

The Public Administration Help Tank



FHV Data Bank for India

Improving Transportation, Culture,
Environment and Quality of Life



Taxis, Autos, Jitneys

- Micro transit or For Hire Vehicles (FHV)
- Transit that is hailed on the street
- FHV is individual transit- Point to Point
- Mass transit is between fixed points
- Micro transit feeds Mass Transit
- Worldwide usually regulated



Objective

- Can fares can be set scientifically to influence driver behaviour?
and all stake holders?

drivers, passengers, fellow road users, government (infrastructure), owners, capital, manufacturers, and society



Revenue Model of FHV

- Depends on topography of city
- Depends on traffic
- Depends on service
- Depends on demand



The Science of Fares

- Demand for Service
- Quality of Service
- Affordability

- *Need for continuous statistics!*



Required: Statistics Bank

- Demand (Quantity demanded)
- Quality of Service demanded
- Affordability
- Traffic and utilisation
- Entry Economics



Current Requirement

- Regulation of Fares requires statistics on demand, capacity and QoS
- Granularity of information critical to influence stake holder behaviour
- Required from all major cities, some B class cities and some towns



Survey of Chennai Autos

- Traffic profile
 - Fleet profile
 - Driver skillset profile
 - Driver demography
-
- Descriptive stats and advanced stats



Research Methodology

- Focus groups of stake holders
- Pilot survey (40 drivers)
- Personal interview by Sample survey
- Confidence level of at least 90%



Research Factors

- Open ended finite population
- Varies by geography, catchment
- No source list
- Legal and illegal autos



Research Design

Frame is part of population yet to be identified-

Multi stage sampling protocol--

Stratification + systematic selection

- Sample survey

- Sample size required 240, actual 260
- Final usable 257 responses



Homogeneity Test on Data

- Chi square test for 99% probability and five degrees freedom
- Split half test of reliability
- Quarter tests (validity?)



Analyses

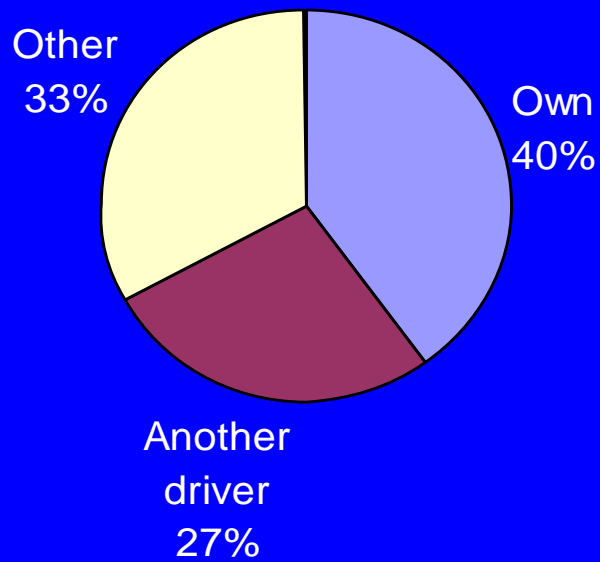
- ANOVA uniformity of fares and driver characteristics
- Regression on fares demanded for underlying patterns



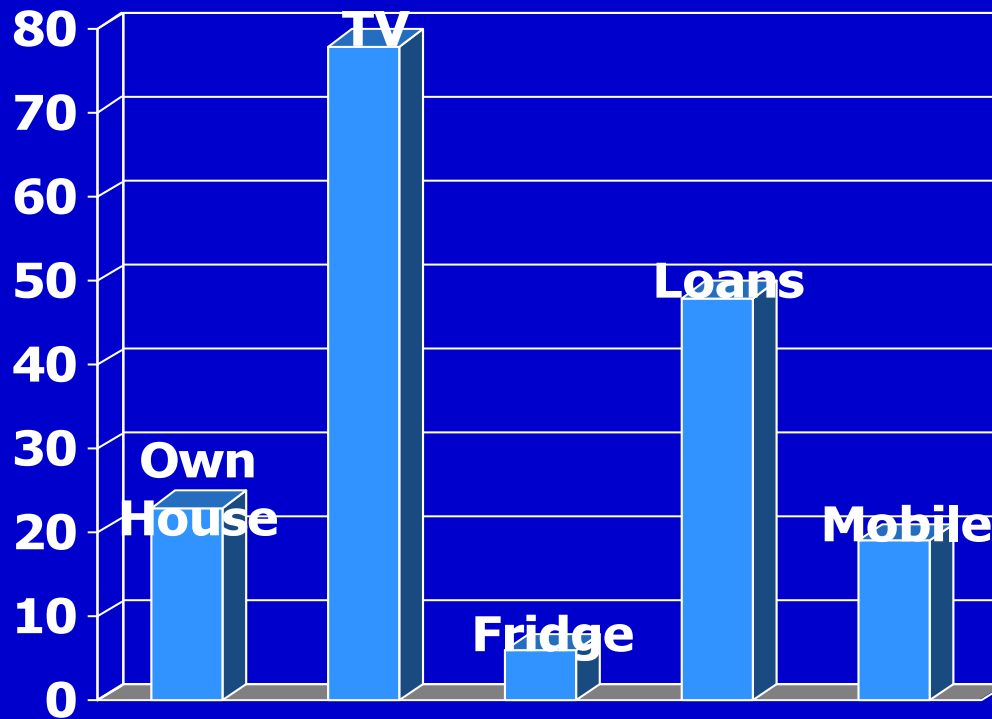
Scope and Limitation

- Scope limited to Chennai
- Limitations
 - Hesitation among drivers to respond
 - Lack of secondary data
 - Usual limitations of all statistical studies

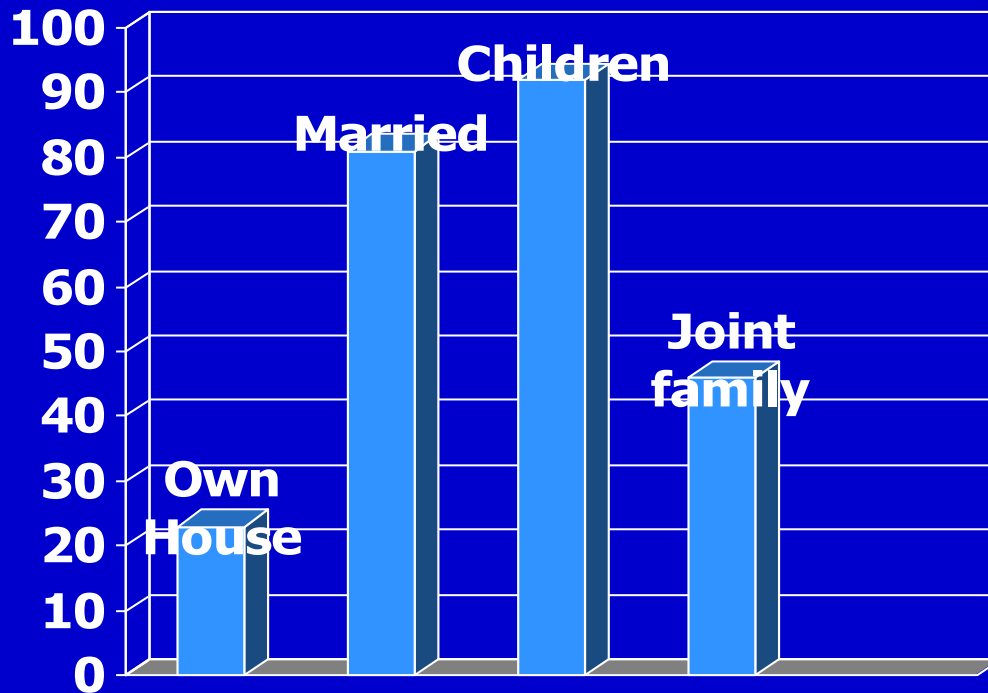
Ownership of autos



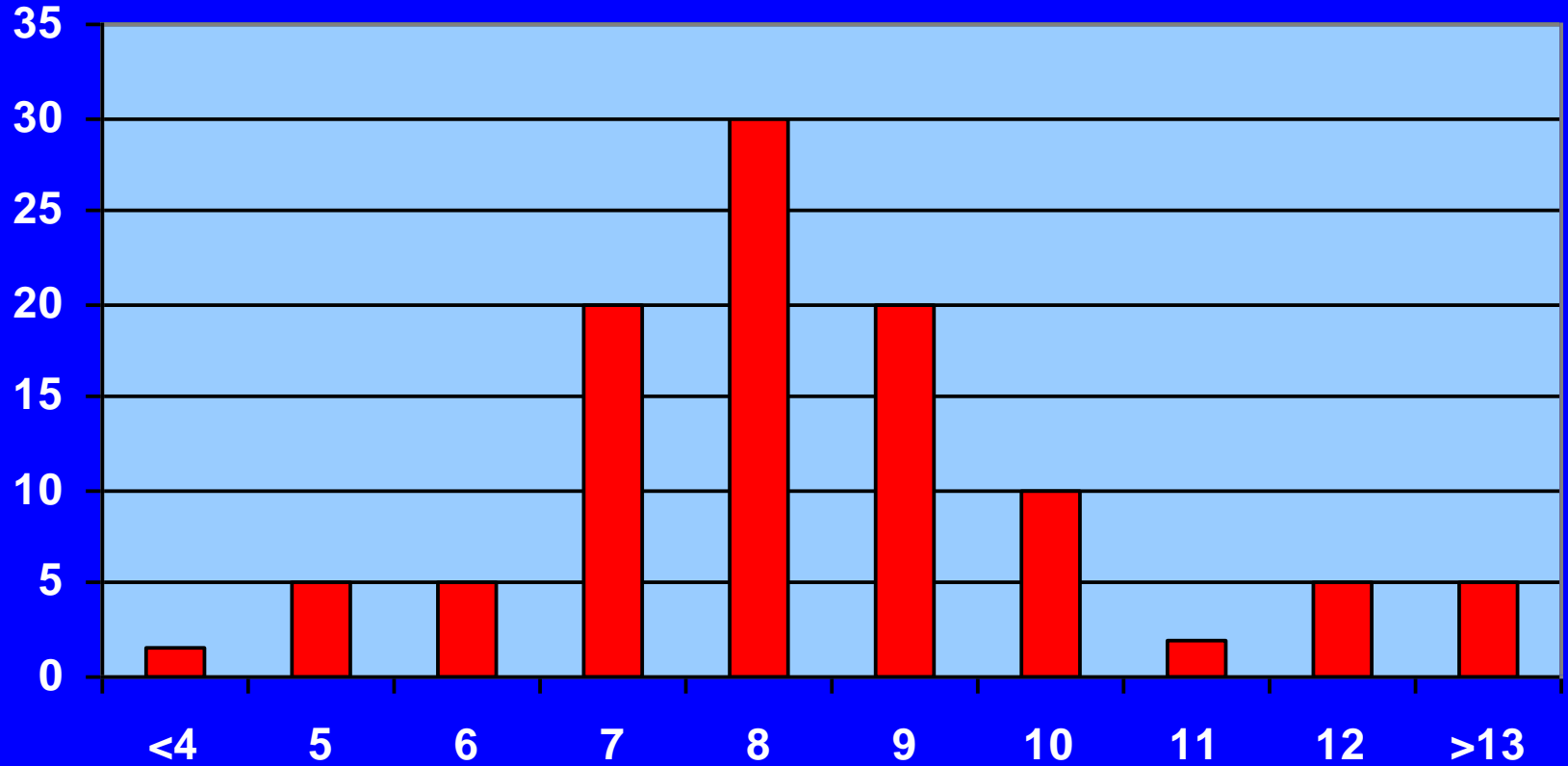
Living standard of drivers %



Family Profile of drivers %

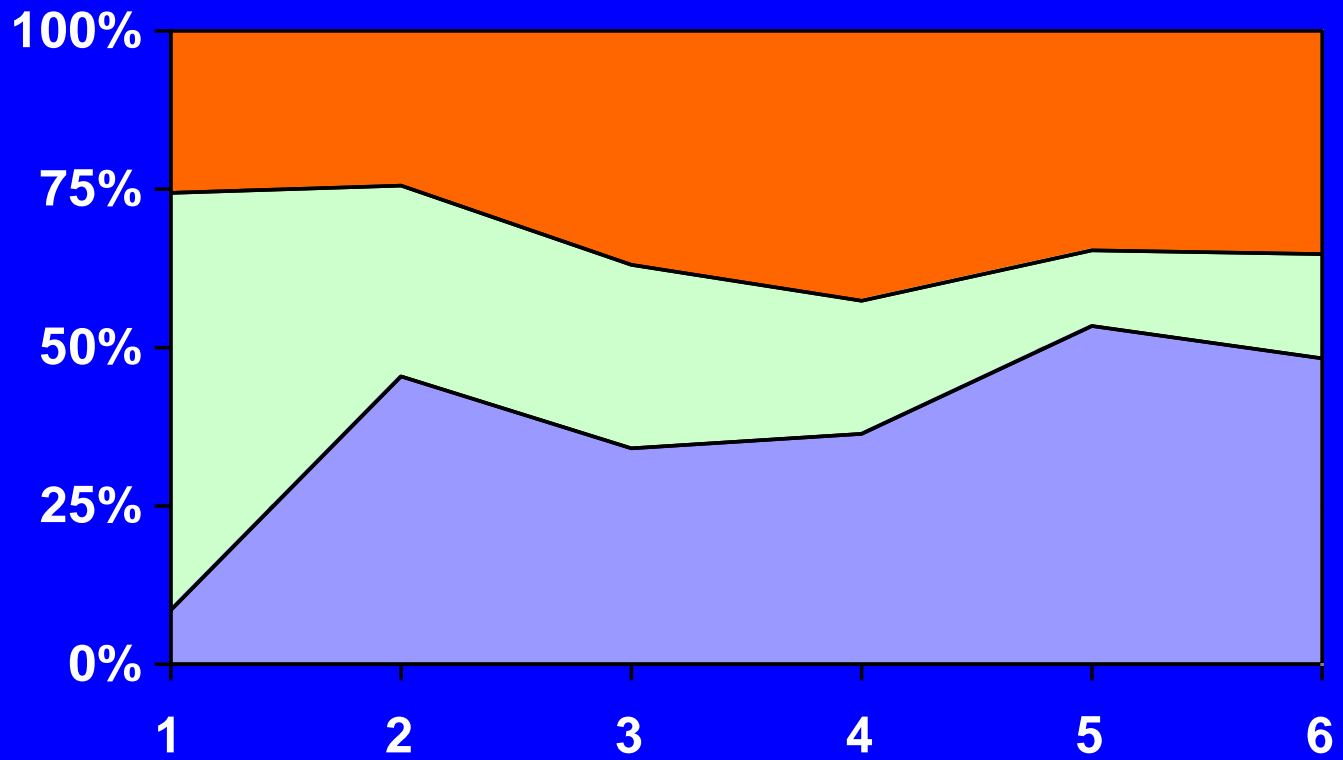


What is 8 Km

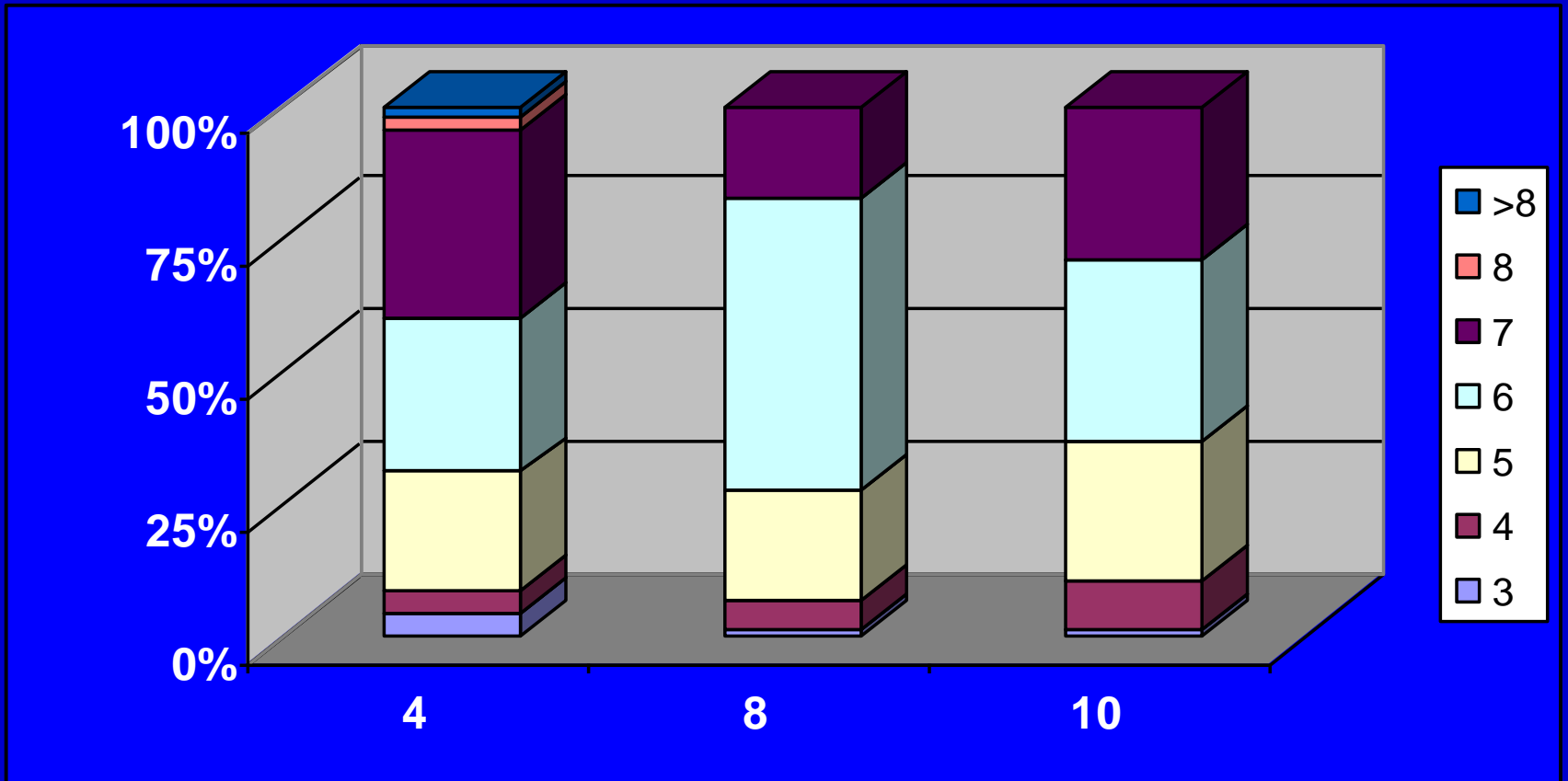


March 2011

Ability to estimate distance



Fare Demanded





ANOVA - Shopping Center

Table 3.30: Fare to Shopping in Different Strata (*Significant)

Source	DF	Sum Sq	Mean Sq	F	P
Strata	7	528.66	75.52	9.48	.000
Error	234	1863.44	7.96		
Total	241	2392.10			



Regression- Shopping Centre

Factor	Coefficient	Error	Sig	R-Sq (Adj)
Constant	7.864	3.571	.0000	68.77%
Distance	1.285	0.328	.0000	
Duration	1.085	0.114	.0000	

$$\text{Fare} = 7.864 + 1.285 \text{ distance} + 1.085 \text{ duration}$$



ANOVA - Fares to Koyambedu

Table 3.29: Fare to Bus Station in Different Strata (*Significant)

Source	DF	Sum Sq	Mean Sq	F	P
Strata	7	128	18.3	1.49	.170
Error	223	2728	12.2		
Total	230	2856			



Regression- Koyambedu Fare

Factor	Coefficient	Error	Sig	R-Sq (Adj)
Constant	11.859	3.571	.0010	57.67%
Distance	3.755	0.328	.0000	
Duration	.444	0.114	.0001	

$$\text{Fare} = 11.859 + 3.755 \text{ distance} + .444 \text{ duration}$$



ANOVA - Fares to Central

Table 3.28: Fare to Rail Head in Different Strata (*Significant)

Source	DF	Sum Sq	Mean Sq	F	P
Strata	7	373.82	53.40	6.21	.000
Error	221	1899	8.59		
Total	228	2272.82			



Regression- Fare to Central

Factor	Coefficient	Error	Sig	R-Sq (Adj)
Constant	8.139	1.699	.0000	75.92%
Distance	2.906	0.368	.0000	
Duration	.70	0.098	.0000	

$$\text{Fare} = 8.139 + 2.906 \text{ distance} + .7 \text{ duration}$$



Working limits of service

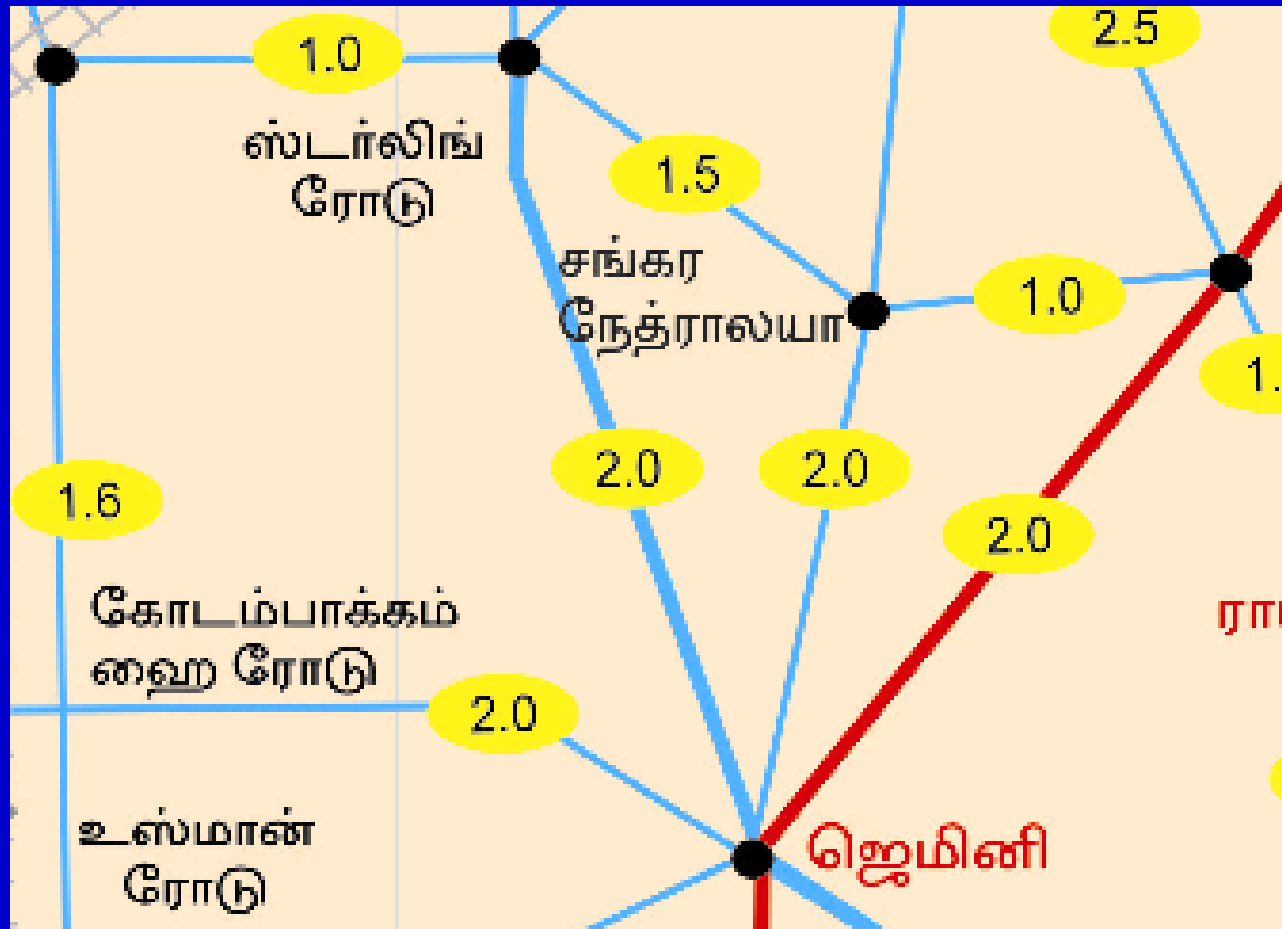
- Number of trips per day: 20
- Probable live Km per day: 100
- Dead Km per day: 50
- Working hours per day: 12 - 13



Discussion

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Gemini to Kodambakkam





2 Km pays Rs 15

- 40 minutes in evening
- One hour if there is a procession
- How much per day?



Gemini to 2 Km fares

- Rs 20 to Spencer
- Rs 50 to Kodambakkam
- Rs 30 to Sterling Road



The Problem

- Fares not linked to Service or Cost
- Permits not related to demand
- Licensing not to knowledge
- No access to institutional capital
- Outdated engineering
- Exploitative culture at all levels
- Economic and social importance not realised by policy makers



The Perspective

- Not about “auto drivers”
- It is the micro transit of the city



Autos and Chennai

- Only to-door service—
- Small turning radius
- Economic and social importance of autos not evident to society



AutoFact: Second Largest

- Second largest people mover in city
 - Autos move 15 lakhs, Buses 30 lakhs
- Only door-to-door service
 - Ambulance of the poor
- Autos reduce traffic congestion
 - Turns in 5 m, taxis require 12 m



AutoFact:

Contribution to City Life

- Good transit improves city life
- Music season, tourism, night cinema can flourish with a good auto system
- Critical for better quality of living



AutoFact:

Contribution to Economy

- Investment of Rs 500 Crores
- Daily revenue of Rs 2 Crores
- Livelihood of 80,000 driver families
- Ancillary tradesmen of 10,000 families



Why regulation

- Stopping on the road penalises others
- Consumer not equipped to judge QoS—
driver, skill, vehicle, distance, time
- Probability of custom is very low
- Spare capacity increases QoS and cost
- FHVs must cruising around to increase
utilisation, thereby reduce fare
- Good service saves total cost to society



Types of Regulation

- Fare
- Fleet size
- Capital- Permits and organisation
- Labour- Driver qualification
- Area of operation
- Vehicle-- type, size, performance, age



Experience of cities worldwide

- **London:** Free entry of capital and labour, considered best in the world
- **New York:** High capital control so permits sell for some Rs 30 lakhs
- **Washington, DC:** No meter, fare zones
- **Hong Kong:** 3 systems in one city
- **Singapore:** 4 companies, good service



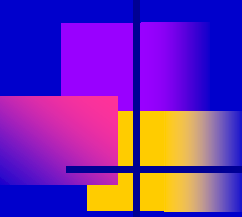
Comparison of Fares-(Rupees)

		LON	TYO	NYC	PAR	SIN	HKG	MAA
1	5 Km/ 30 min	1000	800	650	425	200	300	20
2	Per Km	160	120	100	40	14	45	3.50
3	Per min	27	50	10	25	7	10	Nil



Price and Behaviour

- Price is the factor common to all the stake holders in any product-- it influences behaviour of all stakeholders
- The Fare is the Price for FHV service
- Price modifies behaviour in all walks of life



Pricing example-- One flight

- No two passengers pay same fare
 - Full fare, APEX, Discounted and standby
 - Peak, lean, weekend, festival,
 - OW, RT, RTW, Sector, upgrades
 - Travel agent, courtesy, reciprocals, OSD
 - Mileage, promotions, packages, bundling
 - Combinations of all these
 - First, Business, Semi-business and Coach



Quality of Service

- Waiting time for auto
- Quality of vehicle
- Knowledge and culture of driver
- Comfort of drive
- Price or Fare



Example of Bus Service

- Quality of vehicle
- Frequency / waiting time
- Service coverage
- Number of stops/ travel time
- Staff quality



Factors of price and traffic

- Total demand in Passenger-Km
- Trips per day
- Trip distance, duration, occupancy
- Empty cruising time and distance

- How many permits? Or drivers?



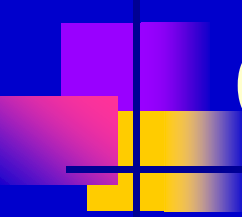
Combinations

		Now	Alt 1	2	3	4	5
1	Per Km	7	9	5	4	5	
2	Per min	0	0	1	1	1	
3	Trip	3	0		5	(10)	
	100 Km		900?	500	400		
	7 hours		0	400	400		
	20 trips		0		100		
	Total		900	900	900		



The Business Perspective

- A defined product or service based on a need
- Chargeable Factors
- A Revenue Model
- Pricing policy



Chargeable Factors

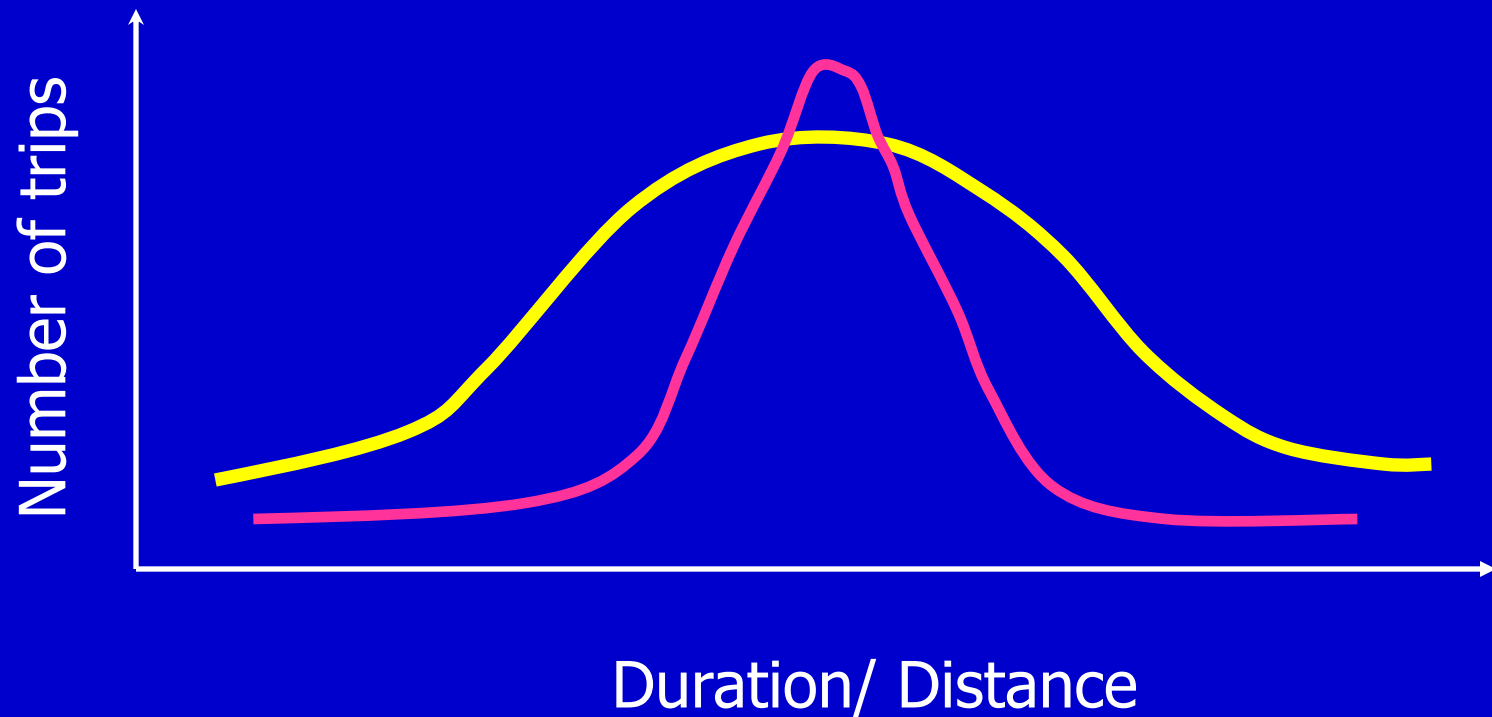
- Primary Factor- Objective of service
 - Distance
- Secondary Factor- Overheads
 - Duration
- Hygiene Factor- Excise of trip-
 - Flag fall



Revenue Model of FHV

- Depends on topography
- Depends on traffic
- Depends on service

Differences to topography





Revenue Models

^> Trip Duration

High Duration Small Distances Ex: Towns- Madurai Time Model	High Duration High Distance Ex: Large Cities Combination Model
Small Duration Small Distances Ex: Kodai Trip Model	High Speed Large Distances Ex: Travel Distance Model

>> Trip distance



Revenue Streams

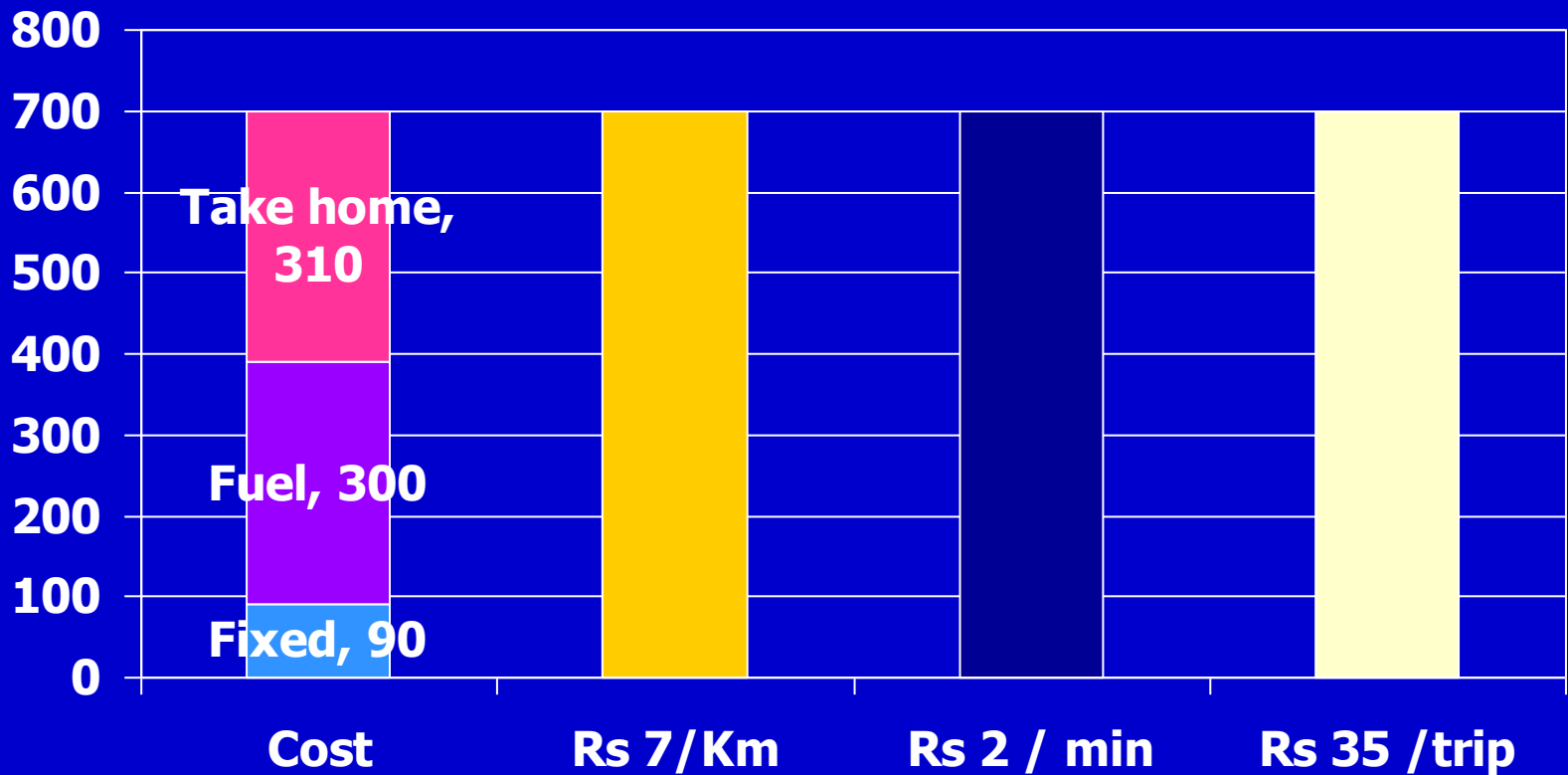
- Businesses offer many products at a time so that price can be varied to suit the interest of consumers
- Alternatively increase revenue streams/ factors to increase granularity in pricing



Four Ds of the Fare

- Distance
- Duration
- Drop
 - Minimum Fare- Flag Drop
 - Minimum increase- Meter Drop
- Discern- surcharges and discounts

Cost and charging methods





Discerns

- Demand Discerns- Peak hour, CBD
- Convenience Discerns- Booking, Negotiated trip, Shared service, Bus Stop drop, Shed run
- Marginal Income Discerns-Luggage, Additional passenger,
- Compensatory Discerns- Waiting, Petrol increase, Electronic Meter, Congregation, Night, Soiling, Holiday



Findings of Chennai

- Fares individually negotiated
- Uncontrolled auto population
- Incorrect Revenue Model and Mix
- Quality of driver pool
- Regulation failure- statistics, perspective
- Quality of life of drivers
- No access to organised finance



Recommendations for Chennai

- Timely Fare Revisions
- Demand based permits
- Combination Model for Fare basis
- Fare Mix to be disseminated
- Education and training of drivers
- Facilitation and infrastructure



Transition

- Permit and Driver regulation
- Introduction of Time Fare
- Petrol Price Surcharge
- Other Surcharges
- Enforcement of Trip Sheet



Discussion

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Findings

- Absence of Behavioural Perspective
- Pricing Method- Cost vs contribution
- Revenue Model
- Fare Mix is absent or not evident



Recommendations

- Behavioural Approach to Fares
- Contribution approach to Pricing
- Revenue Models as base
- 4 Ds for Fare Mix
 - Distance
 - Duration
 - Drops
 - Discerns



Recommendations continued

- Engineering of Autos
- Regulation and Facilitation
- Fare meters with data statistics
- Access to ESI for drivers and family
- Taxi and Auto Commission

- Planned transition and enforcement!



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and Quality of Life