CHAOTIC INDIA DOES HAVE AN URBAN EDGE

Indian cities are in an enviable position of having the potential to evolve into the most sustainable habitats in the world. ***DINESH MOHAN***

"I regard the growth of cities as an evil thing, unfortunate for mankind and the world, unfortunate for England and certainly unfortunate for India...It is only when cities realize the duty of making an adequate return to the villages for the strength and sustenance which they derive from them, instead of selfishly exploiting them, that a healthy and moral relationship between the two will spring up."

MK Gandhi

"The unprecedented urban growth taking place in developing countries reflects the hopes and aspirations of millions of new urbanites. Cities have enormous potential for improving people's lives but inadequate urban management often based on inaccurate perceptions and information, can turn opportunity into disaster."

State of World Population 2007, UNFPA

Here we have two views about cities, almost reconcilable. The first by a humane visionary and the second a consensus view of some professionals in the early 21st century including me. It is difficult to say who will be right in the 'long run' especially in the light of the assertions of the Intergovernmental Panel on Climate Change (IPCC) and their predictions about global warming. But cities are here to stay and I guess Gandhi's concern will have to be taken seriously if IPCC's assessment is correct.

I believe that Indian cities are in an enviable position of having the potential to evolve into the most sustainable habitats in the world if we change our mindset and start looking at their positive attributes along with their shortcomings. A 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 and for the poor to live interspersed with the rich (though 'illegally') –a development in line with the prescriptions of modern urban planners.

Our cities have grown somewhat organically due to the pressure of people's needs in spite of the short-term vision of bureaucrats and businessmen. The result is most people tend to live close to their places of work except the rich, and those poor families evicted by the whims of city planners and the land mafia. Data from all cities indicate that a majority of trips are less than five to six kilometres in length even in large cities. A sprawling Delhi is not like Los Angeles in the USA. In Los Angeles everyone goes long distances from everywhere to everywhere. Delhi, on the other hand, functions as a conglomeration of several 'cities' within a city. Most people work, live and socialise within their 'city'. This is an ideal situation to work towards a very sustainable future by embracing policies that do not force people to travel long distances.

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 all leisure activity revolved within short distances around their homes. In the past two decades, vehicle ownership has increased substantially. Delhi has by far the highest ownership levels with 15 to 20 per cent of families owning a car and about 30 per cent 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 cities. Car ownership in all other cities of India is less than half of that in Delhi.

Car use as a proportion of all trips is so low in India that only very innovative thinking and practices might reduce its growth. In Mumbai and Delhi, recent estimates suggest that car trips constitute less than 10 per cent of all trips. European and American cities have car use in excess of 30 per cent. The share of public transport in Mumbai and Delhi is certainly higher than most cities in Europe or America. Therefore, it is difficult to imagine how car and motorcycle use can be contained as we get richer, if the international experience is anything to go by. Obviously, business as usual and copy-cat emulation of rich cities is not going to help.

Our cities have grown somewhat organically due to the pressure of people's needs in spite of the short term vision of bureaucrats and businessmen.

The high ownership of motorcycles, non-availability of funds to build expensive grade separated metro systems and official plans encouraging multi-nodal business activity in a city has resulted in the absence of dense, high population central business districts. Our cities have developed urban forms which encourage 'sprawl' in the form of relatively dense cities within cities.

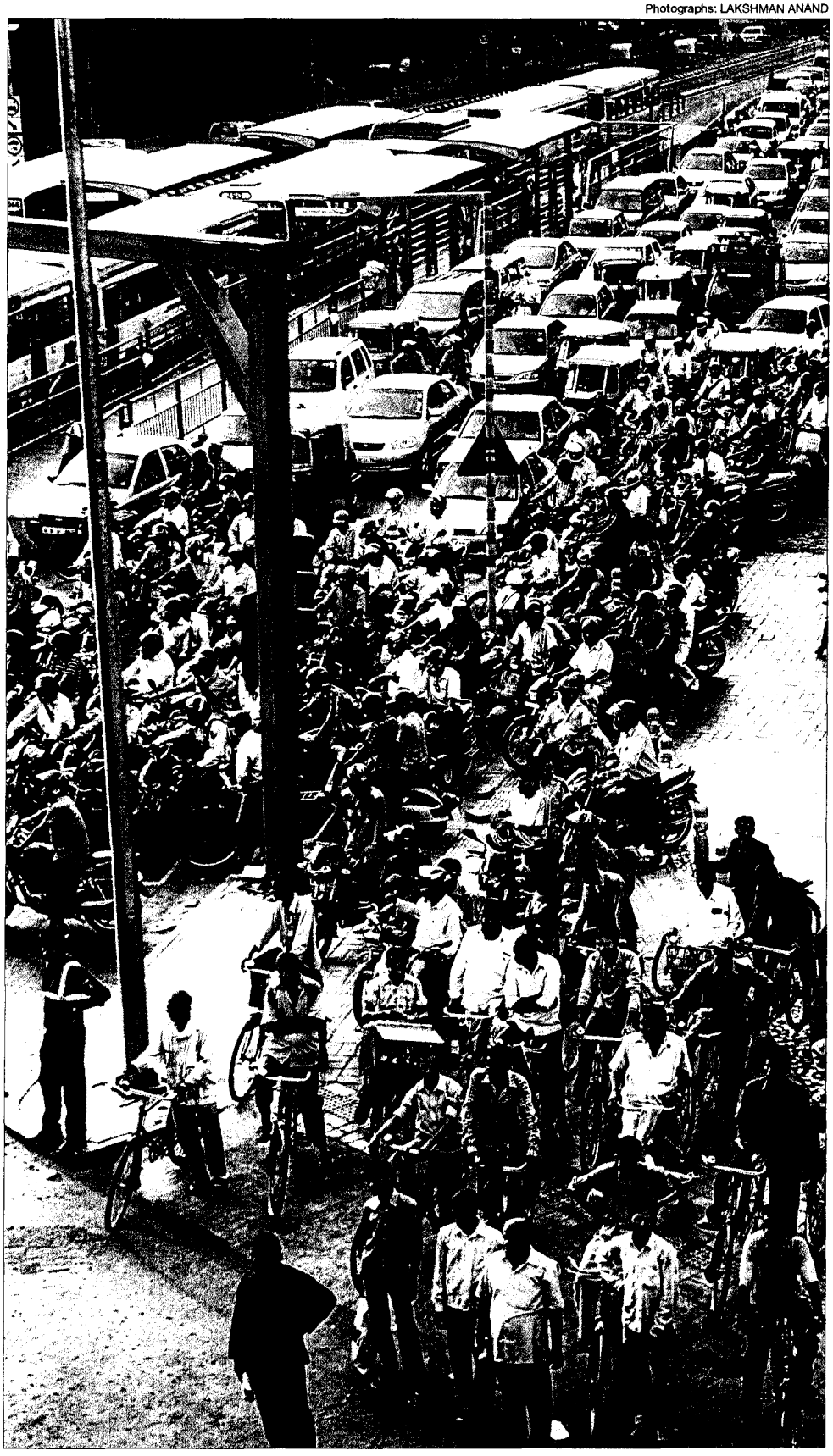
Except for Mumbai and Kolkata no other city in India has a central business district of any consequence. The central old part of the city is really not that important in Delhi, Bangalore, Ahmedabad, Pune or Hyderabad. All large Indian cities are growing around the periphery and will not have dense centres in future either. So, our public transport policies would have to be different from the 19th century European cities which developed very important central business districts and required people to come to the centre. European cities were cities of empires and colonisers where magnificent buildings, theatres, opera houses and parks could be built with income from the periphery. We can't indulge in this luxury as the only periphery we have are our villages!

The magnificence of the central European city evoked a great deal of pride among its citizens and they ensured it's pre-eminence to the current times. There is no such social pressure on Indian cities and most upper class citizens have already abandoned the centre city. This is one of the factors that do not favour very high capacity radial transit systems bringing people to the centre.

In Europe before 1970, most middle class families did not own air-conditioned cars with stereo systems. The cars were noisy and occupants were exposed to traffic fumes as windows had to be kept open. Under such conditions, the train was much more comfortable. This created a situation in which there would be a political demand for metro systems that came from the middle class and could not be ignored.

In Indian cities, on the other hand, low ownership of cars along with high motorcycle use provides the preconditions for public transport that is comfortable, easy to access and affordable. Buses which have proved to be the environmentally preferred choice in cities all over the world meet these requirements.

Photographs: LAKSHMAN ANAND



A stretch of the BRT in Delhi. Indians use a wide variety of private-public transport.

Middle class Indians have become accustomed to air-conditioned cars equipped with stereo for as little as Rs 2.5 lakhs and used ones for even less. They know comfort levels that Europeans had not experienced till late 20th century.

If public transport has to be made more appealing, it has to come closer to home, reduce walking distances and be very predictable. These conditions would favour high density networks, lower capacity, surface transport systems (to reduce walking distances) with predictable arrival and departure times aided by computers and modern information systems.

Wide ownership of motorcycles has never been experienced by Western cities. This is a new phenomenon, especially in Asia. The efficiency of motorcycles – ease of parking, high manoeuvrability, ease of overtaking in congested traffic, same speeds as cars and low operating costs – make them very popular in spite of motorcycle travel being very hazardous.

Availability of motorcycles has further reduced the middle class demand for public transport. But simultaneously it has pegged fare levels that can be charged by public transport operators. Public transport cannot attract road users who can afford motorcycles unless the fare is less than the marginal cost of using a motorcycle. At current prices this works out to less than one rupee per kilometre. The only option is to design very cost efficient public transport systems that come close to matching this price.

US AND THEM

Indian cities in the 21st century are growing under very different conditions from European and American cities in the first half of the 20th century. Politics, ideology and changes in technology will make it difficult to provide efficient transport systems in the old manner. It will also be very difficult to move away from multi-nodal city structures with future job opportunities developing on the periphery.

Higher education and trade obviously have a reasonable amount to do with the size of cities and form of urbanisation. The more 'educated' we are, the larger the pool of resources we need both for work and human contact. Therefore, a large city becomes essential for a reasonable section of the population for finding 'optimal' employment and friends. Inversely, trade and industry need a large pool from which to select employees. This forces Indian cities to become larger than Western cities.

One reason is that for each rich person there are a larger number of poor people to serve her as compared to that in the West. So, the same number of professionals in an Indian city will coexist with a much larger number of poorer residents than in rich countries. For the foreseeable future, this will make Indian cities much larger than the 'mature' cities of Europe. The existence of a large number of low-income people pursuing informal trade and income generating activities places different political pressures on the government and increases demand for low-cost mobility and short distance access to jobs and trade.

This is offset by the middle and upper classes wanting to live away from the poor and form gated communities at the periphery of the city. These developments set up a powerful political demand, aided and abetted by contractors and consultants to provide infrastructure. The upper middle class of post colonial nations mainly have the USA as a model for the good life. All Asian, African, and South American cities are more influenced by the USA than any other society. For example, American town planners were sitting in Delhi helping us plan our cities in the 1950s. So, all these cities have tried hard zoning and broad avenues and highways running through them. If it hasn't happened it is due to our 'inefficiency' and shortage of finances! In the face of all these changes and constraints, the Indian upper class and policy makers still seem to think that flyovers, elevated roads and a few lines of a metro will solve all our problems.

Indian cities at present have a very high proportion of people walking, bicycling and using public transport. If we include those who use company provided buses and vans and others who travel by tempos, Vikrams, autos, rickshaws and other modes of private 'public' transport, then the share of public transport would be higher in all Indian cities than almost all of European or American cities. This is an ideal situation to plan for a sustainable future. The problem is that most Indian citizens adopt these modes out of economic compulsion and not out of choice because it is not a pleasant or safe experience doing so. The challenge before us is to understand the needs and desires of the Indian city dweller, the options available, and then chart a new path for our future.

Auto rickshaws are an efficient form of public transport within the city

HOW WE TRAVEL

What modes of travel people use in cities is decided by a balance of economic compulsions, comfort and safety. Studies of travel behaviour around the world suggest that people don't necessarily minimise time spent on trips. Most seem to have a personal travel time budget preference and utilise it fully except when circumstances don't permit them to do so. If provided faster modes of travel they live further away from work! Public transit is used mainly by those who don't have a vehicle for personal use or when car use is very inconvenient, time wasting, impossible (no parking at destination) or very unsafe.

At the very least public transport should not take more time than car travel. This means that buses on main routes cannot be mixed with car traffic as that will always make them slower than cars.

Door-to-door trip time by public transit is always more than that by car if there is no congestion. It is therefore not surprising that it is so difficult to move people from cars to public transit. It is even more surprising that all public transit projects justify the expense by claiming reductions in congestion. If you reduce congestion and make traffic smooth, there is absolutely no reason why a car driver would leave an air-conditioned space to spend more time travelling!

For short trips up to three kilometres, door-to-door time walking is about the same as by metro and up to six kilometres a bicycle trip compares favourably with a metro trip. You are better off travelling by BRT than a metro for trips up to 12 kilometres. This is because any transit system operating underground or on elevated corridors requires you to climb or go down stairs/escalators and walk around inside the station. This extra time is about three to five minutes in such systems around the world including the Delhi Metro. In one round trip there are four such events and so the time lost in underground or elevated systems of any kind amounts to 12 to 20 minutes. This is one reason why many transit experts now favour surface transit to elevated systems.

This analysis shows that even one change in a transit system makes it much more difficult to save time compared to a car trip even with congestion except over a very long trip. This is why feeder buses (that add significantly to trip time) to metro systems do not generally add too many customers except when people have no choices. Additionally, a significant number of people can't handle stairs and escalators – small children, the disabled, people with arthritis, high blood pressure, or carrying packages. This is why in European cities one sees more elderly persons in buses than in metros. The simple conclusions are that public transport should be faster than car travel, come as close to origins and destinations and avoid going underground or over. This can only happen if every single major road in a city provides efficient and safe surface transit.

Access to bus or metro stations has an important bearing on whether people opt to use it or not. European and American studies show that transit use starts dropping sharply if the distance from home to the station is more than 400 to 500 metres. At average walking speeds of about 80 m per minute this amounts to access time of about five to seven minutes. These studies have been done in temperate and cold climates and no such estimates are available from hot regions.

It is possible to walk when very cold by donning warm clothes and boots, but no respite is available when temperatures are in the high 30s and 40s. So, tolerance levels for people with choices in India are likely to be the same or lower, making it very important that walking distances are small and transit trips do not require many changes or long waiting times. To keep these walking distances manageable it becomes necessary that all arterial roads are not more than 800 to 1,000 metres apart, requiring all colonies and communities to be small. If a community has to be large in size, then a public transport corridor must be allowed to go through it.

Safety on access trips also emerges as an important issue, especially for women and children. Unless the walking trip is safe from accidents, harassment and crime, people avoid using public transport. No urban rail project or bus transport authority in any city has made a special effort to ensure provision of safe walking and bicycling facilities in the vicinity of every station. Unless

there are wide pavements with a tree line, dedicated bicycle facilities and safe road crossing facilities on the surface on every arterial road, we are unlikely to attract more transit users easily.

In addition, safety from crime and harassment is a major concern for parents, children and women. 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'. 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 pavement, abundance of kiosks and cafes and a vibrant walking atmosphere. She was quite clear it could not be done by policing alone.

In India we are again 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 become an essential part of our transportation planning process. It is not very difficult to plan for them as every road needs a tree line which occupies a corridor of 1 to 1.5 metres of space on the pedestrian path. Vendors only need 1 to 1.5 metres and they can occupy spaces between trees without bothering pedestrian traffic.

People cannot depend on public transport unless such facilities are available on low density routes also and they cannot depend on transit alone to satisfy all their needs unless point-to-point transport is available for special occasions. Low density routes cannot be served if the profit motive is the only criterion for establishing a bus service. Well-integrated plans with some elements of cross subsidy have to be put in place so that bus services operate both on high and low density routes.

Such transit services must be complemented by a well-organised and affordable taxi service otherwise public transit becomes less attractive. Again, we are very lucky to have three-wheeler scooter rickshaws (TSRs) that make affordable taxis possible. A vehicle the size of a TSR with low engine capacity is an ideal urban taxi. We only need to make it a bit more comfortable and run it on efficient engines.

Children living on wide noisy roads tend to do less well in school than those who live in quieter neighbourhoods all else being equal.

With an efficient small engine a TSR pollutes much less than a car, takes less parking space, occupies half the road space while running and causes much less damage to the road because of its low height. Since it cannot go above 50 km/h it keeps within legal speed limits and has a very low accident rate. We also need more comfortable taxis that would appeal to car owners if they were available on demand and costs brought down by efficient management. All these taxis could be managed by computer optimising routines to minimise kilometres per passenger trip and maximise occupancy. In such a system all trips would be logged on the computer and so become safe for all users.

BIG ROADS AND HEALTH

Enough has been written on the deleterious effects of vehicle emissions on the health of urban citizens. Action has been taken on these issues through public interest litigation (PIL), regulation and fuel and emission standards. These are important avenues of action as the vehicle fleet is bound to grow for some time to come. It is also important that the most stringent standards must be placed on new models since those vehicles will be around for 15 to 20 years. To ensure cleaner air quality we will have to place much more emphasis on changes, modal shares of travel than we have up to now.

A small shift from cars and motorcycles to walking and cycling has a much greater impact than change in engine quality because you go from a polluting mode to a zero polluting mode. A *thelawalla* (vendor) coming to your home to sell vegetables does more to prevent global warming then an individual driving a less polluting car to a supermarket. Some of these issues have to be understood in greater detail by all city residents to allow healthier policies to be put in place.

For example, very few people know that children living on wide noisy roads tend to do less well in school than those who live in quieter neighbourhoods all else being equal. In addition, children living on wide busy roads tend to have much fewer friends than those living on streets with less traffic. The effect on the elderly is similar. Senior citizens are reported to live lonelier lives on wide, busy and noisy streets and suffer greater health problems with high blood pressure, etc. This is partly because they cannot cross the street easily and lose half the population for socialisation, shopping and other human needs. This is why we should avoid any main road from being more than 45 metres wide, of which not more than 25 metres should be available for motorised traffic and the rest devoted to bicycle and pedestrian paths and the tree line. This is because pedestrians cannot walk more than 25 metres in one pedestrian phase of the traffic signal cycle. Cities with wider roads, in general, have a high pedestrian fatality rate.

Elimination of wide and elevated transportation corridors reduces noise and pollution and make a city more liveable. Statistical data from many cities show that rental prices for residential accommodation have a distinct relationship with noise levels. Noisier streets have lower rentals than noisier ones.

This why many residents who live in prestigious plots in cities shift out when the road in front of their homes is widened. Their residences end up as commercial establishments, legally or illegally. The evidence is clear. But the question is what to do when traffic volumes increase? The answer is that we have to decide what kind of city do we want? If we want liveable, quieter and healthier cities then we can decide what is the widest road we can tolerate? Having done that, we optimise it for carrying the maximum number of people by giving a safe choice for all modes – walking, cycling, cars/two-wheelers and BRT. After that if it starts getting crowded, we don't widen it and thereby invite more people in, but wait for market forces to operate and depend on less people opting to come there eventually.

Finally, what does sustainable transport mean for us? At a fundamental level it requires less energy consumption. The choices available are: low emission vehicles, alternative fuels, fewer trips, shorter trips, more use of public transport instead of private vehicles and maximising the number of walking and bicycle trips. Obviously, all options will have to be pursued for maximum gain. But we will have to establish priorities in our political agenda as the shift is not going to be easy or painless, socially and technologically.

Our cities are ready for sustainable transport systems. Many of these options are present 'illegally' already. We have to recognise them as solutions and not problems. Unless we rethink our plans for flyovers, wider roads, gated communities, 'slum' removal, and elevated transport corridors, our cities will turn out to be 'warmer' than we can tolerate.

Dinesh Mohan is Volvo Chair Professor and Coordinator Transport Research and Injury Prevention Programme at IIT Delhi