



Can there be a more equitable right to passage? *(Photo: Anam Sheikh)*

Exclusion from Mobility and Access

Denial of Public Good

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Introduction

If you cannot get to where you want easily and within your means, then you can find yourself excluded from many of your economic, social and economic needs. Social exclusion in transport has been a topic of concern in many wealthy countries (1-16), but surprisingly, not enough professionals and policy makers deal with this issue in India. As far back as 2003, the government of United Kingdom (UK) published a report that dealt with the links between social exclusion, transport and the location of services and the lack of opportunities that have an impact on life-chances, such as work, learning and health care (17). This report was prepared by the Social Exclusion Unit of the government of UK and was initially part of the Cabinet Office and moved over to the Office of the Deputy Prime Minister in May 2002. The Unit's task was to help improve government action to reduce social exclusion by producing 'joined-up solutions to joined-up problems'. The report stated that problems with transport and the location and delivery of services contribute to social exclusion by preventing people from participating in work or learning and from accessing healthcare, food shopping and other local activities, and that people in deprived communities also suffer the worst effects of road traffic through pollution and pedestrian accidents. They listed the following issues that are associated with transport and social exclusion in England:

- *Access to work:* Two out of five jobseekers say lack of transport is a barrier to getting a job. One in four jobseekers say that the cost of transport is a problem getting to interviews. One in four young people have not applied for a particular job in the last 12 months because of transport problems.
- *Access to learning:* 16–18-year-old students spend on average £370 a year on education-related transport, and nearly half of them experience difficulty with this cost. Six per cent of all 16–24-year-olds turn down training or further education opportunities because of problems with transport.
- *Access to healthcare:* 31 per cent of people without a car have difficulties travelling to their local hospital, compared to 17 per cent of people with a car. Over 1.4 million people say they have missed, turned down, or chosen not to seek medical help over the last 12 months because of transport problems.
- *Access to food shops:* 16 per cent of people without cars find access to supermarkets difficult, compared to 6 per cent of the population as a whole.
- *Access to social, cultural, and sporting activities:* 18 per cent of people without a car find seeing friends and family difficult because of transport problems, compared with 8 per cent for car owners. People without cars are also twice as likely to find it difficult getting

to leisure centres (9 per cent) and libraries (7 per cent).

- *Impact of traffic on deprived communities:* Children from the lowest social class are five times more likely to die in road accidents than those from the highest social class. More than a quarter of child pedestrian casualties happen in the most deprived 10 per cent of wards.
- These problems have an impact on the individuals concerned, for example by cutting them off from jobs, education and training. This in turn prevents them from breaking out of the cycle of social exclusion. The problems have costs for communities, which may be left isolated or unable to attract investment. They also undermine Government objectives that are essential to combat poverty and social exclusion like welfare to work, raising educational participation and attainment, narrowing health inequalities, and reducing crime and antisocial behaviour.”

Social exclusion due to transport problems can be complete or partial and due to a number of reasons which can occur singly or jointly:

- Travel distance.
- Cost of transport.
- Availability and physical accessibility of transport (including problems faced by the differently abled, children and the elderly).
- Safety and fear of crime and harassment on the road while walking/bicycling and in buses and metros.
- Fear of being involved in a road accident
- Social problems faced by women on the road and public transport vehicles.
- Availability of information regarding services.
- Location of services like schools, hospitals and shopping areas.

Though studies and reports originating in high income countries have highlighted these issues for many years, it appears that not much progress has been made anywhere in the last two decades. Kamruzzaman, Yigitcanlar (7) in their review of literature on the subject come to the conclusion that “... social exclusion is often a misunderstood, poorly defined and poorly measured construct. As a result, an operational and theoretically sound measure of transport disadvantage in assessing social exclusion is almost absent”. Mees (18) goes further:

Social equity problems caused by transport have not gone away either. And equity would remain an issue even in the unlikely event that a non-polluting car could be invented. The car has increased mobility for those who can avail themselves of it, but the car-dominated city is actually less accessible for those without private vehicles. Land-use patterns are arranged to suit the automobile, with dispersed activities (fewer, and larger, shops, schools, hospitals, etc.) and wide roads and large car parks, which make walking impractical and cycling positively dangerous. Meanwhile, public transport is generally of such poor quality that, for most trips, it might as well not exist... Analysts tend to underestimate the number of people affected... Although it is widely acknowledged that they have been intellectually discredited, the transport planning techniques developed in the 1950s, and the inappropriate extensions of cost-benefit analysis developed in the 1960s, are still the basis of road planning in every Australian city.

The situation in India is probably worse for many reasons. Social exclusion resulting from lack of mobility and access options to participate fully in social and economic activities can be a result of a large number of factors including long distances, inadequate and affordable transport facilities, fear of crime and harassment, danger of accidents, and ease of reaching and moving. Within each of these reasons we also have the associated problems faced by individuals because of their caste and class, religion, gender, age and physical disabilities.

Traditionally, urban policymaking has been focussed on provision of mechanised transport for over a century. One of the main reasons is that the need to travel longer distances has become greater over the past century as our cities have become much larger in size and more complex as social and economic structures. In addition, almost all town planning models are organised around the car and

neighbourhood design favours those with access to these vehicles. These developments were heavily influenced by the 'The Athens Charter' published as conclusions of the fourth CIAM Congress in 1933. The charter wanted to replace the 'chaotic' jumble of streets, shops, and houses which existed in European cities at the time with a zoned city, comprising of standardised dwellings and different areas for work, home, and leisure. The charter effectively committed CIAM to rigid functional cities, with citizens to be housed in high, widely-spaced apartment blocks and green belts to separate each zone of the city¹. One of the most influential backers of this document was Le Corbusier who wrote that:

Cities will be a part of the country; I shall live 30 miles from my office in one direction, under a pine tree; my secretary will live 30 miles away from it too, in the other direction, under a pine tree. We shall both have our own car.

Subsequently many planners objected to the idea of CIAM's ideal city as they thought that it would lead to isolation and community breakdown. However, with the rise of automobile ownership in USA and Europe after the second world war these ideas continued to have a strong following and most cities around the world followed CIAM's prescriptions. In the last two to three decades, modern town planners around the world rubbished many of these ideas and recommended the development of mixed land use human scale cities. Unfortunately, these ideas are yet to take the form of a movement in India.

Planners in India are still obsessed with provision of more and faster means of transport, an approach that has led to building of inner-urban highways and gated communities (including university campuses and public and private institutions) that divide communities and make walking and bicycling more time consuming, tiring and unattractive. It is because of these reasons that when we think of provision of access as a public good, we only think of buses and metros as public transport. However, in Indian cities almost 50 per cent of people walk or bicycle to work and a significant proportion use

'public transport' options like rickshas, e-rickshas, and autos.

Here we discuss the special characteristics of transport in urban India in particular and for low and middle-income countries in general. The problems of dealing with transportation policies are discussed keeping in mind the issues thrown up that influence social exclusion due to problems in access. We discuss the issue of social exclusion in transport including all modes except private cars and motorcycles. It will be assumed that social exclusion in transport deprives people from one or more of the professional, social and economic activities listed above. We also assume that as far as mobility and access are concerned public goods include provision of safe and convenient walking and bicycling spaces, affordable government and privately provided transport options like buses and metros, and privately provided intermediate public transport (IPT) modes like three-wheeled auto rickshas, cycle rickshas, electric rickshas, 'tempos', etcetera.

Systems have to be put in place that help people choose less harmful modes of travel and reduce the need for long trips. The desired behaviour needs to be rewarded and harmful actions discouraged by negative feedback socially and financially.

Moving around in India

Modes of travel

Most Indian cities have expanded after 1960 and all have planned for multiple business districts. In the second half of the 20th century most families in Indian cities did not own a personal vehicle and so most activities revolved within short distances around the home. In the past two decades, vehicle ownership has increased substantially in Indian cities. Delhi has by far the highest ownership levels with 15-20% of Delhi's families owning a car and about 35% a motorcycle at a very low average per capita income level of about Rs. 50,000 per year. Such high levels of private vehicle ownership (including motorcycles) did not happen until incomes were much higher in western nations. Car ownership in all other cities of India is less than half of that in Delhi. The high ownership of motorcycles, non-availability of funds to build expensive grade separated metro systems and official plans encouraging multi nodal business

¹ CIAM (Congres Internationaux d'Architecture Moderne). <https://www.open.edu/openlearn/history-the-arts/history/heritage/ciam-congres-internationaux-darchitecture-moderne>

activity in a city has resulted in the absence of dense high population central business districts. Our cities have developed urban forms that encourage sprawl in the form of relatively dense cities within cities. The absence of systems like metros (grade separated rail systems) that encourage long distance travel, have helped in this form of development in most large Indian cities until recently.

Even though motor vehicle use is increasing in Indian cities a very large proportion of people still walk and cycle to work. The Census of India 2011 data informs us that for all urban areas combined the proportion of people who reported walking to work was 31 per cent and those cycling 18 per cent (19). People using buses was reported to be 15 per cent and tempos, taxis, autos 6 per cent. The use of metros is not reported separately as most cities did not have metro transport available in 2011. These data tell us that the number of people traveling to work by personal car and motorcycle in urban areas

in India was 5 per cent and 21 per cent respectively. The issues of inclusion in countries like India, therefore, have to focus on the vast majority who do not have access to cars and motorcycles.

Women traveling to work constituted only 16 per cent of the total, or there were five times as many men traveling to work in urban areas as women. Table 1 shows the ratio of men as compared to women traveling to work by different modes. These data show that while men traveling to work comprise five times the number of women overall, the ratios are very different by mode of travel. Women are also hugely underrepresented as users of bicycles and motorcycles. We do not know how much of this underrepresentation of women travelling to work is due to issues concerning exclusion from transport or non-availability of jobs and other social concerns. However, this underrepresentation of women should be one of the foremost concerns in any discussion on exclusion in transport.

Table 1. Ratio of number of men as compared to women travelling to work by different modes in urban areas of India (19)

<i>Mode of travel to work</i>	<i>Ratio of</i>
men:women	
On foot	3
Bicycle	23
Moped/Scooter/Motorcycle	11
Car/Jeep/Van	5
Tempo/Autoricksha/Taxi	3
Bus	3
Train	5

Table 2. Proportion (per cent) of commuters traveling by different modes and distance to work (19)

<i>Mode</i>	<i>Distance travelled in km</i>				
	<i>0-1</i>	<i>2-5</i>	<i>6-10</i>	<i>11-20</i>	<i>>20</i>
<i>On foot</i>	53	31	16	0	0
<i>Bicycle</i>	16	54	17	5	8
<i>Moped/Scooter/Motor Cycle</i>	14	41	22	12	12
<i>Car/Jeep/Van</i>	8	27	22	18	24
<i>Tempo/Autoricksha/Taxi</i>	8	40	24	11	17
<i>Bus</i>	4	23	26	20	27

Table 2 shows the distance travelled to work by different modes. If we assume the average speed of walking, cycling and mechanised modes as 5, 10 and 20 km/h respectively in urban areas, then it appears that the proportion of people spending more than two hours per day in commuting would be: walking-16 per cent, bicycle-13 per cent and mechanised modes 12-27 percent. Ideally people should be spending much less than two hours per day on their commute to work. It appears that more than a quarter of people are spending undesirable amounts of time in their commute to work.

The data presented above are for all urban areas combined in India. Actually, the proportions of modes used and distances travelled also differ with size of city and availability of public transport and IPT services. However, these average values do give us an idea about issues that may be of importance in discussing transport exclusion in the country. Transportation “needs” cannot be considered an independent variable. These needs are also influenced by urban form and size. For example, in very small towns and villages most destinations can be accessed by walking or cycling and in medium sized cities IPT may serve the purpose. It is only in larger cities (say population greater than 1-2 million persons) that formal public transport services may become a necessity. We take the position that technologies and associated knowledge systems are not necessarily neutral socially and they influence societies differently according to the prevalent social structures and economies. In the next few sections we discuss the different aspects of social exclusion in transport.

Indian city structure and travel needs

How people travel in cities is decided by a balancing of economic compulsions, comfort and safety. Studies of travel behaviour around the world suggest that people do not necessarily minimise time spent on trips. Most seem to have a personal travel time budget preference and utilise it fully except when circumstances do not permit them to do so (20). If provided affordable faster modes of travel, many chose to live further away from work. Public transit is used mainly by those who do not have access to a private vehicle for personal use or when car/motorcycle use is very inconvenient (irritating driving conditions, very long-distance travel), time wasting,

impossible (no parking at destination) or very unsafe and unaffordable. Exclusion takes place when people are forced not to travel, limit their travel, or spend too much time or money on travel. The problem of exclusion also arises partly with the need for people to travel long distances for work, shopping and entertainment. The need to travel longer distances also emerged when Indian cities changed in character, form and the built environment under British rule.

Indian cities changed when the British established a new city adjacent to the old one for themselves in most district headquarters and the national capital. This is where they lived and worked and this new city included the ‘civil lines’, all government offices and army cantonments. This city was physically separated from the older city where the ‘natives’ lived. For the next century or so, the old city was neglected, did not get adequate municipal services, and decayed physically. Consequently, after Independence, the Indian elite took over the British city and the decay of the old city continued. As our cities expanded after the 1950s, it was not easy for most people to settle in the bureaucratic city and they did not want to live in the old congested ‘dirty’ city. A third city came into being, which surrounded the earlier two. This historical development of our cities has to be taken into account to understand the difference in mobility patterns between Indian cities and mature European cities. This separation of people by occupation, trade, and also religion increased travel distances. The occupation of large tracts of land by the armed forces inside the city also separated communities and their activities and increased trip distances.

After independence, the emergence of a relatively soft state and frequent elections have ensured that western inspired master plans could not be implemented in totality. This has made it possible for our cities to have mixed land use (often illegally) and the possibility for the poor to live interspersed with the rich. Since most of the inhabitants do not possess cars and motorcycles and cannot afford public transport fares, they try to live close to their places of work. Slums have come up all over large cities in this effort to be close to work. Zoning has been defeated by emergence of illegal businesses, shops, kiosks, street vendors and night markets around residential areas. Most low income neighbourhoods include all

kinds of small business and industrial enterprises. A development in line with the prescriptions of modern urban planners promoting mixed land use. Our cities have grown somewhat organically due to the pressure of people's needs in spite of the short-term vision of bureaucrats and businesspersons.

Data from all cities indicate that a majority of trips are less than 10 km in length even in large cities (21). A sprawling city in India is not like Los Angeles in the USA. In Los Angeles everyone goes long distances from everywhere to everywhere. Whereas large Indian cities function as a conglomeration of a large number of 'cities' within a metropolis. Most people work, live and socialise within their own 'city'. Indian cities are in an enviable position of having the possibility to evolve into sustainable habitats with human scale living environments if we change our mind-set and start looking at their positive attributes along with their shortcomings. This is an ideal situation to work toward a very sustainable future by embracing policies that do not force people to travel long distances.

However, with increasing disparities in income in India (22), gentrification of urban areas, introduction of gated communities, displacement of low income residents due to construction of metros and

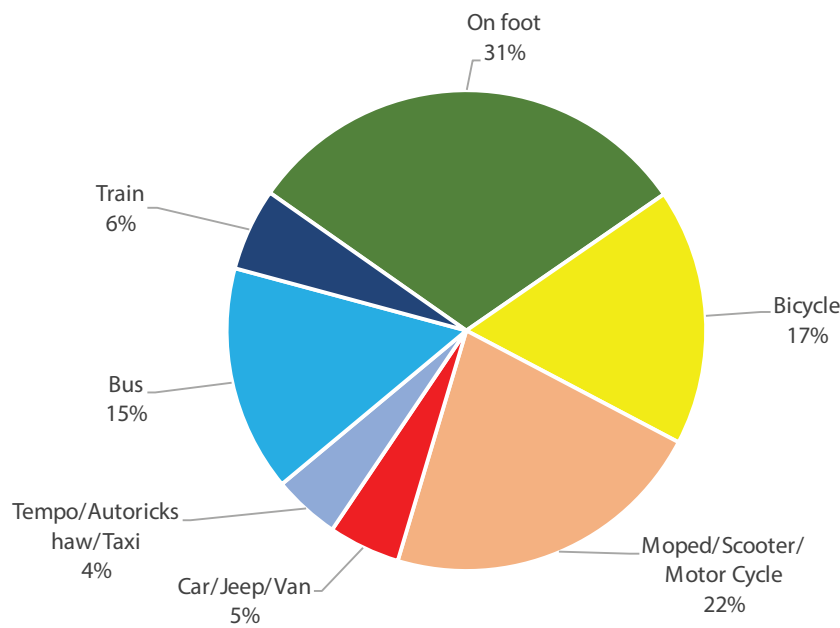
highways inside cities, and increasing polarisation among communities, it appears that social exclusion due to transport problems may be increasing in Indian cities. We discuss some of these issues in the following sections.

Social exclusion and its components

Travel distance

Details of how different people travel for professional and personal reasons are not available for most cities in India. The 2011 Census of India collected data on how people travel to work and this was released in 2017 (19). Figure 1 shows the mode used when traveling to work in urban areas in India in 2011. This shows that almost half the workers either walk or bicycle to work in Indian cities. The ratio would be somewhat different from city to city, but even in a large city like Delhi this ratio works out to be 38%. If such a large proportion of people are walking or cycling in Indian cities it is not likely to be by choice as facilities for walking and bicycling are not safe, convenient or pleasant (23). Further, if the distance to work makes commuting more difficult, it can result in social exclusion of a number of individuals as walking or cycling may not be a convenient option.

Figure 1: Mode of travel to work in urban areas in India (Source: Ref 19)



If we assume that people should not spend more than an hour traveling to work and back every day, then it would mean that the work place should not be more than 3 km away for those who walk (at walking speed of 6 km/h) and 6 km for those cycling (at 12 km/h). Table 2 shows that on an average about a third of those walking and cycling may be exceeding this limit. This indicates that millions of Indians who walk and cycle to work spend far too much time doing so and thus get deprived of time that they need for other family and social activities. Similarly, if we assume that average speed of motorised modes is about 20 km/h in urban areas, then those traveling by motorised modes should not live much more than 10 km from work. Table 2 shows that the proportion of workers exceeding this limit are 47% for bus users, 42% car users, 24% for motorcyclists, and 28% autorickshaw users. The worst off are public transport users with almost a half of them spending more than one hour commuting every day. This could be one of the major reasons why middle class and richer people tend to shift to personal modes of transport as soon as they can afford them. However, car owners seem to be opting for a larger commute time as they may have preferred locations for where they choose to live.

Large commuting times for the low-income groups have been reported to cause more hardship and exclusion as they do not have any help at home and have to spend more time on managing their household activities (24-27). Therefore, need for greater commuting distances hits the lower income groups harder than the rich. Not only do they suffer from time poverty, but they are also forced to spend money on public transport or buy a cheap vehicle to access work (3, 28-30). This extra expenditure eats into other needs that they may have.

Low income groups are also forced to travel long distances in metropolitan cities as many of them are displaced to peripheries of the city in 'slum clearance' policies and campaigns promoting 'world class cities' (31-37). These policies end up in social segmentation of the metropolitan space by pushing the poor from the central areas to the periphery of the city. This forces the displaced residents into situations where they face segregation, polarisation, and socio-spatial fragmentation. Detailed studies on displacement of low-income groups to the periphery

of Delhi show that such policies result in isolation, poverty and reduced educational opportunities due to inaccessibility or high costs of transportation (38-40). These studies show that land use accessibility deteriorates as distance to schools, health services and other urban services increased for 52%, 63% and 52% of the households respectively. Transport accessibility also deteriorated as distance to bus stops increased for 72% of the households and the bus frequency decreased, on an average, from 5 minutes to 63 minutes (almost 13 times). The mobility indicators for travel to work – distance, time and cost – increased for 83%, 82% and 61% of the households respectively. There is no reason to believe that forced evictions of 'slum' residents have not had similar effects of social exclusion in other cities in India.

Safety

Cars also function as 'agents' infecting the population with ideologies and social values that may be detrimental to the evolution of egalitarian and healthy transportation and urban policies in that society. Advertising and marketing policies of transnational corporations promote the car and the motorcycle in ways that can encourage speed and risk taking as a desirable way of life. Ownership of cars and motorcycles by a significant minority of the population in India sets in motion evolution of policies that are determined by properties that are inherent in these vehicles. Groups infected by these values favour private transport over public transport, construction of a few high-speed highways over a widespread road network, and isolation of wealthy neighbourhoods in cities. Poor populations are adversely affected by these policies as they have less access to jobs, live in more polluted environments and have a disproportionate involvement in road traffic crashes as pedestrians and bicyclists (41).

Safety on the road emerges as a very important issue, especially for women, children and the elderly. Unless a trip is safe from accidents, harassment, and crime, people avoid walking, bicycling and using public transport. This can result in exclusion of a majority of people living in the city. Therefore, safety emerges as a precondition for promoting public transport use (42-47). No urban rail project or bus transport authority in any city in India has made a special effort to ensure provision of safe walking and

bicycling facilities in the vicinity of every station. Unless there are wide sidewalks with a treeline, dedicated bicycle facilities and frequent safe road crossing facilities on the surface of every arterial road, women, children, the elderly and the mobility disadvantaged will suffer social exclusion due to limited access to jobs and other daily needs.

Fear of being involved in a road accident and absence of safe and convenient facilities for pedestrians and bicyclists forces many to opt for private transport or not travel at all. Pedestrians and bicyclists do not use these modes by choice and generally belong to the lower income strata of the population. Since they generally do not have health insurance or receive free medical care, the economic impact of road traffic injuries affect them to a much greater extent than the higher income groups. There is some evidence that one disastrous episode of ill health, like poly-trauma due to an accident, can destroy a low-income family for ever. The experience of poor communities in coping with medical catastrophes is very different than that experienced by economically well-off communities. The special problems faced by poor families can include the following (48):

- Reallocation of labour of family members and reduced productivity of whole family
- Permanent loss of job for the victim even if he/she survives
- Loss of land, personal savings, household goods.
- Poor health and educational attainment of surviving members
- Dissolution or reconstitution of household

In addition to road accidents, safety from crime and harassment is a major concern for children, women, and the elderly and discourages them from venturing out alone, walking or public transport. Forty seven years ago, in her book *The Death and Life of Great American Cities*, author Jane Jacobs suggested that crime could be reduced by having 'eyes on the street' (49). This book is quite possibly the most influential American book on urban planning to this day. By 'eyes on the street' Jacobs meant shops on ground floors abutting the side walk, abundance of

kiosks and cafes and a vibrant walking atmosphere. She was quite clear it could not be done by policing alone. The way our cities are planned and are being planned ignore these concerns completely. Though the experts have ignored these aspects of town planning, we are fortunate to have these 'eyes' on all our streets (except in very rich neighbourhoods) in the form of hawkers and vendors. Without them, our streets would not provide the relatively crime free atmosphere we have. These vendors then become essential as a part of our transportation planning process (50). It is not very difficult to plan for them as every road needs a treeline which occupies a corridor of 1-1.5 m of space on the pedestrian path. Vendors only need 1-1.5 m and they can occupy spaces between trees without bothering pedestrian traffic.

A report from U. K. suggests that "there might be as much as a 15 percent increase in passengers for all rail journeys if a range of anticrime initiatives were successfully implemented" (51). Many urban planners, street furniture and public facility designers around the world are also working on designs that automatically reduce incidence of crime and perception of risk by road users. Studies show that reduced fear of crime and higher levels of consumer confidence at railway stations had an effect of 33% increase in annual passenger flows on the local commuter trains (52, 53). Principles used in such designs include the following:

- *Natural Surveillance*. The placement of physical features, activities, and people in such ways as to maximize visibility. This also involves the lighting of public spaces and walkways at night.
- *Natural Access Control*. The physical guidance of people entering and exiting a space by the judicious placement of signs, entrances, exits, fencing, landscaping, and lighting.
- *Territorial Reinforcement*. The use of physical attributes that express ownership, such as fences, pavement treatments, artwork, signage, landscaping, and placement of buildings.
- *Image/Maintenance*. Allows for the continued use of space for its intended purpose and serves as an additional expression of

ownership. This also involves supporting a positive image through the selection of materials, design, and scale.

Road safety and roads free from crime and harassment by design could be treated as a special case of public good that needs to be promoted in all urban areas.

Public transport

Various studies show that government operated public transport buses account for 5% of trips in some of the smaller one million plus cities to about 20-25% in the 5 million plus cities (54, 55). Almost none of the cities with less than 1 million population have government provided public transport services. Even where subsidised bus and metro services are provided the costs of commuting are still too expensive for low income households. A typical lower middle class family in Delhi has an income of less than Rs 20,000 per month and low skilled workers less than Rs 10,000 per month. If we assume minimum family expenditure on food, housing and other necessities in large cities to be Rs 5,000, 3,000 and 2,000 per month that leaves very little for children's education, medical care, etc. Quite obviously individuals belonging to low income households should not be spending any amount of money on transport and be able to live close to their places of work and educational institutions. If they have to travel long distances not possible by foot or bicycle, then public transport ticket prices would have to be heavily subsidised.

In Delhi and other metropolitan cities a trip greater than 5 km costs Rs. 600 or more by bus and Rs. 2,500 or more by metro for a monthly commute. This is clearly unaffordable by low income family members. Even middle class families are expected to spend less than 10 percent of their income on transport. Which indicates that the metro is not a comfortable option for families earning less than Rs 30,000-40,000 per month. It is only the middle-class professionals and students of the city who are the main users of the metro system. It is not surprising that the metro accounts for only 6 per cent of all trips (including walking and cycling) or about 12-15 per cent of motorised trips in Delhi.

The marginal cost of running a motorcycle is about Rs 1 – 1.5 per km and this is about three times cheaper than using a public bus and 6 times less than metro fares. With the introduction of shared taxi services like Uber and Ola a significant number of middle class professionals prefer these to public transport as taxi use has become more convenient and not much more expensive than metro systems. This availability of relatively cheap personal transport has reduced the middle class demand for efficient public transport services in India. The world over, public transport systems give free or heavily subsidised fares to students and senior citizens. Most public transport systems in India do not, including the Delhi metro.

At present only Delhi and Mumbai have train/metro systems that cover large parts of the city and another dozen or so cities are building or planning to build one. Therefore, we cannot expect these systems to be the main solution for mobility and accessibility for Indians in most large Indian cities over the next decade or two. Reasonably efficient public bus systems also do not exist in more than a dozen cities in India. Most of the city bus companies are struggling with lack of finances, adequate number of good quality buses and professional management systems. For public transport issues to be resolved in medium and large size cities we will have to depend on promotion of affordable, efficient and widespread public bus transport systems. To attract passengers in the future, these systems will have to run low-floor air-conditioned buses with fares that are cheaper than cost of motorcycle operation (Rs 1/km at today's prices). These buses will also have to run dedicated lanes on main arteries of cities to reduce travel time. All this is not possible without public transport companies being heavily subsidised by the city. At present the administrative and financial mechanisms that will enable this are not available with city administrations and will need to be established with strong political backing. The details for the same are beyond the scope of this paper.

As long as we think of public transportation systems like buses and metros as the main technologies for accessibility in Indian cities we will be missing some of the solutions that already exist here. The problems associated with lack of state provided public transport are ameliorated somewhat by the

availability of intermediate public transport (IPT) options in all our cities, peri-urban locations and rural areas (56-67). All these are privately owned and operated and have to abide by local and state regulations. In effect they probably transport many more people every day than officially provided public transport options. For example, there are about 100,000 auto rickshas in Delhi and at least 100,000 (estimated) cycle rickshas and e-rickshas. It is possible that they transport about 40-45 lakh people a day compared to the 27 lakh passengers per day by the Delhi metro.

While in large metropolitan cities IPT provide mobility in addition to formal public transport systems, in medium and small towns they are the only form of 'public transport' available. In these cities it may not be possible to run affordable public bus services efficiently and economically. For public transport to be attractive, vehicles must run at frequent intervals, on all routes and for about eighteen hours day. For these reasons large buses would be unviable in smaller cities.

All IPT services provide access and mobility to middle and lower middle class citizens of the country that would otherwise not be available to them and hence reduce the extent of social exclusion. However, in order to provide services that are affordable, it becomes necessary that these vehicles are overloaded, minimise maintenance, capital and labour costs. They also avoid less profitable routes. This automatically makes it easy for police and municipal authorities to project them as law breakers and harass them. Additionally IPT modes are considered a nuisance by car owners, and so they operate under unhospitable social conditions. All this results in the system being suboptimal and neglected. There is a need to consider IPT services as a very important component of public transport policy and evolve rules and regulations that promote the evolution of these modes in a healthier manner.

It is quite clear that the provision of public transport that is affordable, available everywhere at all times and can be used by all citizens including the young, elderly and mobility disadvantaged is just not a matter of provision of buses and trains. It is a much more complex issue involving the role of the state in providing subsidies and financing for the system and the infrastructure around it. As of today, people are

finding their own ways to survive in a socially and physically hostile environment. They are able to do so with accompanying hardships because our cities with somewhat soft governments have developed organically. Illegal settlements, illegal trade and the informal sector have made our cities develop more logically and in a more sustainable manner. The poor live closer to work, spend more time at home until they get displaced. The politics of sustainable transport will revolve around the power the poorer sections of the population can exert on decision making. Wherever the lower income groups are able to get themselves heard we are more likely to have more sustainable cities as they will need facilities for walking, bicycling and public transport closer to place of work and shopping and leisure activities around their homes. This will influence what sustainable cities will look like in the future. The upper class is unlikely to do it willingly.

Gender issues

Levy (68) states:

The distributional aspects of transport are cross cutting, and go beyond the disaggregation of transport users by social relations such as class, gender, age and ethnicity. The social identities of transport "users" are deeply embedded in social relations and urban practices, the latter ranging from the everyday lives of people to urban policies and planning. Furthermore, in transport, these social relations are played out in public space, with implications for how diverse women and men, girls and boys are able to exercise individual and collective "travel choice" and negotiate access to essential activities in the city. Recognition of these processes, as reflected in the "deep distribution" of the transport system, is essential to reframing the notion of "travel choice" and, ultimately, to urban transport and urban planning that is committed to social justice in cities.

Within all this, gender issues play a very important rule. A large number of studies done around the world including India point out the following issues (69-92):

- Gender differences arise in (a) the distance travelled, (b) the mode of travel, and (c) the complexity and purpose of trip making.

- Women appear to be more risk averse than men. Risk aversion may affect women's travel decisions when security becomes an issue.
- Family pressure and social norms inhibit women from venturing out alone on the road.
- Women face harassment on the road and while using public transport.
- *Energy poverty*: Caused by the need to walk long distances due to unaffordable transport options
- *Safety poverty*: Caused by to lack of safe walking and cycling infrastructure, which also impacts access to and from public transit.

Table 1 shows that men outnumber women by a factor of more than 10 in use of motorcycles and bicycles and more than 3 for all other modes on the road. This is probably a reflection of low participation of women in the work force in urban areas but also problems associated with anti-women social norms compounded by lack of safety while moving around. Phadke and Roy (93) state these issues succinctly: "In India, there has always been great anxiety about the presence of women in public, including in protest spaces. Part of the anxiety is that women will be harassed, even assaulted. Another unspoken concern is that the presence of women in public as political agents, making claims as citizens, will lead them to 'get above themselves.'" Mahadevia (89) summarizes the following as gender and transport linkages that may influence social exclusion:

Income poverty: Lack of access to work for women exacerbates income poverty

Expenditure: Transport expenses crowd out other expenditures in household budgets, often pushing women to walk long distances and compromise their health and education.

- *Lack of capabilities*: Lack of access to social services is a deterrent to improving capabilities, more so for women than men.
- *Lack of functioning*: Due to lack of access to employment opportunities, health care, education, etc. This is more pronounced for women in a patriarchal set-up.
- *Time poverty*: Due to inappropriate transport paradigm, which emphasizes mobility but not accessibility and causes fatigue and unfavorable time allocation for women, who are either forced to walk or wait for cheap public transport if available.

Gender issues influencing transport choice and mobility are not likely to be solved by technical quick fixes. While prevention of crime against women can be influenced by urban and street design (46, 51, 94, 95), much more social and political action will be needed in the coming years to make streets and public transport safer for women.

Religion and caste

With India attaining independence and increasing urbanization and education we expected that over time caste and religion would cease to be factors determining settlement patterns in Indian cities. Many recent studies suggest that cities in India are highly segregated along caste, community and religion (96-100). Bharathi, Malghan (100) conclude that "our results pose a significant challenge to one of the bedrock normative promises of urbanization in India – the dilution of caste boundaries. Indian cities (at least the cities presented in the paper, and there is no reason to believe the results will be very different in other urban centres) remain highly segregated along caste lines". Sidhwani (101) using ward-level data released by the Census, carried out an inter-city comparison of the levels of spatial segregation in 10 big Indian cities, and found that there is significant residential segregation by caste and also by access to in-house drinking water, a basic public good. A recent study confirms that caste-based spatial segregation, largely assumed to be a characteristic of rural societies, is reproduced in urban spaces as well, and a large population of Dalits continue to inhabit segregated settlements in the metropolitan cities of the country (102). Studies also report that segregation by religion may be increasing in Indian cities and Muslims cannot buy property or rent housing in many locations in cities and get confined to 'ghettos' (98, 103-105).

There are no studies that explore the effect of this spatial segregation by caste and religion in Indian cities on commuting patterns of residents and consequence regarding social exclusion. However, there is no reason to believe that this kind of segregation would not increase distances to work, have effects on availability of public transport and accessibility to jobs, education and other social needs.

Road, street design and urban form

It has been shown that presence of a greater proportion of wide roads with long block lengths is associated with higher crash rates in cities (106). This seems to suggest that city structure, modal share split, exposure of motorists and pedestrians, may have a greater role in determining fatality rates than vehicle and road design alone. Since perception of safety plays a reasonable role in whether people walk, cycle or use public transport, existence of more hazardous streets would certainly deter many people (especially the young and elderly) from making some trips leading to their exclusion from many activities.

Cities with narrower streets and smaller blocks are likely to experience fewer road traffic fatalities, and would promote the concept of cities with higher densities, mixed neighbourhoods and streets designed for pedestrians and bicyclists, in consonance with sustainable development goals (88, 107-119). These suggestions have important implications for cities in India, where urban areas are expected to expand significantly in the next few decades.

Cities across the world are trying to come to terms with issues pertaining to sustainable public transport and safety on their streets. There is growing awareness that urban living needs to be more compact and friendly, less destructive of the environment. People are happier and healthier when they walk, talk and mingle. Policing is most effective when common values are reinforced through natural equations and shared spaces. The modern city, invented in the twentieth century, with wide sweeping roads and impersonal housing, is being discarded for a friendlier urban form, which was interwoven and organic. The built environment has a direct bearing on the quality of life. Short blocks, space for pedestrians, effective lighting and safe public transport provide a sense of well-being.

Fear of violence impedes activity levels and the ability to move outside freely, especially among populations that are more vulnerable to violence such as children, women, people with disabilities, and older adults. Placing public transportation where it is equitably responsive to community needs and provides links to vibrant centres is valuable. Community involvement and comprehensive approaches and multiple sectors working together are essential for designing safer streets. Effective and safe road design and transport planning have to address a set of conflicts implicit in the social context within which roads are built and transport is provided.

Role of the state and recommendations for the future

It is quite clear that the state and its functions are intimately associated with its all the issues that are connected with transport and social exclusion. Provision of easy access to work, education, shopping, healthcare and social, cultural, and sporting activities for all would require that we treat access and mobility as a public good. This will not be possible unless urban municipalities are strengthened significantly, provided adequate funding from local taxes and staffed by professionals who are given respectable job opportunities. Some of the ways forward are summarised below.

- Urban planners need to give up strict zoning policies and promote actual mixed neighbourhoods in cities.
- Ensuring that streets are safe from road accidents would require the implementation of traffic calming techniques (107, 120, 121) and avoidance of very wide roads with uncrossable medians. All arterial roads need to include wide and convenient pedestrian facilities and bicycle paths. An essential part of making roads safer is strict control of vehicle speeds – less than 50 km/h on arterials and 30 km/h in residential areas.
- Adoption of principles enunciated in crime prevention through environmental design would go a long way in ensuring safety in public spaces without the intrusive adop-

tion of CCTV cameras and active policing (44, 46, 47, 94). This includes better lighting systems, existence of shops/restaurants/businesses along arterial roads and arrangements for spaces for street vendors. These arrangements will also make streets much safer for women, children and the elderly.

- Easy availability of government provided public transport will only be possible if we move away from a singular focus on introducing metro systems in all our cities. It is absolutely necessary that we refocus on evolution of policies that would make it possible to introduce efficient bus services in cities that are subsidised by local revenue generation. It is possible to operate a bus based public transport system without incurring losses at present levels if the systems are exempt from all taxes (20% of expenses). We estimate that if we wanted to raise 20%-30% resources from sources other than the fare box (pollution tax, employment tax, and so on), we would need about 50% of the families in a city to pay about Rs 1,200-2,400 per family annually. This would be less than 1% of annual income for this group of families (122). It is quite clear that the amounts needed are reasonable and within the realm of possibility. Therefore, it is quite possible to run low-floor and semi-low floor air-conditioned buses amortised over 15 years in all cities of India.
- The important role of IPTs is not likely to diminish in the near future. In small and medium sized cities it is not possible to provide high frequency public transport options with buses. In all these locations, efficient public transport systems with reasonable frequency can only be designed with low capacity and low-cost vehicles. It is absolutely necessary that we establish task forces to come up with new ideas and policies that make it possible for IPT services to operate more efficiently (including safety and pollution issues), sensibly and with greater dignity for their operators.
- Subsidised public transport systems cannot be made cheap enough for them to be af-

fordable by the low-income groups in India. The only choice they have is to walk and cycle to work. This is only possible if they can and are allowed to live all over our cities and not displaced to the periphery.

Transport related social exclusion affecting women and minorities is a result of adverse social, political and economic trends in our society and cannot be resolved by technical fixes. This is actually true for many of our other concerns also. We have to decide what kind of a city and society we want. The rest might fall into place – with a little bit of luck.

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