Policy Brief

WHAT IMPROVEMENTS ON PUBLIC TRANSPORT DO PASSENGERS VALUE THE MOST? EVIDENCE FROM ISLAMABAD, LAHORE AND KARACHI

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INTRODUCTION

Public transport is vital for socioeconomic development as it allows citizens to access opportunities, including, markets, social interaction, education, and other services, enabling people to rise out of poverty and overcome social exclusion (GOP, 2018). However, Pakistan lacks a decent and affordable public transport system for its citizens. This issue is particularly serious in urban areas due to the expansion in urbanisation, cities economic potential, generation of greater economic activity and subsequent need for mobility and commuting. Pakistan has a population of around 210 million, roughly 36% of which resides in cities which is expected to reach 50% by 2050 (GOP, 2017). Considering that a good public transport system is fundamental to the sustainable urban development of Pakistan, there is a need to transform Pakistani public transport into a more modern, sustainable, and effective one (GOP, 2018).

The existing public transport options in Pakistani cities are limited, disorganized, inappropriate, and inefficient, which have serious implications for citizens' mobility and their productivity and social wellbeing (Adeel et al. 2016). While a handful of mass transit systems have been installed in the Pakistani cities, they are not socially optimal due to expensive infrastructures and a limited coverage (Qureshi & Huapu, 2007; Imran, 2009; Masood et al., 2011). This has led to a greater use of car and taxi services, increasing the cost of mobility, but also worsening road congestion and pollution, and increasing gender and class inequality. A lack of decent and affordable public transport system deters labour force participation and effectual use of time and human resources, having serious implications for individual workers, businesses, and overall society. The private sector has rushed in to fill the gap with ride-hailing services, which are relatively comfortable and efficient, but these services are unaffordable for the low-income groups and again operate in a largely unregulated environment.

There is a lack of coherent institutional framework for public transport in Pakistan (GOP, 2018) that can properly engage and facilitate the key stakeholders to design and implement an inclusive, affordable, and efficient public transport system. Therefore, there is a need to use more novel approaches such as the use of market-based

mechanism to incentivize the private sector to invest in bus rapid transit systems to make cities more inclusive, diverse, competitive, commuter-friendly, and liveable.

Using a stated preference survey and discrete choice modelling approach, this research investigated citizens' preferences and their willingness to pay for the key attributes of the public transport system in three major cities of Pakistan: Karachi, Lahore and Islamabad. The results of this research can help in designing economically efficient and socially optimal practical solutions to the problem of public transport using novel approaches such as market-based mechanisms based on the idea of economic incentive schemes, having the potential to transform the urban mobility in Pakistan.

Special attention was given to the potential adoption of car-pooling systems in the three cities under study. Car-pool systems are usually implemented as digital platforms where car owners can offer rides to other users of the platform in exchange for a fee. Drivers do not operate as taxis, as they only offer to give rides within a vicinity of their usual commuting routes, or other trips they perform due to their own activity patterns. In other words, drivers are only sharing their cars on their regular trips, not performing additional trips to serve others.

METHODOLOGY

A stated choice survey was design and applied with minor changes on all three cities under study (Islamabad, Lahore and Karachi). In it, respondents faced four choice scenarios. In each of them they had to imaging they had to make a trip and had a series of different modes available to choose from: van, mini-bus, bus, metro-bus (Islamabad and Lahore only), car-pool, metro (Lahore only) or Qingqi (Karachi only). Each mode was described by six attributes: walking (also called access), waiting, and in-vehicle time (in minutes); number of vehicle transfers within the same mode (e.g. changing from one bus to another); availability of services (air conditioning, free wifi internet access, and reserved seats for women); and the cost or fare of the trip. Respondent could state they would not travel under the given conditions. Figure 1 presents an example of a choice scenario. Respondents also answered a brief questionnaire revealing their main socio-demographic characteristics and travelling habits.

Figure 1: Example of A Choice Scenario (Each Respondent Had to Respond Four Scenarios Similar to This)

	Van	Mini-bus	Bus	Metro-bus	Car-Pool	Metro	None
Mode							
Access time (minutes)	20	20	20	15	5	15	
Waiting time (minutes)	5	10	10	5	5	25	
Travel time (minutes)	25	30	30	90	10	20	
Transfers	0	0	2	1	2	1	
Additional services		Wifi Ladies' seats	AC Wifi Ladies' seats	AC Wifi	AC Wifi	AC Wifi	
Fare	15 Rs	20 Rs	20 Rs	30 Rs	25 Rs	20 Rs	

Respondents' choices were analysed using a Multinomial Logit (MNL) model, as proposed by McFadden (1973) and discussed by Train (2009). This framework assumes that respondents have different levels of preference (utility) from each alternative depending on their attributes, and they choose the alternative that provides them the higher utility. Negative attributes (e.g. a high fare) can be compensated by positive attributes (e.g. a short travel time). This framework is extensively used for analysing choice data and measuring preferences in multiple areas.

A total of 1565 respondents participated in the survey, with 70% being male and 30% female (Table 1).

Table 1: Participants per City and Sex

	Islamabad	Lahore	Karachi
♂	408	360	326
♀	122	155	194
Total	530	515	520

RESULTS AND DISCUSSION

Results of the analysis can be transformed into Willingness To Pay (WTP) for attributes. These values represent how much an individual is willing to pay to enjoy a desirable attribute, or how much monetary compensation

they need to endure an undesirable attribute. For example, a WTP of Rs *X* for air conditioning means that an individual is just as likely to choose any of two alternatives with the same characteristic, except for one of them having air conditioning and being Rs *X* more expensive. A positive WTP indicates that respondents are willing to pay to gain access to the corresponding attribute, while a negative one indicates that the respondents should be compensated with a lower price or travel cost if the attribute is present.

Figure 2 presents the WTP for an hour increase in travel time, for different modes, as well as for access (walking) and waiting time. All values are negative, as longer trips are undesirable. A more negative value indicates that respondents using that mode value their time higher, and therefore expect shorter travel times. In Islamabad access and waiting time have the smallest WTP magnitude, which is unusual, but possibly caused by the pandemic, when individuals were weary of spending time inside vehicles with strangers. WTP in Lahore presents a behaviour similar to other big cities of the world, where waiting and access time are considered more onerous than time spent in-vehicle, therefore reaching more negative WTP values. Qingqi presents the most negative WTP in Karachi, probably due to this mode usually being employed for short (last mile) trips. Car-pool presents a WTP of Rs-74, Rs-50, and Rs-67 in Islamabad, Lahore and Karachi, respectively, indicating that their potential users are willing to pay higher amounts for reducing their travel time, unlike potential bus users, whose WTP averages only Rs-45 per hour. In line with literature, most measured values are slightly lower than the minimum wage rate.

Figure 2: Willingness to pay for travel time increases (Rs/Hour)

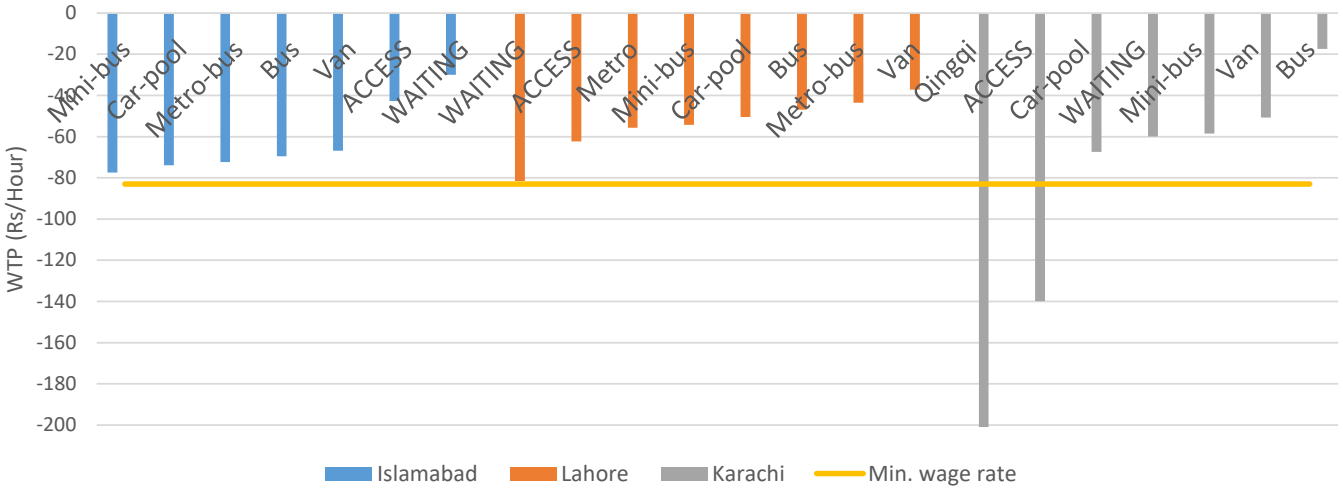
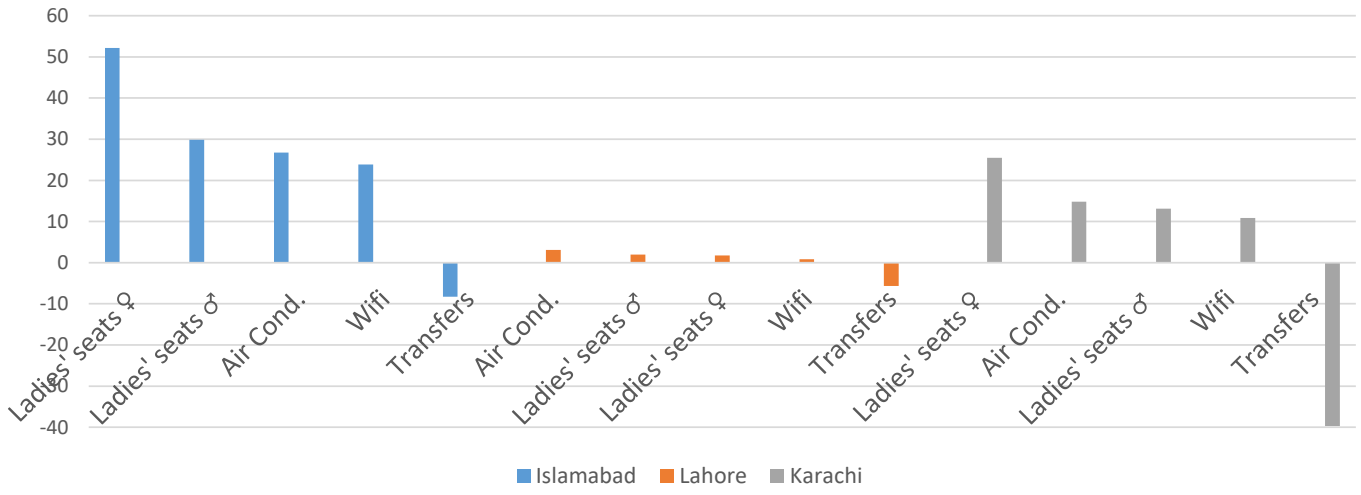


Figure 3 presents the WTP for additional services and transfers. These are significantly higher in Islamabad, followed by Karachi, and very small in Lahore. Reserved ladies' seats among females (♀) are highly values in both Islamabad and Karachi. This is a relatively simple and economic policy to implement, and it could attract a significant number of female users to public transport, so it should be among the priorities when improving

public transport in Islamabad and Karachi. Air conditioning and free wifi internet access are values similarly, but with the second being significantly more economical to provide, it should be implemented before air conditioning. Finally, transfers are perceived very negatively by travellers in Karachi. This could be an important difficulty if a more modern feeder-trunk public transport system is to be implemented. Feeder-trunk systems are structured with two layers: small buses that feed passenger to the main public transport corridors, where metro or Bus Rapid Transit systems carry higher number of passengers. While efficient from an operational perspective, these systems do require users to transfer between buses or even between different modes (e.g. mini-bus to bus, or bus to metro).

Figure 3: Willingness to Pay for Additional Services and Transfers



CONCLUSIONS

Karachi is in need of a better public transport system. Travellers are currently used to long trips. But implementing a better system would not be easy, as it would probably imply more complex trips with multiple transfers, something that travellers dislike in Karachi. Therefore, the new system should focus on reduced access and waiting times, as well as providing reserved ladies' seats if possible.

Results from Lahore show a behaviour typical from big cities with a more developed transport system, where access and waiting time are more onerous than in-vehicle travel time. Car pool systems could be implemented in the city to reduce the use of car, as this city is the one that is most likely to adopt such a system.

Islamabad displays the biggest sensitivity to the provision of additional services while travelling. Adding air conditioning, Wi-Fi, and especially reserved ladies' seats in public transport could have a significant impact in increasing its use in this city.

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