Journal of Transport & Health 12 (2019) 164–182

Contents lists available at ScienceDirect

Journal of Transport & Health

journal homepage: www.elsevier.com/locate/jth

An empirical review of Karachi's transportation predicaments: A paradox of public policy ranging from personal attitudes to public opinion in the megacity

Syeda Hoor-Ul-Ain[1]

Department of Public Administration, University of Karachi, Karachi, Pakistan

ARTICLE INFO

Keywords:
Public opinion
Public policy
Transportation predicaments
Megacity
Safety
Women mobility
Travel behaviour
Sexual harassment

ABSTRACT

Karachi as a megacity faces huge transportation challenges ranging from rampant urbanization and limited budgets to inefficient infrastructures. The issues of over-crowding, traffic congestion, poor quality of service, ill-fitness of the vehicles, women mobility and unbridled sexual harassment issues on busses are the emerging challenges in the transportation sector. The paper focuses on gauging the public opinions, attitude formation and travel behaviour choices of residents and documenting empirical evidence of public concern for improving the public transport predicaments in Karachi. The analysis, largely interpretive in nature, uses the results of a representative survey of residents of Karachi for the evidentiary aspects of the analysis. In principle, this research provides an empirical based mechanism through which public opinion and public policy could be reliably and usefully connected.

1. Introduction

Urban growth is spreading around the world and is receiving a great deal of importance in the field of research both nationally and internationally. The rapid global urbanization phenomenon brings with it many problems and, particularly for this paper, mobility and access (i.e., transportation) in megacities. Megacities are a relatively recent form of urban development and are increasingly recognized as the growth engines of their respective national economies. The United Nations report entitled World Urbanization Prospects[2] states that the numbers of megacities in the world have nearly tripled in the past 24 years. The report defines a megacity as an urban area with over 10 million inhabitants—New York City formed the world's first in the 1950s—and as of 1990, ten such cities had grown up around the globe – a figure that has now risen to 28 megacities on the map on the world (as of 2015). (DESA, United Nations, 2006).

In megacities, the responsiveness of transportation policy to travelers' choices and opinions has become a major concern of policy implementation and provision of quality public transport services. Research affirms that public policy should be informed by public opinion (Dahl, 1956; Arrow, 1963, orig. pub, 1951; Sen, 1970). Increased representation of public opinion in policy formulation and its implementation is one of the key demands that are placed upon the modern strategic policy making process in megacities where democracy prevails (Oldendick, 2002). Urban scientists contemplate the possibility of agreement between public opinion and public policy (Page and Shapiro, 1983; Soroka and Wlezien, 2005). On the other hand, others argue that politicians, pressure groups and

E-mail address: hoorulain.naqvi@gmail.com.
[1] Postal address: House No. R-40, Sumair Bungalows, Sector 34-A, KDA Scheme no. 33, Gulzar E Hijri, Karachi, Pakistan.
[2] Source: United Nations, Department of Economic and Social Affairs, Population Division (2006). World Urbanization Prospects: The 2005 Revision. Working Paper No. ESA/P/WP/200.

https://doi.org/10.1016/j.jth.2019.01.004
Received 8 November 2017; Received in revised form 13 October 2018; Accepted 9 January 2019
Available online 24 January 2019
2214-1405/

policies themselves affect public opinion. This happens under conditions of limited information where statesmen educate or guide ordinary citizens by helping them to understand which policies will nurture and promote their interest (Mill, 1962, orig. pub. 1861; Key, 1961).

In Pakistan, the idea of 'Managing Megacities' has become prominent in recent years and continues to receive local and international attention for its sustainable development (Siemens, 2010). Karachi as a megacity is Pakistan's economic hub, having an estimated population of 24 million spread over 3530 square kilometres (Qureshi, 2010; Hasan, 2015). Its population has grown 80.5% in the last decade, making it the world's fastest growing megacity (Demographia, 2014; Demographia, 2016) and is considered as one of the most important megacities of the world in terms of population, economic potential and geo-strategic location (Robotka, 2013). The city stood at the 7th position on the World's Rankings of Megacities 2017 (Neom, 2017). However, the population estimate of the Karachi's urban area indicated a substantial declining trend in the Census 2017 and due to the reason it goes down to the 25th position on the scale of largest urban areas in the world 2018 (Demographia, 2018) Karachi's economic potential refers to its vital trade and investment, employment opportunities, growth and innovation. On the contrary, the city bears the cost of this function in terms of densification and dilapidated transportation infrastructure.

This paper examines the key challenges for dealing with Karachi's existing transportation predicaments and how they will likely affect the city's development in the coming years. Karachi is emerging as one of the fastest growing cities in the world. The public transport mayhem in the city has exacerbated with a large magnitude over the years and has now become the most heightened issue being faced by Karachiite if one takes the large number and frequency of newspaper reports as an indication of this. A megacity survey[3] has been conducted in Karachi in an effort to gauge the willingness of Karachiites for including public opinion in the policy making process in general and in order to deal with Karachi's public transport problems (Survey Partnership between The University of Karachi, Karachi, Pakistan and George Mason University, VA, US, 2015-2016). The survey provides a reflection or measure of residents' informed and uninformed public opinions, public attitudes and travel behaviour choices and helps in establishing a decision for its representation in the policy making process. Based on the survey, the paper seeks to determine public opinion on the prevailing conditions of public transport in Karachi and to identify potential reasons for the present transportation-related crisis in the city. More specifically the survey produced information about the residents' knowledge, attitudes, behaviours and intentions as they relate to public transport issues. The explicit objectives of the survey were:

- Ascertain and infer residents' knowledge of the public transport issues
- Identify the overall level of concern with public transport quality
- Acquire precise cognizance of the residents' behaviors, choices and actions that are pertinent to transport quality.
- Document the residents' inclination for being involved in transportation quality issues and to enumerate their opinions in policy making process.

The Karachi Megacity household survey 2015–16 was conducted across the seven districts of Karachi: Central, East, West, South, Malir, Cantonment and Korangi. The survey provides a vital source of information on various transportation issues faced by Karachi natives while travelling by public buses for making transportation policy more public opinion responsive. This has a representative survey sample of 1991 households, randomly selected by a two-stage cluster sampling technique. A total of 7697 people (n = 7697) of working age (ranging from 15 to 70 years old) were interviewed including 4110 males and 3569 females.

This paper reports on the findings that deal with the transportation predicaments at present and in the future. This survey data will enable formulation of baseline data for measuring effectiveness of the inclusion of public opinion, traveller choice behavior and attitude about their use to inform the public policy formulation process. It is expected that the authorities concerned with the transportation issues may benefit from the information presented in this paper and also its and application in the formation of public policies and their implementation.

2. Literature review

As noted above, Karachi as a megacity, currently faces huge transportation challenges ranging from rampant urbanization and limited budgets to inefficient infrastructures (Hasan et al., 1991; Haq, 2014; Hasan, 2015). The issues of over-crowding, poor quality of service and ill-fitness of the vehicles are the persistent and emerging challenges in the transportation sector. Poor quality of service adds to the mental deterioration of the society which in turn affects their productivity and effectiveness at work. Provincial and city governments seem to be lacking a commitment towards the vision and strategy laid out for Karachiites to deal with the transportation predicaments. The city's public officials and residents anticipates growing population and look for an increasing number of public transport opportunities but the number of public transport vehicles has been on the decline for a number of reasons. Ironically, no new bus routes have been introduced for years while no buses are being operated on at least 36 existing routes (Dawn, 2008; Hasan, 2015; Ferrer, 2015). The concerned authorities have unfortunately failed to provide relief to commuters despite having spent millions of rupees on improving the public transport system over the past eight years (Hasan, 2015).

Rapid urbanization in the form of immigration from rural areas is a mega challenge for a mega-city like Karachi with an outdated transportation infrastructure. Massive escalation in urbanization has contributed to continuous expansion in the size and geographic

[3] Megacity Survey 2015–2016: The survey appears on the following website: https://cssr.gmu.edu/research-projects/university-of-karachi-partnership/megacities2016-karachimegacitiesdata)

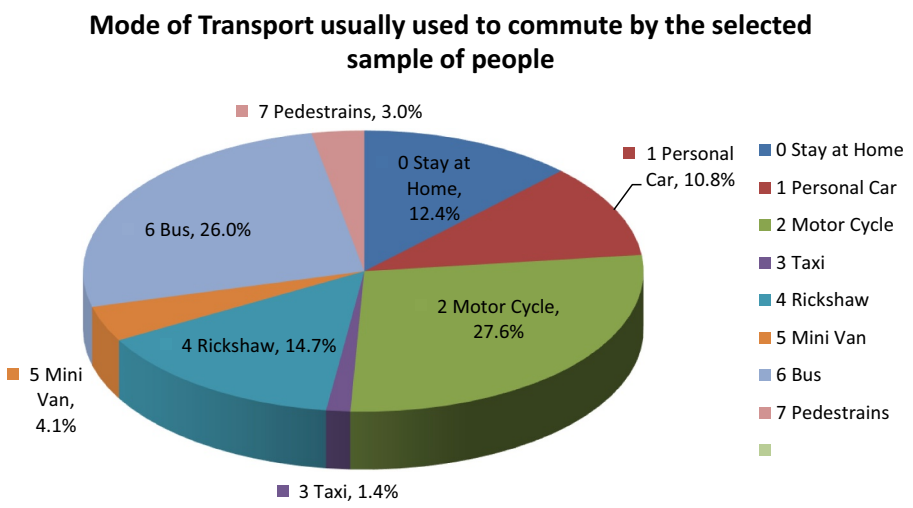

Fig. 1. Mode of transport usually used to commute by the selected sample of people in Karachi (n = 7697).

spread of the metropolitan region of Karachi and modulated the government's focus on sustainable mobility and intelligent transportation system developments to keep Karachi's urban areas dynamic and alive. In this context, urban transportation is a pressing concern in the city and overtakes all other infrastructural developmental concerns (Hasan et al., 1991; Hasan, 2000). Provision of viable, decent, safe, intelligent and sustainable transportation policy, system and infrastructure is viewed as the highest-priority challenge by a wide-margin, and is a prime factor in Karachi's sustainable infrastructural development (Hasan, 2015).

In Karachi, people predominantly prefer to commute via private transport in the form of privately-owned vehicles (Anwar, 2013). While low-income groups typically rely on mini-buses, coaches and rickshaws, middle and higher-income groups prefer to use motor cycles and cars. With increasing rates of motorization, the city is witnessing unprecedented levels of uncontrolled growth of privately-owned vehicles and traffic congestion. The same has been supported by the data collected through the megacity survey[4] (Survey Partnership between The University of Karachi, Karachi, Pakistan and George Mason University, VA, US, 2015-2016). The survey statistics are as follows (See Fig. 1).

2.1. A. Karachi's road transport and network: Facts and figures

- Pakistan's total road network is about 263,775km which carries over 92 percent of passenger traffic (Ministry of Finance, Government of Pakistan, 2013-14).
- Karachi is spread over an area of 3,530 square kilometers, including an urbanized area of 2500 square kilometers and a total road network of over 8000 km (Ministry of Finance, Government of Pakistan, 2013-14)
- The commuters-to-seats ratio for public buses was 40:1 in Karachi a decade ago (Dawn, 2006; Environmental Impact Assessment (EIA), 2015). This ratio has by now doubled, as during the last decade the population of Karachi has risen to 22 million. (Hashim, 2015; KMC, 2016).
- Karachi has roughly 9,527 operational minibuses, as compared to the 22,313 it had in 2011. An additional 8,676 large buses are required to fill the shortfall (Hashim, 2015; Hasan, 2015). Fig. 2 demonstrates a clearer picture of this argument.
- The city has 329 official bus routes. Only 111 are currently being operated, while the others have been abandoned because “they are not considered lucrative by the transporters” (Dawn, 2008; Hasan, 2015; DAWN, 2016).

The rapid global urbanization phenomenon brings problems of urban congestion and mobility. A major contributor to the growing chaos and degradation in Karachi is the city's failure to put in place a mass transit system to support a population now ranging between 20 and 30 million people.

2.2. B. Karachi: transport problems and issues

Karachi's public transport network and system is mainly road based (See Fig. 2). Although, the infrastructure is not as modern and efficient as that of developed mega-cities but considerable attention from the government has made it a little more efficient than it was a decade ago. The author's research indicates that people in Karachi having middle to high income commute by means of personally-owned vehicles. On the contrary, lower-middle and lower-income people use road-based public transport[5] for their daily

[4] (Technical document is available at: https://cssr.gmu.edu/research-projects/university-of-karachi-partnership/megacities2016-karachimegacitiesdata).

[5] Road based public transport is characterized by public buses, public-mini buses, taxi, qingqi rickshaws, motorcycle-rickshaws and auto-

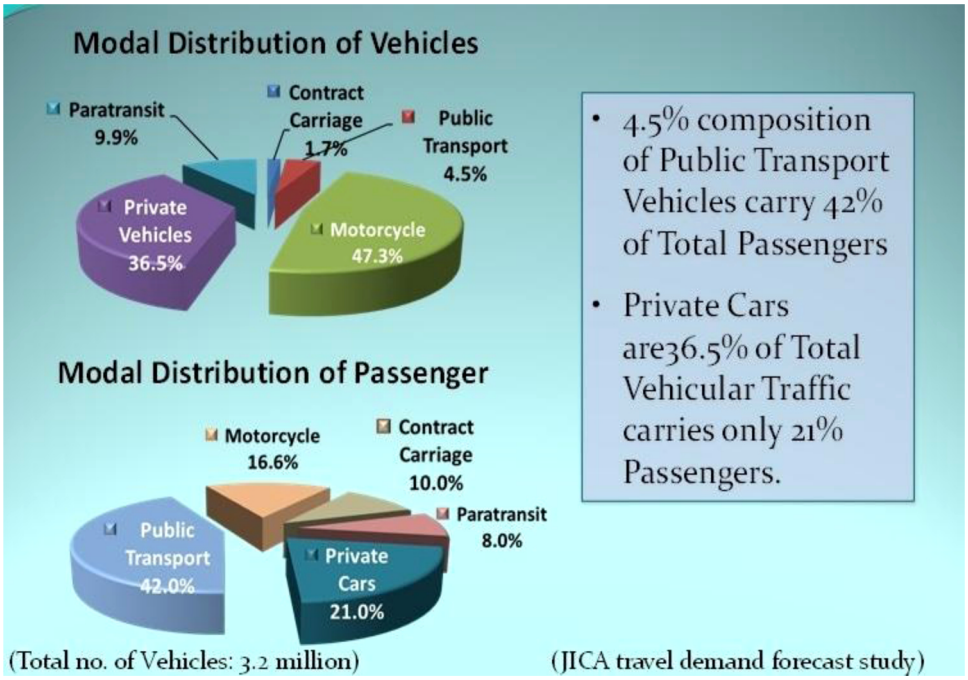

Fig. 2. Source - Karachi's public transport on the verge of collapse: report (Hashim, 2016).

commute (Survey Partnership between The University of Karachi, Karachi, Pakistan and George Mason University, VA, US, 2015-2016).

Major problems and issues of transportation network, system and infrastructure are illustrated below:

- The rapid rise in personal vehicle ownership has resulted in mass motorization on the road transport network (See Fig. 3).
- The commute in Karachi is typified by traffic congestion, poor road conditions and road crashes. Toyota - Indus Motor Company's research on traffic congestion in collaboration with NED University of Engineering and Technology quantified the levels of congestion in Karachi through 'Level of Service through speed' (LOS)[6] = 40 km/h, Road Condition Index (RCI)[7] = 2.36 and Travel Time Index (TTI)[8] = 1.75. The study also calculated the per day traffic congestion cost of the major urban area of Karachi amounting to PKR 10.18 million (USD 0.1018 million per day). The cost will be approximately USD 37.15 million per annum which is very high cost especially when compared to the country's GDP (USD 231.2 billion per annum in 2013) (Toyota Research, 2012-13) [9]. An extrapolation study of traffic congestion indicates that Karachi's traffic congestion cost will exceed USD 1 billion per annum every year and it will exceed to USD 4 billion per annum in 2018 which is representing 2% of the total GDP share of Karachi. The study estimates the plight of traffic congestion as a spiraling burden on the country's economy (Ali et al., 2014, p. 43)

- Another preliminary study published in the African Journal of Biotechnology on fossil fuels consumption and carbon dioxide emission in Karachi highlighted the issue of traffic congestion (Ali and Nitivattananon, 2012). The study suggests that the observed growth in private vehicles between 1990 and 2008, of nearly 656 per cent, far exceeds urban population growth.
- Aggravated congestion due to encroachments and on-street parking in main market streets.
- Dependency on the scanty, unreliable, poorly maintained and outdated public transport.
- Long queues at the bus stops due to the dearth of public buses.
- Compromised quality of public transport compels people to face commuting hardships and puts their safety on stake.

(*footnote continued*)
rickshaws

[6] Level of Service (LOS) is a parameter to quantify level of traffic congestion through travel speed. The level of service of urban street is classified by the defined range of free-flow of speed (FFS) to measure average travel speed (Toyota Research, 2012–13, p. 11)

[7] Toyota Research defines roadway congestion index (RCI) as a determinate to measure the difference between the actual traffic volume and the roadway capacity. It demonstrates the loading condition of the road due to traffic. For instance, a Roadway Congestion Index (RCI) of less than 1 describes that operating conditions to be feasible, whereas any value exceeding one explicitly illustrates the link to be overloaded and encumbered as it exceeds further (Toyota Research, 2012–13, p. 11)

[8] Travel Time Index is the ratio of travel time in peak hours to the travel time in free flow condition (Toyota Research, 2012-13, p. 12).

[9] Toyota Research on Traffic Congestion in collaboration with NED University, 2012–13 (Source:http://www.toyota-indus.com/wp-content/uploads/2012/09/TRTC-Brief-Summary-Report.pdf?3f8f68 (last retrieved: June 10, 2016)

Fig. 3. Courtesy – The Express Tribune[10] (Anwar, 2013).

Fig. 4. Courtesy – Urban Resource Center.
Source: http://www.urckarachi.org/gallery_transport.html

- Limited control of governmental regulatory authorities over the bus operators.

2.3. C. Women mobility and unbridled harassment issues in Karachi

Gender equality is growing at a faster pace at work and education in Karachi (Kirk, 2004; Hussain, 2009; Syed, 2010; Ali, 2011; Chaudhary, 2012). There is an increasing number of women who leave for work and education from their homes. Provision of limited space in public transport for women commuters has become a major impediment in their mobility. Other women' mobility issues include longer hours of waiting for the bus, unsafe and insecure travelling patterns such as facing sexual harassment, physical and emotional stress (Sohail et al., 2006; Hussain, 2009; Sohail, 2000; Social Policy and Development Center SPDC, 2014; Hasan, 2015).

Women in Karachi are not alone facing mobility, safety, sexual assault and harassment issues on buses. Thomson Reuters Foundation highlighted the gravity of the issue across the world by conducting a survey in 15 of the world's largest capitals and in New York, the most populous megacity in the United States. It is significant to mention that three megacities of the world namely London, Beijing and Tokyo were ranked worse than New York. "The survey involved questioning women in each of the 16 cities, as well as experts that focused on women's rights, gender equality, urban planning and gender-friendly urban spaces. The survey was carried out in collaboration with a major UK polling company, YouGov" (Thomson Reuters Foundation, 2014). The poll results ranked Bogota's public transport system as the most unsafe for women (Moloney, 2014).

During rush hour situations in Karachi, some men commuters travel by sitting on roof tops and hanging on doors. Figs. 4 and 5 also support this argument and provide evidence of the scanty transport and depict unavailability/ insufficiency of the public buses for women to commute in Karachi (Hasan, 2007). Unaffordable rikshaw and taxi fares compel them to travel by an unsafe qinjqi rikshaws (Hasan, 2015).

[10] (Source: http://tribune.com.pk/story/649242/urban-planning-transport-sector-in-karachi-fails-to-plan-for-the-common-man/

Fig. 5. Courtesy – Urban Resource Center.
Source: (http://www.urckarachi.org/gallery_transport.html

3. Rationale for hypotheses

In megacities, the outcomes of public opinion polls or surveys have increasingly been projected in the public policy making processes across the world. Unfortunately, Pakistan's largest megacity - Karachi stands far behind in the journey of enumerating public opinion into the public policy as very few surveys have been conducted and given importance or considered in the policy making processes. The following research hypotheses are tested to establish significant relationships between the respondents' concern for the enumeration of public opinion in the policy making process to improve Karachi's Transportation conditions and potential opportunities for the future development of Karachi as a mega city. The focal point of the investigation has been studying public opinion of Karachi's population (across all the seven districts namely Central, East, West, South, Malir, Cantonment and Korangi), with a special emphasis on gender, employment status and commuters to bring substantial improvement in the transportation amenities & services. In particular, public opinion on women mobility, safety, security is tested in the context of sexual harassment issues on buses in Karachi to analyse the possibility of considerable acceptance for reckoning public opinion in the development and execution of public policy.

4. Hypotheses

A. H_0: There is no difference between including or not including public opinion in the policy making process to improve Karachi's transportation situation according to Karachi's Population in all districts.
   H_1:Karachi's Population in all districts affirms that the inclusion of Public Opinion in the Policy making process will help to improve Karachi's Transportation Situation.
B. H_0: There is no difference between including or not including public opinion in the policy making process to improve Karachi's transportation situation according to gender.
   H_1 = Gender affirms that the inclusion of Public Opinion in the Policy making process will help to improve Karachi's Transportation Situation.
C. H_0: Inclusion or exclusion of public opinion in the policy making process to improve Karachi's transportation situation is independent of employment status of Karachiites.
   H_1: Inclusion or exclusion of public opinion in the policy making process to improve Karachi's transportation situation is dependent on employment status of Karachiites.
D. H_0: Inclusion of commuters[11] opinion in the policy making process will not help to improve Karachi's transportation system.
   H_1: Inclusion of commuters' opinion in the policy making process will help to improve Karachi's transportation system
E. H_0: In Karachi, women commuters feel secure and don't face sexual harassment while travelling by public bus.
   H_1: In Karachi, women commuters feel insecure and face sexual harassment while travelling by public bus.

5. Methodology

This megacity transportation survey instrument was developed for collecting information on residents' attitudes, opinion, knowledge and behaviors on current conditions and the critical factors for bringing improvement in the transportation system and making transportation policy more public opinion responsive. The representative survey sample was randomly selected by two-stage cluster sampling techniques. The full survey methodology and sampling details (comparable with the general population of the city)

[11] Commuters: Here commuters in Karachi are classified into 3 categories. 1) People who stays at home. 2) People who commute with other than bus. 3) People who commute with bus.

Table 1
Statistics of the representative survey sample.

Total no. of households	Human Sample (Total no. people)	Age of Human Sample (People of working age)	Gender of Human Sample	
			Males	Females
1,991	7,697	Ranging from 15 to 70 year old	4,110	3,569

are available online on the George Mason University's website at https://cssr.gmu.edu/research-projects/university-of-karachi-partnership/megacities2016-karachimegacitiesdata (Survey Partnership between The University of Karachi, Karachi, Pakistan and George Mason University, VA, US, 2015-2016). The human sample of the following statistics are illustrated below in Table 1.

The survey questions were structured and organized into the following five categories: 1) public transport quality and reliability concern; 2) concerns about the availability and accessibility of public buses; 3) concerns about inclusion of public opinion in the policy making process to improve Karachi's Transportation System; 4) public's inclination in being involved to improve Karachi's Transportation Plan; and 5) Concerns about safety and security during travel.

6. Survey analysis and results

The following discussion is a report on the main findings of the survey that are particularly relevant for understanding the Karachi's residents' sentiments, opinions, knowledge, travel choices and attitudes to deal with the public transport predicaments.

A. Overall level of concern about public transport quality.
B. Precise cognizance of the residents' choices, behaviors, and actions that are germane to transport quality.
C. Enumeration of public opinion in policy making process.
D. Ascertain and infer the residents' knowledge of the travel issues and their impact on society.

The survey findings present a challenge to public officials in learning what the people of Karachi want. The results of the survey provide a precise reflection of the public opinion. The information from a representative sample of Karachi's population (n = 7697)[12] helps public officials in making confident decisions informed by the wishes of the entire population. Key findings of the research include the following.

6.1. Overall level of concern about public transport quality

This research effort sought to identify the relationship between Karachi's residents' over all level of concern about public transport quality in terms of safety (Fig. 6) and gauge the respondents perception on the impact of services they receive during their travel (Fig. 7). Amidst all available modes of transportation, survey respondents reckoned that the bicycle and motorcycle are the most unsafe modes of transport in Karachi. Alarmingly, they have rated the Qinjqi Rikshaw as the safest mode of travel. Qinjqi rickshaws (Motorcycle powered) had been banned in Karachi by the Additional Inspector General (IG) Traffic in 2013. The decision was taken after the disclosure that stolen motorcycles were being used in the rickshaws. Later the Supreme Court of Pakistan had lifted the ban in January 2016 and dissolved the restriction implemented on the Qingqi rickshaws in the economic capital of Pakistan, Karachi. The registration and adherence to the safety standards of the three-wheelers was made imperative for the drivers (Baloch, 2016).

Fifty two percent of the respondents indicate that public buses are the safe mode of public transport (See Fig. 6). On the other hand, the opinions of the respondents who commute by bus is more supportive as 57% consider public bus as a safe mode of transport (See Fig. 7). At the same time, they have expressed relatively high levels of concern about the quality of public bus service and condition. A majority of the respondents rated the physical condition of the public buses as poor. Few reckoned it to be even fair (See Fig. 8). The survey findings support Hasan's (2015) study that documented the responses of the high level of concerns on a host of transportation woes including the physical condition of public buses (Hasan, 2015).

6.2. Precise understanding of individual behaviours, choices and actions that are relevant to transportation and quality service delivery

To ascertain respondents' travel choices, behaviours, and actions that are relevant to transportation and quality of service delivery, they were asked to identify the main reasons for not travelling by public buses. Sixty-eight percent of the respondents indicate that public buses are unreliable, insecure and overcrowded; 66% rated public buses as unsafe; and, only 63% consider public buses as an uncomfortable mode of transport (see Fig. 9).

Respondents were also asked to indicate whether several aspects of the transportation system should be considered least important to most important in a Transportation Plan for Karachi. Majority of the respondents emphasized the need for improvement of the quality of public buses on the roads as the top priority, the second priority was given to the physical condition of the road

[12] Valid n = 5818 in all cases except a few where specific sample of the population is separately studied. 1879 out of 7697 residents were non-responsive.

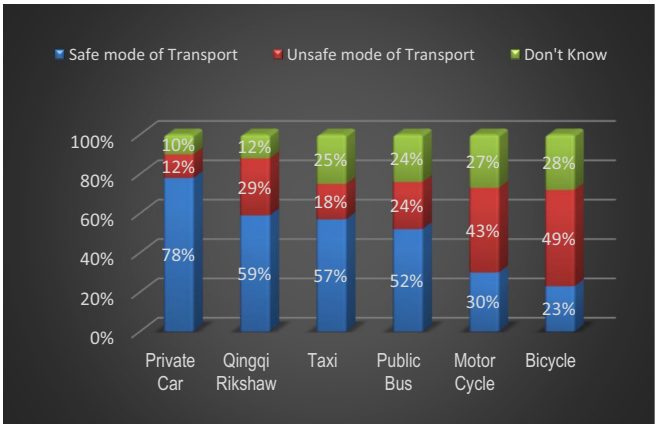

Fig. 6. Modes of Transport in Karachi – Public Opinion on travel safety (n = 5818).

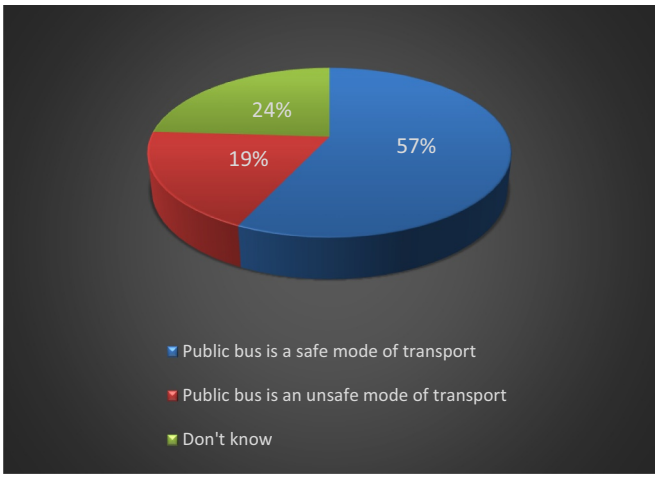

Fig. 7. Commuters opinion on bus safety (People who commute by bus in Karachi n = 1558).

network, and high levels of concern were also shown for the establishment of a vehicle inspection system for public buses (See Fig. 10).

These responses can be used as the key indicators for explaing heterogeneity in the mode of preferences of the respondents. These responses will also help policy makers in the identification of latent variables[13] to improve the transport system in Karachi. In practice, most choice and behavior dimensions are explained by the respondent's socioeconomic factors and alternatives. However, these are not the only variables that explain heterogeneity in the expressed preferences. This has become evident and well accepted from the pioneering of (Koppelman and Pas, 1980) that showed attitudes and perceptions play an important role in the decision-making (policy making) process. They reasoned that attitudes and perceptions cannot be directly observed from the data and are hence considered latent variables.

In transport research, a large body of literature exists on the use of attitudinal latent variables to explain traveler behavior and choices for decision/ policy making processes. More recent studies have discerned that lifestyle preferences play a key role in the residential choice of individuals; this residential choice in turn has an important impact on travel mode choice (Golob, 2003; Scheiner and Holz-Rau, 2007; Chen et al., 2014). Another internet survey conducted in Flanders, Belgium provides confirmatory evidence that travel behavior decisions are significantly affected by residential attitudes (Van Acker and Witlox, 2010).

This megacity survey also suggests that the choices of the residents of Karachi are evolving in support for a better transportation system. These choices create demand for better quality travel. For demand management purposes in particular, it is important to understand the processes of information collection and attitude evolution; better understanding and integrating of residents choices with latent and attitudinal variables can enable agencies and policy makers to more effectively attain policy objectives that target travel demand. Bus Rapid Transport Plan and JICA Project of Mass Transit in Karachi are the examples of integrated choice and latent

[13] In statistics, **latent variables** mean ("lie hidden"), as opposed to observable **variables**, are **variables** that are not directly observed but are rather inferred through a mathematical model from other **variables** that are observed (directly measured).

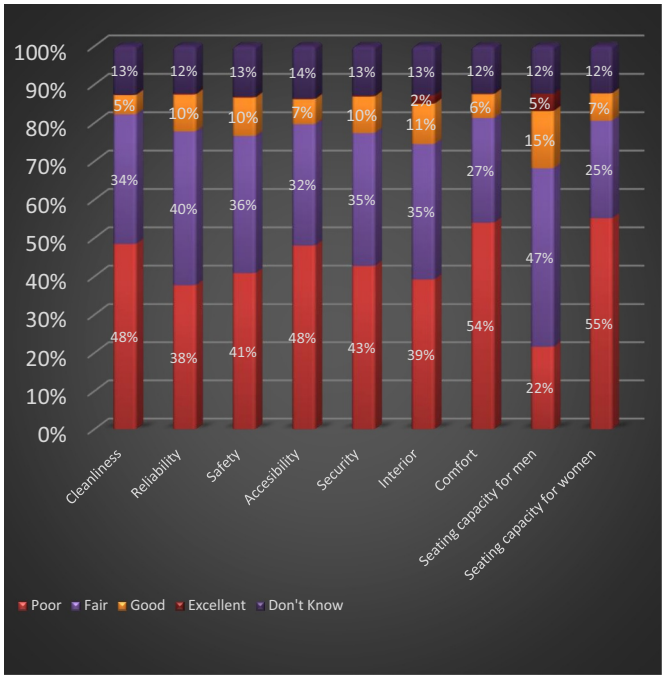

Fig. 8. Response on the survey question: How would you rate the following attributes of public bus service? (n = 5818).

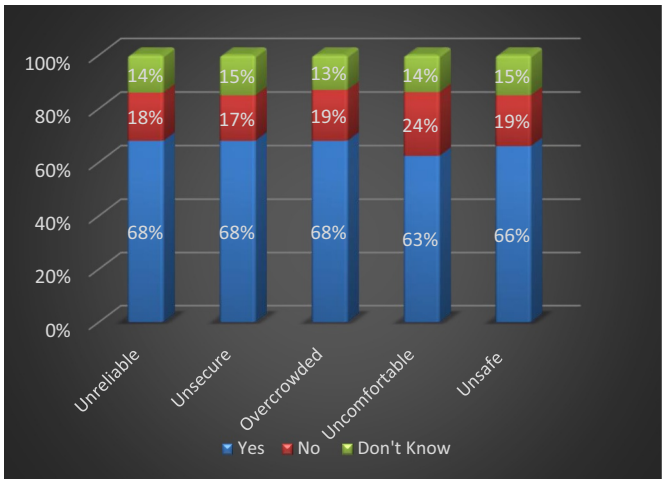

Fig. 9. Reasons for not commuting by Public Buses.

variable models. Further study is needed for the successful and sustainable implementation of these projects. Hence these survey results may become an impetus for further research.

6.3. Enumeration of public opinion in policy making process

In megacities, the reports of the results of public opinion polls or surveys have increasingly become a part of the political and developmental processes across the world. Unfortunately, Pakistan stands far behind in such activities as very few surveys have been conducted and reckoned in the policy making processes.

This local survey describing the public's evaluation of public transportation services accentuates the role of public opinion in policy and practice. Results of this public opinion survey provide the rationale underlying the role of public opinion, highlights existing/ present-day transport conditions and potential opportunities for the future development of Karachi's Transportation System, and outlines many key indicators for providing a quality transportation services to the residents of Karachi. This survey can clarify needs for improvement and embarking upon actions to assist governmental agencies in utilizing the public resources more effectively to improve transport quality.

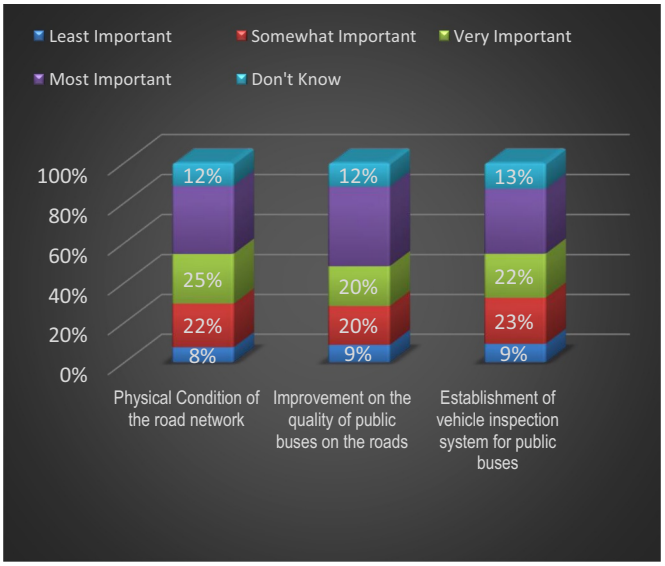

Fig. 10. Response to the question – What aspects of the transportation system should be considered least important to most important in a Transportation Plan for Karachi? (n = 5818).

The research established significant relationships between the respondents' concern for the enumeration of public opinion in the policy making process and with respondents' perception to improve Karachi's Transportation conditions and potential opportunities for the future development of Karachi as a mega city. As noted earlier in the study, the focal point of the investigation has been studying public opinion of Karachi's population (across all the districts), with a special emphasis on gender, employment status and commuters to bring substantial improvement in the transportation amenities & services.

Chi-square tests of goodness of fit/ independence were performed to examine the relation between the following variables. The relation between the variables are found to be significant. The summary of the tests is as follows:

- ***Results for Hypothesis A***: A chi-square test of goodness-of-fit was performed to determine whether, in the view of respondents to the survey, the inclusion of public opinion in the policy making process will help to improve Karachi's transportation situation was equally preferred across the districts. Preference for the inclusion of the public opinion was not equally distributed in the population but proved to be significant as the argument is strongly supported by the data. Overall 78% of the Karachi's population affirms the argument, X^2 (2, N = 5818) = 242.716, $p < 0.05$. (For detailed statistics, please see Appendix 'A'.)
- ***Results for Hypothesis B***: A chi-square test of independence was performed to examine the responsiveness of gender on the inclusion of public opinion in the policy making process will help to improve Karachi's transportation situation. The relation between these variables was significant, X^2 (2, N = 5818) = 23.177, $p < 0.05$. Men are more likely to support the inclusion of public opinion in the policy making process than women. (For detailed statistics, please see Appendix 'A'.)
- ***Results for Hypothesis C***: A chi-square test of independence was executed to determine if there was a statistically significant difference in enumerating public opinion in the policy making process based on the employment status of Karachi's residents. The relation between these variables was significant, X^2 (2, N = 5818) = 39.746, $p < 0.05$. Employed and self-employed residents of Karachi are more likely to support the inclusion of public opinion in the policy making process than unemployed. (For detailed statistics, please see Appendix 'A'.)
- ***Results for Hypothesis D***: A chi-square test of goodness-of-fit was used to analyze if there was a difference in the commuters'[14]opinion for bolting public opinion with the policy and practice. Preference on enumeration of public opinion in the policy making process for improving the transportation set up and conditions in Karachi. Preference for the inclusion of the public opinion was not equally distributed in the population but proved to be significant as the inclusion of public opinion is strongly favored by the commuters. Overall 79% of the Karachi's population advocate the inclusion of public opinion policy development, X^2 (2, N = 5818) = 36.846, $p < 0.05$. (For detailed statistics, please see Appendix 'A').

6.4. The residents' knowledge of the travel issues and their impact on society

- *Travel issues impact the quality of life*:

To gauge the impact of travel by over-crowded and poorly maintained public buses on society and to ascertain respondents'

[14] See footnote 5 for commuters' details.

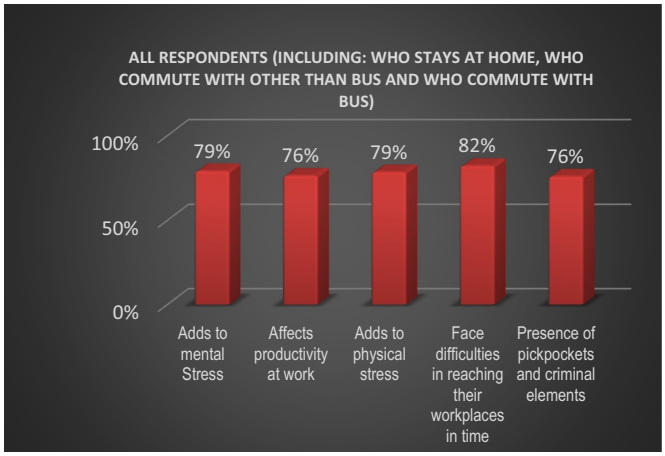

Fig. 11. Do you think travel by public buses has the following negative impacts on the society? (n = 5818).

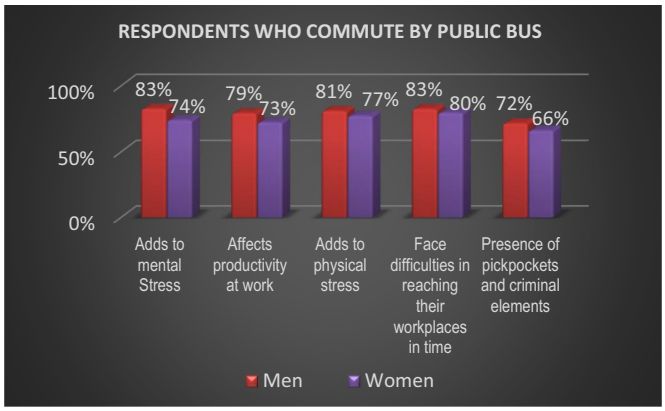

Fig. 12. Do you think travel by public buses has the following negative impacts on the society? (n = 1628).

knowledge on the issue; a series of factors were accounted-for in the survey questions. The following series of graphs shows the overall and commuters'[15] specific views in terms of percentages of responses to questions related to the issue. Overall survey results indicate that 79% of the sample subjects say that the poorly managed public buses adds to the mental and physical stress of the commuters which in turn affects their productivity and effectiveness at work. However, 82 percent of the respondents state that they face difficulties in reaching their workplaces due to dependence on the scanty and ill-maintained public buses. Moreover, 76 percent of the population is afraid of travelling by buses because of the presence of pickpockets and other criminals (See Fig. 11). Responses of the people who commute by public buses paint a more disturbing picture as their percent of weighted responses are much higher than the overall response. Amongst these respondents, male gender is more responsive than females. Their responses are most likely the best indicators of measuring the negative impact of bus travel on society (See Fig. 12).

- *Women face issues of sexual harassment on public buses:*

Sexual harassment on buses has become a daily ordeal for women commuters in Karachi (Hashim, 2015; DAWN, 2016; Khan and Samma, 2016). Due to several socio-economic related reasons, women are stepping out of their houses to attain work, but unavailability of a safe and secure public transport system makes life difficult for them. The research findings are also supported by another authentic study conducted by Social Policy and Development Center on 'Rapid Assessment of Sexual Harassment in Public Transport and Connected Spaces in Karachi'. For reference, (Social Policy and Development Center SPDC, 2014). The report emphasizes on the high prevalence of harassment issues on buses.

In particular, 55% of the women who commute by public buses say that they feel insecure and face sexual harassment whereas 62% of the women who don't travel by public buses expressed a higher level of concern and highlighted the sensitivity of the issue in this survey (See Fig. 13). The district East has been rated as the most unsafe area for women commuters with 83% affirming this argument (See Fig. 14). Further, 70% of the women respondents say they don't commute by bus because of the limited seating

[15] Survey Respondents who commute by bus in Karachi.

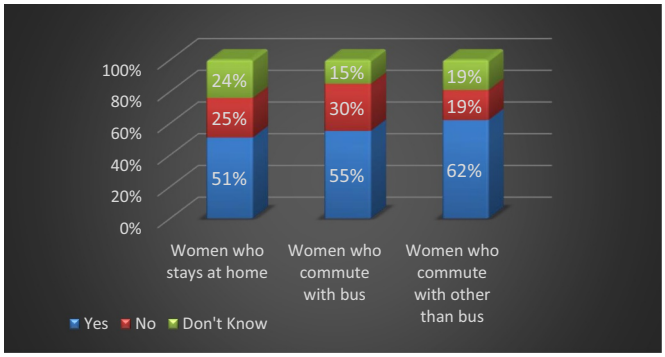

Fig. 13. Do you think women feel insecure and face sexual harassment on buses (n = 2698)?.

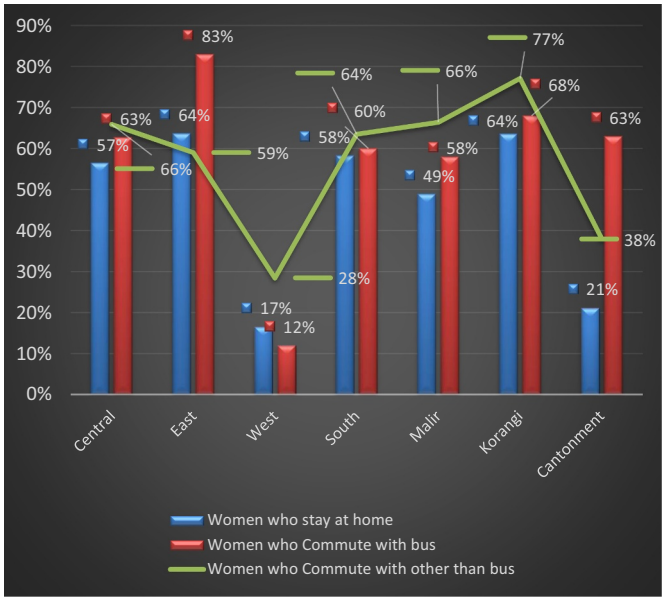

Fig. 14. Do you think women feel insecure and face sexual harassment on buses (n = 2698)?.

capacity. This finding seems to support the Urban Resource Center's report, cited earlier. The finding also supports another report published in The Daily Dawn on the topic of harassing women on buses -– "When will Pakistani men stop harassing women on buses?" (Nabi, 2016). Women who participated in this study shared similar narratives accentuating the women mobility issues as well. This report states that "Men in cars or on motorbikes stop next to them, offering them a lift, often persistently. When women refuse and continue waiting for their bus/ride, men start pestering them and harassing them". The report emphasizes that women face harassment at bus stops too. Given this insight, the government needs to take adequate measures for curbing the daily ordeal and anguish women experience while travelling on public buses - not only physically, but emotional and mental too.

- ***Results for Hypothesis E***: A chi-square test of independence was performed to examine the significance of the claim that women commuters feel insecure and face sexual harassment on public buses. The test results are significant, $X2\ (2, N = 2698) = 234.245$, $p < 0.05$. The chi-square statistic indicates that unbridled sexual harassment on public buses is predominantly an issue every other woman commuter is forced to confront.

6.5. Discussion for results and implications for transport policy and planning

This megacity survey evinces the public transport plight in Karachi. Public opinion as a reality check; highlights the gravity of transportation predicaments in the mammoth city with ever-increasing population. The city deserves an intelligent public transport system, network and service; but, no special heed was ever paid to enumerate public opinion into the policy-making process by the

government.

Karachi bus service has been identified as a key issue of mismanagement through this survey. It is purely a failure of governmental agencies that should regulate and monitor the service. Absence of public opinion and policy coherence questions the ability of the governmental administrative agencies to function effectively. Currently, the public transport services are not able to cope with the current and increasing travel demand; this results in the dire need to organize transport service by providing mass transit options on subsidized rates.

Principles of sustainable transport suggest that the State must provide low cost transportation services to its citizens that are capable of absorbing high density population while providing high mobility with high quality travel.

In the recent years, investment have been made to strengthen surface transportation (Projects like: Metro Bus and Mass Rapid Transit) through public private partnership in Lahore to provide efficient, economical, comfortable and safe transport facility for the public (Imran and Low, 2003). Keeping the Karachi's residents' choices, attitudes and behaviors in view, the same model can be implemented in the city as this is considered appropriate for improving the megacity's transportation condition and absorbing traffic intensity variations (Master Plan group of Offices City District Government Karachi in Association with M/sEngineering consultant Pvt. Ltd., 2007) However, in December 2012, a comprehensive study was conducted for Karachi Transportation Improvement Project (KTIP – 2030) in collaboration with JICA[16] and KMTC[17] (Karachi Mass Transit Cell (KMTC) and Japan International Cooperation Agency (JICA), 2012). In 2014, the Prime Minister of Pakistan announced to provide an infrastructure component to launch the Bus Rapid Transit (BRT) Green Line project on modern lines to alleviate and serve traffic congestion problems in Karachi and to improve the quality of life of the daily commuters by improving the existing transport system. The project implementation had remained in a deadlock for couple of years. Recently, the government has drawn its attention to this pressing issue and Chief Secretary Sindh - Muhammad Siddique Memon has asked the Secretary of Transport to expedite the implementation of Bus Rapid Transit System (BRTS) project for facilitating Karachiites local travel (The Information Department, Sindh Secretariat, 2015). A leading architect and urban researcher – Mr. Asif Hasan has also suggested BRTS are the best solution for the city since the 1975-85 Karachi's Master Plan was prepared. Hasan confidently recommended in one of his transportation researches that if these projects materializes, traffic engineering and mass transit will change the city for the better (Hasan, 2014).

Like other studies, this research also exposes the perils of sexual harassment working women experience in the mega city of Karachi. They cannot commute in a respectable manner to their workplaces and back home. Recently, Karachi was found to be the 2nd most dangerous megacity for women in Thompson Reuters Foundation survey 2017 (Reuters Staff, 2017). In 2011, Pakistan was ranked as the third most dangerous country in the world for women, after Afghanistan and Democratic Republic of Congo in Thomson Reuters Foundation's Trust Law Polls (Anderson, 2011). In a country where more serious crimes against women continue despite laws of women protection, there is no hope of any improvement in their mobility plight. Bogota's case flickers the ray of hope to improving the safety conditions for women commuters in Karachi. In 2014, Bogota's public transport system ranked the city as the most unsafe for women. The city's Mayor – Gustavo Petro took excellent measures to arrest the perpetrators behind this serious crime. Upon receiving a spate of sexual harassment complaints from women passengers, Bogota's mayor deployed undercover policewomen on buses and stations and the perpetrators got arrested red-handed on the spot. The strategy implemented was very successful and brought a dramatic decline in the number of filed sexual harassment cases (Moloney, 2014). To mitigate the risk of sexual harassment on buses and bus stops in Karachi, the provincial government must activate law enforcement agencies to take strict action.

7. Conclusion and recommendations

This described survey instrument was initiated to discover the policy and planning solutions for Karachi's transportation problems in the light of public opinion. In the context of policy development and public involvement, there is a need to better understand how residents' attitudes shape household behaviours and what behaviours require targeted civic education to use modern transportation systems.

The significant inclination of the residents of Karachi towards inclusion of public opinion into the policy-making process may be regarded as a sheer observation of preference for congruence between opinion and policy. The preference for congruence indicates that Karachiites believe in democratic responsiveness that demands a direct impact of public preferences on public policy (which means changes in public preference cause changes in policy). In Karachi's case, it is reasonable to infer that policy has not affected public opinion. It is evident from the research that a high proportion of the changes in public behaviours, choices and actions that are relevant to transportation and quality service delivery have forced the policy-makers to develop mass transit plans for the megacity of Karachi.

The increasing trend in the daily transport troubles has identified an ineludible need for the following immediate steps to be taken by the governmental machinery to address the Karachi's transportation woes.

[16] Japan International Cooperation Agency

[17] Karachi Mass Transit Cell

- Rapid Mass Transit Plans should to be contrived and effectuated without any delays to provide accessible, reliable, affordable, safe, high quality and time saving travelling.
- In spirit of sustainability, a comprehensive policy should be developed to regulate, monitor and maintain a robust transport system in the megacity of Karachi.
- Establish a vehicle inspection and certification system to improve road safety.
- Karachi's Local Government should design a accountability mechanism to provide safer transportation to women. All transporters should be held accountable legally by concerned authorities. Immediate legislation is required in this regard.
- Despite of the enactment of 'The Protection Against Harassment of Women at the Workplace Act[18], in 2010, women are not safe on the roads and buses. The act applies solely to working environments. This has become an urgent need of the time to frame a law enabling women to fight and manage harassment on public transport vehicles as well.
- Karachi's Local Government should introduce and run civic education campaigns to help people learn about their legal rights and obligations. In this connection, policy awareness and advocacy training should be made compulsory in all educational institutions and workplaces to spread awareness among commuters about their safety rights.

Political instability and rapid shifts in governance structures (from political to bureaucratic systems) are the fundamental issues in dealing with the transport predicaments in Karachi (Central Intelligence Agency of the United States of America, 2006; Masood et al., 2011; Matin et al., 2012; Hasan, 2015; The Borgen Project, 2017). The implementation of Rapid Mass Plans and other transport programs have suffered a lot due to the absence of sustainable leadership at the local level. The transporters, government officials and the public are in agreement that Karachi needs a modern transportation system which alone can provide comfortable means of commuting. Overall, the research indicates that the megacity of Karachi must shift from the passive administration of transportation services to active management of its infrastructures.

Acknowledgment

This paper was presented at the Managing Megacity Conference 2016; the author thanks the Conference Thematic Chair Dr. Kenneth Button and other attendees for logical and constructive questions/feedback which have strengthened the analysis. The author would like to acknowledge and thank Dr. Roger R. Stough, Dr. James. C. Witte, Dr. Mehtab S. Karim, and Dr. Shah J. Alam for their guidance and supervision in developing this scholarly piece of work for the International Conference 2016 on 'Managing Megacities'; jointly organized by George Mason University, Virginia, USA and the University of Karachi, Karachi, Pakistan. Prof. Roger Stough's name is of prime importance as he helped the author in the completion of this research work with high standards of professionalism. It was made possible by a grant from the US Department of State/US Embassy, Islamabad. Last but not the least, the names of Drs. Abuzar Wajidi and Khalid. M. Iraqi are also important to mention as they nominated the author for the US Exchange Program.

Financial disclosure

The author did not receive any specific funding for this work.

Conflict of interest

None.

Appendix A. Hypotheses testing results

Hypothesis A

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Recodedf3_q64 Public Opinion * district District of Residence	5818	75.8%	1861	24.2%	7679	100.0%

[18] Source: The Women Protection Against Harassment Act can be read at https://www.qau.edu.pk/pdfs/ha.pdf

Public Opinion * District of Residence Crosstabulation

			District District of Residence							Total
			1 Central	2 East	3 West	4 South	5 Malir	6 Korangi	7 Cantonment	
Recodedf3_q64 Public Opinion	1.00 No	Count	125	48	89	56	73	24	50	465
		% within district District of Residence	6.9%	3.6%	10.1%	12.8%	15.7%	4.0%	18.7%	8.0%
	2.00 Yes	Count	1535	1115	682	286	328	463	175	4584
		% within district District of Residence	84.7%	82.5%	77.3%	65.6%	70.7%	76.8%	65.3%	78.8%
	3.00 Don't Know	Count	153	189	111	94	63	116	43	769
		% within district District of Residence	8.4%	14.0%	12.6%	21.6%	13.6%	19.2%	16.0%	13.2%
Total		Count	1813	1352	882	436	464	603	268	5818
		% within district District of Residence	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	242.716[a]	12	.000
Likelihood Ratio	233.475	12	.000
Linear-by-Linear Association	2.680	1	.102
N of Valid Cases	5818		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 21.42.

Hypothesis B

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Recodedf3_q64 Public Opinion * f1_q1b HH2-Sex of the Household member	5818	75.8%	1861	24.2%	7679	100.0%

Public Opinion * HH2-Sex of the Household member Crosstabulation

			f1_q1b HH2-Sex of the Household member		Total
			1 Male	2 Female	
Recodedf3_q64 Public Opinion	1.00 No	Count	248	217	465
		% within f1_q1b HH2-Sex of the Household member	7.9%	8.0%	8.0%
	2.00 Yes	Count	2521	2063	4584
		% within f1_q1b HH2-Sex of the Household member	80.8%	76.5%	78.8%
	3.00 Don't Know	Count	351	418	769
		% within f1_q1b HH2-Sex of the Household member	11.2%	15.5%	13.2%
Total		Count	3120	2698	5818
		% within f1_q1b HH2-Sex of the Household member	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.177[a]	2	.000
Likelihood Ratio	23.113	2	.000
Linear-by-Linear Association	11.892	1	.001
N of Valid Cases	5818		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 215.64.

Hypothesis C

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Recodedf3_q64 Public Opinion * Q1irecoded Employment Status	5818	75.8%	1861	24.2%	7679	100.0%

Public Opinion * Employment Status Crosstabulation

			Q1irecoded Employment Status			Total
			1.00 Employed	2.00 Self Employed	3.00 Other	
Recodedf3_q64 Public Opinion	1.00 No	Count	139	42	284	465
		% within Q1irecoded Employment Status	7.4%	8.1%	8.3%	8.0%
	2.00 Yes	Count	1530	438	2616	4584
		% within Q1irecoded Employment Status	81.8%	84.1%	76.3%	78.8%
	3.00 Don't Know	Count	201	41	527	769
		% within Q1irecoded Employment Status	10.7%	7.9%	15.4%	13.2%
Total		Count	1870	521	3427	5818
		% within Q1irecoded Employment Status	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	39.746[a]	4	.000
Likelihood Ratio	41.635	4	.000
Linear-by-Linear Association	9.716	1	.002
N of Valid Cases	5818		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 41.64.

Hypothesis D

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Recodedf3_q64 Public Opinion * commuter	5818	75.8%	1861	24.2%	7679	100.0%

Public Opinion * commuter Crosstabulation

			Commuter			Total
			.00 Stays at home	1.00 Commutes with other than bus	2.00 Commutes with bus	
Recodedf3_q64 Public Opinion	1.00 No	Count	33	264	168	465
		% within commuter	4.6%	7.6%	10.3%	8.0%
	2.00 Yes	Count	559	2766	1259	4584
		% within commuter	77.5%	79.7%	77.3%	78.8%
	3.00 Don't Know	Count	129	439	201	769
		% within commuter	17.9%	12.7%	12.3%	13.2%
Total		Count	721	3469	1628	5818
		% within commuter	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.846[a]	4	.000
Likelihood Ratio	36.691	4	.000
Linear-by-Linear Association	26.361	1	.000
N of Valid Cases	5818		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 57.63.

Hypothesis E

Chi-Square Tests

commuter	Women		Value	df	Asymp. Sig. (2-sided)
2.00 Commutes with bus	.00 Women	Pearson Chi-Square	234.245[d]	12	.000
		Likelihood Ratio	261.840	12	.000
		Linear-by-Linear Association	1.004	1	.316
		N of Valid Cases	760		
	Total	Pearson Chi-Square	234.245[d]	12	.000
		Likelihood Ratio	261.840	12	.000
		Linear-by-Linear Association	1.004	1	.316
		N of Valid Cases	760		

a. 4 cells (19.0%) have expected count less than 5. The minimum expected count is 2.90.

References

Ali, G., Nitivattananon, V., 2012. Exercising multidisciplinary approach to assess interrelationship between energy use, carbon emission and land use change in a metropolitan city of Pakistan. Renew. Sustain. Energy Rev. *16* (1), 775–786.

Ali, M.S., Adnan, M., Nomana, S.M., Abbas, S.F., 2014. Estimation of Traffic Congestion Cost-A Case Study of a Major Arterial in Karachi. Procedia Eng. 77, 37–44. Retrieved 02 March 2018. https://www.researchgate.net/profile/Muhammad_Adnan41/publication/265386321_Estimation_of_Traffic_Congestion_Cost-A_Case_Study_of_a_Major_Arterial_in_Karachi/links/559130ad08ae15962d8c8a2a/Estimation-of-Traffic-Congestion-Cost-A-Case-Study-of-a-Major-Arte.

Ali, T.S., 2011. Gender roles and their influence on life prospects for women in urban Karachi, Pakistan: a qualitative study. Glob. Health Action *4* (10). https://doi.org/10.3402/gha.v4i0.7448.

Anderson, L., 2011, July 15). TRUSTLAW POLL-Afghanistan is most dangerous country for women. Retrieved July 31, 2017, from 〈http://news.trust.org//item/?Map=trustlaw-poll-afghanistan-is-most-dangerous-country-for-women/〉.

Anwar, F., 2013. Urban planning: transport sector in Karachi fails to plan for the common man. Urban planning: transport sector in Karachi fails to plan for the common man. The Express Tribune, Karachi, Sindh, Pakistan (December 23). 〈http://tribune.com.pk/story/649242/urban-planning-transport-sector-in-karachi-fails-to-plan-for-the-common-man/〉.

Arrow, K.J., 1963. Social choice and individual values. (orig. pub, 1951). John Wiley and Sons, New York.

Baloch, S., 2016, January 15). Qingqi rickshaws likely to be back on Karachi roads next week. Karachi, Sindh, Pakistan: Dawn. Retrieved from 〈http://www.dawn.com/news/1233001〉.

Central Intelligence Agency of the United States of America, 2006. Pakistan Population Problems and Political Stability (U). Central Intelligence Agency of the United States of America, Washington, D.C (Retrieved October 05, 2018). 〈https://www.cia.gov/library/readingroom/docs/CIA-RDP94T00754R000200070010-2.pdf〉.

Chaudhary, A.R., 2012. An analysis of different approaches to women empowerment: a case study of Pakistan. World Appl. Sci. J. *16* (7), 971–980.
Chen, Y., Frei, A., Mahmassani, H., 2014. From personal attitudes to public opinion: information diffusion in social networks toward sustainable transportation. Transp. Res. Rec.:J. Transp. Res. Board 28–37. (Retrieved from). 〈http://trrjournalonline.trb.org/doi/abs/10.3141/2430-04〉.
Dahl, R.A., 1956. A Preference to Democratic Theory. University of Chicago Press, Chicago.
Dawn, (2006, June 08). KARACHI: Large buses only solution to transport problem. Retrieved from Dawn: 〈https://www.dawn.com/news/196123〉.
Dawn. (2008, September 30). Public transport situation worsening in Karachi. Dawn. Karachi, Sindh, 730 Pakistan: The Daily Dawn. Retrieved from 〈http://www.dawn.com/news/970556/public-transport-situation-worsening-in-karachi〉.
DAWN. (2016, May 12). How often do Pakistani women get harassed on public transport? You would be surprised. Retrieved September 01, 2016, from 〈https://youtu.be/YHkLYALV4HI〉.
Demographia, 2014. Demographia World Urban Areas Report. Belleville, IL 62222 USA: Demographia.
Demographia, (2016, April). Demographia World Urban Areas 12th Annual Edition. Retrieved from 〈http://www.demographia.com〉: 〈http://www.demographia.com/db-worldua.pdf〉.
Demographia, 2018. Demographia World Urban Areas (14th Annual Edition). Belleville, IL 62222 USA: Demographia. Retrieved October 01, 2018, from 〈http://www.demographia.com/db-worldua.pdf〉.
DESA, United Nations, 2006. World Urbanization Prospects: The 2005 Revision. United Nations, Department of Economic and Social Affairs, Population Division. New York: UN publications. Retrieved from 〈http://www.un.org/esa/population/publications/WUP2005/2005WUPHighlights_Final_Report.pdf〉.
Environmental Impact Assessment (EIA), 2015. Green Line Bus Transit System. EMC Pakistan Private Limited, Karachi (Retrieved February 23, 2018, from). 〈http://shehri.org/laws/Final%20Report%20-%20Green%20Line_opt.pdf〉.
Ferrer, M., 2015. Karachi: Megacity of Woes. The New School of Public Engagement, New York. 〈http://s3.amazonaws.com/academia.edu.documents/37973322/Ferrer_Mildred_.pdf?AWSAccessKeyId=AKIAJ56TQJRTWSMTNPEA&Expires=1471595276&Signature=L4Iq9ABjM4aYWavZTsDK2LGu52Y%3D&response-content-disposition=inline%3B%20filename%3DKarachi_City_of_Woes.pdf〉.
Golob, T., 2003. Structural Equation Modeling for Travel Behavior Research. Transp. Res. Part B: Methodol. *37* (1), 1–25.
Haq, M., 2014. The Rise of Karachi as a Megacity: Issues and Challenges. Human Development Center, Lahore, Pakistan.
Hasan, A., 2000. Understanding Karachi. City Press, Karachi.
Hasan, A., 2007. The Urban Resource Centre, Karachi. Environ. Urban. *19* (1), 275–292.
Hasan, A., 2014. The Karachi Circular Railway Imperatives. Retrieved from 〈http://arifhasan.org/articles/the-karachi-circularrailway-〉.
Hasan, A., 2015. Karachi: The Transport Crisis – A Report. Urban Resource Center, Karachi, Pakistan.
Hasan, et al., 1991. Karachi Master Plan: Report of the Evaluation Mission for the UNDP. UNDP, Islamabad.
Hashim, A., 2015, (January 23). Karachi's public transport on the verge of collapse: report. Retrieved from The Daily Dawn: 〈https://www.dawn.com/news/1158772〉.
Hussain, I., 2009. Problems of Working Women in Karachi, Pakistan. Cambridge Scholars Publishing, Newcastle upon Tyne.
Imran, M., Low, N., 2003. Time to change the old paradigm: promoting sustainable urban transport in Lahore, Pakistan. World Transp. Policy Pract. 9 (2), 1–13. 〈http://purclhr.co.nf/wp-content/uploads/2015/08/Time-to-Change-the-Old-Paradigm-Promoting-Sustainable-Urban-Transport-in-LahorePakistan.pdf〉.
Karachi Mass Transit Cell (KMTC) and Japan International Cooperation Agency (JICA), 2012. Karachi Transportation Improvement Project Green Line Bus Rapid Transit System. Ministry of Communications Govt. of Pakistan, Karachi (Retrieved from). 〈http://greenline.gov.pk/doc/Business-Plan-BRT.pdf〉.
Key, V.O., 1961. Public Opinion and American Democracy. Alfred A. Knopf, NewYork.
Khan, N. from Samma T., 2012 (September 22). "Exclusive report on eve-teasing and harassment of women including cat-calling, ogling and teasing in public buses of Karachi.". Retrieved from 〈https://www.facebook.com/nazahat.khan/videos/vb.100002225817434/1146963962054453/?Type=2&theater〉.
Kirk, J., 2004. Impossible fictions: the lived experiences of women teachers in Karachi. Comp. Educ. Rev. *48* (4), 374–395.
KMC, 2016, March 1. Retrieved from Official Website of the Karachi Metropolitan Corporation: 〈http://www.kmc.gos.pk/〉.
Koppelman, F.S., Pas, E.I., 1980. Travel-choice behavior: models of perceptions, feelings, preference, and choice. Transp. Res. Rec. *765*, 26–33. 〈https://trid.trb.org/view.aspx?id=166900〉.
Masood, M.T., Khan, A., Naqvi, H.A., 2011. Transportation problems in developing countries Pakistan. Int. J. Bus. Manag. *6* (11), 256–266. (Retrieved October 05, 2018, from). 〈http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.885.3656&rep=rep1&type=pdf〉.
Master Plan group of Offices City District Government Karachi in Association with M/s Engineering Consultant (Pvt.) Ltd, 2007. Karachi Strategic Development Plan 2020. Karachi: Master Plan group of Offices City District Government Karachi.
Matin, F., Herani, G.M., Warraich, U.A., 2012. Factors affecting traffic jam in Karachi and its impact on performance of economy. KASBIT Bus. J. *5*, 25–32. (Retrieved October 05, 2018, from). 〈https://www.kasbit.edu.pk/KBJVol_5/4%20Faiq%20Matin%20-%20FINDING%20FACTORS%20OF%20TRAFFIC%20JAM%20IN%20KARACHI%20AND%20ITS%20IMPACT.pdf〉.
Mill, J.S., 1962. Considerations on Representative Government. (orig. pub. 1861). Henry Regnery, Chicago.
Ministry of Finance, Government of Pakistan, 2013. Pakistan Economic Survey. Government of Pakistan, Ministry of Finance (14). Government of Pakistan, Islamabad (14). 〈http://finance.gov.pk/survey_1314.html〉.
Moloney, A., 2014, October 30. Thomson Reuters Foundation Poll. Bogota's public transport system ranked most unsafe for women in Thomson Reuters Foundation poll of world's largest capitals. Thomson Reuters Foundation News. Retrieved from 〈http://news.trust.org/item/20141030015320-122l6/?Source=spotlight〉.
Nabi, I., 2016, May 12. When will Pakistani men stop harassing women on buses? Retrieved from 〈http://www.dawn.com/news/1244564〉.
Neom, 2017. , November 04). Top 10 largest megacities in the world 2018. Retrieved from Neom News: 〈https://neomsaudicity.net/top-largest-megacities-2017/〉.
Oldendick, R.W., 2002. The Role of Public Opinion in Policy and Practice. Public Policy and Practice - USC Institute for Public Service and Policy Research, pp. 29–35.
Page, B.I., Shapiro, R.Y., 1983. Effects of public opinion on policy. Am. Political Sci. Rev. *77* (01), 175–190.
Qureshi, S., 2010. The fast growing megacity Karachi as a frontier of environmental challenges: urbanization and contemporary urbanism issues. J. Geogr. Reg. Plan. *3* (11), 306–321.
Reuters Staff, 2017, October 16). EXCLUSIVE -Cairo named most dangerous megacity for women; London best - poll. (Thomson Reuters Foundation) Retrieved November 01, 2017, from 〈https://af.reuters.com/article/africaTech/idAFL8N1L74J3〉.
Robotka, B., 2013. Political turmoil in a megacity: the role of Karachi for the stability of Pakistan and South Asia. Pak. Vision. *14* (2), 1–25.
Scheiner, J., Holz-Rau, C., 2007. Travel mode choice: affected by objective or subjective determinants? Transportation *34*, 487–511.
Sen, A.K., 1970. Collective Choice and Social Welfare. Holden-Day, San Francisco.
Siemens, 2010. Megacity Challenges. A stakeholder perspective. Siemens AG. 〈http://w1.siemens.com/entry/cc/features/urbanization/_development/all/en/pdf/study/_megacities/_en.pdf〉. Accessed.
Social Policy and Development Center (SPDC), 2014. *Rapid Assessment of Sexual Harassment In Public Transport and Connected Spaces in Karachi.* Karachi: Asian Development Bank for ADB RETA 7563: Promoting Gender Inclusive Growth in Central and West Asia Developing. Retrieved from 〈https://www.adb.org/sites/default/files/project-document/152881/44067-012-tacr-19.pdf〉.
Sohail, M., 2000. Urban Public Transport and Sustainable Livelihoods for the Poor: A Case Study: Karachi, Pakistan. Water, Engineering and Development Centre, Loughborough University, Leicestershire.
Sohail, M., Maunder, D.A., Cavill, S., 2006. Effective regulation for sustainable public transport in developing countries. Transp. Policy *13* (3), 177–190.
Soroka, S.N., Wlezien, C., 2005. Opinion–policy dynamics: public preferences and public expenditure in the United Kingdom. Br. J. Political Sci. *35* (*04*), 665–689.
Survey Partnership between The University of Karachi, Karachi, Pakistan and George Mason University, VA, US. (2015–2016, April 01). Megacities 2016: Karachi Megacities Data. Retrieved from Center for Social Science Research, George Mason University: 〈https://cssr.gmu.edu/research-projects/university-of-karachi-partnership/megacities2016-karachimegacitiesdata〉.
Syed, M.B., 2010. Women empowerment through higher education. Univ. News, Wkly. J. High. Educ. *48*, 25–31.
The Borgen Project, 2017, December 11). Solving the Challenges of Infrastructure in Pakistan. Retrieved from The Borgen Project: 〈https://borgenproject.org/

infrastructure-in-pakistan/〉.
The Information Department, Sindh Secretariat, 2015, July 28). Sindh Chief Secretary presides Bus Rapid Transit System project meeting. Karachi, Sindh, Pakistan. Retrieved from 〈http://officialnews.pk/79903/sindh-chief-secretary-presides-bus-rapid-transit-system-project-meeting/〉.
Thomson Reuters Foundation, 2014. Thomson Reuters Foundation Poll. Ranking the Most Dangerous Transport Systems for Women in Major Cities (November 06). Thomson Reuters Foundation News (November 06). 〈http://thomsonreuters.com/en/articles/2014/most-dangerous-transport-systems-for-women.html〉.
Toyota Research, 2012. Toyota Research on Traffic Congestion in collaboration with NED University (13). Toyota, Karachi.
Van Acker, V., Witlox, F., 2010. Car ownership as a mediating variable in car travel behaviour research using a structural equation modeling approach to identify its dual relationship. J. Transp. Geogr. *18* (1), 65–74.