

TOWARDS AN INCLUSIVE PUBLIC TRANSPORT SYSTEM IN PAKISTAN¹

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Abstract

Urban transport in Pakistan is characterized by the coexistence of formal and informal transit services. While urban transport is deregulated and - somehow – multimodal in the country, the transport service providers often compete with each other within their particular constraints and their equilibrium defines the overall landscape of urban accessibility. With examples from the cities of Islamabad and Rawalpindi, the paper discusses three broad constraints on the urban modes of transportation, namely regulatory, spatial and demand related constraints, using a number of important system characteristics. Results show that the overall level of constraints remains 'Very High' on the newly constructed BRT, followed by 'High' constraints on the informal paratransit mode, 'Qingqi'. Whereas the Suzuki and Wagon modes coverage remains maximum and they carry relatively lower level of constraints. In this context, an inclusive urban mobility largely depends on a proactive approach by management authorities to minimize these constraints through a number of initiatives including integration of modes, improvements of the quality of service and condition of vehicle, and by facilitating the mobility of women and non-motorized travellers.

Keywords: *Transport, accessibility, Pakistan, BRT, Qingqi*

1. BACKGROUND

Population explosion and rapid urbanization in Asian countries have brought complex mobility challenges for a vast majority of their people who also face issues of poverty, inequality and limited access to basic services (Gakenheimer, 1999). While the average distances between activities are increasing with time, so are the issues of mobility and accessibility. Lack of access to public transport, poor quality of transportation infrastructure, rising levels of personal automobile ownership and a persistent disregard of traffic regulations pose further issues to the already challenging mobility environment (Dimitriou and Gakenheimer, 2011). These issues affect the majority of Asian population, including poor, unemployed, young, elderly and most of the women. In this context, provision of an inclusive transport system has been a top priority of the national as well as local governmental and non-governmental organizations. Often the aim is to provide an inclusive public transport system that moves the masses at a financially affordable, socially acceptable and environmentally sustainable manner and also helps increasing local economic growth in the area. However, the on-ground public transport system regularly fails to provide the minimum acceptable level of mobility that suits the sociocultural and financial needs of its users (Vasconcellos, 2014).

With the example from the cities of Islamabad and Rawalpindi, this paper elaborates three broad constraints on the urban public transport system in Pakistan, namely regulatory, spatial and demand related constraints, which have consequential effects on the landscape of accessibility and inclusiveness of the transportation system in the country. The next two sections provide a background of public transport system and sociocultural context of mobility in the country. Section 4 and 5 explains the salient characteristics of public transportation in the case study cities and the data and methods. Section 6 defines and examines the salient characteristics of the three constraints on public transport system. Lastly, section 7 concludes with some recommendations for addressing these constraints and the way forward towards an inclusive urban transport environment in the country.

2. PUBLIC TRANSPORT SYSTEM IN PAKISTAN

Nearly half of the Pakistan's total 190 million population resides in urban areas, which makes it the most urbanized country in Asia Pacific (Planning Commission, 2014). Around two thirds of its

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urban population is concentrated in 10 large cities. Continuous changes in the organizational and functional characteristics of urban areas are making them a tougher place to live and survive. The traditional high density, walkable and prosperous urban localities are becoming overcrowded, deficient in local service provision with rising levels of urban poverty. A lower average income means that only the well-off Pakistanis can afford private cars at home. As a result, and nearly half of the work or job related trips depend on the fragile public transport system of the country (Adeel et al., 2014a).

Public transport system in Pakistan was deregulated in early 1980s. Since then, private operators provide the urban transport services and the government plays a role in fare control and route licensing. These individual transport operators prefer low cost, small size transport vehicles in order to maximize the profits. Transport authorities consistently fail to supervise the quality and efficiency of the public transport system due to lack of institutional capacity to supervise these solo transport operators (Imran, 2010).

3. SOCIOCULTURAL CONTEXT OF MOBILITY IN PAKISTAN

Mobility is largely a gender phenomenon in the country. Women are considered private and family honor. This particular sociocultural context makes female mobility through public transport a sensitive subject as it may affect their privacy and personal safety. As a result, women become less mobile, travel mostly for important purposes and that also after permission from the family head, after veiling their bodies or with escort from a male family member.

In this context, women and their families prefer a transport facility that is highly accessible, comfortable and more importantly which helps preserving their honour and privacy. Lack of access to personal automobiles means that majority of population, including women, largely depend on the existing public transportation system for their daily mobility. However, the transport system in its current form, rarely suits their mobility needs as it fails to provide door to door accessibility, comfortable and female-reserved seating, privacy from male travellers and a hassle free travel. Walking access to public transport remains the most important and defining aspect of urban public transportation system in the country. Studies have shown that the lack of access to transportation system and a suitable mobility environment significantly decrease female access to basic services such as healthcare and education (NIPS, 2008).

Other than women, lack of access to transportation system greatly affects the lives of vulnerable population including the student, unemployed, disabled, elderly and the young. All these disadvantaged social groups, when combined, form a majority of country's overall population and only a handful of population comes out to be non-disadvantaged for their daily accessibility and mobility in Pakistani society.

4. DESCRIPTION OF THE STUDY AREA

Cities of Rawalpindi and Islamabad forms the third largest metropolitan in Pakistan, called Rawalpindi Islamabad Metropolitan Area (RIMA). It houses approximately 1.8 million populations on 278 km² land (NTRC, 2006, RDA, 2013).

According to recent estimates by the authors, the city of Rawalpindi houses 61 per cent of RIMA's total population at just 9 per cent area, with estimated density of 6600 persons/km² (Adeel et al., 2014b). The city of Rawalpindi is a typical example of mix use, high-density Asian cities. Existing facilities and services in the city remain inadequate and overused (Government of Punjab, 2008). It seems that accessibility to goods and services is further deteriorating with its continuous densification and outward spatial expansion. The city also exhibits an above average unemployment rate as compared to its Punjab province (4.0 vs. 5.5, see Government of Punjab (2008)). Similarly, about half of its population can be categorized as urban poor (Asian Development Bank, 2005). As a result, majority of Rawalpindi's residents find it hard to pay for their daily mobility needs (NTRC, 2006).

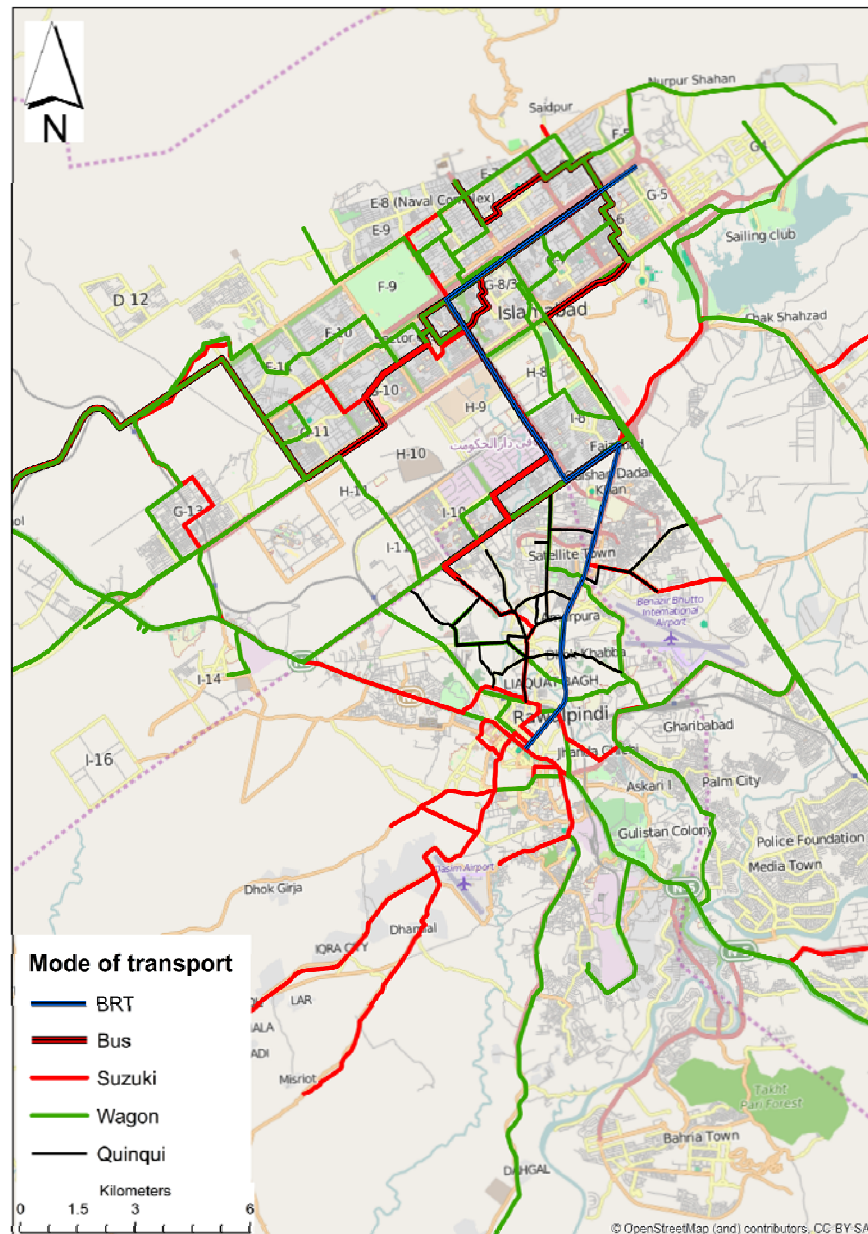
Built in the early 1960s, Islamabad is the only master planned city in the country and the seat of the Federal government. The city houses 39 per cent of the RIMA population at 91 per cent area with estimated densities of approximately 2800 persons/km² (Adeel et al., 2014b). Approximately one third of Islamabad's population resides in squatter settlements (CDA, 2013). As a whole, issues of

affordability and accessibility put at least 40 per cent of the capital's residents in various transport related disadvantages (Adeel et al. 2014b).

Public transport is controlled and regulated by two different government entities in RIMA. District Regional Transport Authority - Rawalpindi (RTA) is responsible for managing the public transport affairs in Rawalpindi while Islamabad Transport Authority (ITA) does the same work for Islamabad.

RIMA is often seen as one urban agglomeration, especially for the provision of the public transport system. Approximately, 70,000 workers and students commute daily between the twin cities over a distance of 30 km long job-housing axis along Murree road and Islamabad highway (CDA, 2012). Many of the current transport routes in RIMA have been approved by any of these two authorities however they provide service to both cities e.g. Wagon route no 1, approved by RTA, originates from Saddar Rawalpindi and ends in Pakistan Secretariat stop in Islamabad.

Figure 1. Public transport network in the Rawalpindi Islamabad Metropolitan Area



The public transport system in the study area comprises of both formal (authorized) and an informal modes of transportation. Formal public transport modes are: 12 seater Suzuki (similar to Jeepnys in Manila), 20 seater Wagon (Similar to Matatus in Nairobi, Kenya) and 30-40 seater Buses or Minibuses (Figure 2). Recently the government has initiated a new Bus Rapid Transit (BRT) network along Rawalpindi's Murre road and Islamabad's 9th Avenue and central business district (Blue Area). The BRT network is approximately 23 km long and has a bus station at every one-kilometre road length. Qingqi rickshaw is the informal or unauthorized public transport service in the study area.

Figure 2. Public transport modes in the study area (not to scale)



Up to 95 per cent of RIMA's current public transport fleet is made of Suzuki and Wagon modes that are run by individual operators. People cannot stand inside both transport modes and they are particularly less suitable for women, children, disabled and elderly (Scandiaconsult and Contrans AB, 1995).

5. DATA AND METHODS

The paper is based on the primary and secondary data related to public transport network and the management of public transport operations in the study area. The primary data on public transport route network was collected through GPS based field surveys in December 2013. The field data was overlaid on the online street map freely available through ESRI's ArcGIS for GIS based buffer analysis. As there was no updated public transport network map of the study area, the data and its results provide a wealth of information on public transport accessibility in the study area.

For examining and commenting on the public transport governance and its specific constraints in the study area, we have largely relied on the most recent available official communication, updates and reports by the ITA and RTA. This data was collected by the first author through a number of visits to these organizations. Discussion with the office staff and personal experience as a resident of the area was also useful in organizing and elaborating the information presented in this paper.

6. THREE CONSTRAINTS ON PUBLIC TRANSPORT SYSTEM IN THE STUDY AREA

6.1. Regulatory Constraints

RIMA's transport route network was delineated in the early 1980s, potentially without any scientific analysis, and even today retains its original alignment. Lack of revision in transport network has created pockets of underserved residential areas in the city. Newly constructed suburban neighbourhoods also face a shortage of transport due to lack of new transport routes. Other than this, up to 40 per cent of public transport routes are inactive because transporters do not see financial incentive in these routes (Adeel et al., 2014b).

Two different authorities, RTA and ITA, manage RIMA's transport system. Due to lack of coordination between them, there are no uniform standards of route approval or enforcement in the area. Regulatory constraints on public transport are usually stricter in Islamabad and in commercial or institutional areas than in Rawalpindi or in residential areas. As a result, residential areas are more likely to suffer from oversupply or undersupply of public transport. The lack of coordination between authorities results in poor enforcement of service standards. If the transport authority in one city tries to enforce stricter regulations, such as setting a maximum permissible age of transport vehicle, their operators get registered with the authority in other city and still keep serving the metropolitan area without following the stricter service standards. Transport fares are not regularly updated with the change in fuel prices. This often becomes a source of contention between government, transporters and the passengers. Lack of enforcement in Rawalpindi often results in frequent overcharging by transport operators and complains about non-availability of service during off peak hours. Passengers also complain that transporters often refuse to complete their route and sell their passengers to other vehicles for their convenience.

Figure 3: Newly constructed overhead bridge for Bus Rapid Transit network in Rawalpindi



The operators of Bus, Suzuki and Wagon vehicles need a route permit for running their service. Their route permit requires them to operate along authorized transport routes only. However, Qingqi service, being the unrecognized transport mode, is operated without any permit. Authorities

tend to prohibit Qingqi from serving along the existing transport route network. As a result, their network exists in the service gap areas that were previously operated by the defunct horse driven 'Tonga' service. As they are not allowed to operate in Islamabad, the service gap areas in the capital city remain unnerved due to the regulatory constraints. However, our spatial analysis indicates that Qingqi covers more than 90 per cent of population in Rawalpindi. Although this paratransit service remains an important part of urban mobility, it has got the least priority in the urban transport system of study area due to regulatory issues with this mode.

Table 1. Regulatory constraints on public transport system in the cities of Rawalpindi and Islamabad, Pakistan

Transport modes	Bus / minibus	Suzuki / wagon	BRT	Qingqi
Status	Legal	Legal	Legal	Unauthorized
Role of government	Regulator	Regulator	Promotional	Prohibitive
Route structure	Fixed	Fixed	Fixed	Flexible
Working in both cities	Yes	Yes	Yes	No - banned in Islamabad
Priority in public transport system	Normal	Normal	High	Least
Fare subsidy	Yes	No	No	No
Overall – regulatory constraints	<i>Low</i>	<i>Low</i>	<i>Very low</i>	<i>High</i>

The limited network of BRT has obtained highest priority in RIMA's public transport system evident from the newly constructed bus bays, exclusive bus-only roads and overhead bridges. As a whole, it seems that the regulatory constraints remain very low in BRT (due to extensive support by the government), low in case of bus, Suzuki and wagon (as they provide most of the transportation services in the area), and high for Qingqi (due to strong opposition by government and transport operators).

6.2. Spatial Constraints

Overall, it can be observed that each mode of transport carries its specific spatial constraints due to its size, seating capacity, ease of operation and the area of service. Buses and BRT service exhibit the highest level of spatial constraints, followed by Suzuki/ Wagon network while the paratransit service of Qingqi is the least, yet significantly, affected by these constraints (Table 2).

Table 2. Spatial constraints on public transport system in the cities of Rawalpindi and Islamabad

Transport modes	Bus / minibus	Suzuki / wagon	BRT	Qingqi
Share of population covered	Minimum	Highest	Medium	Restricted due to legal issues
Service locations	Suburban	Main city roads	Main corridors	Inner city; service gap areas
Movability in congestion	Least	Lower	Highest	Higher
Overall - spatial constraints	<i>High</i>	<i>Low</i>	<i>High</i>	<i>High</i>

Table 3 below presents the result of spatial analysis that estimates the share of population within given walking distance buffer. At the metropolitan level, public transport accessibility remains

quite low and nearly three quarters residents live beyond convenient walking distance from public transport network. Estimates show that, around 41, 61 and 81 per cent population can access any mode of transportation within 5, 10 and 20 minute walk from their residence, respectively. Wide differences exist at modal level and buses provide the minimum level of coverage in the studied area. Buses and Suzuki cover only 45 per cent, within 20 minutes' walk, each while the newly constructed BRT covers just 22 per cent of metropolitan residents. On the other hand, wagons cover much greater share of 80 per cent population within this threshold distance. As a large share of urban residents remains un-served, the lack of accessibility to public transport increases the demand for intermediate mode of transportation. However, the paratransit service of Qingqi, which runs in the service gap area, covers only 13 per cent of the metropolitan population highlighting an unfulfilled demand for public transport in the area.

Wagons cover the largest share of the metropolitan population and nearly one third of the population resides within 400 meters while 54 per cent could reach them within 10 minute walk. Still 22 per cent residents cannot find wagons within 20 minutes walking distance from home. Suzuki service is available to only 10 and 20 per cent residents within 5 and 10 minutes' walk from home, respectively. Around 61 per cent population of the capital city cannot access it within 20 minutes walking distance. Surprisingly, the proposed BRT network covers only a handful of city's population. Only 8 per cent population of Islamabad resides within 10 minutes' walk from the BRT while around 83 per cent of city's population resides more than 20 minutes' walk from BRT network.

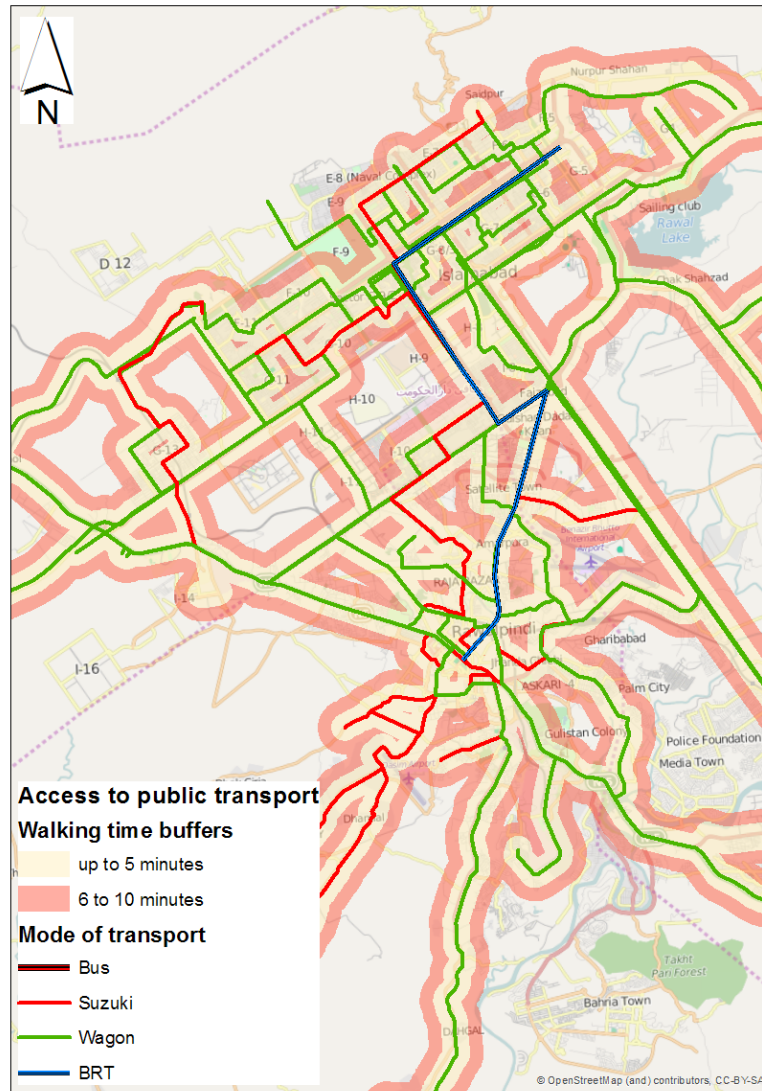
Table 3. Public transport accessibility in the cities of Rawalpindi and Islamabad

City	Transport Mode	< 5 minute	10 minute	15 minute	20 minute	> 20	All
Islamabad	1. Bus, Minibus	16	28	37	45	54	100
	2. Wagon	34	54	68	78	22	100
	3. Suzuki	10	20	30	39	61	100
	4. Qingqi	0	1	2	3	96	100
	5. BRT	3	8	12	16	83	100
	Any of 1-3 modes	38	57	70	79	21	100
Rawalpindi	1. Bus, Minibus	10	21	33	43	56	100
	2. Wagon	57	88	98	100	0	100
	3. Suzuki	38	66	88	99	2	100
	4. Qingqi	63	85	93	97	3	100
	5. BRT	15	38	56	71	28	100
	Any of 1-3 modes	70	96	99	99	0	100
RIMA (both cities)	1. Bus, Minibus	15	27	37	45	55	100
	2. Wagon	36	57	71	80	20	100
	3. Suzuki	13	25	36	45	55	100
	4. Qingqi	6	9	11	13	87	100
	5. BRT	4	11	17	22	78	100
	Any of 1-3 modes	41	61	73	81	19	100

Note: 5 minutes walk = 400 meter, 10 minutes walk = 800 meter and so on
Source: GIS buffer analysis on the primary data collected by the first author

When the results are disaggregated at city level, we see that the coverage of public transport coverage is significantly better in Rawalpindi than that of Islamabad. Nearly all of Rawalpindi's residents could find any mode of authorized public transport within 15 minutes walking distance as compared to only 70 per cent residents from Islamabad. While the BRT network is accessible to only a handful of population within convenient walking distances in both cities, it serves nearly 56 per cent of Rawalpindi residents within 15 minutes' walk as compared to only 12 per cent Islamabad residents.

Figure 4. Portion of RIMA within and outside 10 minutes walking buffers from public transport network



Source: Primary data collected by the first author

Wagon and Suzuki compete with each other for maximum coverage in Rawalpindi. However, wagon clearly serves greater population in Islamabad. This is probably linked with the fact that the Islamabad's transport authority, ITA, prefers wagons due to their better quality of service and physical outlook. However, in Rawalpindi, Suzuki becomes the preferred choice for suburban transport routes due to its lower seating capacity and relatively smaller size.

6.3. Demand constraints

The concept of demand constraints points out to the extent to which a particular mode of transportation is desirable from user perspective. Buses and minibuses are often used by employed and student travellers, who commute to the institutions located in the administrative neighbourhoods of the metropolitan. However, these modes of transport run at a relatively lower average speed due to traffic congestion. As compared to Suzuki and wagon service, buses are more gender friendly due to more comfortable seating and ability to accommodate standing travellers. Initial investment is high and so a majority of buses are very old. There is relatively fewer number of buses on road which

means that they have a lower service frequency and poor availability in off peak hours. Overall, demand constraints for buses remain high.

Suzuki and wagon modes generally serve the residential neighbourhoods and commercial areas of the metropolitan. They are mostly used by the low-income population who travel to work in the central business district or reside in the inner city or suburban areas. These vehicles can be very old, poorly maintained, with congested seating and their operators often exhibiting risky driving behaviour in the picking of passengers, often pushing them forcefully in and out of the vehicle. During low ridership periods, they may refuse to complete the route and sell their passenger to the other vehicles. Despite their poor service, due to their extensive coverage they somehow have a monopoly in this passenger market.

BRT service is specifically designed to quickly transport intuition workers and students along the main commuting axis of the metropolitan area. Its serves a special corridor with an exclusive bus way and bus stops. A better operation management means better service frequency, less accident risk and a courteous attitude towards women travellers. The expansive construction of network means that the government heavily subsidizes its fare and it might not cover the project costs in the near future. As a result of limited network coverage and numerous financial and operational issues, demand related constraints on this system remain 'High'.

Table 4. Demand constraints on public transport system in the cities of Rawalpindi and Islamabad

Transport modes	Bus / minibus	Suzuki / wagon	BRT	Qingqi
Mostly used for	Work	Social and Work	Work and education	Social, educational, connecting trips
Travel speed	Medium	High	High	Low
Service frequency	Lower	High	High	Medium
Off peak hours availability	Extremely poor	Poor	Good	Poor
Initial investment	High	Medium	Highest	Minimum
Attitude towards women travelers	Somehow facilitating	Rigid and prohibitive	Facilitating	Facilitating
Route completion complaints	Yes	Yes	No	No
Risk of accidents	High	Higher	Least	Highest
Age of vehicle	Very old	Old	New	New
Overall - Demand related constraints	Medium	Low	High	High
Total level of constraints	Medium	Low	Very high	High

Qingqi service is used by both, the students and employed population alike, due to its strategic positioning in the service gap areas. They travel at lower speeds but are more risky due to poor vehicle design and often a lesser skilled driver. Qingqi operators are often more supportive to its

travellers and generally do not refuse female travellers and ensure that they do not get touched by the male passengers. Due to their legal status and quality issues, demand constraints remain 'High'.

7. RECOMMENDATION FOR AN INCLUSIVE PUBLIC TRANSPORT SYSTEM

The previous section highlighted the nature and extent of regulatory, spatial and demand constraints on each of the transport modes in the study area. These constraints not only affect the functioning of a transport system, they create the overall landscape of accessibility and ease of mobility for their service population. As discussed at the start of this paper, an inclusive public transport system would enable the mobility of masses at a financially affordable, socially acceptable and environmentally sustainable manner. Other than providing an adequate mobility option and stemming the growth of private vehicles in the metropolitan area, an inclusive transport system would also facilitate local economic growth by facilitating the employment opportunities in the surrounding area.

Keeping in view the existing land use growth patterns as well as spatial, regulatory and demand related constraints on the urban transportation, this article recommends the following improvements for realizing a realizing an inclusive public transport system:

- **Enhancing public transport accessibility**

Existing transport route network is almost three decades old. City size and population has doubled over this period and is expected to further grow in future. Widening of road network and construction of new residential areas mean new transport nodes have developed over time. There is a need to re-examine the route network with a greater focus on bus based transportation system. Designing an integrated transport system with feeder routes is the answer to limit the growth of paratransit service and provide accessible public transport service to all the urban residents at convenient walking distance. Lack of availability of public transport has contributed to the growth of private vehicles in the cities of Rawalpindi and Islamabad. Strict enforcement of service levels in residential areas is required to provide an inclusive public transport system.

- **Improving affordability and quality of the service**

It is contended that the exiting public transport network need not be overlooked for improvement as it still serves as the main mobility system in the area and provides livelihoods to thousands of individual operators. The existing transport service badly needs measures for improving affordability and quality of service. Provision of subsidized public transport for the unemployed, students and elderly is desirable as is an introduction of express bus routes that serve fewer stops, and a reduction in the maximum limit of passengers per vehicle. Again, as it will involve a trade-off with cost of travel, it is recommended to use multiple fare structure depending on the type and quality of service offered by the transport mode. Public transport should be made affordable for the urban poor by various means such as free service and concessionary fares, where applicable. Special considerations need to be given for safe and affordable mobility of students and women along with improvement in the behaviour of transporters. Student or female only busses can be a good option to start with.

- **Innovative use of ITS in traditional public transport**

Innovative use of ITS can go a long way in improving the quality of public transport system in the area, electronic fare collection and integration, bus schedule, ticketing and a feedback system are some of the important improvements needed in the existing system.

- **Gradual improvement in the of BRT**

An accessibility analysis of the BRT network presented in this study highlights that it serves only a minority of the urban population. Even within its coverage area, concerns remain over its suitability for the young, elderly and women because the passengers would need to walk up stairs to reach the overhead bus bays. Furthermore, BRT further needs to cover the previously un-served residential neighbourhoods particularly in Islamabad, and the gated communities

- **Integration of paratransit system**

Regularization and improvement of the organic Qingqi service can also facilitate mobility and accessibility in certain disadvantaged areas with reduced public transport coverage. While Qingqi is working without any binding service standards, they carry a considerable risk of safety during their journeys. If properly regulated, they can serve in the areas of low ridership as the feeder network for the main public transport system.

- **Active role of transport and planning agencies**

Lastly, urban management and planning has an important role to play in ensuring convenient access to activities in urban areas. The existing built environment and public transport service does not match with the needs of women, low income and those without a personal automobile, let alone the people facing physical mobility challenges. It seems that the current trend in urban planning has turned middle-income groups into a car-based society. Lack of coordination between suburban gated communities, transport providers and the development authorities has further forced people to turn towards personal automobiles. Appropriate connectivity between locations through walkways, traffic calming measures in residential areas and 'demand responsive' land use management can go a long way in reducing the automobile dependency of women, income less and elderly population. What remains to be seen is whether the urban and transportation officials have the will to do it and whether political decision makers would encourage management rather than construction practices.

Local transport and urban planning agencies need to promote public transport and non-motorized transportation through hard and soft measures. Hard measures include physical planning and facilitation of user-friendly mass transport system whereas soft measures include public awareness campaigns on the roads as well as in the electronic and print media.

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