

Re-Engineering Urban Transportation: A Review with reference to Social Mobility in India

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Abstract

Social mobility's deteriorating state in developing nations is an important policy issue. The scenario is anticipated to get worse due to the growing motorization trend. A multifaceted issue is particularly evident in the downward trend of the modal share of public transport in cities of developing nations. Although global trends and policy experiences can provide useful insights for decision-makers, the complex dynamics of the Urban transport system frequently defy logical policy alternatives. India is experiencing rapid Urbanization along with the growth of vehicles. Traffic congestion is getting worse due to the increasing disparity between demand and supply for Urban transport, which has become a significant barrier to social mobility. When it comes to social mobility, public transport has become of utmost importance. Several initiatives to improve the public transport system have been launched in India in recent years. The paper describes the role of Urban transportation in Indian cities as the part of social mobility. It covers the recent trends and problems in the transport systems in India; the policy practices are also introduced.

Keywords: Social mobility, Urban Transportation, Policy Stimulation, Urbanization, Motorisation

1.1 Introduction

India supports sustainable modes of transport through fostering sustainable Urban development. Only a few Indian cities have mass transit systems like metro rail, sub-Urban rail, light rail system, etc. As a result, public travel on buses is crucial and, in many places, the only option. Additionally, India, a developing country, has seen an increase in the female literacy rate over time, which has led to an increase in the female work force participation rate. India has a sizable and diverse transport industry that meets the demands of 1.1 billion people. The sector's GDP contribution to the country in 2012–2013 was 5.2%, with a large portion of it coming from road transport. For economic growth to occur, both Urban and rural areas must have good physical connectivity. Demand for transport services and infrastructure has increased since the early 1990s by India's expanding economy. India needs effective and dependable Urban transport networks to maintain its rapid economic expansion. The significance of Urban transport in India stems from the role that it plays in reduction of poverty, by improving access to labour markets and thus increasing incomes in poorer communities (Antonio Estache, 2007). Industries like services and manufacturing, which are concentrated in and around big cities, need effective and dependable Urban transport systems to transfer workers and link manufacturing sites to the supply chain.

Mobility flows have become a key dynamic in the rapid Urbanisation process of Indian cities with Urban transport infrastructure constituting the skeleton of the Urban form (Amin et al., 2013). Despite the rising rates of social mobility in Indian cities, it is getting more and more inconvenient, expensive, and time-consuming to access locations, activities, and services. In fact, present levels of social mobility are already generating a crisis situation characterized by high levels of congestion, environmental pollution, traffic fatalities and inequity eventually leading to a situation of undesired accessibility crisis (Pucher et al., 2005). With over a quarter of India's Urban population below the poverty line, the mobility problems of the poor are of special concern (C Rangarajan et al., 2014). The

unaffordability of private transport or the lack of public transit options forces this segment of the Urban population to walk or cycle increasingly long distances, and, consequently, suffer severe pollution. As Indian cities continue to spread outward, those residents too poor to afford motorised transport will be increasingly put at a disadvantage, and further cut off from employment, recreational, educational, medical and other activity sites they need to access in the city.

1. Trends influencing social mobility

a. Rapid Urbanization

Social mobility is a stumbling challenge faced by cities as the present mobility systems are on the verge of collapse. Congestion and the associated slow social mobility can have a persisting impact on the quality of life and the economy. Urbanization triggers larger cities and increased rates of motorization. These two features subsequently lead to a complete gridlock and congestion. The world's population is progressively becoming city-based. By 2030, 60% of the world's population will live in cities in emerging markets with over 2 billion people entering the middle class. 64% of all transportation today is within Urban environment and the total amount of Urban distances travelled is expected to triple by 2050. According to 2011 census, 31.2% of India's population (377 million) is living in Urban areas. However, this Urban population contributes to about 2/3 of the economic output. As the UN estimates, this numbers will grow to 40% (590 million) by 2030 and 58% (875 million) by 2050. It is noted that in 1951, there were only five Indian cities with a population greater than one million and 42 cities with a population greater than 0.1 million, much of India effectively lived in villages. In 2011, there were 468 cities with population above 0.1 million and 53 cities with population greater than 1 million.

According to 2011 census data, there are three cities with population of above 10 million and another 53 cities with a population greater than 1 million (Revi et al., 2012). The top 10 Indian cities with 8 per cent of the total Indian population are estimated to contribute 15 per cent to the country's GDP output while the remaining 53 cities with a million-plus population contribute 31 per cent of the Indian GDP (Revi et al., 2012). About 377 million people now live in 8,000 cities and towns in India constituting almost 38 per cent of the Indian population and together contribute more than 50 per cent to the country's GDP. By 2031, the Urban population is expected to increase to almost 600 million, or nearly 40% of the Indian population, as a result of this demographic shift from rural to Urban areas. Cities and towns are anticipated to take a greater leadership role in driving the nation's economic growth during the next few decades.

b. Rapid motorisation

Rapid Urbanization and growing economic prosperity have brought about a higher rate of motorization in developing countries. However, the level of physical facilities and institutional capacity is not rising adequately enough to manage the pace of motorization. Motorization, Urban sprawling, and declining modal share of public transport constitute a vicious cycle and, as a result, mobility and accessibility are declining rapidly particularly in big cities of the developing world (Gakenheimer 1999). Experience in cities of both developed and developing countries demonstrates that public policy can significantly influence resulting pattern of Urban transport systems as is visible in the contrasting patterns of private automobile domination in most US cities and public transport led multi-modal system in some European and Japanese cities.

Since 2001, the number of vehicles per 1,000 people in Indian metropolitan cities have grown significantly. The total registered vehicles in the country grew at a CAGR (Compounded Annual Growth Rate) of 9.8 per cent between 1991 and 2009. Personalised private vehicles like cars and two-wheelers grew at CAGR of 9.6 per cent and 10.3 per cent per annum. The growth of registered vehicles in cities with population more than a million is significantly higher

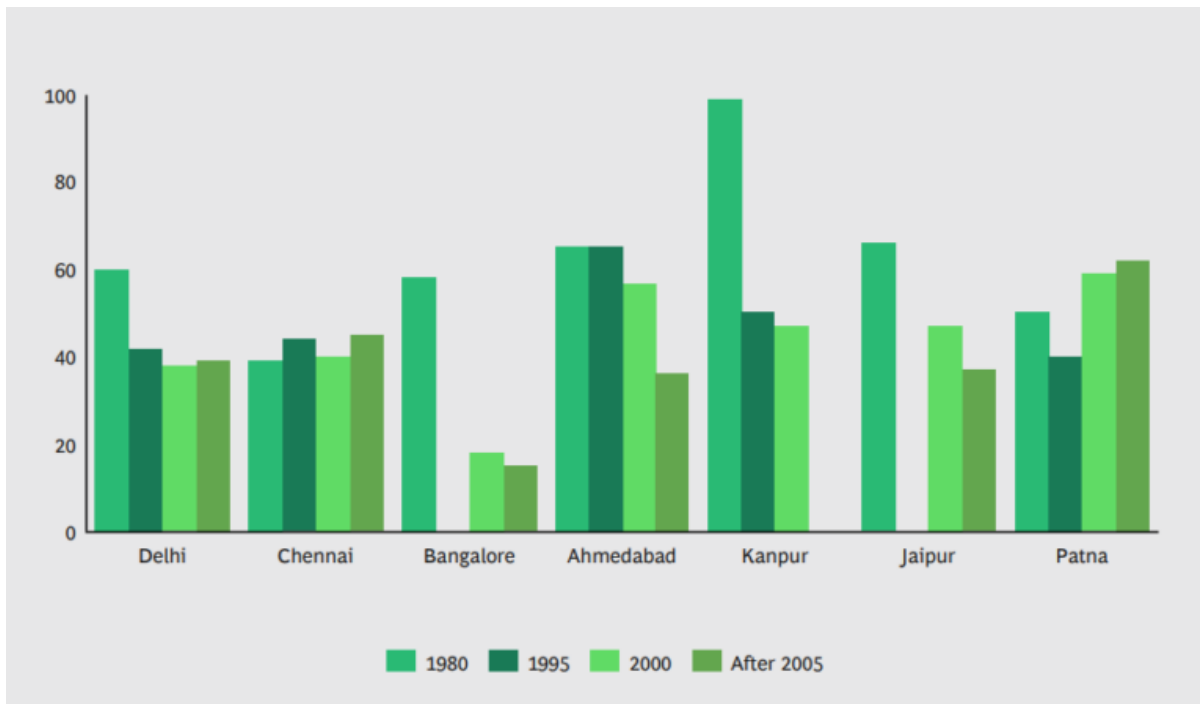
than the rest of India. Meanwhile, vehicle registrations in metro cities grew at almost double the rates than that of million-plus cities. In 2011, 22 cities posted a CAGR of 8.7 per cent in the total number of vehicle registrations or a share of nearly 28 per cent (39.7 million) of the total vehicles in the country (141.8 million) (Sarma et al., 2011). Five metro cities have vehicle registration rates in excess of 500 per 1,000 people and account for 54 per cent of the total vehicles in the metropolitan cities as of 2011 (Sarma et al., 2011). Delhi had the highest vehicle population with almost 6.3 million vehicles. In 2011, with nearly 17 million vehicles, the four big cities Delhi, Bengaluru, Chennai and Hyderabad alone constituted 12.3 per cent of the total number vehicles in the country. Delhi, which has around 1.4 per cent of the Indian population, accounts for nearly 5 per cent of all motor vehicles. According to the statistics provided by the MORTH (Ministry of Road Transport and Highways), the annual growth rate of motor vehicle population in India has been around 10 per cent during the last decade (Mohan, 2014b). Two-wheelers are a dominant form of private transport on Indian roads constituting about 71.8 per cent of the 141.8 million registered vehicles in 2011. Two-wheelers are unsafe, environmentally damaging and unsustainable because providing adequate infrastructure for the rising numbers of two-wheelers is impossible. Many experts feel that the present motorisation levels are relatively sustainable, but the high motorisation trend is certainly unsustainable and, therefore, the thrust on better balancing demand across the different transport modes is critical (Ahluwalia, 2011).

c. Dwindling share of Non-Motorised Transportation

Transportation facilities and activities have significant effects on our ecosystem. The concept of clean transportation is vital to ensure a safe environment and good quality of life on earth. Non-motorised transport (NMT) is one of the main elements of clean Urban transport. NMT includes travel forms that do not rely on engines. Trips which are shorter in commute are easy to cover by non-motorised modes. These are also the highest trips in the travelling share in cities. On the one hand, private vehicles are growing globally due to their perks of safety, reliability and comfort. In comparison, cycling and walking are more active, healthy and Urban ways to commute. As cities grown, the share of NMT reduces drastically creating increased reliance on private modes of transport. Urban design that fosters walking and cycling is under threat as sprawl based Urban design is becoming the norm in big cities. The plans for new extensions and townships are still based on low-density, segregated land use with wide roads. Smaller cities have a higher threat of losing walking and cycling share to private motorised transport in the coming decades. These cities have neither invested in infrastructure for NMT nor have a formal public transport alternative to prevent shift to personal transport modes. Sidewalks and cycle tracks are the most neglected in infrastructure planning.

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In India, cities are compact and yet witnessing substantial demand for mobility. Indian cities are expected to exceed 800 million inhabitants by 2050. Also, motorisation rates are increasing, putting strain on limited available resources of the cities. The resultant is polluted cities and congestion. In the early 80s, the share of NMT in the country ranged from 40-60%, as per one report by NITI Aayog. However, the trend has been declining in recent years. This decline stems from a lack of dedicated infrastructure with poor upkeep and maintenance. Further, the NMT usage is low due to inadequate safety measures – cyclists and pedestrians have the highest share of fatalities per MoRTH.



Source: NITI Aayog report on Transforming India's Mobility 2018.

The Karnataka Government in Bengaluru city, in a pilot project, started with Self Service Bicycle Repair Kiosk. The city departments are at the forefront to develop and popularise active travel in the city. The government is considering publishing an Active Mobility Bill to protect the rights of cyclists and pedestrians. The bill aims to promote public spaces and streets with active travel, keeping in mind the needs of all road users.

The circumstances in the current transport system in India require changes in technology, energy, environment and space. As people in India are more transportation disadvantaged, they often rely on walking and cycling to access transit. With increased latent demand for non-motorised travel, people would walk and bicycle more frequently given proper infrastructure and facilities. The inclusion of NMT in Urban areas must be considered as a way to reduce pollution, congestion and health issues for its citizens, making sustainable mobility go beyond Urban inclusion.

2. Urban Transport Problems

a. Road Congestion

Urban transport is becoming a serious challenge as a result of the significant rise in travel demand caused by increasing Urbanisation. The country is also experiencing rapid growth of private vehicle population and these private vehicles are concentrated largely around Urban areas. Most of the Indian cities are not planned as per the planning principles and norms. It is more evident in the case of land allocation for roads that it seems to be generally inadequate. According to the statistics provided by the Ministry of Road Transport & Highways, Government of India, the annual rate of growth of motor vehicle population in India has been around 10% during last decade. The basic problem is not the number of vehicles in the country but their concentration in a few selected cities, particularly in metropolitan cities. The main reason for all these is the prevailing imbalance in modal split besides inadequate transport infrastructure and its sub-optimal use. Public transport systems in cities have not been able to keep pace with the rapid and substantial increases in demand over the past few years. As a result, people have turned towards personalized modes such as mopeds, scooters, motorcycles, and cars and intermediate public transport modes such as auto-rickshaws, tempos, and taxis.

Cities cannot afford to cater only to the private vehicles and there has to be a general recognition that policy should be designed in such a way that reduces the need to travel by personalized modes and boosts public transport particularly bus transport system. Much needs to be done if public transport is to play a significant role in the life of a city. Measures need to be taken to enhance the quality as well as quantity of public transport services and to impose constraints on the use of private vehicles. People should also be encouraged to use non-motorized transport and investments may be made to make it safer. It must not be forgotten that cities are the major contributors to economic growth, and movement in and between cities is crucial for improved quality of life.

b. Parking Problems

The Urban areas face tremendous pressure on the parking spaces which results in parking issues such as traffic congestion, disproportionate demand and supply and the environmental hazards. Also. The rapid economic and population growth in Indian metropolis is staring at a mobility crisis. Due to the poor parking management and policy, India struggles with the chaotic situations like overcrowded footpaths, illegal parking and other criminal activities owing to the improper surveillance. In Delhi, 14 per cent of road lengths used for on-street parking while Surat has almost 60 per cent of its road lengths blocked by on-street parking. On-street parking is perversely incentivized because it is either free or priced lower than off-street parking. Even if cities invest in multi-level car parks in prime areas, the parking rates are not expected to recover the costs (Rye, 2010). In several Indian cities, commercial development of vacant plots has taken place without following systematic planning procedures for access and mixed use. This induces heavy traffic leading to localized congestion and parking issues in the neighbourhood. Unless parking issues are addressed through a systematic planning process and strict enforcement, such issues will only aggravate over time in Indian cities.

c. Air Pollution

Pollution is a contamination that directly affects human and planetary health, along with altering natural ecosystems. Most cities world-wide suffer from serious air-quality problems, which have received increasing attention in the past decade. A major probable reason for the air-quality problems is Urban population growth, combined with change in land use due to increasing Urban areas. The severity of air pollution in Indian cities is judged based on CPCB's (Central Pollution Control Board) air quality classification. According to available air quality data (Kamyotra et al., 2012), of 180 Indian cities, there is a wide variation in the pollution concentration and severity across cities. Cities are considered critically polluted if the levels of criteria pollutants (namely PM₁₀ and NO₂) are more than 1.5 times the standard. The results show that half of the residential areas in cities monitored by CPCB are at critical levels of air pollution.

Air pollution in Indian cities is the fifth leading cause of death in India. Annually, about 620,000 premature deaths occur due to air pollution in Indian cities (Roychowdhury, 2013). Premature deaths due to air pollution occur as a consequence of cardio-vascular ailments. Over a decade, air quality management attempts have met with mixed responses. Metro cities that have initiated pollution control action have witnessed either stabilization or dip in the pollution levels, however, in other cities, the situation has been observed to be getting worse. Toxic air and its effects on health are seriously compromising the 'livability' of Indian cities.

According to the Environment Pollution Control Authority (EPCA) report for the years 2002 to 2012, there were 97% more vehicles on the road, which significantly increased pollution and put nearly 55% of Delhi's 17 million residents who live less than 500 metres from any roadside at risk for direct exposure to toxic fumes from vehicles. Public transportation was harmed and the clean fuel programme was hampered by the sharp drop in the price disparity between CNG and diesel to just 7% in December 2013 from 46% in 2002-2003 (CSE, 2014). The EPCA report was

handed to the Supreme Court in February 2014; it took cognizance of it and instructed the city authorities to respond to the priority actions listed in the report to quicken second-generation reforms.

d. Deteriorating Road Safety

According to the 2008 National Urban Transport Policy (NUTP), non-motorized modes including walking and cycling currently share the same right-of-way with automobiles and two-wheelers in the majority of Indian cities, creating hazardous conditions for everyone. In addition, as motorization grows and the proportion of slow-moving cars in the traffic stream rises, the number of deaths also rises. The demands of the most vulnerable road users, particularly cyclists and pedestrians, are not being satisfied, despite improvements in the protection of those who travel in automobiles.

1.3 Policy response to address Urban transportation

In terms of Urban transit, the central government's influence is still limited. Since a majority of the population still lived in rural areas up until the mid-1990s, investment and transport policy were primarily directed at improving connectivity between rural and Urban areas of India. Most of the cities have the capacity to formulate and implement at local levels. However, they lack the proper incentives to choose strategically in the long-term best interests of cities and the people who live in them. Additionally, there are no safeguards to guarantee that a sound strategic plan is put into action. Additionally, there are no safeguards that would guarantee the successful execution of a sound strategic plan. At the local level, where planning and policy are implemented, central monitoring and supervision are constrained. The delayed transfer of authority and funding from states to local governments is evidence of the institutional gap this situation has generated. The political constituencies of state and local institutions being different, the continued dominance of state produces transport policies that are not aligned with local interests. The major plans, policies, and programmes launched by the federal government to solve Urban transport issues in Indian cities are highlighted in the following subsections.

a) National Urban Transport Policy (NUTP)

The central government, under the Ministry of Urban Development (MOUD), issued the National Urban Transport Policy in 2006 with specific policy objectives of achieving safe, affordable, quick, comfortable, reliable and sustainable access to jobs, education, shopping and recreation and other such needs to an increasing number of Urban residents within our cities. The policy addressed the issues with air pollution and traffic congestion. The NUTP proposed four strategies to address these problems, with a primary focus on increasing the efficiency of road space by favouring public transport, utilising traffic management tools to improve traffic performance, limiting the growth of private vehicular traffic, and technological advancements in vehicles and fuels to lower vehicle emissions. The NUTP recognized the states as the main facilitators in the process of policy implementation and the central government's role was confined to supporting the states with the necessary financial support and technical expertise. The development of sustainable social mobility has been successfully boosted by participatory measures that include community consultation and increased engagement by all Urban groups, according to international experience.

b) Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

JNNURM has been so far the largest Urban initiative taken by the Government. It aimed to track development in 63 cities and was launched on 3rd January 2005. It was believed that by 2011 Urban areas would contribute to the 65% GDP of the country, but this productivity was subjected to the condition of having potential infrastructure. Urban activities are directly proportional to its infrastructure, including sanitation, roads, telecommunications, solid waste management, and more. Various initiatives were undertaken to make the infrastructure of Urban areas developed and worth producing employment opportunities. The 74th Constitution Amendment act and model municipal law are

examples of the same. Later on, in 2005, JNNURM was launched, which solely focused on developing Urban areas and their development. It focused on providing the Urban Poor with the necessities and opportunities for wageful opportunities.

The JNNURM program attempted to improve the public transport system in larger cities through funding of public transport buses, development of comprehensive city mobility plans and supporting city transport infrastructure projects (Baindur, 2011). As of December 2012, 15,388 buses, at a cost of more than Rs47 billion, in 63 cities had been funded under the program. This has led cities to develop new bus services. Bus rapid transit projects have been initiated in 10 large cities. Some cities have also used central funding to improve traffic management. The JNNURM programme demanded the creation of City Development Plans (CDP) to promote the holistically planned growth of cities. In order to integrate transport and land use planning and to meet infrastructure needs sustainably, the CDP would highlight achievements made at the city level.

Conclusion

For Indian cities to promote sustainable Urban economic development, accessibility and social mobility is essential. In terms of the consolidation of the built form and the growth of the built environment, they are also closely related to Urban stock and flows. Social mobility hasn't helped achieve the desired results, though, because city-level plans and initiatives have consistently supported car-centric policies. In terms of its consequences for operations and policy, social mobility is multifaceted. Therefore, consistency in policy interventions and connections between processes are crucial. It is not possible to increase accessibility by building more highways, railroads, or automobiles, nor can it be done with impromptu spatial interventions like traffic management strategies used in isolation to accomplish delocalization and decongestion.

In conclusion, sustainable mobility is an essential component of Urban development in India that helps to eradicate poverty and promote shared wealth. For Indian cities to benefit from synergies to be maximised, interconnectivity to be encouraged, and functionality to be optimised through multimodal mobility solutions, comprehensive integration of Urban transport and land use planning systems is required.

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