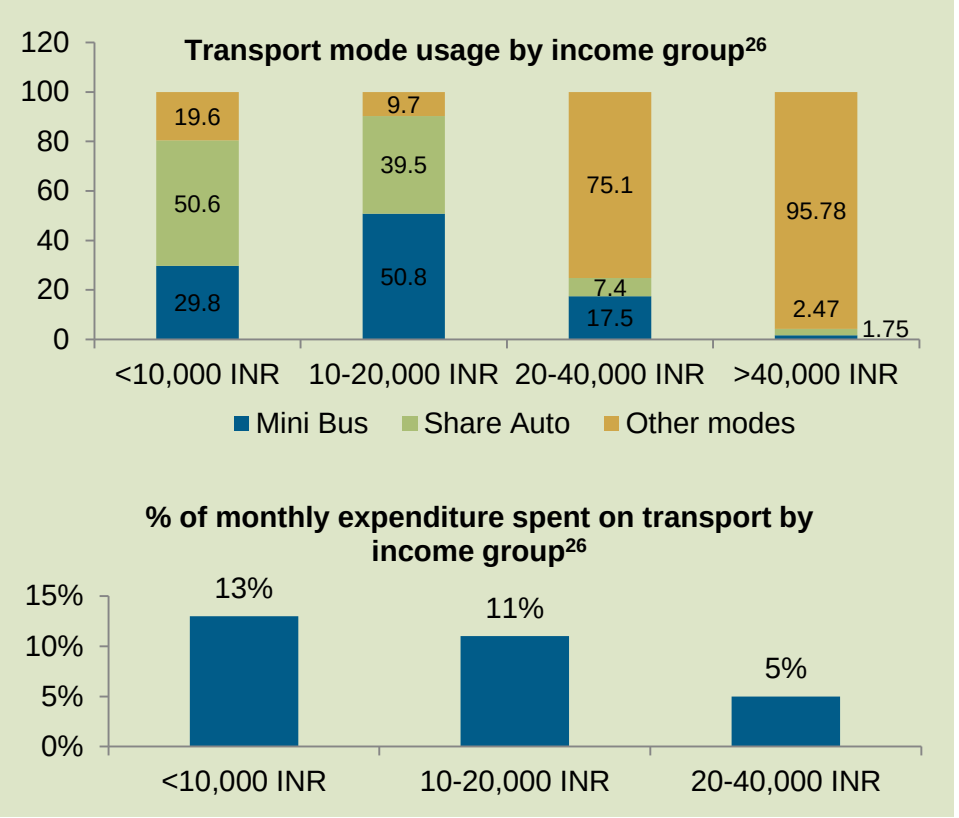
- **Single ownership structure:** With the law permitting only one auto per person it gets tough to organize the space. In the case of radio taxis entrepreneurs can own a fleet of vehicles and then hire drivers to run the fleet. Radio cabs brought in a lot of discipline into the operations of cabs in Delhi but implementing such a model for autos is tough as there are multiple owners involved leaving little scope for entrepreneurs to run such operations. With radio cabs the major revenue source for the organization that runs the service is the rent that they make per vehicle each day

- **Stringent Advertising rules:** Advertising can be an attractive alternative mode for generating funds for sustaining an entrepreneurial venture such as dial a rickshaw etc. However, current legislation on advertising requires that the company share its ad revenues with the municipal cooperation leaves limited funds for the entrepreneur to run his operations in a sustainable way. As paratransit modes operate in fixed routes 'local advertisements' still hold potential generate revenue as the Ads can reach out to the people living the vicinity and attract the right target audience to the brand that is advertising

Transport infrastructure in satellite cities in NCR is nearly as developed as NCT

Gurgaon is primarily dependent on paratransit:

- Gurgaon is a one of the satellite cities in the National Capital Region (NCR). Gurgaon has seen rapid development in the last decade and the flipside to this development story is the largely ignored public services such as transport, sanitation etc.
- Public transport has been largely ignored by the authorities and the city is currently predominately dependent on paratransit modes provided by various private players
- Share Autos (eight seater three wheel vehicle), Mini buses (20 seater) and cycle rickshaws are the three main modes used in Gurgaon
- Share Auto is the most used mode with over 200,000 trips/day; the usage of buses is low because they currently operate in two main routes (mini buses do approximately 35,000 passenger trips in a day)
- It is the low income households that use these modes the most. Over 80% vehicular trips made by households with income less than INR 20,000 are done by using either the mini bus or the share auto
- The expenditure on public transport is between 5-13% of the monthly expenditure for households with incomes between INR 10,000-40,000



Issues with informal transport setup:

- The accessibility is poor as most modes operate only in profitable routes
- As the modes operate in fixed routes multiple change overs make transport expensive for the poor
- Low supply of these modes leads to overcrowding which makes commuting very unsafe especially in the share autos

Delhi: Thoughts on the way forward

	Recommendation	Progress so far
City Management	▪ Implement a unified plan for all the regions in the National Capital Region (NCR) as many commuters go to various parts of the city to access employment opportunities	▪ A single NCR Board (NCRB) has been formed to foresee various issues including mobility ▪ The NCRB has entered into an MoU with various state governments in NCR such as Delhi, Haryana, etc. for implementing an efficient commuter transit infrastructure
Public Transport	▪ Invest in implementing efficient BRT lines along with the Metro rail projects as metros are not cost efficient for all areas ▪ Create a unified authority to plan efficient systems based on traffic demand and other budgetary concerns	▪ Delhi government is planning to invest in another 4 metro lines ▪ A 680km BRT feasibility study has been completed but there has been no progress in the space because of the negative press received by the Chirag Delhi BRT line ▪ The government has proposed a Unified Mass Transit Authority (UMTA) to have an integrated plan for bus and rail networks
Paratransit	▪ Promote transport cooperatives and access to finance services for improving the earnings of poor entrepreneurs, especially the cycle rickshaw drivers	
Walking/Cycling	▪ Build good quality and continuous pedestrian paths and cycle ways ▪ Promote public bike sharing and implement pro-private sector PBS policies ▪ Implement an effective and sensitized hawkers' management plan so that they are able to keep their livelihoods without blocking the walking/cycling paths	▪ Walking infrastructure is very poor, good quality NMT lanes are planned along with the BRT line ▪ A few pilot projects have come up for PBS systems along the BRT line and near metro stations

Interests of various funders in Delhi Urban Mobility

Funder	Interest area
Asian Development Bank (ADB) & Kreditanstalt für Wiederaufbau (KfW) – German Government owned development agency	Funding the NCR planning boards infrastructure project for connecting NCT of Delhi with various suburban satellite cities. A loan of USD 150 million from ADB has been approved for financing infrastructure projects in NCR and it's suburban areas, of which USD 78 million will be available as the first tranche. Agreement for loan of Euro 100 million from KfW for environment friendly infrastructure projects has also been signed
Japan International Cooperation Agency (JICA)	JICA played a major in the implementation of the Delhi metro both from the financial and technical standpoint
GIZ	The Sustainable Urban Transport Project (SUTP) provides Advisory Services for Environmental Management which provides technical assistance to some Indian cities which are under the JNNURM scheme

Note: This is not an exhaustive list as this was compiled through interviews with key informants

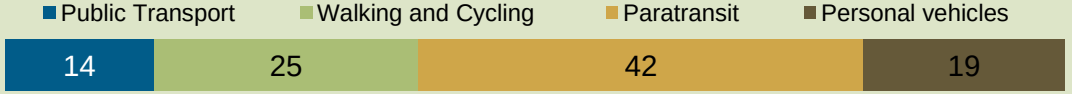
Agenda

- Executive Summary
- Context and Key Definitions
- Current state of urban transport
  - Public Transport
  - Paratransit
  - Walking and Cycling
- Issues for Entrepreneurs and service providers
- Solutions to solve urban transport issues
- **Deep Dives**
  - Delhi, India
  - **Manila, The Philippines**
  - Nairobi, Kenya
- Annexures

Metro Manila: Paratransit dominates the transport landscape

Note: Most of the data in this section has been compiled through interviews with list of key informants (Refer to Annexure 3)

Modal Share of Metro Manila[5]



General

- Metro Manila comprises 16 cities and one Municipality, had a population of 11.5 million & population Density of 18, 093 persons per Km² in 2007

Public Transport

- The urban transport scenario is characterized by low modal share of public transport
- The bus based public transport in Metro Manila is run by the private sector acting as government franchisees. Though the fares are well regulated but unregistered units (colorums) do exist.
- The rail based public transport has high capacity utilization but continues to run on government subsidies

Walking and Bicycling

- People walk and cycle mostly by compulsion rather than by choice, as urban transport environment is generally hostile to them (captive users)

Paratransit

- Dominated by Jeepneys, paratransit plays the role of primary transport
- Oversupply of Jeepneys and tricycles results in lower capacity utilization leading to lower incomes and long working hours for their drivers
- Commuters have to take multiple rides to reach their destinations owing to zoning system for Jeepneys and tricycles leading to higher cost, higher commuting time and decreased comfort
- The fare of Jeepneys and Tricycles are well regulated
- Presence of unregistered units (colorums) of shared taxis (FX), Tricycles and Jeepneys is owing to statutory capping (aimed at reducing congestion) of their number in each zone

People earning less than US $ 1.26 per day, numbering 64,404 and constituting 2.6% of population considered poor

- Per capita annual income for Metro Manila in 2009 was PhP 77,462
- The Gini coefficient of income for the Philippines in 2009 was 0.4484
- The minimum wages in 2011 for urban unskilled labour was PhP 426 per day for Metro Manila[27]

National Statistical Coordination Board estimates of poverty

Family Size	Daily (PhP)	Monthly (PhP)	Annual (PhP)
1	54	1650	19802
2	109	3300	39604
3	163	4950	59406
4	217	6601	79208
5	271	8251	99010
6	326	9901	118812
7	380	11551	138614
8	434	13201	158416

- Incidence of family poverty in Metro Manila in 2009 was 2.6% comprising 64,404 families
- A family of five needed PhP 8251 per month to stay out of poverty

Competing Estimates of poverty in Metro Manila

- A family survey conducted by the Social Weather Station estimated[30] self-rated poverty rate in September 2011 at 39%. The sample comprises of 1200 respondents from Metro-Manila and may have an error of ±6%
- If being an informal settler (see photo 1) in Metro Manila is taken as a proxy for poverty then over 5 million people (out of a ADB estimated population of 14 million) are informal settlers[28], nearly one fifth of whom face evictions (see photo 2) from their habitat[29], then the proportion of poor in Metro Manila would be 36%
- Based on Philippine census for 2000 and 2007 the population CAGR helps project 2011 population at 12,489,782. The number of informal settlers[28] works out to 2,782,630 (assuming 5 members/family) for 556526 informal settler families. Hence, the proportion of poor would be about 22% when number of informal settlers is taken as proxy indicator for the poor

Informal settlements in Manila

Opposition to eviction from informal settlements in Manila

With 17 LGUs in Metro Manila; implementing unified plans and policies across the city is a challenge

Scope of Metro Manila Development Authority (MMDA)

The MMDA was constituted in 1995 under the Republic Act No. 7924 to look after the functions of (a) Development Planning, (b) Transport and Traffic Management, (c) Urban Renewal, Zoning and Land Use Planning, (d) Public Safety, (e) Solid Waste Management, (f) Flood Control and Sewerage Management, and (g) Health and Sanitation, Urban Protection and Pollution Control. Only those services, in the above categories, that were metro wide and transcended the boundaries of the Local Government Units (LGUs) and the ones that entailed huge expenditures which could not be met by the individual LGUs came under the ambit of MMDA.

Metro Manila Council

This is the Governing Board and the policy making body of MMDA. It is composed of the directly elected Mayors of the 16 cities and one municipality and the Presidents of the Metro Manila Vice Mayors League and the Metro Manila Councilors League. The council is headed by the Chairman who is directly appointed by the President and holds the rank of a cabinet member. Heads of the Department of Transport and Communications (DOTC), Public Works (DPWH), Tourism, Budget and Management (DBM), Housing and Urban Development Coordinating Committee (HUDCC) and the Philippine National Police attend the meetings of the council as non voting members. The council approves metro-wide plans, programmes and projects, approves the MMDA budget for submission to DBM, prescribes and collect services and regulatory fees and impose and collect fines and penalties.

Functions of MMDA Chairman

Appoints all the officers, employees and consultants, executes the decisions of the council while managing the day to day operations of MMDA, prepares MMDA's budget for submission to the council, submit for consideration of the council such other policies and measures that it deems necessary for effectively discharging its duties, prepare the annual accomplishment report of MMDA and perform any other duties and functions assigned by the President and the Council

Institutional Linkages of the MMDA

The MMDA needs to consult, coordinate and work closely with the LGUs, National Economic Development Agency (NEDA) and all the other departments/committees represented by other voting and non-voting members in the council, accredited people's and non-government organizations and private sector operating in Metro Manila. The MMDA Chairman or his authorized representative would be ex-officio member in the boards of relevant corporations and committees functioning under department of Metropolitan Water Works and Sewerage Systems (MWWSS), DOTC, DPWH, HUDCC and the Department of Interior and Local Government (DILG).

Deep Dive Findings

For MMDA to be successful in carrying out their mandate, it is important that the Chairman is accessible to all the stakeholders and is able to work out a consensus on various issues among them. The current MMDA leadership has been able to play this role effectively as it has a wide acceptance across various stakeholders. However, the decision making process entails building consensus in the council and this is a time consuming process as is evident in the time taken in implementing a uniform ticketing system.

Public transport is not accessible in most parts of the city; both buses and trains are operational in select few routes

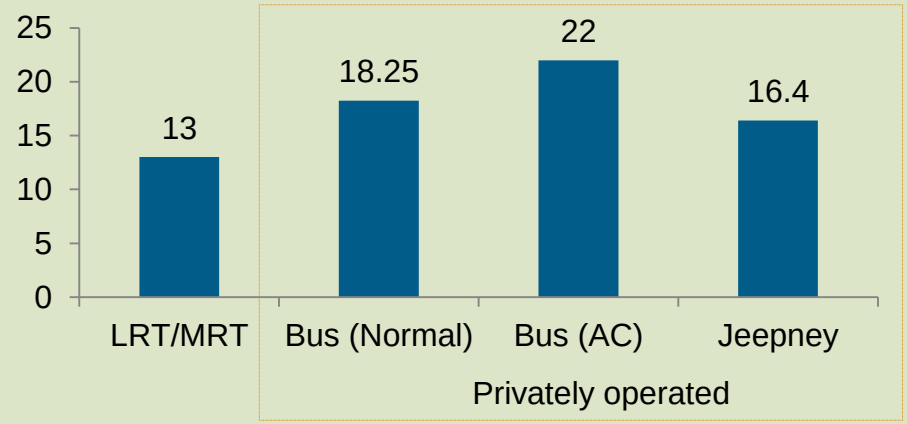
The rail network:

- The Light Rail Transit (LRT) and the Mass Rapid Transit (MRT) trains are the only government run public transport systems available in Metro Manila
- There are 2 LRT lines and 1 MRT line operational in the area which carry close to 1.2 million passengers on a daily basis (approximately 10% of the total population)
- The LRT and MRT trains are heavily subsidized and hence are affordable to the commuter The government is considering hiking the prices as currently for a trip which costs P60 a commuter is being charged only P15 and the rates are lesser than that of the buses
- Accessibility is a major concern, most LRT and MRT users will have to use another mode to complete their journey because of the limited network of the rail system

The bus network:

- Buses are run by private players, there are 113 bus operators currently and each bus operator must have at least 10 buses to get the franchise done
- The bus fares are much more expensive when compared to that of the train or the Para transit modes Jeepneys

Cost of 10km trip (Pesos)[31]



What to look forward for:

- Very low activity on bus rapid transit (BRT)systems, the only BRT implemented so far is in Cebu city which is not a part of the metro Manila area. BRT is being planned in the C5 area in Metro Manila (pre-feasibility studies have been submitted)
- Major infrastructure investments are planned on improving road commuting for cars and improving the rail system (There is huge scope of capacity improvement in case of LRT and MRT trains)

Though the rail is the most affordable mode of transport, the poor use the Jeepneys because they are more accessible . From a scale perspective rail based growth is not sustainable as the current fares are highly subsidized

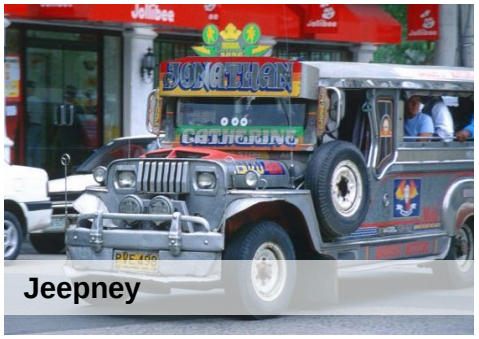
Para transit modes play the role of both primary modes and feeders in Metro Manila

In terms of paratransit, Manila as a city is rich in transport options. There are many options available for the commuter, some old and traditional options such as the Jeepneys, tricycles etc. and other more advanced and comfortable options such as the FX taxis etc.

- The mode that is most used by the poor are the Jeepneys as they are the most accessible and affordable primary modes in Manila and it is not a surprise that the Jeepneys are called 'Public Transport' in Manila. (The Jeepneys are regulated by the national governments)
- The FX cabs have AC and more comfortable seats and hence it caters to the middle class commuter segment.
- The tricycles and pedicabs are regulated by the local governments and they are used mostly by the middle class commuters as the poor prefer to walk such small distances
- The tricycles can act both as shared and non shared modes and it has different pricing for different number of commuters. The driver earns more when he carries 3 commuters in a trip

Tricycle pricing mechanism:

No of commuters	1	2	3
Per commuter fare	20	10	9
Drivers earnings	20	20	27


Jeepney

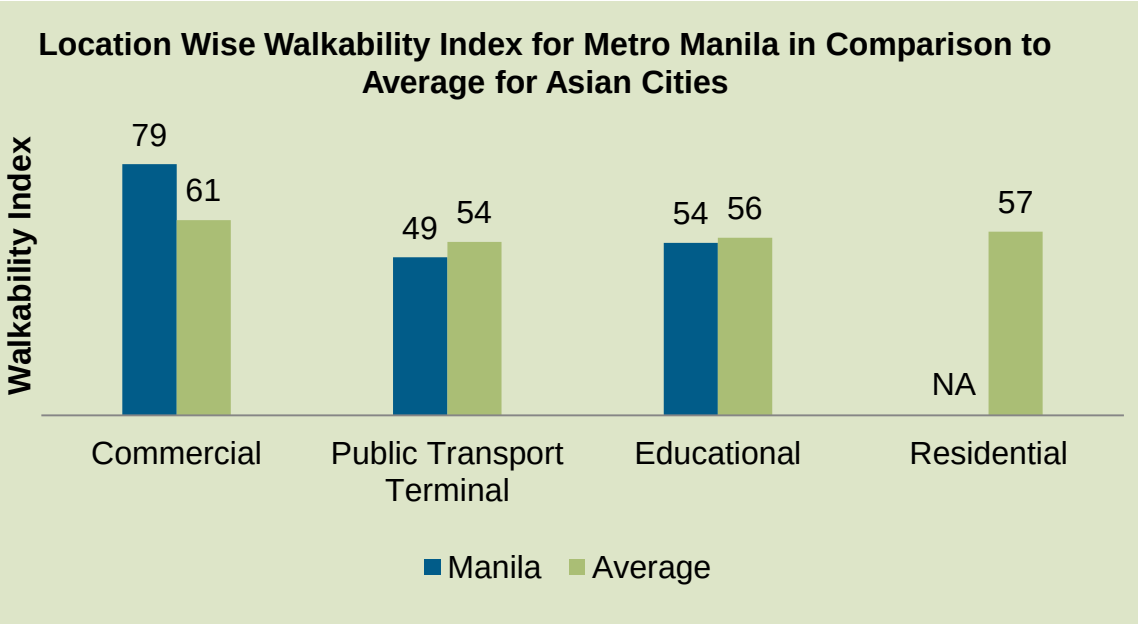

FX Cabs


Tricycle

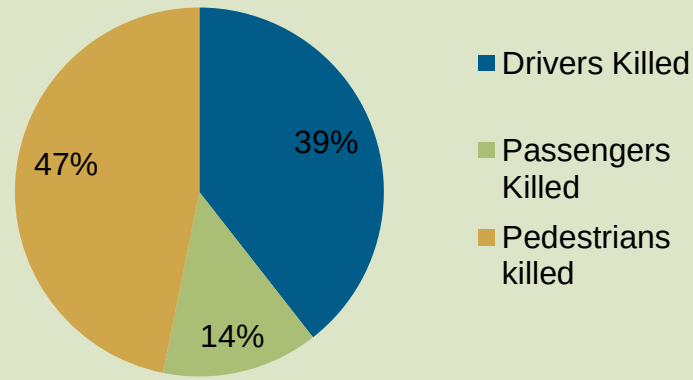

Pedicabs

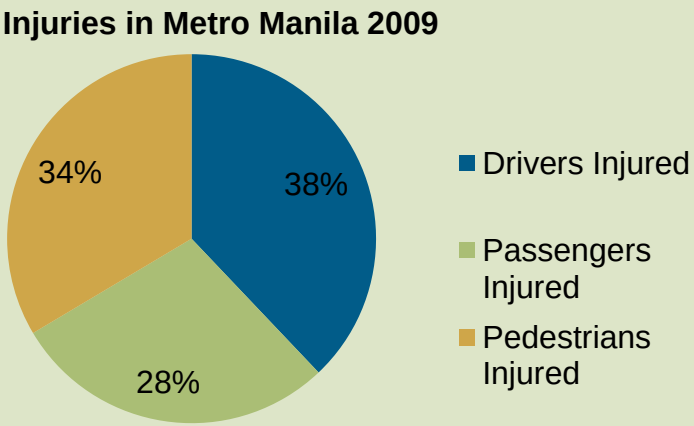
'Fragmented journeys'- the major issue to the commuter: Most modes operate in associations and hence are allowed to ply in fixed routes. For commuters who travel across cities the major problem is switching modes to complete the journey as Jeepneys or tricycles cannot ply for the entire distance, which makes their trips fragmented (multiple rides). The poor commuter stays close to his employment to ensure that he finishes his daily trip in 1 ride and hence compromises on comfortable housing by staying in informal settlements

Lack of uniformity of sidewalks in residential and public transport terminals and low safety of pedestrians deter walking



- Walkability index of Metro Manila in commercial areas is better than the average for Asian cities with weakness showing in walkability around public transport terminals and Educational areas
- The average of walkability index includes figures from the 13 Asian cities of Ulanbaatar, Metro Manila, Lanzhou, Kathmandu, Kota, Karachi, Jakarta, Hong Kong, Ho Chi Minh, Ha Noi, Davao, Colombo and Cebu
- As commercial areas are developed mostly by the private sector in Metro Manila, it fares better in this category than the average for Asian cities
- As The pedestrian side walks in Metro Manila are to be provided by the land owners themselves (owing to National Building Code); though present, the footpaths are undulating and of varying quality resulting in poor walking experience





Pedestrians account for nearly half the fatalities (as compared to one fifth in 2010 in 35 major Indian cities) and one third of the road injuries indicating a hostile environment for them

Attempts at improving the conditions for walking and cycling needs to be driven both as part of pro-poor and green agenda

Projects that may have a positive demonstration effect on improving the walking and cycling conditions in Metro Manila have been driven by the Green Agenda. Some of the examples are as follows.

- The 35-km bikeway network in Marikina city demonstrated that bicycle travel can be promoted in medium-scale growing cities. The project resulted in increasing the modal share of bicycling from the 4 percent in 1999 to 9 percent in 2008 (WB-GEF, 2008). The bikeway not only helped improve the revenues from the bicycling industry but also helped the mobility of the poor factory workers who saved on their transportation expenditure
- In 2010, 64 foot over bridges were operational and accounted for a pedestrian count of 2.34 million
- Manila city's pedestrianisation project in Avenida
- University of Philippines, Diliman campus oval is a 3-lane corridor where on weekdays the innermost lane is reserved for the pedestrians and cyclists and the two other lanes are used for one way vehicular traffic. On Sundays the carless oval scheme on the same road transforms the entire space conducive for leisurely walking, jogging and cycling. The traffic model zone project has helped students take to biking and save money that was earlier used for taking Jeepney rides for travelling within Diliman Campus.

The green agenda continued to drive the efforts at improving the walking and cycling conditions even in 2011.

In 2011 the Department for Transportation and Communication and the Department of Environment and Natural Resources acted as focal agencies for formulation of "National Environmentally sustainable transport strategy for the Philippines" which was prepared by the National Center for Transportation Strategy (NCTS), University of Philippines and funded by the United Nations Centre for Regional Development (UNCRD)

The democracy in Philippines strengthens the political will for positive action on issues that are driven by pro poor agenda

The last Presidential elections in the Philippines witnessed clear articulation of the interests of the informal settlers who were able to persuade the current President before he was elected to the post, to agree to taking a closer look at their impending eviction from their homes once he was elected. The Government is presently in dialogue with the representatives of informal settlers to sort out the issue amicably to the advantage of all the stakeholders

Despite projects that have demonstrated that improving walkability and the bicycling environment in the city helps the mobility of the poor and is environmentally sustainable, there is very little happening in Metro Manila to improve walkability and for scaling-up bicycling. There is a strong case for pushing the walking/bicycling as pro poor initiatives as well rather than as a green initiative alone.

Both the Jeepney and Tricycle drivers earn less than the daily minimum wage of Manila

In Manila the Jeepneys and tricycles cater to most of the urban mobility needs of commuters. The drivers of both the modes operate vehicles by taking it on rent from the owner. After taking care of all the operational costs including the rent the drivers make anywhere between P300-P400 per day, which is lesser than the minimum daily wage (which is P426/day) in Manila. One of the reason for low earnings is the oversupply of these vehicles for example the load factor for Jeepneys is only 40%

Key operational characteristics of Jeepney: [32]

Operational Characteristic	Quantum
Average passengers per day	245
Average number of trips	14
Average work hours for drivers	14
Load capacity	40%
Boundary or rent	PhP 675
Average expense on fuel	PhP 775
Other costs	Terminal fee PhP 350/month , Dispatcher fee - PhP 10-20/Trip, Barangay fee (local government fee): PhP 150 every quarter
Daily revenues	PhP 1800
Daily earnings for the driver	PhP 350

Driver case studies:

Chris is 40 years old and is a member of the Loyola heights tricycle association in Quezon city, Manila. He has been working as a tricycle driver for the past 9 years, has 4 children and lives in a nearby informal settlement

He works for 30 days every month for 12-14 hours everyday and makes a revenue of PhP 1000 per day. Out of that he pays PhP 150 as rent to the owner and pays PhP 550 on fuel and other expenses and saves PhP 400 everyday on an average.

Stefan is a Jeepney driver who operates in Makati city. He has been driving the Jeepney for over an year now and before that he used to be a mechanic. A year ago he decided to buy a Jeepney to make a living

He bought an old Jeepney for P180,000 by taking a loan from an informal source, as the Jeepney was not functional he invested another P70,000 to make it functional and started plying the Jeepney. His wife travels with him in the Jeep and she acts as a ticket collector. Today he makes P20,000 a month out of which P10,000 is his loan repayment amount. After a few months he would own the Jeepney and hence make P20,000 every month (which would over P600 per day, greater than the daily minimum wage)

The e-Jeepney franchise model could improve the value proposition of the Jeepney drivers

Context:

Jeepney is by far the most used vehicle in Manila and with the average age of the engine around 30 years they are also the most polluting modes. The eJeepney (which is currently being promoted by the Institute of Climate and Sustainable cities) would not only reduce the emissions but it will also the improve the value proposition of the Jeepney driver

Key stakeholders in the model:

Franchise:

The franchise would own the fleet of vehicles and would be responsible for running the fleet on fixed schedules and would provide electronic ticketing system etc.

Vehicle Manufacturers:

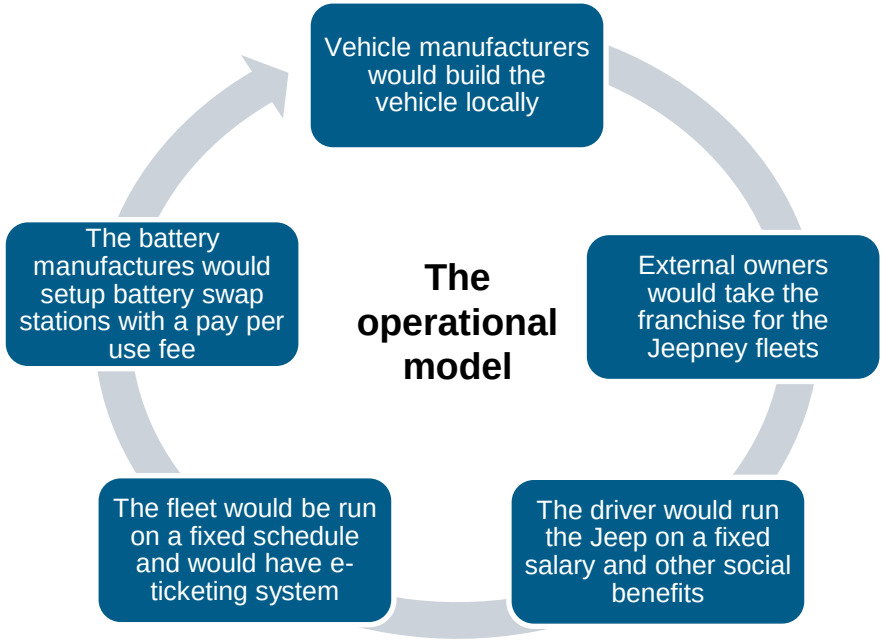
The current Jeepneys cannot be converted into electric vehicles because of the weight of the current vehicles. Hence vehicle manufacturers would be manufacture vehicles which can run on led-acid batteries, the electric vehicles today are being imported from China. The capex of the vehicle without the battery is P500,000.

The Driver:

The driver would be a key stakeholder as he would be making fixed salary which is much higher than what the current Jeepney drivers make and also would be getting social benefits. The driver would be responsible for following the schedule and maintaining discipline (not over speeding etc.)

The Battery manufacturers:

The battery manufacturers would setup battery swap terminals where they would rent out batteries to the fleets through pay per use system (this would ensure that there wouldn't be any downtime for charging batteries) and also the fleet owners neednt spend P70,000 every few years to replace the battery. The pricing mechanism for the battery swap model needs to be built



The government with the support of ADB is planning to convert all tricycles to e-trikes

Context:

Today there are around 95,000 registered tricycles plying in the metro Manila region and there are approximately the same number of unregistered vehicles. The MMDA with the support of the local governments and the Asian Development Bank (ADB) is planning to convert the entire fleet of tricycles to electric vehicles which runs on Lithium Ion batteries. ADB has decided to give a $400 million loan to the Manila government to implement the following project

Current Status:

Trial runs were conducted on many etrikes designs and a particular design has been decided for replication across the city. The new vehicle has a capacity of carrying 8 commuters (whereas the current ones can carry only 3)

Proposed Plan (E-Trike rent to own model):

As per the new model the operator or owner of the current vehicle would be provided access to finance to procure the electric vehicle which he would own over a period of time through daily repayments. The government plans to procure the current tricycles from the owners and the amount they make can be used as the initial down payment

Impact: The new trike would increase the daily earnings of the driver from P400 to P1400 and would reduce emissions

Challenges:

- The capex of the newly proposed vehicle is around P200,000 which is at least 3 times greater than the cost of the current tricycle. The major cost in the vehicle is the Li-ion battery which has a life of 5-10 years and once the battery dies down the operator will have to invest in procuring the battery again (Perhaps the government must adapt the pay per use plan for batteries like in case of eJeepneys)
- Other challenge would be to build environment for battery recharging points etc. which is a critical aspect for the success of the project
- The government plans to deploy the old vehicles in the provincial areas and must understand if there is a demand for 100,000 vehicles in the provincial areas

Transport cooperatives would improve the value propositions for both the drivers and operators (Case of Naga City)

Context:

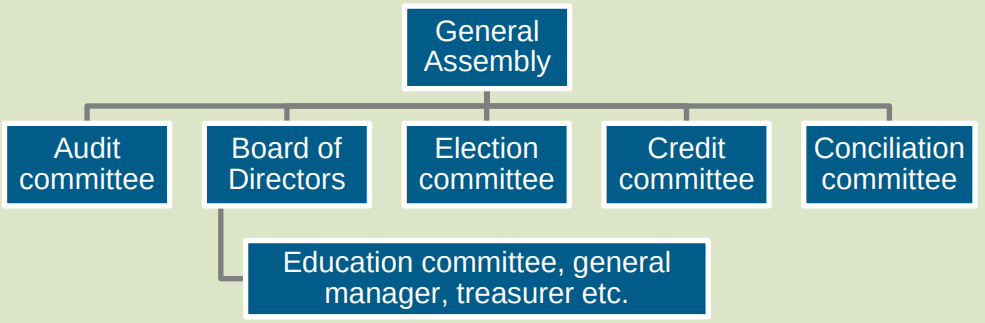
Over 200,000 people are dependent on Jeepneys and Tricycles for livelihoods and most of them earn less than the daily minimum wages of Manila. Currently majority of them operate under and association (TODA or JODA) and pay association fees for plying on a particular route. The Office of Transport Cooperatives (OTC) is the government agency that registers and promotes cooperatives in the transport space.

Case study of PISTTON a cooperative based out of Naga City (outside Metro Manila):

The cooperative was formed in 1987 and currently has 1241 members with around 130 of them participating in the transport business of the cooperative (115 drivers, 10 operators, 5 allied workers). The cooperative has taken up other initiatives which not only generates additional revenues but also would compliment the transport operations. Some of the initiative that the cooperative has undertaken are as follows.

- Garage (maintenance services)
- Spare parts store
- Grocery store
- Access to finance services etc.

Organization Structure:



All members of the cooperative comprise the general assembly which elects the board of directors , a chairman, a vice chairman and at least 3 other members with representation from among stakeholders such as drivers, operators, store managers, etc.. The board with various committees and operational teams under them takes care of the day to day operations and 4 oversight committees (namely, audit, election, credit and conciliation) act as watchdogs to ensure operational transparency

Benefits to the drivers:

The cooperative provides a share of profits generated from the garage operations, spare part stores and grocery stores apart from offering savings as a product to its members. The drivers are asked to save PhP 5 per day with the cooperative. These savings are used to provide social security to the cooperative members through insuring them for covering the risks of injury and death due to accident and for providing retirement benefits for the members.

Manila: Thoughts on the way forward

	Recommendation	Progress so far (what to look forward for)
City Management	▪ Implement a city wide unified transport plan. Commuting between various cities in metropolitan area is a daily activity for many commuters and hence having a unified plan would help plan and implement things better ▪ Promote eco-friendly fuels	▪ Currently the city management structure is very fragmented because the metropolitan area is divided into 17 cities, hence metro wide plans are difficult and time consuming to finalize ▪ Department of Energy (DOE) is planning to promote the use of CNG/LPG in the city ▪ The government wants to convert the entire fleet of tricycles to electric vehicles with support of ADB ▪ The Institute of Climate and Sustainable cities is promoting electric Jeepneys
Public Transport	▪ Expand the MRT/LRT system but charge premium to the users (the LRT/MRT system is not used by the poor and hence needn't be subsidized)	▪ Currently there are 3 LRT/MRT lines which are not meeting the entire demand. LRT/MRT will help ease congestion in the city as it could promote modal shift from cars to rail based rapid transit systems
	▪ Curb oversupply of transport options and implement effective route planning based on traffic demand . Different capacity vehicles will have different roles to play	▪ No action in this regard
	▪ Promote limited competition in the bus space (put minimum thresholds such as min size of fleet etc for private players to bid) or make all buses to operate under single management ▪ Make bus journeys more comfortable for people so that the modal shares would increase ▪ Promote right of way for buses (BRT lines) after fixing the issues such as oversupply, no fixed schedules etc. with the current bus system	▪ Very low activity on BRT, the only BRT implemented so far is in Cebu city which is not a part of the metro Manila area ▪ BRT is being proposed in the C5 area in Metro Manila (pre-feasibility studies have been submitted)
Paratransit	Promote transport cooperatives to improve the value proposition of Jeepney and Tricyle drivers and owners	▪ Office for Transport Cooperatives (OTC) is promoting transport co-operatives in Metro Manila and other urban areas in the Philipines
Walking/ Cycling	▪ Promote cycling through public bike sharing ▪ Provide the right infrastructure for cycling and capacity building measures for cycling	▪ One pilot project was implemented in Marikina by the World Bank/GEF but the effects were limited

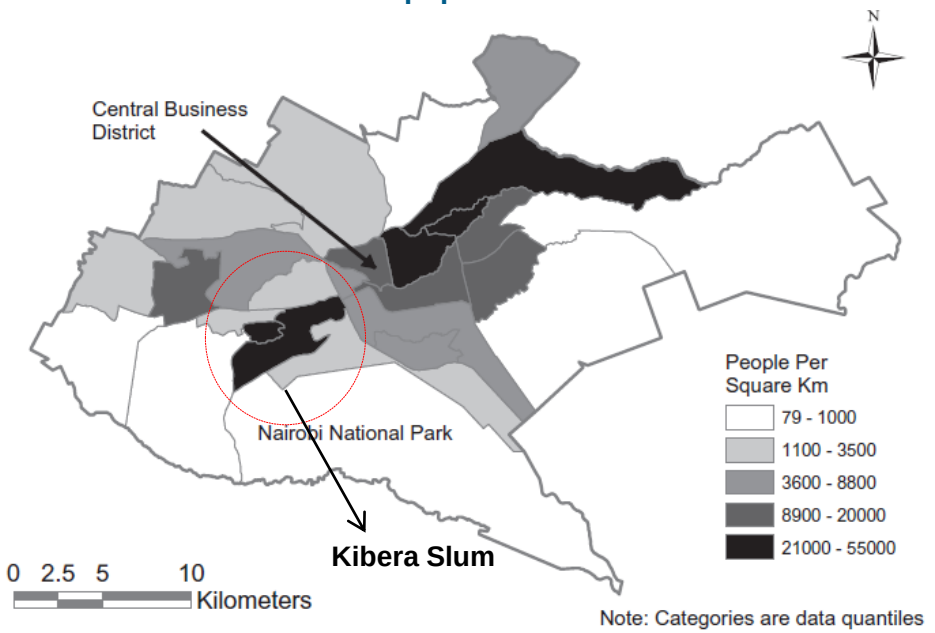
Interests of various funders in Manila Urban Mobility

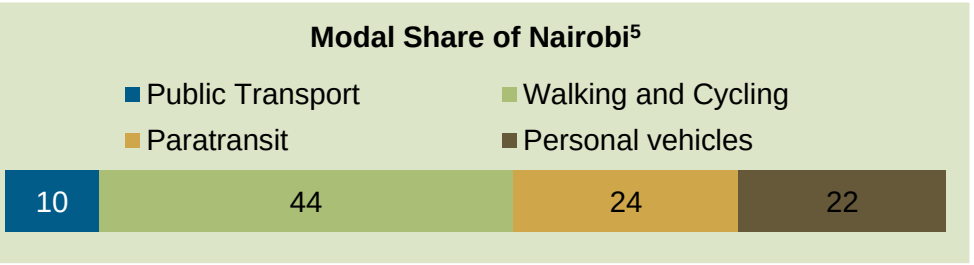
Funder	Interest area
Asian Development Bank (ADB)	ADB has set aside $1.0 billion clean energy financing portfolio fund which would various government's alternative fuels programs: ▪ Conversion of all the petrol run tricycles to electric vehicles, they are planning to provide a $400 million loan to the government ▪ ADB also plans to help the Department of Energy in various projects such as building infrastructure to improve the supply of Compressed Natural Gas (CNG) etc.
GIZ and ADB	▪ GIZ and ADB together have published "Changing Course in Urban Transport," which emphasizes the need for sustainable transport options in Asia ▪ They have also funded the Cities Development Initiative for Asia (CDIA) with a mandate to promote to contribute to the promotion of sustainable and equitable urban development. They currently are responsible for providing technical assistance to policy makers, building local institutional level capacity and promoting regional dialogue
JICA	▪ JICA helped create the Metro Manila Urban Development Master Plans right since the early 1970s where they proposed a comprehensive road network for the city ▪ Later on JICA was involved in developing the mass rapid systems (MRT/LRT) projects in Metro Manila

Note: This is not an exhaustive list as this was compiled through interviews with key informants

Agenda

Poor public transport is compensated by paratransit, limited affordable options force 44% people to walk





General

- The city had a population of 3.14 million in 2009 with a population density of 4509 persons per km²

Public Transport

- Buses is the only major public transport mode in Nairobi, they have low modal shares of 10%
- Multiple private operators provide the services, the government is responsible for route licensing etc.
- The fares are not regulated and hence the buses are not affordable to the poor commuters
- The fares fluctuate with demand for example: peak hour fares are higher when compared to non-peak hour fares

Paratransit

- Dominated by 12-seater and 25-seater Matatus, the paratransit space is witnessing the advent of tuk-tuks (autos), motorcycle boda bodas (Taxis) and 5/7-seater vans on the roads
- As Matatus are the only accessible modes in most parts of the cities they have a high modal share of 42%
- Matatus have taken up the role of primary mode in Nairobi as buses failed to cater to the demand
- The fares are relatively higher when compared to the buses and they are not regulated
- Rash driving, non compliance to traffic rules, over charging etc. make commuting in Matatus inconvenient for commuters

Walking and Cycling

- Lack of affordable means force 44% of the people in city to walk
- Cycling is not a common sight in the city, very few people cycle (construction workers use cycles but the modal share is very low)
- The walking cycling environment is poor, there is little action that can help improve the current walking and cycling environment

Note: Most of the data in this section has been compiled through interviews with list of key informants (Refer to Annexure 3)

60% of the city's population are either low income or below poverty line (<$1/day) and largely reside in slums

Overview:

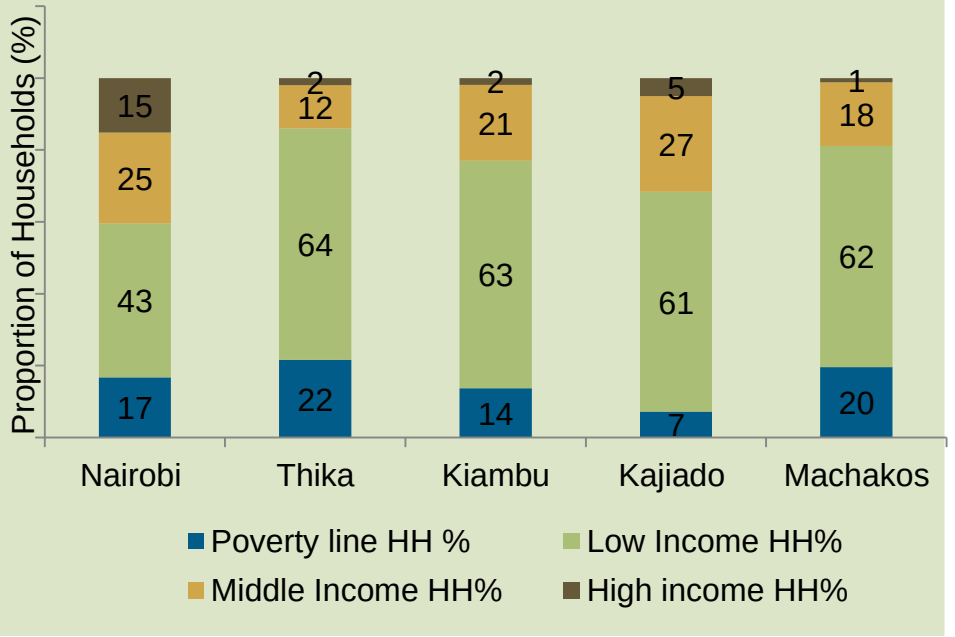
- The per capita GDP in 2009 at current prices was US $ 739[33]
- The Gini coefficient for income in Nairobi was 0.59 in 2009. This is worse than the international alert line of 0.52[34]
- The minimum wages in Nairobi stands at 6130 Ksh per month or 279 ksh/day (assuming 22 working days per month)[36]
- The inflation rate stood at 18.31% in January 2012[35]

Living conditions of the poor

- The lower income group experiences higher inflation than the middle and higher income groups in Nairobi Their respective rates of inflation for January 2011 to January 2012 were 20.27%, 14.07% and 11.56%
- A UNHABITAT report indicates that the poor in Kenya were categorized as highly food insecure owing to their decreasing purchasing power for food[1]
- Most of the slums are located along the transport corridors or near places that offer livelihoods opportunities to the poor
- Life is tougher for women and school going children than it is for the men in the slums when it comes to accessing livelihoods opportunities and education respectively[2]

Monthly Expenditure (ksh) at 2005 prices [37]	Description
≤ 2400	Poverty line
> 2400 but ≤ 23670	Low Income
> 23670 but ≤ 119999	Middle Income
> 120000	High Income

Poverty in Nairobi Metropolitan Area [38]



State of flux in fragmented city management continues to slow urban transport development of the Nairobi Metropolitan Area

The current governance structure in Urban Transport

- On February 28, 2008, President Mwai Kibaki and Mr. Raila Odinga, the current Prime Minister, signed a power-sharing agreement called the National Accord and Reconciliation Act, which established the office of Prime Minister and created a coalition government.
- The power-sharing cabinet, headed by Mr Odinga as Prime Minister, was eventually named and sworn in April 2008. The National Accord and Reconciliation Act resulted in a large cabinet of over 40 ministries.
- The Draft Harmonised Constitution was adopted by the parliament and approved through a referendum that witnessed 67% Kenyans supporting the new constitution in August 2010

- The Urban Transport work is scattered among various ministries that were then divided between the President and the Prime Minister (see table below)

Ministries under the President	Ministry of Nairobi Metropolitan Development (MNMD), Ministry of State for Provincial Administration and National Security (that houses the Department of Police), Ministry of Finance that houses the Kenya revenue Authority and the Ministry of Transport (the originator of all policies that houses the Transport Licensing Board and Tribunal, the Motor Vehicle Inspection unit and the National Road Safety Council)
Ministries under the Prime Minister	The Ministry of Roads and Ministry of Local Governance that houses the City Council of Nairobi

- The Local Government Amendment Bill 2009 passed into the Local Government Act Cap 265 in 2011
- The Act shall require interpretation and unpacking into a number of strategic policy and management reforms and frameworks to put the urban transport governance in place.
- Going forward MNMD and the Ministry of Local Governance would play a critical role in defining the urban transport landscape

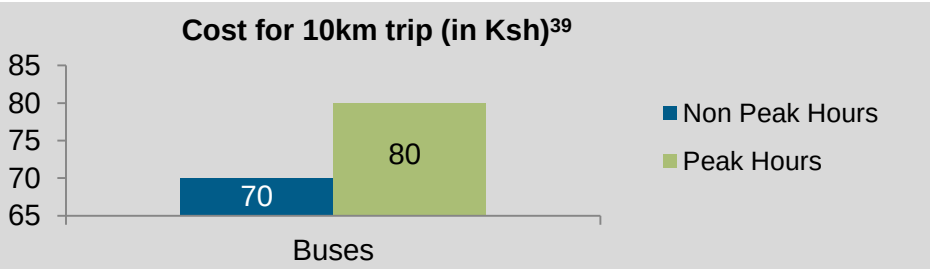
The state of flux in the city management continues

- The implementation of the mandate of the MNMD is slow owing to the fact that it is not fully anchored in law (as it was established through President's directive) and it fails to get full support from the local authorities, who are currently operating under Cap 265.
- The MNMD believes that the Local Government Act (Cap 265) that provides the Local Government Ministry the sole mandate over all local authorities was an impediment to its functioning and that the amendment of Cap 265 is needed for the ministry to be free to carry out its development strategies in the Metropolitan region.
- the ongoing turf war between the two entities that hold the mandate to develop the metropolitan region threatens to slow down the progress on development of Nairobi Metropolitan Area as the cooperation between them is not forthcoming
- As the MNMD is under the President and the Ministry of Local Government is under the Prime Minister, it is likely that the situation would resolve only after the impending Presidential elections in 2012 which would result in having one single authority instead of the dual authority structure that currently prevails.

Public transport (Buses) is not affordable (fares not regulated); fragmented private players lead to unorganized operations

The Bus system:

- The bus system was always managed by private players but in the 1970s the city council had a substantial stake in the companies that managed and the council regulated fares
- The fares are currently not regulated and hence not affordable and they fluctuate with time and other factors such as weather conditions etc. For example if one commuter from a low income household travels using the bus in peak hours everyday he has to spend at least 16% of his monthly earning on commuting



Note: Only fares from Kenya bus service (KBS) were taken for analysis

Current issues in bus operations:

- With the government passing a law that no passenger should stand while commuting in a bus, the capacity during peak hours fell from 100 passengers to 40-50 passengers. Hence buses wait till all seats are filled before leaving to the destination, which increases the waiting time for commuters especially in non-peak hours
- With multiple individual owners operating the buses (majority operating in franchise model) it is tough for operators to maintain fixed fares and operate on schedule
- It is also tough to maintain discipline because the owners sometimes push the drivers to generate additional revenues (which makes the current operating system similar to paratransit operations)

Operating models for the bus service:

Currently buses are operated in three different models franchise model, fleet ownership and Savings and Credit Co-operative Society (SACCO) formation. Franchise model is the most dominant among the three models

Operating models:

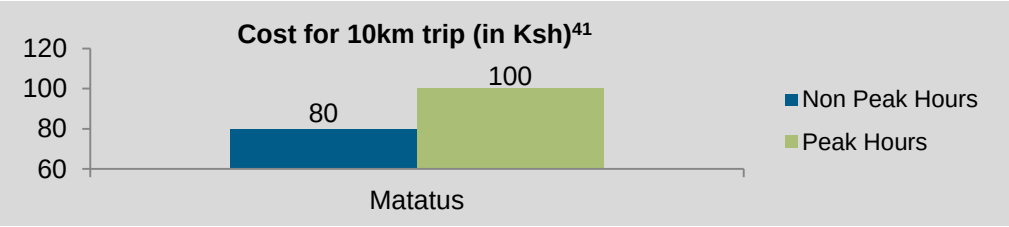
- **Franchise model:** As the capex of buses is very high (approx. 4 million Ksh) currently most bus companies adopt the franchise model. In this model the operator provides operational support and individual owners provide their buses to the operating company to use the buses in their operations. The owners pay franchise fee to the company and keep the revenues. Some examples of operators would be Kenya Bus Service (KBS), city hoppa etc. Even the 'Compliant' service operated by Matatu owners association operates on the same ownership structure
- **Fleet ownership:** The operator himself owns the fleet. This would help operate scheduled services and manage the fleet efficiently based on demand , 'Double M' operates on this model
- **SACCOs:** As the government plans to phase out the 14 seater Matatu, they are trying to encourage the stakeholders of Matatu operations to form into SACCOs or co-operatives. This model of formation of co-operatives to fund the purchase of high capacity vehicles is the least penetrated model (because of issues mentioned in next slide) . Apart from a few SACCOs such as EMBASAB currently this structure is rarely seen. Different SACCOs would operate on different brands

With 40% down payment, 18% interest rate and 13% of value for insurance cover[40] it is getting tough for individual companies to own fleets and run formal operations. Hence most companies opt for the franchise model

Paratransit modes (Matatus) are also not affordable for the poor; phasing them out would impact 7% of the population's livelihood

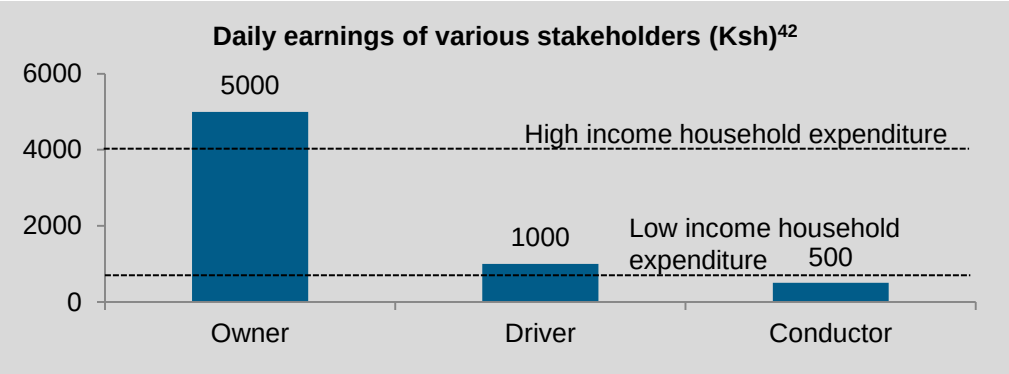
The Matatus:

- As the buses were operational only in the profitable routes and the sprawl increased it created a huge accessibility problem ; Matatus were introduced to fill the gap. Today, they compete with buses even in the primary routes
- Matatus are marginally more expensive then buses and hence not affordable to the low income families. For example: A low income commuter travels in the peak hours everyday he would have to spend at least **20% of his monthly earning** on commuting



Matatu Stakeholder value proposition:

- In the Matatu space the owner of the Matatus earn the most and fall under the high income category. The drivers and the conductor are typically low income
- The cost of the Matatus is approximately 1.8 million Ksh out of which 800,000 Ksh (80% of cost of vehicle) goes towards import duties, causing the owners to charge a high daily rent to recover their costs rapidly



Proposed policy change: The government plans to phase out the 14 seater Matatus for higher capacity vehicles:

- The government has identified the Matatus as one of the major reason for congestion on road and hence plans to phase them out
- Phasing out the Matatus would impact the livelihoods of close to 50,000 families (7% of the total population in Nairobi)
- To avoid this situation the national transport policy proposed formation of Savings and Credit Co-operative Society or SACCOs with various stakeholders of the Matatu industry in order to purchase high capacity buses
- This model of formation of co-operatives to fund buses has not penetrated . Apart from a few SACCOs such as EMBASAB currently this structure is rarely seen
- The 14 seaters would be moved to internal roads and would act as feeders to primary routes operated by buses

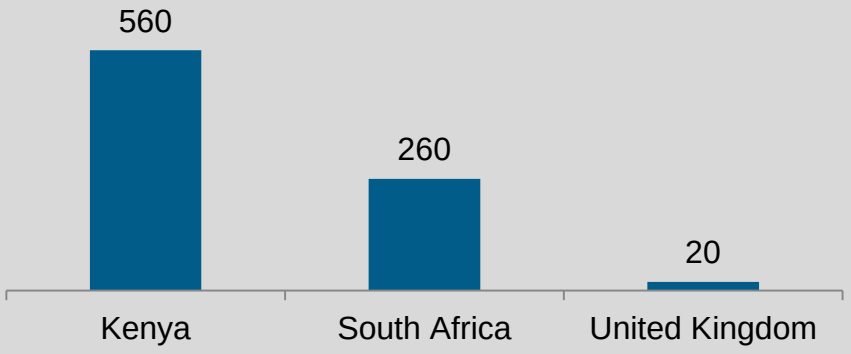
Issues with the proposed plan:

- SACCOs would take time approximately 5-10 years to strengthen their balance sheets and leverage them for loans
- After the purchase of HCVs, the members of the SACCO would get dividends once an year and wouldn't have daily income which is why they are unlikely to get rid of their 14 seater Matatus
- High capital expenditure of the buses is another road block. Experts suggest scrapping import duties on high capacity vehicles, importing fully built units from foreign countries and looking for cheaper sources of funds to provide low interest loans to encourage owners to move to high capacity vehicles
- As the plan is to move the Matatus to low demand feeder routes, experts suggest that it is important to look at other revenue generating sources such as advertisements

Other Paratransit modes: There are other modes such as a the tuk-tuks (three wheeled vehicle), 7 – seater Toyotas etc which are as expensive as the Matatus. Experts criticize the move by the government because they don't see any logic behind banning 14 seaters Matatus when the government is readily giving out licenses to much lower capacity paratransit modes.

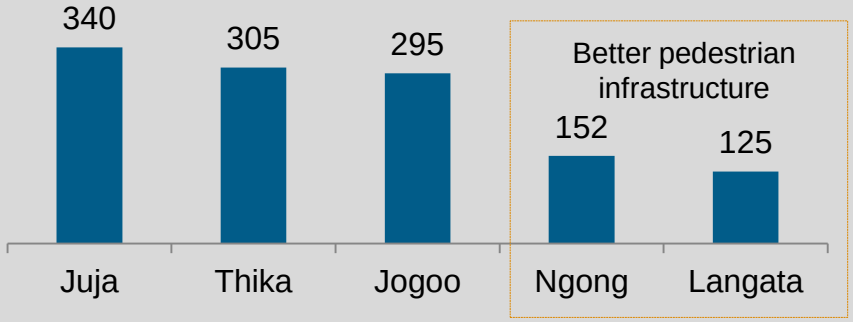
Although the majority of urban poor walk/cycle, the environment is hostile to them and efforts at improvement inadequate

Number of vehicles involved in fatal accidents per 100,000 vehicles (2009)[43]



- 65% of deaths involve pedestrians
- 35% of those killed in accidents are children

Distribution of accidents by roads in Nairobi (2008):[44]



The urban transport environment for Pedestrians and cyclists is challenging

- 81% pedestrian feel that they do not have adequate facilities to walk on the routes they commute. 86% of pedestrian interviewed indicated lack of safe crossings as a huge problem[1]
- An iRAP study shows that not only is the infrastructure for pedestrians inadequate but also most of the fatalities occur at the crossings[2]
- Those walking and cycling attributed the low modal share for cycling to a lack of dedicated cycling paths, lack of parking space, non provisioning of road shoulders, traffic congestion, inadequate street lighting, lack of NMT awareness and inadequate security environment.
- Deductive analysis of some of the recent projects that have an NMT component is that 10% of the budget allocation to NMT and safety is highly inadequate[3]

Efforts at improving the NMT infrastructure have been inadequate and the progress is slow

- The ‘Share the road’ program, implemented a 2 km NMT lane in the UN avenue. It did not have the desired demonstration effect and is not perceived to be catering to the poor commuters significantly
- Retrofitting some major roads with NMT infrastructure has been attempted but the system is not adequately equipped to capture disaggregated data on safety and NMT leading to difficulties in standardizing cost on NMT projects

Nairobi: Thoughts on the way forward

	Recommendation	Progress so far
City Management	▪ Constitute a Road Transport Authority (RTA) to handle all urban transport issues in the metropolitan area ▪ All the agencies such as licensing board, road safety agency etc. which are under different ministries must fall under the RTO ▪ Create a separate urban transport fund to exclusively finance public transport, walking/cycling infrastructure etc.	▪ Kenya is currently in a transition phase where a new constitution would be adopted. The new constitution would consolidate the current ministries (will reduce it from 40 to 20) and also would deploy more powers to the local governments (counties) ▪ With some parts of Nairobi metropolitan area falling under different counties the policy makers are planning to look at National Capital Region (NCR) as a special region
Public Transport	Reconsider the planned Mass rapid rail system given the low tax base of Nairobi, against the heavy investment required	The government is planning to invest in LRT/MRT systems as suggested by a study from Consulting Engineering Services (CES)
	▪ Build an effective (both affordable and accessible) public transport system -Cap the fares -Operate on schedule -Plan routes effectively -Have an integrated ticketing system ▪ Limit the competition between various players to make the system more streamlined ▪ Promote multiple players under one operating agency which can allocate routes transparently to various players	▪ With very low entry barrier currently any person who can own a single bus can operate buses in Nairobi. With multiple bus operators the drivers end up driving rashly in the greed for more passengers, no fixed schedule, fare etc. ▪ With Matatus being asked to move to HCVs it is only increasing the number of players who will be in the bus business
	▪ Promote right of way for buses (BRT lines) after fixing the issues with the current bus system	▪ GEF Sustrans project is mobilizing funders and other government agencies to implement a substantial BRT corridor
Paratransit	Regulate paratransit fares	Currently the fares are not regulated and Matatus are very expensive, no activity in this front
Walking Cycling	Build continuous good quality walking/ cycling infrastructure	NMT lanes are being built whenever a road maintenance is being implemented

Interests of various funders in Nairobi Urban Mobility

Funder	Interest area
European Union (EU)	Currently supports big infrastructure projects (roads) in rural areas. In terms of public transport they are interested in investing in BRT after July 2012
GEF UNHABITAT	Facilitating the BRT pilot project by engaging with various funders and stakeholders in the government
JICA	▪ Were earlier interested in funding mass transit systems such as MRT and BRT ▪ Currently they are focusing on building an urban master plan for Nairobi (Nairobi operated without a master plan since 1973)
AFD	AFD operates in the road sector via the upgrading of the MaaiMahiu-Narok road, the main access route to the Maasai Mara National Reserve, and the “rural roads” project, which finances road infrastructure upgrading for the economic opening-up of Central Province
African Development Bank	▪ They funded the Mombasa-Nairobi-Addis Ababa Road Corridor Project along with EU and the national governments of Kenya and Ethiopia which aims at promoting trade and regional integration between Ethiopia and Kenya ▪ They funded the feasibility study for MRT in a few corridors
UNEP	Launched the ‘Share the road program’ for promoting walking/cycling in the city – the program included promotional campaigns, pilot corridor at the UN avenue for demonstration etc.

Note: This is not an exhaustive list as this was compiled through interviews with key informants

Agenda

- Executive Summary
- Context and Key Definitions
- Current state of urban transport
  - Public Transport
  - Paratransit
  - Walking and Cycling
- Issues for Entrepreneurs and service providers
- Solutions to solve urban transport issues
- Deep Dives
  - Delhi, India
  - Manila, The Philippines
  - Nairobi, Kenya
- **Annexures**

Annexure 1: Sources

- 1, 2, 3, 9, 10, 16, 17, 23, 24, 26, 31, 41, 42 Intellecap research (anecdotal and primary research data)
- 4: Delhi : Prof Geetam Tiwari, TRIPP, 2011 household survey data , Bangkok: Noboru Harata, “Some Basic Characteristics of Travel Behavior in Bangkok , Mumbai: Urban Poverty and Transport: The Case of Mumbai, World bank Sept 2005 report
- 5, Refer to the table in Annexure 2
- 6, Mr Pawan Diwedi, Prof. Sanjay Gupta, School of planning and Architecture, New Delhi
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- 44, http://www.unep.org/transport/sharetheroad/PDF/ClimateXL_NMTNairobiReport.pdf

Annexure 2: Sources for Modal share data of various cities

Cities	Mode Split Data Sources
Abidjan, Accra, Addis Ababa, Dar Es Salaam, Dakar, Douala, Johanessburg, Lagos, Nairobi, Windhoek	http://www.uitp.org/knowledge/pdf/Report_on_statistical_indicators_of_publictransportperformanceinS-SA.pdf
Delhi	http://www.idfc.com/pdf/report/Chapter-19.pdf
Mumbai, Ahmedabad, Surat	http://www.slideshare.net/EMBARQNetwork/trb-presentation-final
Guwahati	http://www.vtpi.org/tdm/tdm80.htm
Bangalore	http://www.arrivesafe.org/pdfs/Bangalore-Silicon_Capital_or_Black_City.pdf
Chennai	http://www.cmdachennai.gov.in/Highlights_HLC0901200913-1-09.pdf
Kolkata	http://www.vtpi.org/tdm/tdm80.htm
Seoul, Tokyo	http://www.ieej.or.jp/aperc/pdf/urbanisation.pdf
Manila	http://www.thegef.org/gef/sites/thegef.org/files/repository/Philippines_Marikina_Bikeways.pdf
Istanbul	http://conduits.eu/documents/city-summaries/Istanbul.pdf
Colombo, Dhaka, Lahore	http://www.vtpi.org/tdm/tdm80.htm
Kathmandu	http://www.energycommunity.org/documents/iges_start_final_reprot.pdf
Tehran	http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/egm0310/presentation_Mehdi_Hashemi.pdf
Shanghai	http://www.fav.de/DOCS/APW_Acharya_WSI_Develop-sustain-transport%2012092007.pdf

Annexure: 3 List of key informants for Deep Dives

Key Informants: Delhi

Name	Organization
Mr Amit Bhat	EMBARQ
Prof. Dinesh Mohan	TRIPP, IIT Delhi
Prof. Geetam Tiwari	TRIPP, IIT Delhi
Mr K L Thapar	Asian Institute of Transport Development
Mr Santhosh Kodikula	GIZ-Sustainable Urban Transport Project
Ms. Anvita Arora	IIT Delhi
Ms Shreya Gadepalli	ITDP, India

Key Informants: Nairobi

Name	Organization
Mr James / Mr Eric Aligula	KIPPRA
Ms Rahab Mundara / Mr Jean Bonzi	UNHABITAT
Prof Dorothy McCormick / Prof. Winnie Mittulah	Institute for Development Studies
Mr Dickson Mbugua	Matatu Welfare Association

Key Informants: Manila

Name	Organization
Mr. Rey / Mr Francis	Metro Manila Development Authority
Mr. Bert	Clean Air Initiative, Asia
Ms. Santos/ Ms Danielle	Ateneo School
Mr Karl / Mr Ricardo	NCTS
Mr. Laurence	Office of Transport Cooperatives
Mr. Joris	CDIA
Mr. Alberto	Ex Head of Land Transport Office
Mr Red	eJeepney.org
Ms Mary	Urban Poor Associates

Annexure – 4 : Functions of some of the important agencies involved in urban transport in Delhi

Functions of National Capital Region Planning Board

- To prepare the Regional Plan and the Functional Plans,
- To arrange for the preparation of Sub-region Plans and Project Plans by each of the participating States and the NCT, Delhi
- To co-ordinate the enforcement and implementation of the Regional Plan, Functional Plans, Sub-regional Plans and project Plans through the participating States and the NCT, Delhi
- To ensure proper and systematic programming by the participating States and the NCT Delhi in regard to project formulation, determination of priorities in the National Capital Region or Sub-regions, and phasing of development of the NCR in accordance with stages indicated in the Regional Plans;
- To arrange for, and oversee, the financing of selected development projects in the NCR through Central and State Plan, funds and other sources of revenue

Functions of Department of transport, Government of NCT of Delhi

- Administration of the Motor Vehicles Act,1988 and Rules framed there under .
- Issuance and renewal of driving licenses/International Driving Permits
- Registration of Vehicles and its related activities.
- Issuance of trade certificate to dealers of the vehicles.
- Issue of permits to various categories of transport vehicles and issue of countersignatures in respect of other-state transport vehicles.
- Road safety issues with special emphasis on safety of school buses.
- Enforcement of emission and safety related norms of vehicles.
- Management and operations of Inter -state Bus Terminals.
- Integration of Road transport with Metro, Railways & Airports.

Functions of Delhi Integrated Metropolitan Transit System Limited (DIMTS)

- Identify problems and opportunities in the urban transport infrastructure space.
- Provide policy level support for government and government agencies.
- Undertake relevant and necessary studies.
- Undertake measures to promote public transport system by improving the coverage, frequency and comfort level in public transport system.
- Undertake specific project development activities in its capacity as an advisor or as a developer.
- Undertake measures to improve efficiency and affordability of public transport.

Functions of Department of Delhi Transport Corporation(DTC)

- To provide or secure or promote an efficient, economical, reliable and properly coordinated system the road transport in NCT of Delhi and any extended area.
- In doing so, it shall act on business principles.
- To achieve a high level operational efficiency.
- To charge fares not exceeding those prescribed by the State Under Section 43(1)(i) of the Motor Vehicle Act, 1939.
- To attain financial self-sufficiency