

IMPACT OF GLOBAL INSTITUTIONS ON URBAN TRANSPORT IN PAKISTANI CITIES

By Muhammad Imran[☞] & Nicholas Low^{☞☞}

Introduction

Urban transport is one of the important sectors at present experiencing drastic changes due to globalization. These changes bring various global trends in urban transport to bear on Pakistani cities. However, the relationship between globalization and transport policies is a complex one. It is important to evaluate that how global institutions bring global solutions in urban transport to Pakistani cities. The purpose of this paper is to map out the potential impact of globalization on the planning and implementation of urban transport policies in Pakistan. The aim here is to gain insight into the future planned development of urban transport in Lahore. The discussion first centers on the Urban Transport Master Plan of Lahore prepared with the technical and financial assistance of Japan International Corporation Agency (JICA). Proposals pushed by the master plan are assessed, especially high technology Light Rail Transit (LRT) along with construction of new roads. Lahore is characterized by high densities, intensely mixed land use patterns, short trip distances and a high share of walking and non-motorized transport. In question is whether huge investments in high tech solutions will, in this context, solve Lahore's transport problems.

The paper starts with a general discussion of the concept of globalization and its impact on urban transport in developing countries. Then the City of Lahore is discussed as a case study. The Comprehensive Urban Transport Master Plan of Lahore is analyzed. The current concept of sustainable development is analyzed with the aim of providing sustainable urban transport in Lahore by encouraging non-motorized transport and providing the opportunity to fast growing private vehicle users to change their travel mode. The data presented have been collected through secondary sources as a synthesis of desktop research. The paper concludes that the only solution suitable for Pakistani cities is one that has been locally designed and aims to solve the transport problems of the majority.

Globalization, Urban Transport and Pakistan

One aspect of globalization is the export of technology from the developed to the developing world. This export trade has been going on for much longer than the current round of globalization driven by information technology and footloose capital organized by international finance. Nevertheless, it is unquestionably an accelerating feature of globalization affecting particularly the urban transport policies of developing countries. Although, technology has played an integral role in the development of all modern societies and is sometimes referred to

[☞] Associate Professor, Faculty of Architecture, Building & Planning, University of Melbourne, Victoria 3010, Australia.

Email: npl@unimelb.edu.au

[☞] PhD Candidate, Faculty of Architecture, Building & Planning, University of Melbourne, Victoria 3010, Australia.

Email: i.muhammad@pgrad.unimelb.edu.au

"the engine of economic growth", the challenge for developing countries is to adopt appropriate technology "wisely and humanely". Defining appropriate technology depends on local needs and local social, environmental and economic circumstances, for no single technological solution can be assumed to be "best" for all situations around the world (Roque, 1996, p.178). Globalization trends, however, increase the uniformity of urban transport solutions all over the world. So a taxi driver in Bangkok can proudly comment to a client: "With all of our traffic, we have become modern. We are just like New York" (New York Times, August 19, 1994)

Similar trends are experienced in China, where non-motorized trips can still comprise up to 80 percent of total daily trips, but transport priorities are sadly moving to adopt western trends of motorization (Smith, 1997). The situation is similar in Pakistan, where urban transport policy is neither strong enough to self-finance its development to meet the existing demand, nor do government institutions have the capacity to develop policy for the welfare of the major part of the urban population. Therefore, government has to depend on global development agencies to support urban transport activities in large cities. Although, locally designed solutions for urban transport are the best, every city of Pakistan is under tremendous pressure from global forces to adopt capital-intensive projects that emphasize investment and construction rather than improve operations and maintenance. Recent capital intensive, consumption promoting and relatively private vehicle oriented transport policies are the common response to these pressures. These policies will change the modal split and stimulate growth in mobility thus having a direct impact on the transport system in the near future (Rodenburg *et al.* 2002, p.449). These global influenced infrastructure projects are often designed by the Urban Transport Planning Process (UTPP) (Dimitriou, 1992, p.187) and justified by the principle 'Predict and Provide' (Owens, 1995). Yet they are unsuitable for developing countries because they are neglecting non-motorized and the current need for improved public transport. A central assumption of the UTPP process is that people are willing to spend more to reduce travel time. This assumption is true for some travelers. However, in developing countries, large numbers of people prefer to spend more time on travel and pay less for it because they are already spending close to 25 percent of their income on urban transport (Arif, 2002, p.371, Cohen *et al.*, 1996, p.31).

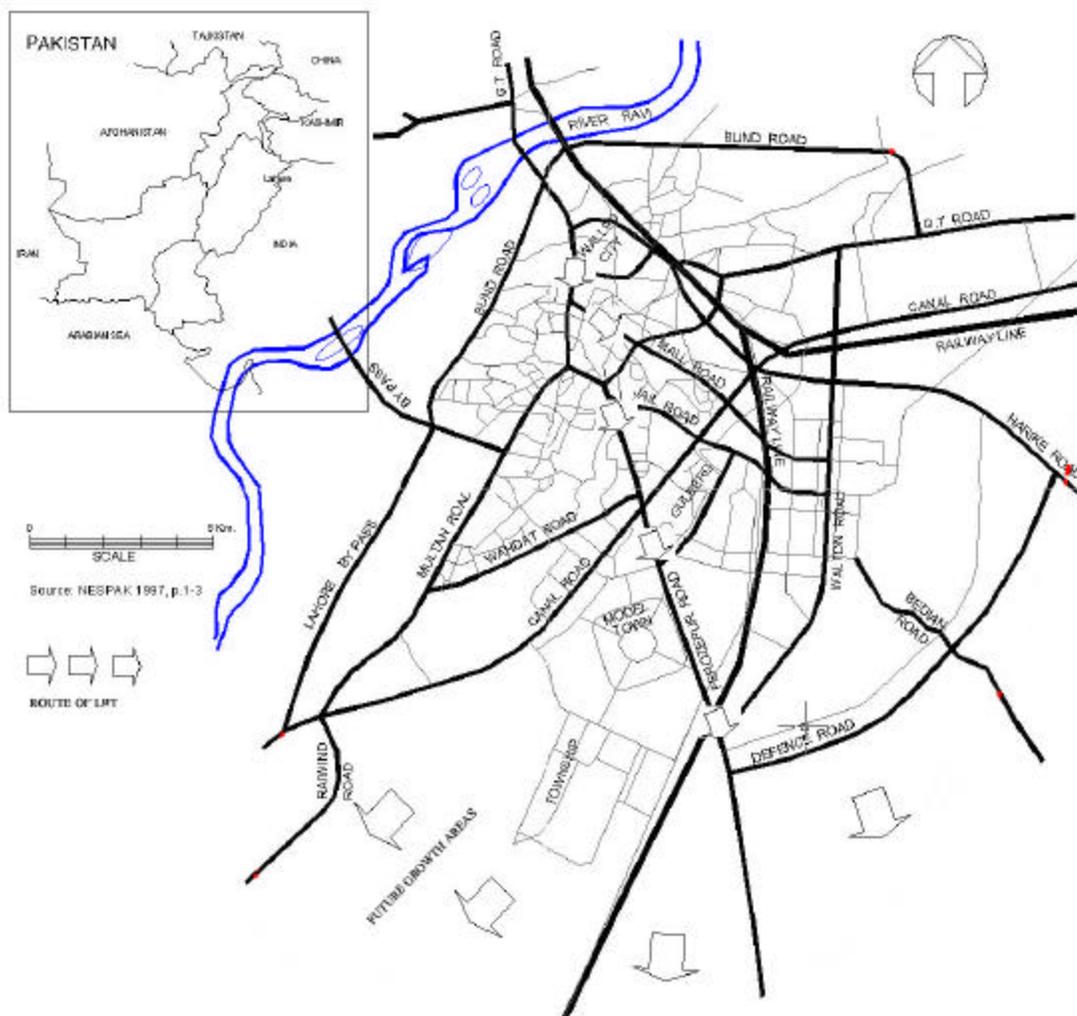
Historically global institutions play an important role in delivering financial and technical assistance in the development sector of Pakistan. Such influence is enhanced by economic globalization. Due to this power, global institutions apply pressure on the formulation of policies in the urban transport sector. In the long run, it is the responsibility of local institutions to provide a suitable transport model for their people; however, due to their lack of capacity, local institutions always look for the advice to the global agencies and their foreign consultants. Due to lack of local knowledge and their own preference, these consultants propose capital-intensive projects, ignoring local conditions and the current economic capacity of the country. Such is the situation in Lahore, whose comprehensive urban transport Master Plan was prepared with the technical assistance of JICA, proposing a huge investment in high technology LRT in parallel to new road construction in the urban fabric. The JICA study claims that it will resolve the urban transport problems of the city, in addition to relieving congestion and improving air quality. However, these claims need to be carefully examined by considering Lahore's particular urban transport issues and challenges.

Urban Transport in Lahore: Issues and Challenges

Lahore, the provincial capital of Punjab Province and the second largest city of Pakistan is located on the left bank of River Ravi (NESPAC 1997, p.1-1). Administrative boundaries of

Lahore Metropolitan Area (LMA) cover an area of 2250 sq. km. having a total population of 5.81 million in 1997 (NESPAK 1997, 2-4). The population is increasing at an annual growth rate of 4.23 percent per annum in the metropolitan area. The average population density of 80 percent people living within 7 km radius of the city is 120 people per acre whereas the density of different areas varies from the Walled City (274 persons per acre) to the outskirts of the modern township that has developed with an urban sprawl of 57 persons per acre (NESPAK 1997, p.6-5). In terms of its economic role, Lahore is the hub of commercial activities in the province of Punjab and significantly contributing to the national economy of Pakistan (JICA 1991, p.1-4).

Map Lahore, LRT and Future Growth Corridors



However, these economic and social activities of the city are under threat due to growing problems of urban transport, which can be characterized by the following points: rapid growth in vehicle ownership, insufficient public transport, deteriorating environment, contradiction between

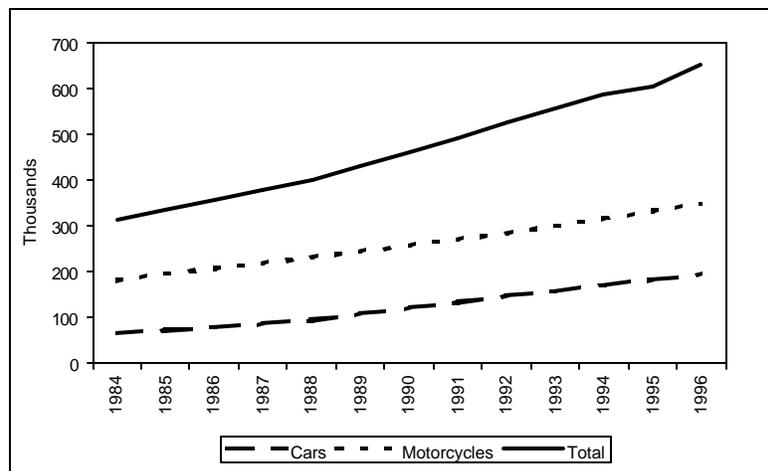
travel behavior and transport policies and institutional weakness. We now consider each of these problems in turn.

Rapid Growth in Private Vehicle Ownership

According to the Lahore Urban Development and Traffic Study (1981) carried out under the Assistance of World Bank/IDA there were only 39,205 licensed and 'on road' vehicles in the Lahore District during the year 1974. This number rose to 74,742 by 1979 and 652,082 1996 with an annual growth rate of motorized vehicles of 6.31 percent. In 1996, the percentage of total registered vehicles in Lahore were as follows: Motorcycles (53%), Motor Cars (29%), Trucks (1%), Delivery Vans (5%), Tractors (3%), Buses (3%), Taxis (2%), Rickshaw (3%) and others (1%) (NESPAK 1997, 6-13).

Figures show that motorcycles and cars constitute 84 percent of the total registered vehicles. Although a higher percentage of motorcycles has been observed during the past 20 years, comparing the figures shows that the actual numbers of cars has increased three times and motorcycles twice. The major reason for these trends is the favorable policies of decision makers on private vehicle and road investment. Road are constructed in outlying urban areas where a small percentage of the people live. But this is at the cost of the remaining 80 percent, the city population forced to live in a degraded environment. This is the really challenge of current urban transportation policies.

Fig.1 Growth of Registered Vehicles in Lahore District (1984-1996)



Source: (NESPAK 1997, p.6-12)

Insufficient Public Transport

Lahore has a limited capacity in the public transport modes offered to the people of the city. Wagons (18-seated small-motorized vehicles) are the main mode of public transport in the city: 2807 instead of the 4105 required (Figure extracted from Lahore Regional Transport Authority data, 2001). There are 270 buses (48 seated) and 892 mini buses (32 seated) plying in limited areas of the city. In the absence of proper regulations from the government, there is no control on the operation timetable, usage, and condition of privately owned vehicles. The ratio of available seat capacity on public transport to population in Lahore is 1:38 as compare to Delhi

1:7, which shows the deficiency in the capacity of public transport in Lahore (Figure extracted from Lahore Regional Transport Authority data, 2001).

A significant improvement has been made to the bus system by introducing the Lahore Transport System (LTS) in 1997. This scheme has introduced CNG (Compressed Natural Gas) and air-conditioned franchised buses operated by multinational and national companies. However, this scheme has not fully succeeded in attracting investment in urban transport sector from global agencies, which are more interested in investing in the Light Rail Project and the Ring Road in Lahore. Moreover, the Lahore transport systems in general and public transport in particular have completely ignored the requirements of women, the poor and the elderly people in urban transport.

Deteriorating Environment

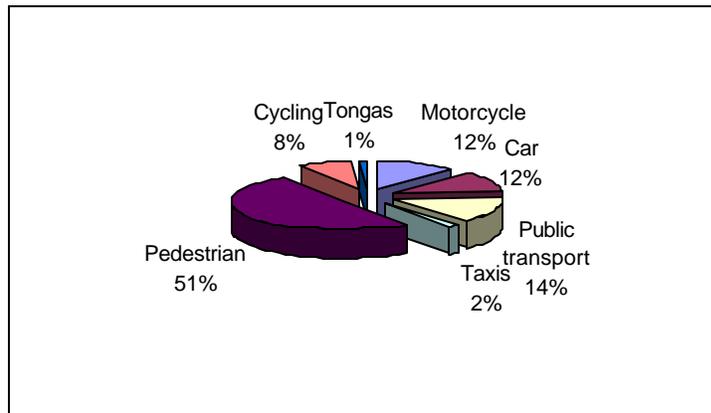
The rapid increase in population, the absence of decent public transport and the high growth rate of private vehicles has created a negative impact on the air quality of Lahore. According to Environment Protection Department (EPD) data, Carbon monoxide (CO) and Suspended Particulates Matter concentration was found to be 10 times higher than World Health Organization (WHO) standards in central parts of the city. Most of the particulate matter can be attributed to the emissions from vehicles, re-suspension of road dust by passing vehicles, idle burning of fuel etc (NESPAK 1997, p.13-17). Motor vehicles account for 90 percent of total emissions of hydrocarbons, aldehydes and carbon monoxide in cities, and for three-fourths of all sulfur dioxide and nitrogen oxides. The suspended particulates in air cause lung irritation, sinus problems, bronchitis and asthma, whereas lead emitted by gasoline vehicles causes liver dysfunction and impairment of mental health. Different studies carried out by Pakistan Medical and Dental Association and Agha Khan Medical Hospital have confirmed the presence of high concentrations of blood lead levels in school children, traffic police and adults. The presence of such high levels of suspended particulate matters and lead in the air is certainly a matter of major health concern for the public. In addition, traffic noise data shows that 89 to 90 decibels is common on important roads exceeding the maximum advisable of 85 decibels (NESPAK, 1997, p.13-22).

Due to continuous improvement and widening of roads, Lahore was recorded a high growth of fatalities (11.4%) and injuries (10 %) during 1990 to 1996 and most of the victims are pedestrians and cyclist (NESPAK 1997, p.6-25). This is an alarming situation, especially discouraging to pedestrian and non-motorized traffic to play a role in the development of city transport.

Contradiction between Travel Behaviour and Transport Priorities

The urban transport needs of a city are cyclic in nature and largely depend on the travel behaviour of the citizens. According to the JICA study in 1992, the population of Lahore generated about 12.4 millions trips, of which non-motorized trips comprised 60 percent of the total. Among these non-motorized trips a large proportion are walking/pedestrian trips (51%) followed by bicycles (8%). In terms of motorized trips, cars and motorcycles contribute 12 percent of each mode followed by 14 percent of public transport (NESPAK 1997, p.6-5).

Fig. 2 Travel Characteristics by Mode



Source: (Extracted from NESPAK 1997 data)

Regardless of the 51 percent of trips made on foot, there is no serious effort towards pedestrian planning in Lahore. Provision of narrow footpaths, which have been either encroached upon or are ill maintained, is considered to be adequate pedestrian planning in Lahore. In the whole city of Lahore, there is no pedestrian crossing phase installed at any of the traffic signalized intersections. One pedestrian crossing underpass and few overhead bridges are provided which are not used due to their mis-location and poor maintenance. So, as a whole, the pedestrian environment is the worst in the city. Pedestrians have to not only bear air and noise pollution but also put their lives in danger, as most of the victims of road accidents are pedestrians.

Institutional Weakness

A secure institutional foundation is required for achieving sustainable urban transport. Despite the greater intensity of the problems in Pakistan, administrative and fiscal arrangements to handle the problems are often inadequate. Pakistan is a good example of overlapping of responsibilities among different levels of government. Urban transport policy is not the responsibility of Federal Government but the Federal level controls these policies by formulating overall development policy, allocation of intergovernmental funding and establishing the legal framework within which lower level authorities and agencies operate. Traditionally federal expenditure on transport infrastructure has in the past overwhelmingly favored roads due to the short-term benefit, it allegedly offers to business. While the federal government provides a large proportion of the funding, provision of transport infrastructure is the responsibility of Provincial government. Provincial authorities have major responsibilities for determining their own priorities for urban transport to achieve city objectives. However, if the money earmarked for the roads is available from federal or global institutions, it is politically difficult for Provincial governments to turn it down. At local level, implementing agencies have the responsibility for performing the tasks attributed to them by Provincial authorities. At present, there are at least seven government organizations that are directly or indirectly responsible for regulating the transport system of the city. Unfortunately, due to lack of coordination and vision among these organizations, urban transport solutions are viewed just in the forms of certain task-oriented projects and programs.

Moreover, foreign borrowing and aid currently finance 80 to 90 percent of development expenditure in Pakistan, and the country's reliance on external flows to finance its development has increased overtime (Husain, 1984, p.105, Burki, 1992, p.129). This gives the opportunity to global agencies to play a significant role in all levels of development activities in Pakistan. Qadeer (1983) has pointed out that in previous years every new development paradigm and every contemporary idea in vogue in the world has been imported under the public aegis in Pakistan in response to international influence. Due to their financial power, they put pressure on the formulation of policies in all sectors, especially urban transport. Therefore, the weakness of financial resources is one of the factors influencing the adoption of strategies not suitable for urban transport in Pakistan.

After discussion of the challenges and issues facing the urban transport sector of Lahore, our paper now turns to the Urban Transport Master Plan of Lahore to analyze how that document has addressed these issues especially for its future proposals.

Comprehensive Study on Transportation System in Lahore

A comprehensive study on Transportation System in Lahore was completed in 1992 with the technical and financial assistance of JICA. The study aims to formulate a Master Plan to solve the urban transportation problems in Lahore Metropolitan Area up to the year 2010. By evaluating the existing situation and future growth of urban transport in Lahore, the study has proposed a huge investment in road construction and the introduction of high technology public transport. Among these proposals, prominent was 200 kms of construction of new roads along with three new bridges on Ravi River and the introduction of Light Rail Transit (LRT) in a 12.5 km section of one of the fast growing corridors (JICA, 1991, p.10-2). These projects are justified by the Urban Transport Planning Process (UTPP) (Dimitriou, 1992, p.187) or Predict and Provide (Owens, 1995) where demand for travel by various modes is extrapolated and then the attempt is made to match the supply of infrastructure to the potential demand. A similar model was used for planning public transport. However, no consideration has been given to accommodating 60 percent of the trips mainly comprised of pedestrian and other non-motorized modes of transport. Although urban rail projects are being considered for various cities in Pakistan like Karachi, Islamabad etc., this is first effort in Lahore to solve urban transport problems through rail based technology. The LRT project is very important to evaluate in Lahore's context because of its potential to affect the other modes of transport.

The Master Plan has set year 2010 as the start of normal commercial operations of the LRT. It was estimated that 231,000 passengers would use LRT every day. However, in our opinion the level of fares will determine the number of travelers on the LRT. Studies have proposed Rs. 5 per trip as the average fare of LRT according to 1990 survey. This is expected to increase to Rs. 30 per trip in 2010. Under current circumstances, it is an unapproachable fare for the urban poor and lower middle class of the city. A central assumption of the UTPP process used to justify the LRT is the willingness of people to spend more to reduce travel time. This assumption is true for some travelers, however, in developing countries, large numbers of the population prefer to spend more on travel time than on travel cost (Arif, 2002, p.371). Badami (2003, p.23) describes the results of surveys in Indian cities which shows that the financial viability of urban rail systems depend critically on large populations with high per capita income to provide the revenue base to sustain them while keeping utilization and fares as high as possible, and staffing and wage levels as low as possible. However, experience from several developing cities suggests that high

fares cannot be charged without losing patronage. In order to attract patronage, the integrated bus and rail fare should ideally not be much higher than the existing bus fare. If it is, the poor will continue to use buses. All of this means that fares in developing cities have to be subsidized. But this would effectively drain resources from other important social sectors to benefit the urban middle class.

In terms of the financial viability of Lahore LRT, it should be noted that the construction cost of the LRT of 12.5 km in length is estimated to be Rs. 5,965 million along with annual operation cost of Rs. 210.7 million (JICA, 1991, p.12-28). However, the environmental cost is simply ignored which will be expected to be high during the construction period by running in a densely populated urban area with grade separation. LRT will achieve savings in traffic accidents and some reduction in air pollution, but the grade separated structure will itself have a major impact on the urban scene of the historic and cultural city of Lahore. Moreover, these figures have been calculated for 1990 when one US\$ was 21.70 Rs. Under current the economic situation, these costs will be expected to increase more than three times (US\$ 1= Rs. 60 approximate). In addition, the further rupee depreciation will increase the cost in future.

UK Overseas Development Administration with the technical support of the World Bank has conducted studies in 21 developing countries for mass transit. The studies indicated that 75 percent of the mass transit system had cost and time overruns, often large, and operating costs were nearly always substantially above expectations, while revenues were below expectations in two thirds of cases. Two thirds of the metros required annual subsidy. Not surprisingly financial performance was very much worse than anticipated. No metro was financially viable in terms of funding its operating, asset replacement and initial capital costs from revenues and providing an acceptable return on capital. Only the Hong Kong MTR (Mass Transit Rail) was close (TEPA, 1993, p.7). However, Hong Kong and Singapore are small and wealthy cities, Pakistani cities are predominately poor, growing without any control and attracting a growth of motor vehicle activity. The gross per capita income of Hong Kong and Singapore, for example, is around US\$ 12,000 (SAR Government, 1999) and US\$ 12,939 respectively (Kenworthy and Laube, 1999a). On the other hand, the per capita income in Lahore is only US\$ 800-1000 (TEPA, 1993, p.76) unsuitable for LRT journey. Lahore's lower per capita income makes it unlikely that the city could support the LRT without massive subsidies which the country cannot afford.

Barter *et al.* (2003) argue strongly in favour of urban rail, because of its potential to transport large numbers of people quickly, reliably, comfortably and safely to attract people from personal motor vehicles. This is true for Hong Kong and Singapore, which despite their wealth have low automobile dependence and high transit usage. While Hong Kong and Singapore have the demonstrated ability to control land use, plan and implement intense mixed development integrated with rail transit, and apply strong economic and traffic restraint measures to curb personal motor vehicle ownership and use, it is unclear how successful Pakistani cities will be in accomplishing these ends. Therefore, the Hong Kong and Singapore situation is not matched by Lahore because of the high-income level and strong institutional capacity of the former cities to run the system. However, we need to learn the lesson of Singapore's successful transit system, which is not properly, describes without reference to its battles in the early 1970s with the World Bank and some American consultants who advised against developing its own urban transport systems according to its local characteristics (Newman and Kenworthy, 2000, p.192)

In Lahore, the priority section along Ferozepur Road up to Model Town has been selected for LRT operation due to its heavy public transport use and the existence of urban development

corridors. However, in Lahore, there are several corridors where the city is growing rapidly. It is doubtful that the introduction of LRT in one corridor will solve the traffic problems and improve environmental sustainability. While ambitious claims have been made on behalf of the Lahore LRT, the ability of such a system to reduce personal motor vehicle activity, congestion and achieve financial viability must be strongly questioned.

The LRT is simply a plan to introduce an alternative form of public transport, assuming that many bus passengers will use LRT in high public transport use corridor. However, given the current air pollution condition of the city, the aim should be transfer car or private vehicle users to public transport. Newman and Kenworthy (2000, p.192) argue that a transit system should be implemented in conjunction with restraints on car ownership along with a commitment to maintaining traditional forms of non-motorized mobility e.g. Tonga (Horse driven-6 seated vehicle in Lahore) that are so effective in dense, mixed land use settings with short travel distance for many trips. Therefore, strong economic controls to curb personal motor vehicle ownership and use by means of high taxes, parking costs and traffic restraints would be required. The success of the urban rail system in Hong Kong, Singapore and Tokyo is in fact largely due to these features. However, the Lahore Transportation Master Plan only proposes a transit system without formulating proper policies for other sectors mentioned by Newman and Kenworthy (2000, p.192). Experience from several countries suggests that construction of ever more high capacity roads can have the unintended effect of reduction in public transport and bicycle use without increasing vehicle speeds or reducing congestion on city roads. For example, in the Chinese cities of Guangzhou, Beijing, Shanghai and Shenzhen, the input to road infrastructure has been doubled in the past five years along with an increase in public transit vehicles. However, data shows that the total number of passenger using public transport has decreased in these cities (Wu Yong and Li Xiaojiang, 1999). No study has been done to understand the effect of these changes on road user behavior in Lahore before proposing huge investments in roads and high tech public transport. In the absence of all these supporting and complementary policies in Lahore, it is doubtful if the LRT system can succeed.

Although LRT has proved to be a 'state of the art' technology system, in terms of performance and reliability, the requirement of residents of Lahore is for a quantum improvement in level of service of public transport while keeping the costs and fares as low as possible. In recent years, some efforts have been made with the introduction of air-conditioned and CNG franchised buses in Lahore. This is a step in the right direction for improving the quality of service of public transport. However, financial resources are scarce and building expensive infrastructure of LRT and roads to accommodate the middle and upper class leaves nothing over for low cost improvements to benefit the poor majority. Sustainable transportation options rely heavily on the promotion of affordable public transport and non-motorized modes (Tiwari, 2002, p.98, Newman and Kenworthy, 2000, p.162). For low income people commuting to work, walking, bicycling or affordable public transport are not a matter of choice but a necessity for survival. Therefore, it is critically important that the urban transport network be designed from the perspective of the pedestrians, bicyclists and low cost public transport vehicles to improve their convenience, safety, comfort and affordability. However, the actual policies promoted do not recognize the importance of non-motorized modes, even actively discriminated by ignoring their importance in urban transport of the city (Whitelegg, 1993). In addition, decision makers pursue transport policies that work against walking and cycling. This is despite the fact that these modes can contribute significantly to improve environmental sustainability. Instead of emphasizing pedestrian planning as in many western cities, particularly in Europe, Lahore Urban Transport Master Plan has not accommodated pedestrian and other non-motorized transport in a future

urban transport scenario. In the presence of high density, mixed land use and tradition of non-motorized mode use and large number of non motorized trips in Lahore, the prospects for effective pedestrian planning are more favorable than any other project, if only the facilities existed for them. Even bicycle travel can be promoted by providing adequate infrastructure. It is therefore, concluded that institutions in Pakistan need to develop transport policies that take into consideration Pakistan's unique needs and priorities as well as the country's capabilities and financial constraints to achieve low cost, safe and robust policy outcomes.

Conclusion and Further Research

The above analysis of the Lahore Urban Transport Master Plan, especially the LRT project has indicated that urban transport problems were generally viewed through a developed world perspective, having narrow environmental and social concerns, while the basic mobility needs of the majority were neglected. Although, many cities around the world have adopted transport policies influenced by the USA model of promoting private vehicles or the European and Japanese model of high tech rail based urban transport, neither of these models is particularly suited for Pakistani cities because in both cases, the costs of individual mobility are born by society and the environment and both the benefits and the costs are very unevenly distributed among local populations. Therefore, the only solution suitable for Pakistani cities is one that has been locally designed to solve the problems of the majority as happened in Curitiba, Brazil. The solution should be low cost, environmentally sustainable and responsive to the social needs of the local people. However, locally designed development programs especially in urban transport raise questions of institutional and human resource capacity within local institutions. In the case of Pakistan, the technical and financial assistance of global agencies has not paid attention to building the capacity of existing institutions, which could then design local solutions independently. Therefore, this discussion points to the need for further in-depth assessment to examine the role of institutional relationships and capacities in transport planning among different levels in the hierarchy of government and their relationships with global agencies in order to explain urban transport decision making in Pakistan. The current research project is one of the steps to explore this phenomenon.

Acknowledgement

I would like to thank UNESCO for special sponsorship, which made possible to present this paper in the 39th International Planning Congress "Planning in a more Globalized World" on 15-22 October 2003 in Cairo – Egypt organized by International Society of City and Regional Planners (ISoCaRP), Netherlands. I would like to thank my Faculty of Architecture, Building & Planning, University of Melbourne, Australia to provide me with full support and remaining amount of funds to participate in the conference.

References

- Arif, Fifi Anggraini (2002) "Transport Planning in Jakarta", *Urban Policy and Research*, Vol. 20, No. 4 pp. 371-389
- Badami, Madhav G. (2003) "Urban Transport Planning for Sustainability and Justice in Less Industrialized Countries: The Case of India" Paper Presented at the AESOP-ACSP Joint Congress, Leuven, Belgium
- Barter, Paul, Kenworth, Jeffery and Laube Felix (2003) "Lessons from Asia on Sustainable Urban Transport" in Low Nicholas and Glesson Brendan, *Making Urban Transport Sustainable*, London: Palgrave

- Burki Shahid Javed (1992) "The management of Crisis" in James William E. and Roy Subroto (ed.), *Foundations of Pakistan's Political Economy: towards and agenda for the 1990s*, New Delhi, Sage Publications
- Cohen, Michael A, Ruble, Blair A., Tulchin Joseph S. and Garland Allison M. (1996) "Preparing for the Urban Future, Global Pressure and Local Forces" Washington: The Woodrow Wilson Centre Press
- Dimitriou Harry T. (1992) "Urban Transport Planning: A development Approach" London: Routledge
- Gakenheimer Ralph (1999) "Urban mobility in the developing world" *Transportation Research Part A*, 33, p.671-689
- Husain, Ishrat (1984) "Raising Resources for Development" in Burki Shahid Javed and Jr. Laporte Robert (ed.), *Pakistan's Development Priorities: Choices for Future*, Karachi: Oxford Press
- JICA and TEPA (1992) "Comprehensive Study on Transportation System in Lahore" Lahore: published by TEPA
- Kenworthy, Jeffery R. and Felix B. Laube (1999a) "Pattern of automobile dependence in cities: an international overview of key physical and economic dimensions with some implications for urban policy" *Transportation Research Part A*. Vol. 33 pp.691-723
- McMahon, Peter (2001) "Technology and Globalization: An overview" *Prometheus*, Vol.19, No.3, 211-222
- NESPAK (1997) "Integrated Master Plan of Lahore" Lahore
- Newman Peter and Kenworthy Jeffery (2000) "Sustainability and cities" Washington: Island Press.
- Owens, S. (1995) From 'predict and provide' to 'predict and prevent'? pricing and planning in transport policy. *Transport Policy*, 2(1), pp.43-50
- Patankar, P.G (2000) 'Urban Transport' in the *Hindu Survey of the Environment 2000*, Chennai, pp.10-114
- Qadeer, M. (1983) "Lahore: Urban Development in Third World", Lahore: Vanguard
- Rodenburg Caroline A., Ubbeks Barry and Nijkamp Peter (2002) "Policy scenarios for achieving sustainable transportation in Europe", *Transport Reviews*, Vol. 22, No. 4, 449-472
- Roque, Julie A. (1996) "The social dimensions of technological change: reshaping cities and urban life" in Cohen (ed.), *Urban Future, Global Pressure and Local Forces*, Washington: Woodrow Wilson Center Press
- Satterthwaite (1998) "Environmental Problems in Cities in the South: Sharing my confusion" in E. Ferandes (ed.) *Environmental Strategies for Sustainable Development in Urban Areas – Lesson from Africa and Latin America*, Brookfield, USA.
- Smith, R (1997) Creative destruction: Capitalist development and China's environment" *New Left Review*, 222, p.3-42
- TEPA and Halcrow Fox (1993) "Lahore Traffic and Transport Study: Pre-Feasibility Study of Light Rail Transit Project" Lahore: Published by TEPA
- Tiwari, Geetam (2002) "Urban transport priorities: meeting the challenge of socio-economic diversity in cities, a case study of Delhi, India" *Cities*, Vol. 19, No. 2, p.95-103
- Whitelegg, J (1993) "Transport for sustainable future: the case of Europe" London: Belhaven press
- Wu Yong and Li Xiaojiang (1999) "Targeting Sustainable Development for Urban Transport" In Workshop on Urban Transport and Environment, CICODE, Beijing