

IMPROVING INFORMAL PUBLIC TRANSPORT SYSTEMS IN INDIAN CITIES

KEY FINDINGS AND RECOMMENDATIONS
OF STUDY CARRIED OUT BY
THE ENERGY AND RESOURCES INSTITUTE (TERI, NEW DELHI)

Presenter – Akshima T Ghatе, Fellow and Associate Director, TERI

Project team – Megha Kumar, Seema Singh, Sangeetha Ann Wilson, Sarbojit Pal,
Akshima T Ghatе

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About the study

- > TERI was commissioned by the **Department for International Development (DFID), UK** to carry out this study
- > The study aimed to bridge the knowledge gap with respect to informal transport systems
- > Key objectives of the study:
 - Understanding **role and contribution** of informal transport modes in meeting mobility needs
 - Identifying **key issues** associated with their operations, and
 - Suggesting **solutions** for improving these systems at city, state and national level
- > The study outputs were aimed to influence relevant transport policies and regulations related to informal public transport sector

What is “Informal public transport”?

- > Lack of a single well-accepted definition
- > Some definitions from literature:
 - Informal public transport is publicly available passenger transport service that is outside the traditional public transport regulatory system” (*World Bank, 2002*)
 - Informal public transport – “outside the officially sanctioned public transport sector” and lacking “official and proper credentials” to run passenger services (*Cervero, 2000*)
- > In absence of a proper definition, the term ‘informal transport’ is used loosely to study and understand a wide range of modes except government provided transport systems and metro

Criteria for understanding Informal public transport

> In studying these systems, the following criteria were applied

- Who provides the transport service?

- Any individual, group of individuals, company, etc. but not government.

- Who regulates the services?

- Self-formed/elected unions or associations.

In limited cases, government may regulate some aspects like time of operations, routes/areas where they ply, etc.

- What does the transport service do?

- Meet the mobility needs in areas/cities where public transport is not present.
- Meet the mobility needs where formal services don't go, especially in peri-urban areas, in crowded areas/narrow streets
- Provide last mile connectivity
- Meet the mobility needs when formal services don't (for example early morning or evening hours, night services)

**Based on the above criteria,
informal public transport modes in Indian cities includes a wide array
of modes ranging from ...**
**...high capacity four wheeler minibuses to medium capacity Tata
magics/ Gios/others..., low capacity three wheeled motorized auto
rickshaws to pedal powered cycle rickshaws ... and many other locally
manufactured modes operating in Indian cities.**



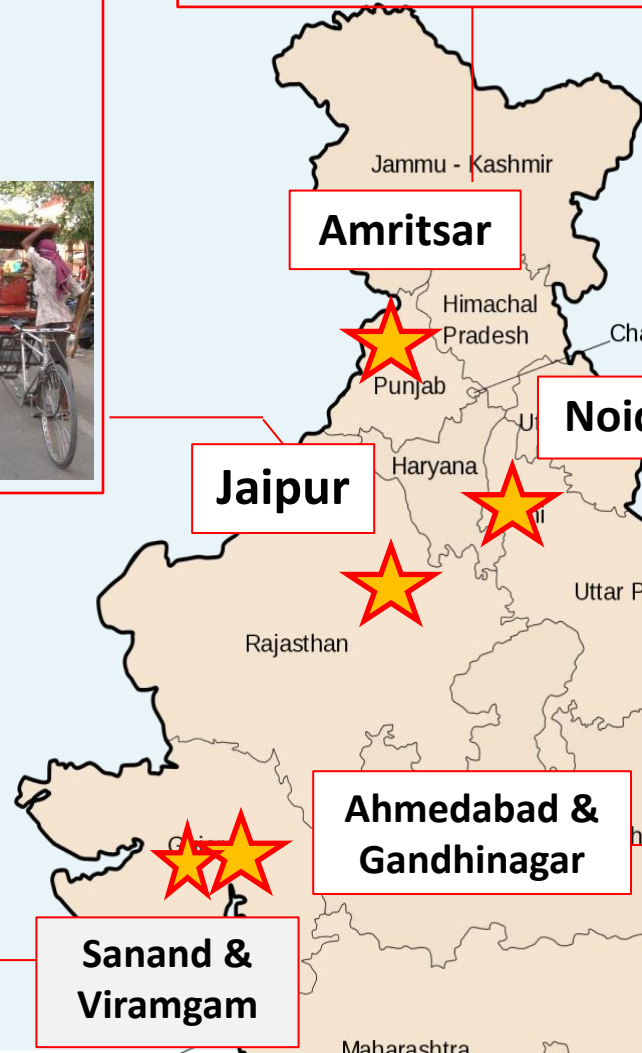
Selected case cities

*Five **cities** were selected...
... with different **settings**...
...wherein different informal **modes**
played varying **roles**....*



City	Formal modes	Informal modes	Setting
Jaipur	Metro rail, City bus service	Mini buses, Tata magics, Auto rickshaws, Vikrams, Cruisers, Jeeps, Cycle rickshaws	Urban
Amritsar	City bus service	Mini buses, Tata magics, Auto rickshaws, Gios, Cycle rickshaws, Kadukas	Urban and peri urban
Noida	Buses (DTC), Metro rail (DMRC)	Tata magics, Vikrams, Auto rickshaws, Cycle rickshaws	Urban
Ahmedabad-Gandhinagar	City Bus, Janmarg buses (BRTS)	Auto rickshaws, Maxi cabs and Jeeps	Urban, peri urban and rural
Sanand-Viramgam	State run buses (GSRTC)	Auto rickshaws and Chakdas	Urban, peri urban and rural

Modes studied



Amritsar

Noida

Jaipur

Ahmedabad &
Gandhinagar

Sanand &
Viramgam

Study Methods

- > Available secondary literature
- > Field research in selected cities
 - Driver surveys
 - Passenger surveys
 - Other road users
- > Wide consultations
 - Government officials (*Transport Department, Traffic Police, Municipal Corporation, Urban Development Authority*)
 - Fleet operators and manufacturers
 - NGO representatives
 - Academicians working in the field of informal transport
- > Focused group discussions (*drivers, union heads and users*)

Challenges faced

- > Limited availability of secondary literature
- > Lack of adequate data/information at city level
- > Limited digitization of data/manually stored data making past trend analysis a challenge
- > Inconsistencies in data stored at the city level making comparative analysis difficult
- > Resistance from drivers/fleet operators/unions

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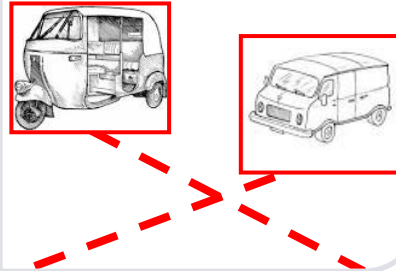
ROLES, CONTRIBUTION AND TYPES

How do these modes emerge and their role

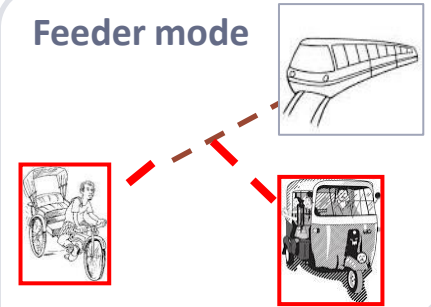
- Huge transport demand supply mismatch
- Informal public transport emerge to meet such unmet demand, spatially and temporally
- Operational flexibility and ability to quickly respond to changing demand characteristic provides it an edge over formal systems

R O L E S

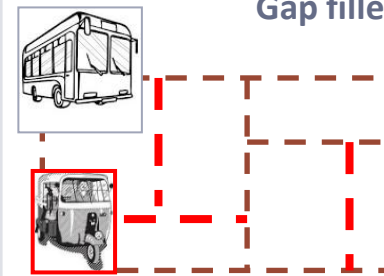
Main mode



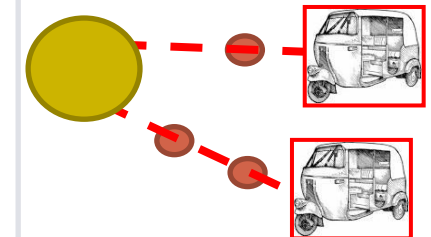
Feeder mode



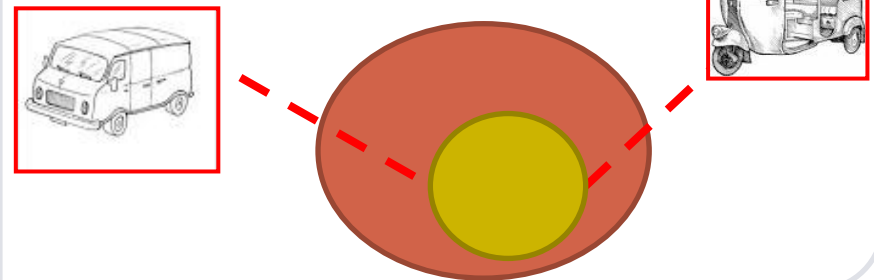
Gap filler



Inter city connectivity



Peri-urban connectivity



Contribution of these modes in meeting mobility needs

- As main mode, they contribute substantially towards mode share
Share in vehicle registration vs. Mode share
 - Jaipur (buses and auto-rickshaws): 2% vs. 25%
 - Amritsar (auto-rickshaws): 2% vs. 22%
- In some cities, these modes are the only modes of public transport
 - Noida: 3000 shared auto-rickshaws and 4500 auto-rickshaws (personal hire)# vs. Zero public transport
- In peri-urban and rural areas, due to limited and sometimes completely absent public transport options, these modes fill the mobility gap
 - Kadukas in Punjab
 - Chakkdas in Gujarat

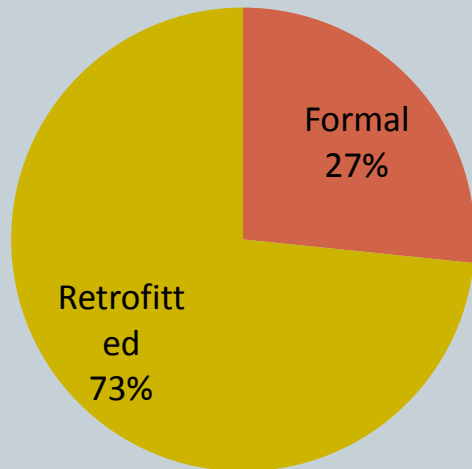
Source: Jaipur: CMP, 2008, Fleet sanctioned as per MoUD document 'Transforming City Bus Transport in India through Financial Assistance for Bus Procurement under JnNURM', 2012, and estimates of Transport Department

Amritsar: CMP 2012; NOIDA: News paper article, Nav Bharat Times, NOIDA edition, Jan 2015;

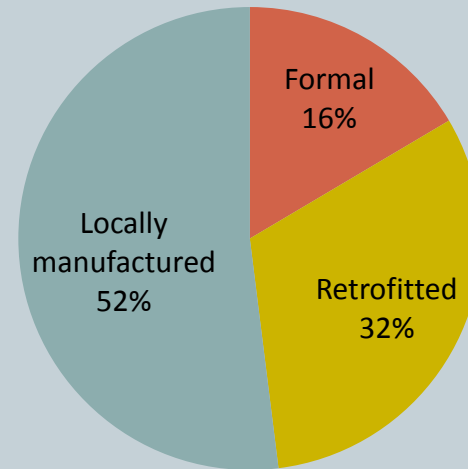
Types of vehicles used to service informal public transport

- Informal public transport services use all kinds of formal, retrofit and locally manufactured vehicles
- Urban areas had higher shares of formal vehicles as compared to peri-urban regions
- Locally manufactured vehicles were found only in peri-urban regions

Services operating in urban areas



Services operating in Peri-urban/Rural areas



Note: The analysis includes vehicle design and manufacture for motorized modes only

Formal + Retrofits



Locally manufactured

Operational characteristics studied (Motorized Modes)

- Types of services offered
- Routes/ zones of operation
- Average route lengths for shared services
- Scheduling
- Fares setting
- Capacity utilization
- Business models
- Profitability of operations
- Perceived service quality

Types of services offered

On personal hire services

- Modes (3+1): Auto-rickshaws (Bajaj, Piaggio, etc)

Shared services

- Modes (7+1 seating capacity): Piaggio ape, Atul, Tata Magic, Vikram (by Scooter India), Mahindra Gios, etc.
- Typically operate on fixed routes

Case of services operating in peri-urban areas

- Distinction of shared and on personal hire service blurs as one moves towards peri-urban areas.
 - Case of auto-rickshaw plying in Sanand
- Modes (8/10+1): Mahindra cruisers, Omnis, Jeeps
- Limited enforcement of regulations outside urban boundaries

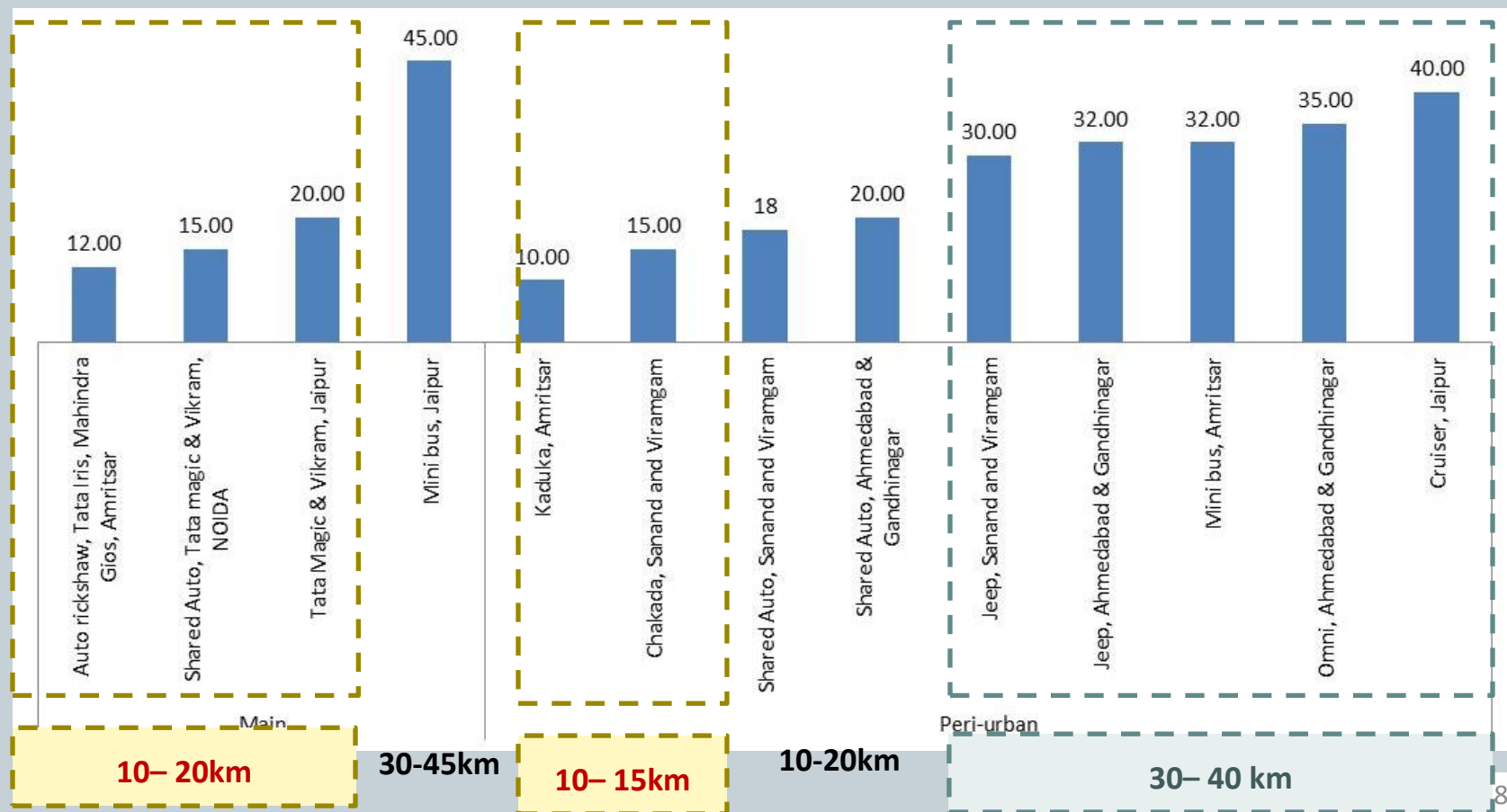
Route/ zone of operation

- Route or zone of operation is guided by **permit issued by RTO**
 - Contract carriage permit is issued to services operating on personal hire
 - Stage carriage permit is issued to shared services
- Large scale violations were observed in permit regulation
- Violations observed:
 - Contract carriage operate as shared service
 - Contract carriage operate outside the permitted zone for operation
 - Stage carriage infringe upon routes other than the one permitted
- Reasons for violation:
 - Cost of permit varies from route to route
 - Cost is higher for high demand route/zone, lower for low demand route/ zone
 - To maximize revenue generation drivers infringe upon higher demand routes/ zones

High degree of non-compliance was observed with respect to permit regulation

Average route lengths for shared services

- Intra-city : Correspond to city size
- Peri-urban: lower for indigenous modes, higher for formal modes which typically provide inter-city connectivity



Scheduling

Usually, a queue system was followed in all the cities

- Driver operated on the basis of the occupancy – highlighting profit making as criteria for operation
- Case of *Kadukas*

In select few cases a strict service frequency was followed, irrespective of the occupancy

Fare setting

On personal hire service

- Auto Rickshaws (Noida, Amritsar, Jaipur, Ahmedabad): Fixed by **RTO**
- However, large number of vehicles were found not to comply with fare regulations
- Auto Rickshaws (Sanand, Viramgam): Driver's charge at their discretion

Shared services

- Tata Magics, Vikrams and Minibuses (Jaipur): Fixed by RTO
- Minibuses (Amritsar): Followed fare fixed by Punjab Roadways

Personal hire vehicles (contract carriage) operating as shared services

- Auto Rickshaws (Sanand, Amritsar, Noida): Fares usually decided by informal driver groups/ unions decided fare

However, there is lack of timely fare revisions

(Minibuses, Jaipur – 2005; Auto-rickshaw, Noida - 2009)

These modes are highly demand responsive with profitability as the motive of operation

Case of shared services in Jaipur

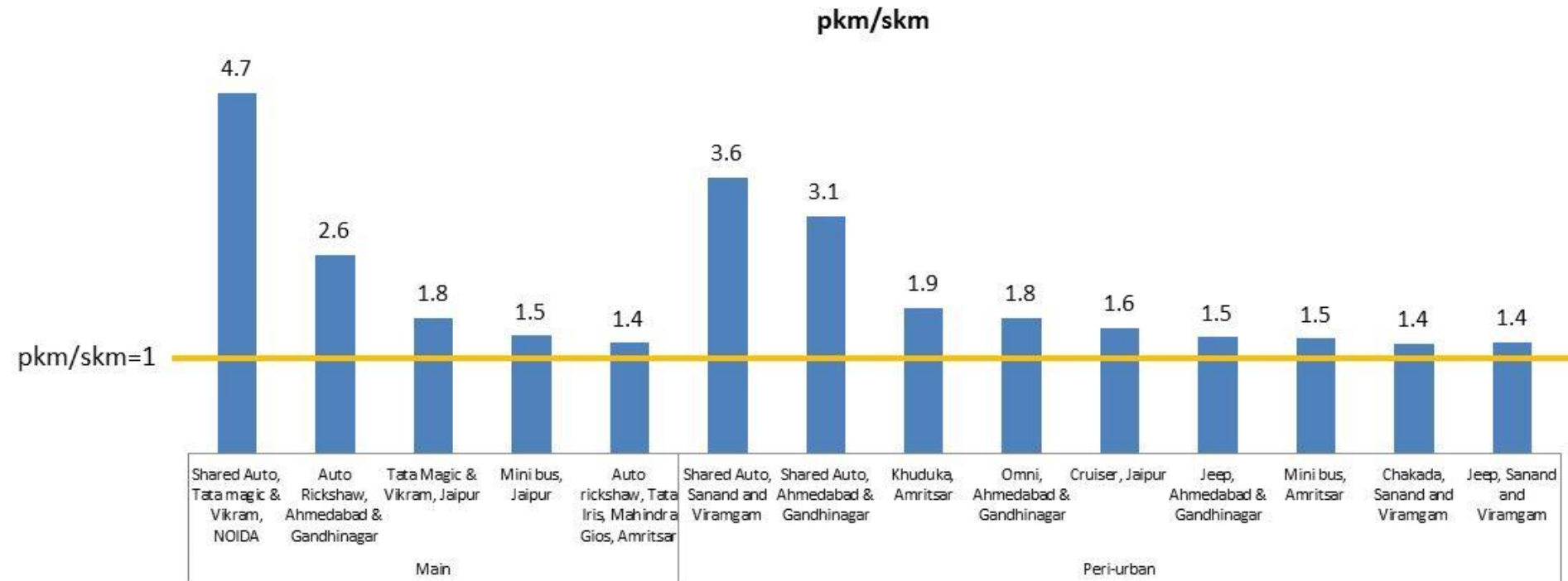
- Shared service providing Mini-buses, Tata Magics and Vikrams operate on stage carriage permit
- Follow routes and fares fixed by RTO
- Services operate on service frequency determined by unions
- Service frequency respond to the demand
 - Peak hour frequency: 3-5 mins
 - Non-peak hour frequency: 10-15 min
- Union enforced compliance with the decided frequency
 - The union also penalized violators



- STAGE CARRIAGE PERMIT
- NAME AND ADDRESS OF PERMIT HOLDER
- REGISTRATION NUMBER, YEAR OF MANUFACTURING, SEATING CAPACITY OF MINIBUS
- ROUTE AND ROUTE NUMBER
- VALIDITY OF PERMIT

Capacity utilization

Passenger km/seat km (pkm/skm)

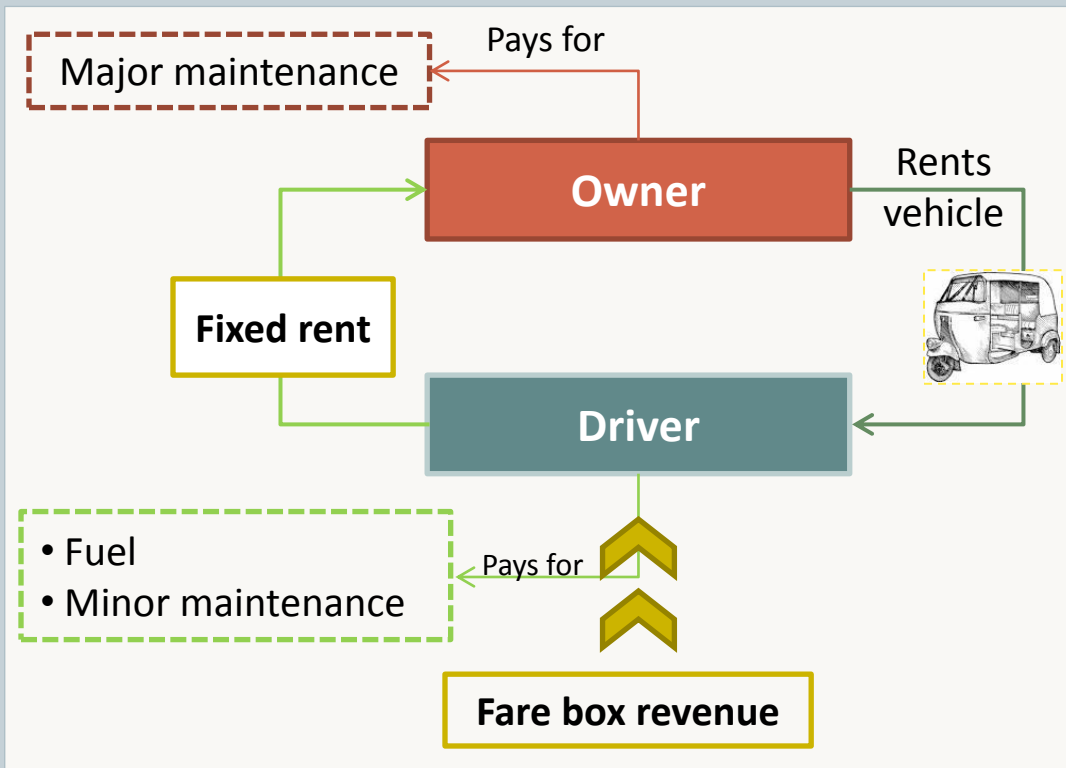


- Pkm/skm for most of the services is **more than unity**
- Indicates **high utilization rates and demand** for these systems

Business models

- Vehicles were being operated either by the **owners** themselves, or by someone **employed by the owner (gross-cost model)**, or was being **driven on rent (net-cost model)**
- “**Driven-on-rent**” (**net cost model**) was found to be most popular among the modes studied

Net cost model



Vehicle rental depends on:

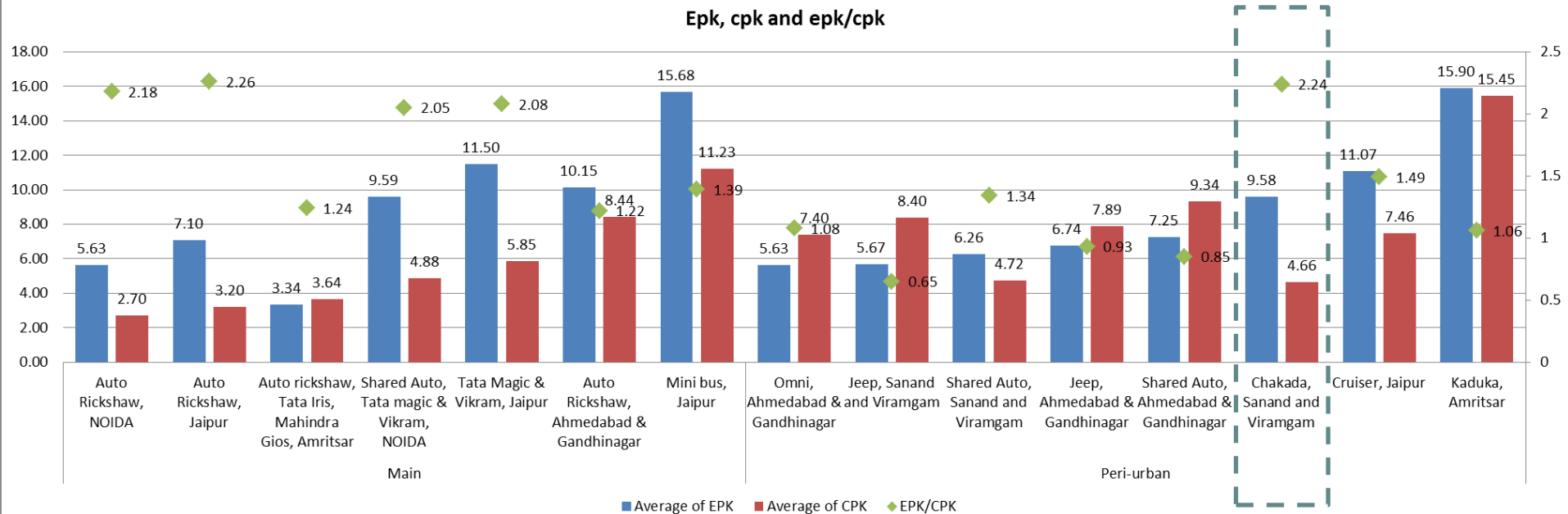
- Vehicle condition
- Vehicle age
- Route/ zone permit

Rent charged (Avg.)

On personal hire modes	Rs 300-400
Shared services (TataMagic, Vikram, Gio, etc.)	Rs 500-700
Shared (Minibuses)	Rs 500-1000

Profitability of operations

Cost/km (cpk) and Earning per km (epk)



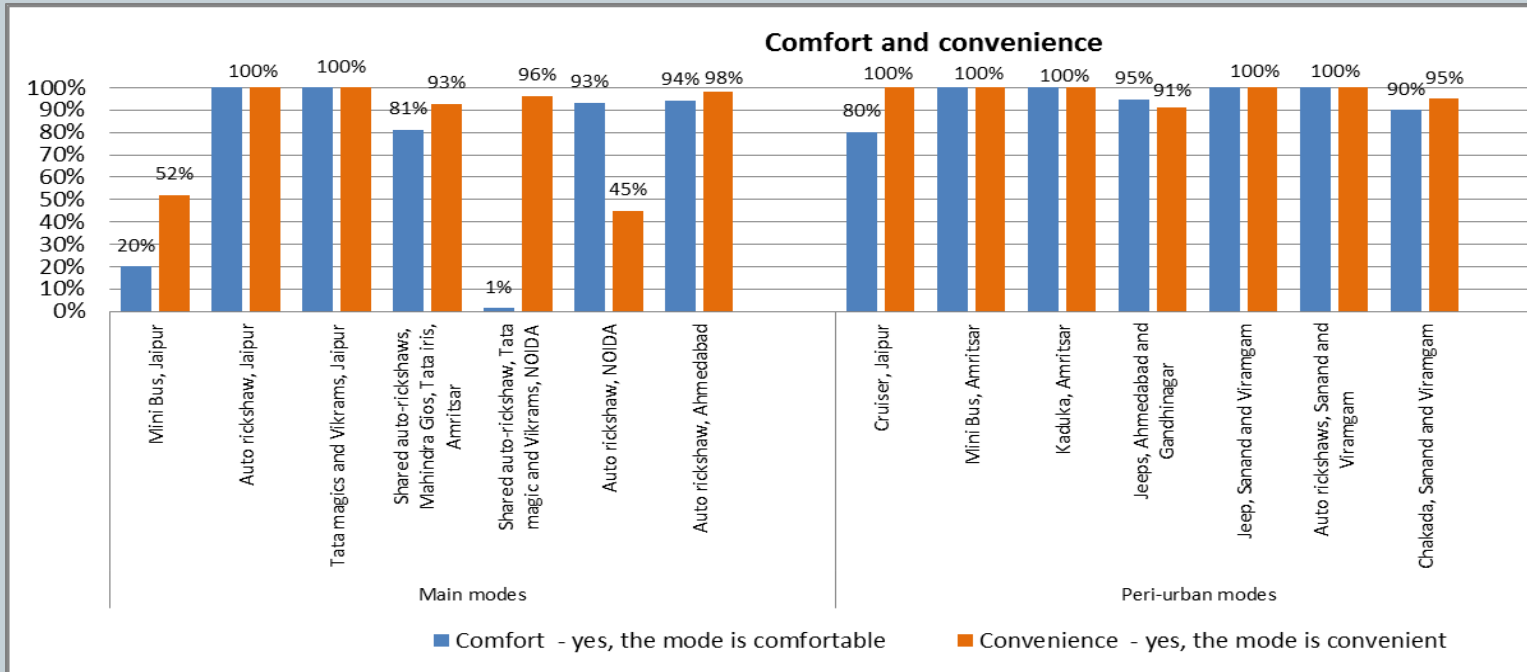
Cost of operations

- 3+1 capacity modes - ~Rs 3pkm
- 7+1 capacity modes - ~Rs 5-6 pkm
- 20+1 capacity modes - ~Rs 11 pkm

- All modes for which earnings data was available were found to be operating in profit (epk/cpk>1)
- In most cases epk/cpk of urban services was found to be higher than for peri-urban services

Service quality

User's perception - Comfort and convenience

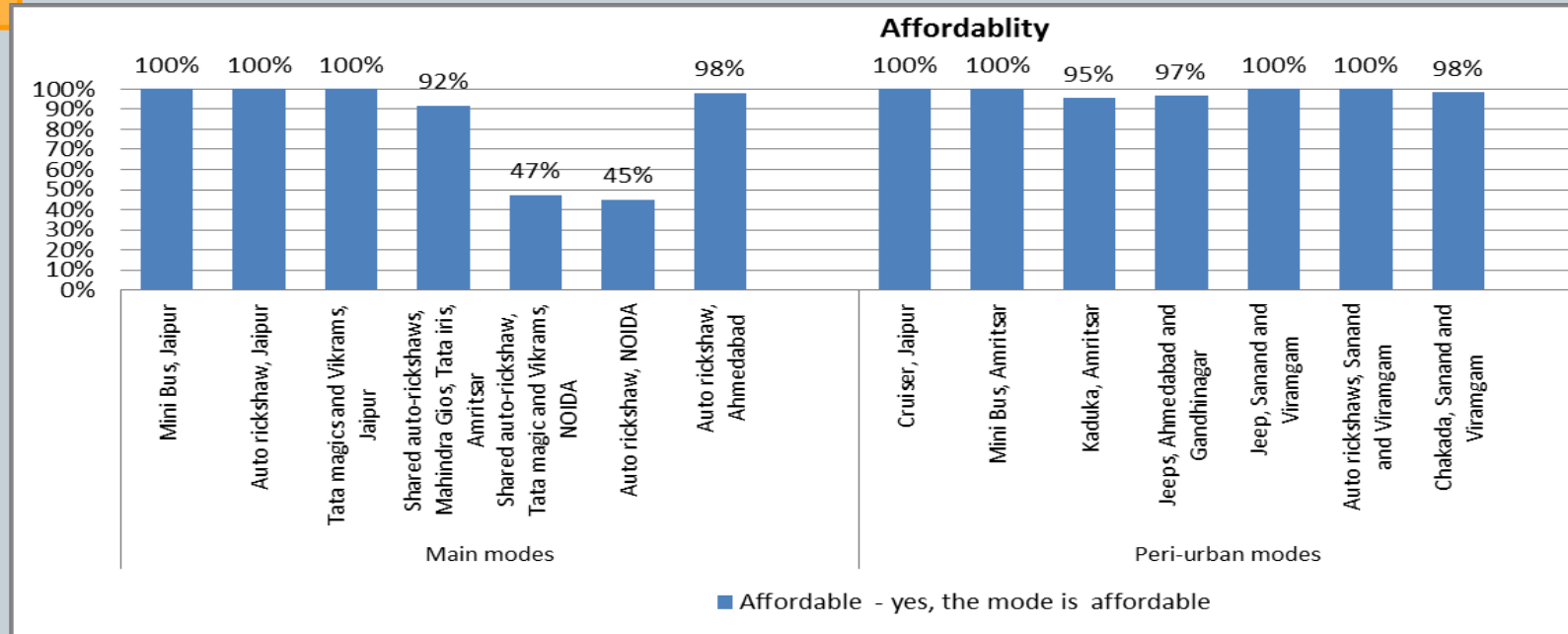


- Service quality perception is mostly positive, indicating high level of user satisfaction
- Exceptions were all the modes in Noida and mini-buses in Jaipur
- Service quality perception is high for locally manufactured modes

Mostly users are satisfied with comfort and convenience offered by Informal modes

Service quality

User's perception – Affordability



- Perception is mostly positive, indicating that people are comfortable paying the current fares of the different modes

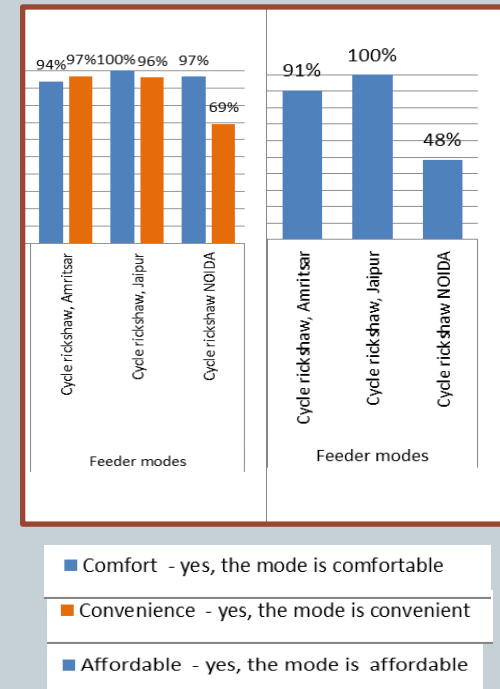
Mostly users find informal public transport modes affordable

Operational characteristics

Cycle rickshaws

- Neither routes or zone of operation was defined
- No permit, licensing/ driver registration, vehicle registration, PSV badge required
- Operate from any stand
- Usually informal driver groups follow a queue system
- Union is often weak or non-existent
- Cover distances upto 2-3 km on average and undertake 10-12 trips per day
- Cost involved in daily operations is miniscule
- Mostly operated on rent
- Rent per day usually varies from Rs 30- 50 per day
- A cycle rickshaw puller typically earns Rs 200-300 per day
- Annual maintenance - Rs 1000-3000

User's perception on comfort, convenience and affordability



Cycle rickshaws were generally found to be unregulated in all the cities studies

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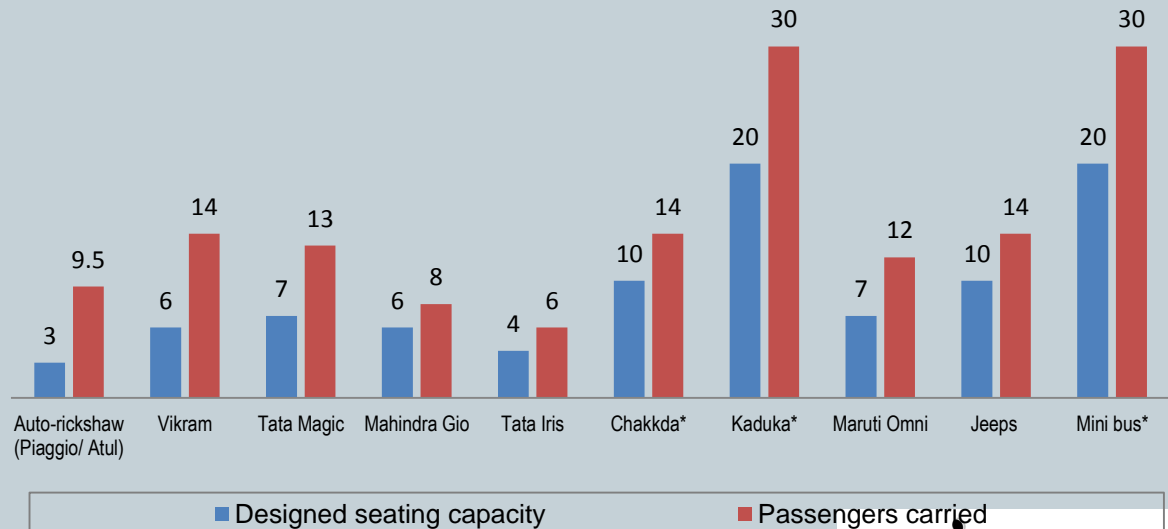
COMMONLY PERCEIVED ISSUES WITH THESE MODES

Are these modes safe ?

- **Design and manufacture**
 - Largely retrofitted vehicles, a compromise on safety of passengers
 - Some of the vehicle are not type approved
- **Operations**
 - Overloading is an issue common across modes and regions



Seating capacity vs. No. of passengers carried



A case in point...

Locally manufactured motorized vehicle – *Kaduka*, Punjab



Kaduka, locally manufactured vehicle, ply in border areas of Punjab



Engine



Body of the vehicle



Manufactured in small workshops



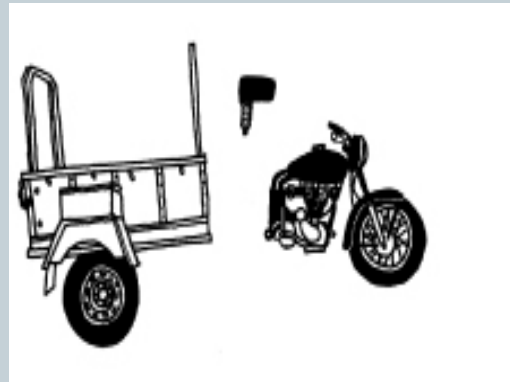
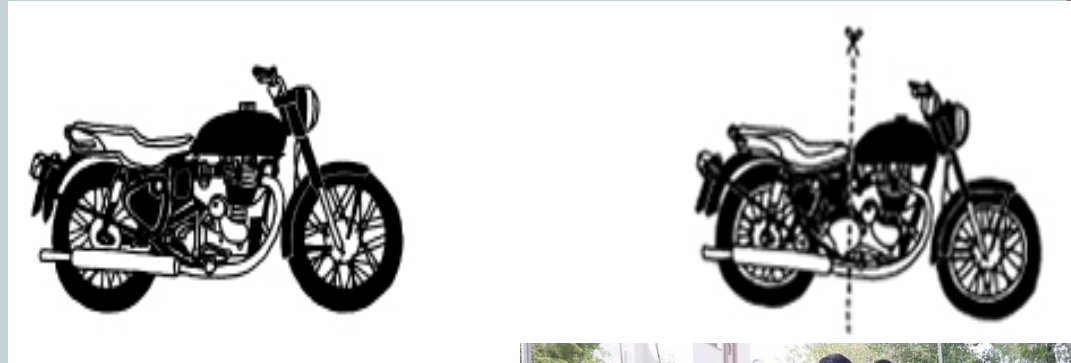
Seating planks in Kadukas



Absence of infrastructure

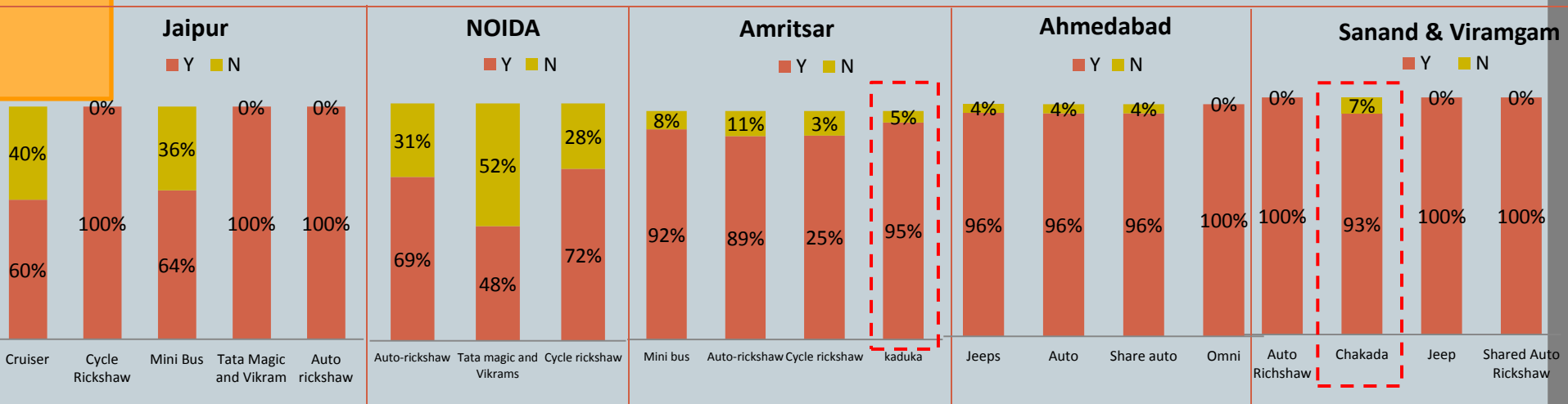
Locally manufactured motorized vehicle – *Chakdas*, Gujarat

- Basic motorcycle chassis and mount developed by registered manufacturers
- Rear carriage is retrofitted by vehicle owners to carry passengers
- Was initially manufactured locally
- Powered by engines of 6.5 to 8.5 horse-power
- Type approval obtained as a three wheeled goods carriage vehicle
- Now registered as three wheeled light goods vehicle

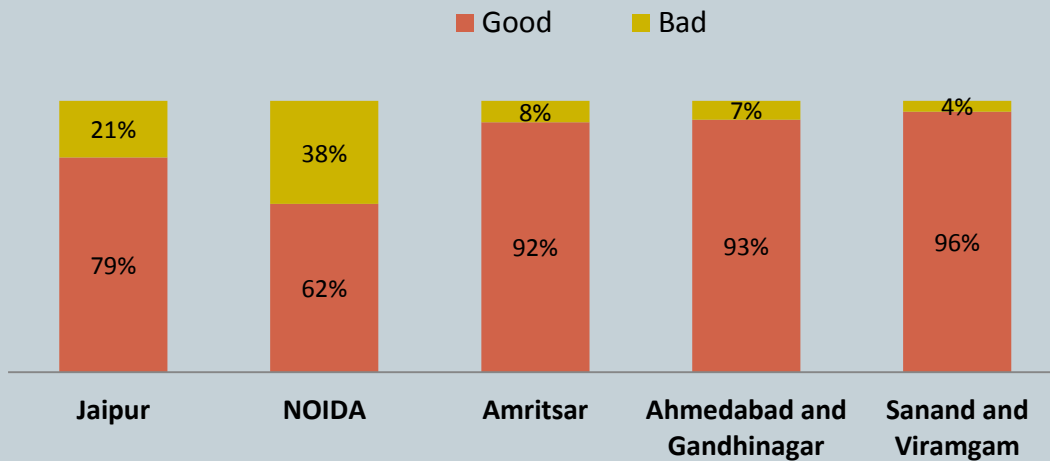


User's perception

Safety



Security

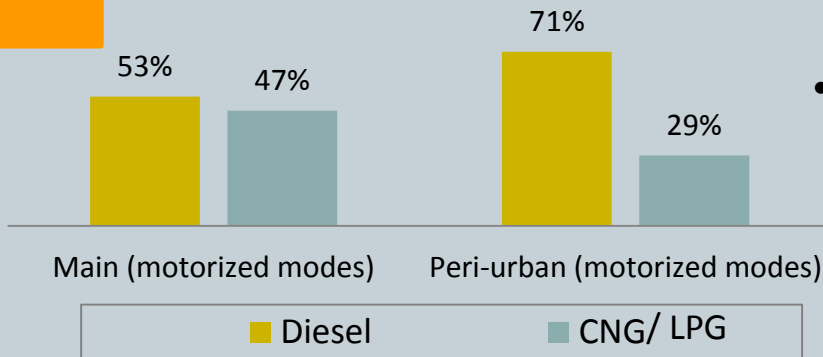


Users of these modes feel that these modes are safe and secure

To understand aspect of safety analysis of accident data was intended to be conducted. However, **accident data** for these cities was sporadically available with large inconsistencies, making analysis difficult

Are these modes CLEAN?

Fuel used



- Penetration of CNG/LPG run vehicles was higher in case of modes operating in urban areas

Fleet age

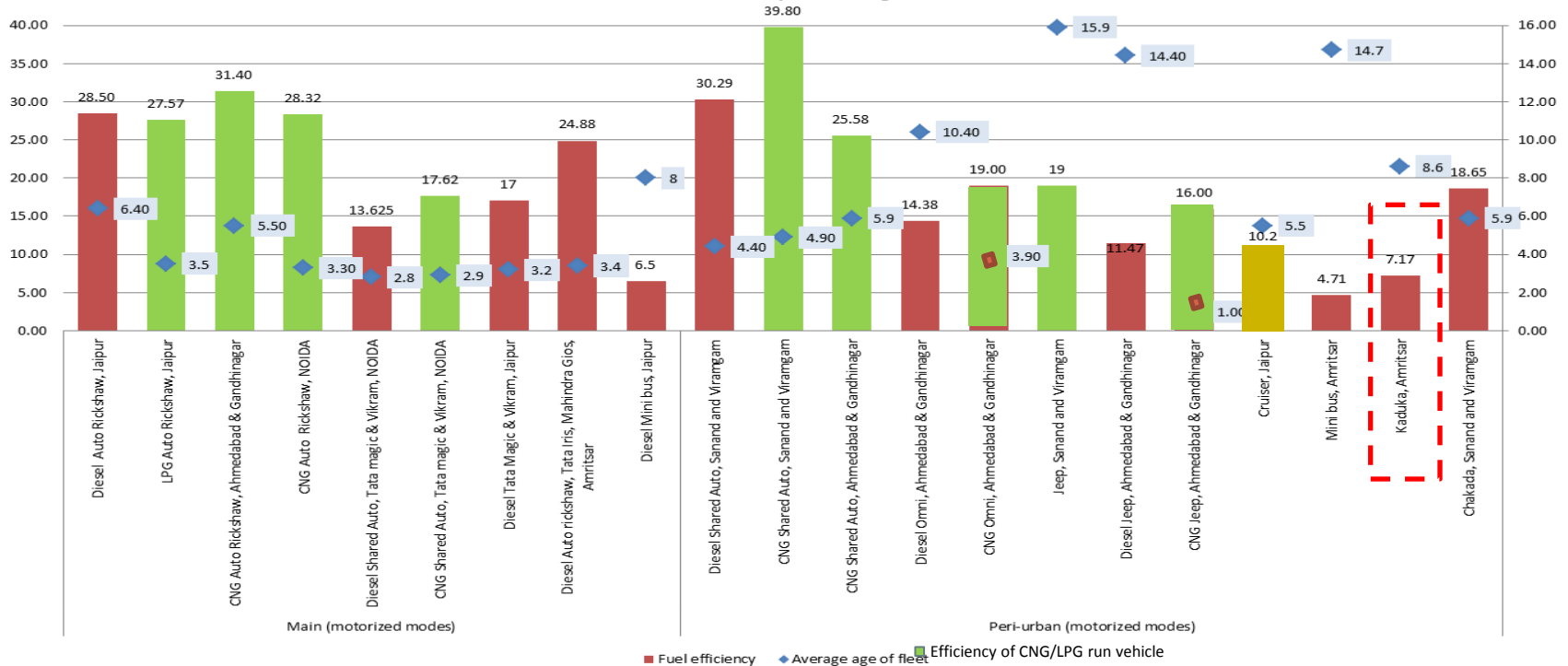


- Average age of fleet (urban areas) – 3.88 years
- Older fleet was pre dominant in peri urban areas
 - Jeeps operating in Ahmedabad, Gandhinagar, Sanand and Viramgam region and mini buses in Amritsar were almost 15 years old

Are these modes CLEAN?

Fuel efficiency and Fleet age

Fuel efficiency and fleet age



Average fuel efficiency was found to be -

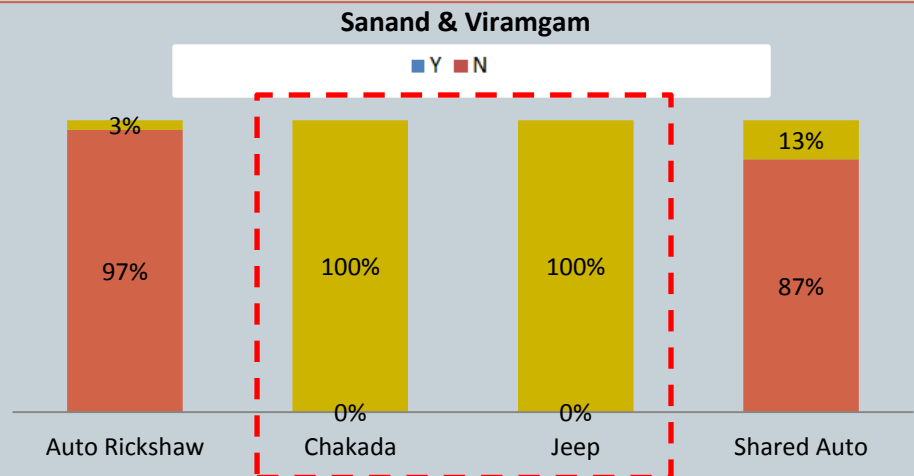
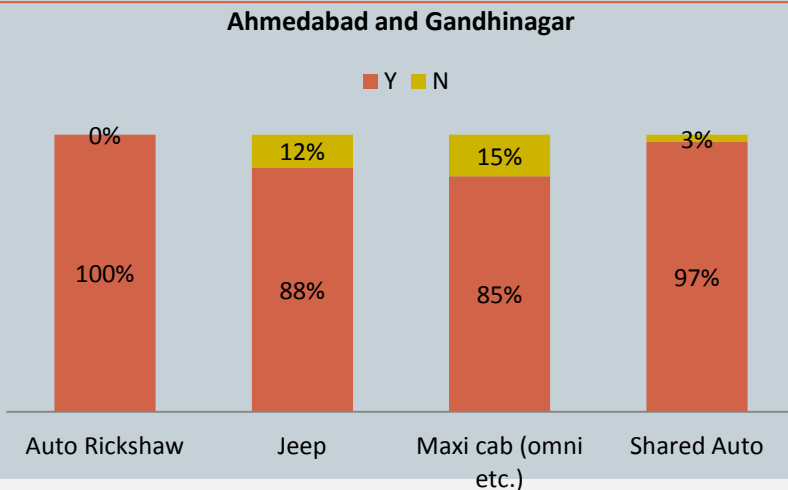
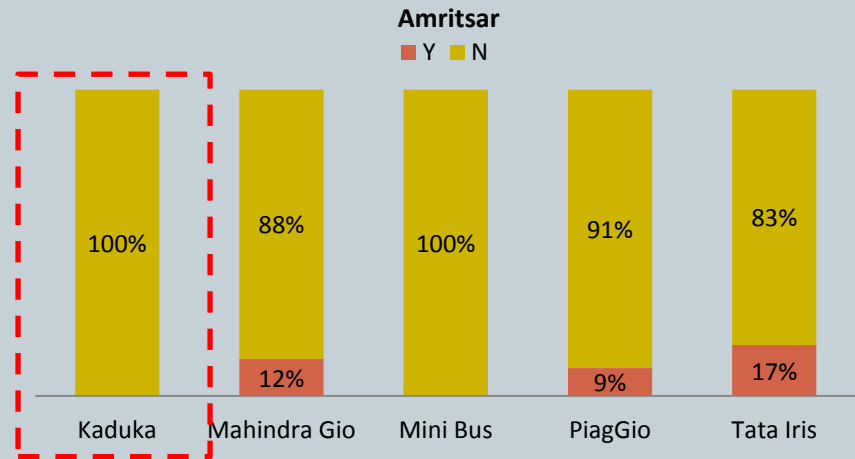
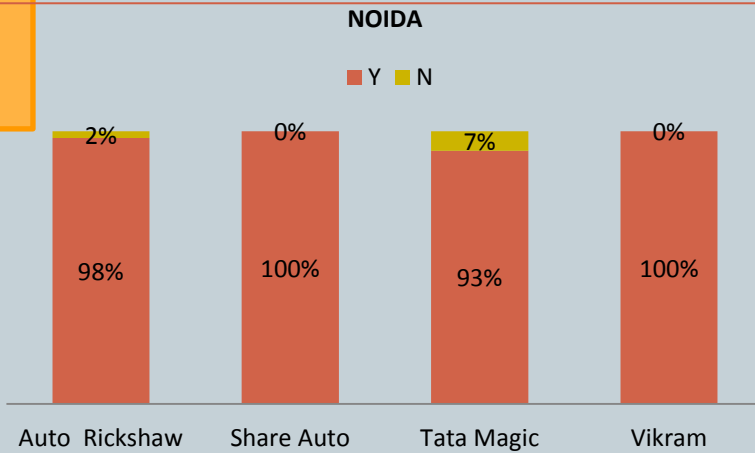
- Auto-rickshaws (personal)
 - Diesel ~ 29 kmpl
 - LPG/ CNG ~ 30kmpl
- Shared services (Tata magics, Vikrams, Gios, etc.)
 - Diesel ~ 17kmpl
 - LPG/ CNG ~ 27kmpl

- Cruisers, Jeeps, Omnis, etc
 - Diesel ~ 12kmpl
 - LPG/ CNG ~ 18kmpl
- Diesel minibuses ~ 6kmpl
- Kaduka ~ 7kmpl

Fuel efficiencies were lower for older

Are these modes CLEAN?

Compliance with Pollution Under Control Certificate (PUC)



- **Not all the motorized modes carried a PUC**
- Level of enforcement varied from city to city
- More violations have been observed where the mode operated in peri-urban and rural settings
- It is an enforcement issue

Do these modes comply with REGULATIONS?

Driving license

Vehicle registration

Permit

PUC

Driving license

- All drivers operating in urban and peri-urban areas carried a valid commercial driving license
- Only in case of locally manufactured modes – drivers did not carry a valid driving license

Vehicle registration

- All vehicles operating in urban areas operated with valid vehicle registration
- Instances of violations increase as one moves away from urban boundaries:
 - Jeeps operating in Ahmedabd – Gandhinagar, Sanand, Viramgam – Violated –white number plate vehicles operate as shared service
 - Chakdas – violation - registered as goods vehicle
 - Kadukas - No vehicle registration

Non-compliance in case of peri-urban areas highlight issue of poor enforcement in such areas

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RECOMMENDATIONS

Should these modes be regulated?

- Yes all modes used as informal transport must be regulated
- Regulations should aim at:
 - Minimizing negative externality: Safe, security and environment friendly
 - Operational aspects should be market determined



Proposed regulations

1. Integrate informal systems with formal systems and give informal transport cognizance in city mobility services
2. Enforcement must be strengthened to ensure strict adherence to rules and regulations
3. Fares should be left to the market
4. Vehicle and driver registration for NMV should be made compulsory by the local bodies
 - possibility of insurance to be looked into
5. New modes that emerge need to be considered by the authorities and type approval and safety tests be performed before they are allowed to ply and move passengers

Proposed regulations

6. Permits for shared services (autos, shared jeep/ cruisers, Tata Magics, etc) may be considered to be issued by the authorities, as is the case in cities like in Kolkata and Surat
7. Passenger limit for three wheelers vehicles may be increased depending on vehicle capacity/ size
8. Scheduling system as followed in Jaipur has immense scope for replication in other cities

Thank you