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Public Transport in Karachi: A Study of Relationship between Consumer Perception and Use of Private Vehicles

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Key Words:

Public Transport, Karachi, Consumer Perception, Private Vehicles.

Abstract:

The significance of public transport is undeniable which has further increased with the increase in population. With a population of 14.91 million people, public transport available in Karachi is both inadequate and inefficient. The growing number of private cars on road has added to traffic, pollution, and congestion. In order to determine the impact of dissatisfaction towards the quality of public transport on preference towards private vehicles, a survey was distributed among 76 respondents. Evaluation of results partially proved the hypothesis and showed that dissatisfaction towards consistency of transit time, comfortability, and quality are the key determinants of use of private vehicles while dissatisfaction towards fare charges and walking distance to stop was found to have no influence on this preference.

1. Introduction

Mass transit and transport system plays an integral role in the stabilization of urban infrastructure and in facilitating the urban population for their daily commute. As remarked by the latest Global Human Settlements Report from UN-Habitat (2019), it is integral to ensure the provision of good quality public transport system such as subways, light rail and bus rapid transit (BRT) for improving the socio- economic and ecological dynamics of cities. During the past few years, the mass transit industry in many developed countries, remarkably the United States and Canada, has shown substantial progress between 1995 and 2012. A significant increase in use of public transport was reported in the United States where the preference ratio increased by 34% (Apta.com., 2019). This increase is attributed to the increase in number and quality of mass transit provided to the people, along with the affordability that fuels this personal preference of consumers.

However, in developing and under-developed countries that are struggling with their economies, a trend of unprecedented preference of private motorization is being witnessed that has further led to a series of socio-economic and environmental issues, with threat to security of pedestrians and other passers-by, excessive intake of non-renewable energy resources, and harm to the global environment as the most prominent and direct consequences of increased private motorization (Hansen & Nielsen, 2016). In addition to this, increased traffic problems and congestion are also results of increased private vehicles on road that not only prolongs the travel time, but also induces frustration among travelers and instigates road rage.

With reference to increase in private vehicles and the fate of public transport, a vicious cycle represents this relationship in an apt manner. Where increase in private vehicles is deemed as a consequence of inadequate quality of public transport, the deteriorating quality of mass transit is held as a consequence of increased preference towards private vehicles and lack of revenues provided to the concerned ministries that is necessary for sustainability of these services (Andaleeb, Haq & Ahmed, 2007). The shift from collective transport to individual riding is also attributed to the preference of public to travel as per their own schedule and routes in contrast to the fixed timings and routes specified by public transports.

In this situation, the question that is raised frequently asks if public transport should be discontinued entirely and private vehicles should remain as the sole medium of public commute. While this theory can be experimented in smaller cities, it may not be as functional and practical in bigger urban cities due to a number of reasons. To begin with, a significant

portion of mass transit market caters to the individuals who cannot afford private vehicles or who cannot access private motors for some reasons such as if they are too young, too old, physically or mentally disabled. Thus, for their mobility, it is important to have a systematic service of public transport. Another reason for the importance of mass transit is its ability to mobilize rather greater number of people while utilizing limited resources (Dumitru, 2017). While a bus can carry 60-70 passengers at a time while using fewer space and fuel, it would take approximately 50-60 cars to carry the same amount of people, taking more space and fuel. Moreover, since public transport is driven by professional drivers, there are lesser risks of accidents and other road mishaps.

However, greater benefits of mass transit can be attained through greater utilization of these services. Availability of limited number and compromising quality of public transportation can also result in issues of air pollution, accidents, and congestion. On the contrary, if public transport is properly used and if people increase their preference of using mass transportation as opposed to private vehicles, a greater revenue would be generated from the fares of passengers. Ultimately, the quality of these services will be improved and made more efficient.

When competition from cars is restricted, it is easy to maintain high bus utilization. Many developed cities in Europe and Asia have a long-term government policy. Car ownership growth can be controlled by imposing high taxes on vehicles and their fuels; limited land development to encourage the inclusion of new suburbs in high-density activity centers and mixed land use to reduce travel time, and intelligent use of resources can be made to sustain mass transit systems financially sustainable – keeping it affordable for the public all the while generating revenue from the market so that it can be developed further more (Linda, 2003).

In order to enhance the quality of public transportation and to devise better public policies, it is imperative to identify the functioning and performance of public transport from the perspective of passengers. Karachi is identified as one of the largest metropolitan city of Pakistan, extending over an area of 3,780 square kilometers. With 14.91 million people residing in the city as cited by Pakistan Bureau of Statistics (2017), the daily commute of this vast population is a struggle. The main attributes of public transport in Karachi are identified as insufficient number of buses, deteriorating conditions of buses, overcrowding, congestion, ill traffic management, increased accident rates, and an alarming rise in air and noise pollution (Qureshi & Lu, 2007). While the quality of service is decreasing day by day, the fares of

public transport are on a hike that is unaffordable for people who rely on public transportation for their daily commute.

In addition to this, the decline in quality of public transport has had a severe effect on the female commuters. Due to security concerns and risks of harassment in these overcrowded public buses, the mobility of women is largely restricted and they are reluctant to make use of public transport. The advent of Uber and Careem in Pakistan, app-based ride hailing companies, served to change the dynamics of daily commute of passengers by providing quality solitary transport that arrives at doorsteps and entertain passengers in their time of need. However, the risks of travelling alone for women and the rising fares of the service presented a fall in its preference by the public. In these circumstances, arrival of Airlift and Swvl, online pick and drop service that provides potential passengers with private bus service and travels across all major residential and commercial locations of the city, has made transportation even more accessible, comfortable, and affordable for the larger segment of the passengers (Yasin & Awan, 2018). On the other hand, however, these services has further declined the need and the quality of public transport of the city.

As per a report by World Bank, there must be a bus that can accommodate 100 people for every segment of 1500 people (Gwilliam, 2002). This implies that there must be 20,448 minibuses and 5,566 coaches that can accommodate 50 people in the city. However, in reality, the number of buses in Karachi is far less than the requirement, resulting in the collapse of public transport in the city. Moreover, with already less number of buses available in the city, even more lesser number of these buses are operational that makes it impossible for such a transport system to cater to the rising number of population in the city. A proper Bus Rapid Transit (BRT) system and an efficient mass transit system can serve to resolve these rising issues and can help in the settlement of city's infrastructure.

Thus, to improve the condition of public transportation in Karachi and to mitigate the social, economic, and environmental threats that have arisen as a result of poor quality transportation, this study shall aim to identify the range of satisfaction of consumers from these services. Consumer satisfaction and the perceived quality of public transport shall also be studied. More importantly, it shall seek to explore the relationship between increase in preference of private vehicles and dissatisfaction towards the quality of public transportation.

2. Literature Review

Although buses play an essential part in urban areas, the services they provide are usually not enough in frequency and quality to meet the demands of consumers and thus, most services that are provided are met with dissatisfaction. Therefore, in most big cities of the developing and under-developed world, public tend to use their private cars for daily commute due to the hassle they may face through public transport and its inadequate quality. In order to facilitate public policy making regarding development of public transit systems and to provide efficient and effective commute medium to the public, a plethora of studies have been carried out that help to gauge the demands of consumers in relation to their transport needs and preferences. Moreover, a number of researches have been conducted to identify the relationship between consumer dissatisfaction with the available public transport and their preference towards the use of private vehicles. This helps to evaluate the need of enhancing the quality of public transport and increasing the ratio of public transport consumers, which may ultimately improve the infrastructure issues.

In this regard, a study conducted by Cullinane (2002) analyzed a case study based in Hong Kong and the public transport of the country. The objective of the study was to assess the traditionally held assumption that improvement within the public transport system does not have any impact on the willingness of private car ownership among public. For this purpose, a survey was distributed among 389 university students in Hong Kong and their attitude was measured towards private car ownership. The results indicated that 65% participants were unwilling to own a car in the next five years, and considered public transport convenient for their commute. Here, it is essential to acknowledge that public transport in Hong Kong is cheap, efficient, and enough in number to cater to the demand. It debunks the traditional assumption and stresses upon the positive impact of quality public transport on decrease in number of private cars.

Beirão & Cabral (2007) conducted a study with similar objective and sought to develop a clear understanding of people's opinion of public transport and its service quality. The relationship of this perception with the preference of owning private car was also evaluated. For this purpose, 24 in-depth interviews were carried out of both users and non-users of public transport. They were asked to rate their satisfaction with public transport and express the reason behind their use or disuse of public transport. An analysis of the findings depicted that it is imperative to improve the quality of mass transit system by including proper accommodation, safety, and efficient features as per demand of public in order to attract more

people towards its use. Thus, it is suggested that environmentalists or other activists who wish to limit the usage of private cars should target public transport market and introduce improvements in this market first.

Reduction in the trend of private car ownership has been one of the primary goal of environmental policy makers as they consider increased vehicles on road as a fuel to environmental pollution and congestion on roads. To minimize the use of private cars, Woldeamanuel, Cyganski, Schulz & Justen (2009) carried a study to determine the factors that influence car ownership among people. German Mobility Panel (1996-2006) was used to identify the change in attitudes towards car ownership across different households. The results showed that the main factors that influence car ownership are socioeconomic background of individuals, quality and of public transport and satisfaction with these services, and difficulty in parking. This indicates that increasing the quality of public transport can play a vital role in reducing ownership of private cars and in creating a less car dependent society, along with working on other factors simultaneously.

Aidoo, Agyemang, Monkah, & Afukaar, (2013) analyzed a case study of Ghana and evaluated the satisfaction levels of public towards the quality of public transport available in the city. The results showed that participants were fairly convinced with the quality of mass transit. The important components that accounted for good quality of service were found to be lower fare, security from criminal activities, and rides with traffic safety. This helps to understand the demands of public upon which, measures can be taken to improve over all quality. Thus, it was inferred that preference towards use of public transport is because of the satisfaction with the service. In case of dissatisfaction and inability of service to fulfill the needs of consumers, there is a potential chance of increase in preference towards use of private cars for daily commute.

The issue of public transport is bigger in developing countries. The unavailability of adequate funds and inability to manage mass transit result in low quality public transport system. On the other hand, high prices of petroleum and gas makes it difficult for people to afford private vehicles for daily commute. In a country like Pakistan, this situation is quite severe as people who cannot afford private cars are forced to travel through public transport despite their dissatisfaction towards its quality. Khurshid, Naeem, Ejaz, Mukhtar, & Batool (2012) surveyed 120 respondents from both the gender and from different socioeconomic background. Results showed that 80% male participants were not satisfied with the waiting time of public transport while they were more or less fairly satisfied with other aspects. On

the other hand, 95% female participants were dissatisfied with the over all quality of the service, with their main concerns residing towards security, unavailability of enough allotted seats, and cleanliness. Nevertheless, it was found out that 70% of the population use public transport for their commute due to its affordability and lack of other better options.

With public transport popularly identified as a means of sustainable development of infrastructure, efforts are constantly made to devise such strategies that can help to attract private car owners towards increased use of public transport. Therefore, Redman, Friman, Gärling, & Hartig (2013) carried out a research to identify the factors that can attract car owners to modal switch to public transport. It was concluded that while individuals' own perception and particular context plays an important role in influencing this switch, low fares, reliable service, and frequency are also significant determinants of preference towards public transport. It was asserted that low fares and safety are a great motivation for modal shift and most car users are readily willing to make this switch to public transport if it costs less and is safer than transporting through private car.

The view that customer satisfaction from public transport is influenced by the perceived quality, time, safety, and cost of service was further explored in the study by Githui, Okamura & Nakamura (2009) who aimed at evaluating the public transport system in Nairobi and consumers' preference towards its usage. A survey questionnaire was distributed among public transport users and their perception was recorded. It was concluded that degree of satisfaction is directly proportional to quality of service. Therefore, in order to sustain satisfaction and promote its use, attempts must be made for quality improvement.

Cats, Susilo & Reimal (2017) conducted an experimental analysis of effect of public transport with free fare on transportation modes of public. The case study of full scale fare-free public transport was taken from Tallinn, Estonia and the change in travel attitude of people was measured before and after the scheme's introduction through interviews. Results showed that there was a significant modal shift among the travel mode of public as large number of people, including private car owners, showed preference towards the use of public transport. An over all increase of 14% was reported in public transport users. It was also reported that the commute of low income individuals also increased greatly. This showed that majority of private car owners used their own cars for daily commute due to high fares of public transport, and thus, decline in fare urged them to make the modal shift.

The above mentioned studies primarily focused on the quality of public transport on consumer satisfaction. There is a gap in the knowledge of relationship between dissatisfaction

towards public transport and preference of usage of private cars. Therefore, in order to contribute to filling this gap, following hypothesis is proposed:

H1: Preference towards use of private cars is fueled by dissatisfaction towards quality of public transport.

As opposed to the above proposed hypothesis, a null hypothesis is also proposed that states:

H_0: There is no relationship between use of private cars and dissatisfaction towards quality of public transport.

3. Methodology

3.1 Method

A correlational research design is employed in the study for the investigation of linear relationship between dissatisfaction towards quality of public transport (independent variable) and preference towards usage of private cars (dependent variable). This relationship is examined using the quantitative research method that helps to emphasize on collecting numerical data and summarizing or interpreting specific phenomena between different variables. Obtaining the results in numerical form through quantitative method offers a number of advantages to the research. The foremost benefit of this research method is that it requires a well-structured research design and data collection method which can help other researchers to easily replicate the study and compare their findings. It also helps to strengthen the validity and authenticity of the results (McCusker & Gunaydin, 2015). In addition to this, quantitative research method provides a number of statistical data evaluation methods that can be used as per the type of results. The final result is therefore objective and straightforward that automatically minimizes risks of error.

This form of research method also helps to conduct a broader study by collecting data from greater number of participants, adding more strength to the data and helping to generalize the findings across greater portion of the population. As quantitative research method enables researcher to collect data from participants without being involved with one-on-one, it serves to eliminate risks of personal biases that are common in methods which require researcher to meet with the participants directly.

Quantitative data collection can be done through a number of techniques, for instance, survey questionnaires, observations, focus groups, and interviews. For this research, survey method is used for collecting data from the participants. Surveys are relatively easy to regulate as they can developed in less time as compared to other data collection methods and can be

distributed among the participants without any difficulties. Online surveys are more cost effective than traditional paper and face-to-face surveys, therefore, this research made use of online surveys to reach out to participants. Moreover, questionnaires allow researchers to ask participants greater number of close ended questions, minimizing time. Participants are also usually more comfortable in responding through writing as compared to answering verbally in front of the researcher. Online surveys are also helpful in the way that these online platforms usually provide a statistical summary and graphical representation of the results which enables the researcher to obtain an overall idea of the findings (Nardi, 2018).

3.2 Participants and Procedure

A sample of 76 participants was approached for the study and an online survey form was forwarded to them through Google forms. Participants were selected randomly with no specific requirement regarding their gender. However, the age specification for the participants was limited to the age group of above 18 since the study is mainly focused on young adults who can travel independently. In the beginning of the form, participants were notified about the objective of the research. They were also ensured that the confidentiality and anonymity of their responses will be strictly maintained.

Out of the 76 participants, 51.3% (n=39) were males, 48.7% (n=37) were females. 43 of these participants were aged between 25-34, 21 were aged between 18-24, 9 were aged between 35-44, while the remaining 3 participants belonged to the age group of 45-54. The survey questionnaire was divided into two sections. In the first section, participants were asked about their preferred transport modes and the reasons behind it. In the second section, participants were asked to rank their satisfaction level from different attributes of public transport through a 5 point Likert scale.

4. Results

After the data collection phase, all of the survey responses were coded and the data was statistically analyzed through SPSS. The function of correlation data analysis was employed to verify the nature of relationship between the satisfaction with public transport and preference of usage of private car. Since quality measures of public transport were divided into five separate themes, therefore, the responses of participants regarding these aspects were analyzed separately with the preference of private cars.

For this purpose, Pearson correlation coefficient provided the framework for the analysis of results as it helps to provide a measure of linear correlation between two variables. Because it is centered on the covariance method, it is regarded as the most suitable method to measure the correlation between target variables. It gives information about the degree of association or relevance and the direction of the relationship (de Winter, Gosling & Potter, 2016).

Out of 76 respondents, 82% (n=63) responded that they prefer to use their own vehicle while the remaining 18% (n=13) did not prefer to use their own vehicle. With reference to quality of public transport, majority (47.4%) ranked consistency of transit time as 4 (1 being very satisfied and 5 being very dissatisfied), quality of public transport was ranked 5 by 53.9% participants, 47.4% ranked comfortability as 5, 31% ranked fare charges as 3, while 50% ranked walking distance to stop as 3.

Figure 1: Correlation between Variables

		Consistency of transit time	Quality	Comfort-ability	Fare Charges	Walking distance to stop	Do you prefer to use your vehicle
Consistency of transit time	Pearson Correlation	1	.562**	.595**	.022	.341**	-.785
	Sig. (2-tailed)		.000	.000	.849	.003	.004
	N	76	76	76	76	76	76
Quality	Pearson Correlation	.562**	1	.876**	.202	.264*	-.914
	Sig. (2-tailed)	.000		.000	.081	.021	.002
	N	76	76	76	76	76	76
Comfort-ability	Pearson Correlation	.595**	.876**	1	.274*	.249*	-.547*
	Sig. (2-tailed)	.000	.000		.016	.030	.032
	N	76	76	76	76	76	76
Fare Charges	Pearson Correlation	.022	.202	.274*	1	.349**	-.385**
	Sig. (2-tailed)	.849	.081	.016		.002	.001
	N	76	76	76	76	76	76
Walking distance to stop	Pearson Correlation	.341**	.264*	.249*	.349**	1	-.275
	Sig. (2-tailed)	.003	.021	.030	.002		.519
	N	76	76	76	76	76	76
Do you prefer to use your vehicle	Pearson Correlation	-.009	-.119	-.247*	-.385**	-.075	1
	Sig. (2-tailed)	.939	.306	.032	.001	.519	
	N	76	76	76	76	76	76

**."Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed)."

As per the SPSS findings of survey responses, the Pearson correlation coefficient (r) for consistency of transit time and preference towards private vehicle is -0.785 which shows a very strong negative correlation between the two variables with a significance of 0.004. Pearson's r value for quality and preference of private vehicle is -0.914 with a significance of 0.002 that shows an almost perfect negative correlation. Value of r for comfortability and preference of private car is -.547 that shows a moderate negative correlation. On the other hand, the value of r for fare charges and walking distance to stop in correlation with preference towards use of private car is -0.385 and -0.275 which shows a weaker correlation.

In light of these results, it is evident that the three themes of quality which include consistency of transit time, quality, and comfortability have a strong negative correlation with preference towards use of private car. This means that individuals who are dissatisfied with these characteristics of public transport are highly likely to prefer using their own car as opposed to the use of public transport. On the other hand, the correlation between the other two aspects of quality that included fare charges and walking distance to stop with preference towards use of private car was quite weak and insignificant. Therefore, it may be inferred that the hypothesis is partially proved.

5. Discussion

An in-depth study of the survey results provided a detailed statistical explanation of relationship between preference towards usage of private car and the degree of satisfaction towards public transport. The foremost aspect of quality of public transport taken in the survey was consistency of transit time. 47.4% out of 76 participants were reported to be dissatisfied with this aspect. A study of mass transit system in USA found out that commute through public transport takes 22 minutes longer than it takes to travel through one's own vehicle. Traffic, stops, and longer route are the main reasons behind this delay in public transport while private vehicles are usually free from these factors. This survey further showed that daily commuters are more concerned about the transit time of public transport as opposed to the cost or other aspects (Maciag, 2017).

In Karachi, majority of people spend more time on roads since travelling take up a lot of time of their day. Small distances are covered in greater time spans. Traffic and pollution fuel frustration within the passengers, and as a result, public prefer to use their own car for transport in order to lessen the transit time and to save themselves from the traffic and pollution (Hasan & Raza, 2015). Bus Rapid Transit (BRT) system can serve to resolve this

issue and can provide a faster transport to the passengers. Through this mechanism, buses can run on fixed schedules with pre-decided stops, reducing the delay in travel.

The second theme is that of quality. This aspect relates to the structure, functionality, efficacy, and environment-friendly nature of the transport. The minibuses and coaches that run across the roads of Karachi are a threat to the passengers, passersby, and to the environment of the city. The deteriorating condition of these buses reflect their age and shows how these buses are being overused more than their capability. Moreover, these overloaded buses indicate towards the lack of transport available for a greater number of consumers. Most of the bus drivers are not professionally trained to drive such big vehicles. In addition to this, a lot of these drivers are not legally licensed that raises more questions on the reliability of buses (Aamir, Masroor, Ali & Ting, 2019). Thus, the quality of public transport in Karachi is currently in shambles that is also indicated by results in which 41 participants reported to be very dissatisfied and 21 reported to be dissatisfied with the quality out of 76 participants. With these threats posed by the quality of public transport, people tend to prefer using their private vehicles which they consider safer and more efficient than public transport. In this situation, it is essential to introduce efficient buses that are well designed according to needs of consumers.

The third aspect of quality is comfortability that deals with the degree of measures that are taken to cater to the needs of passengers in public transport. 50% participants reported that they prefer to use their own vehicles because it is more convenient and 24% reported that they are more comfortable in their own cars. In the city's public transport, passengers are constantly implicated with threats to their safety. Risks of crime in Karachi's buses are increasing day by day. Robbery in buses is a common encounter for its regular passengers. Moreover, women passengers feel that they are not safe in public transport. It has been reported that inadequate safety measures and inefficient infrastructure of buses are the root causes of why women feel unsafe in buses (Whitzman, 2013). With fear of sexual harassment, women tend to avoid traveling through public transport and prefer to travel in their own vehicles.

Fare charges is the fourth determinant of quality of public transport. Even though no significant correlation was found between dissatisfaction towards fare charges and preference towards use of private vehicle, 31.6% participants reported a neutral response towards these charges, while 27.6% reported to be dissatisfied with the charges. While the fare of buses are relatively affordable for travelers, the fares charged by auto-rickshaws and taxis are very high.

Drivers charge passengers as per their own will since these vehicles do not have functional meters. Illegal increase in fares by drivers is one of the biggest issue of Karachi's public transport that causes travelers to switch to other modes of transport (Khan, Gazder, Umer & Ali, 2010).

Walking distance to stop is the fifth determinant that measures the satisfaction of public towards placement of bus stops from their homes or workplaces. In order to serve travelers adequately, it is important to construct stops strategically so that maximum number of people may facilitate from them and their walking distance may be reduced (Nazir, 2018). Even though no correlation was found between this variable and preference towards usage of private cars, 50% participants reported that they are not satisfied with stop placements. Moreover, 8.9% participants cited lack of bus stop near their homes and/or work placements as a reason of why they do not use public transport. This stresses upon the need to improve the bus schedules and their stops to attract more travelers towards its use.

6. Limitations

One of the major limitations of the study was the limited size and nature of the sample. Due to time constraints and bounded accessibility to people, the survey questionnaire was distributed among a small number of participants. As a result, the sample size may not be deemed enough to represent the perception of entire population of Karachi. In addition to this, the cultural and social backgrounds of all of the participants were also more or less the same which creates a limitation in the sense that it provides a representation of a specific portion of the population. There is also a possibility that preference of using private vehicles may be fueled by a number of other situational factors and/or personal choice of an individual. Due to values of privacy, the survey questionnaire did not include any questions regarding such factors that could have helped in understanding other possible reasons behind this preference.

Another limitation of the study is use of single research method. While quantitative research method is an effective way to gain statistical results, qualitative method may have also provided an understanding of factors that can not be quantified. Thus, a mixed research methodology could have been more appropriate for this form of study, which was not adopted due to time constraints.

7. Recommendations

For future studies that intend to study the relationship between satisfaction level of quality of public transport and preference of using private cars, it is recommended to approach a greater sample size so that a diverse sample may be created in terms of age, ethnicity, and social background. In addition to this, greater sample size can help to provide a greater and stronger representation of the parent population. Non-random sampling can also help address the issue of limited nature of sample as it may enable the researcher to create a sample as per the better requirements of the study.

Another recommendation for future study is to integrate a mixed research method which can help strengthen the findings and provide an understanding of other components that may play a part in the relationship under study. Interview is an effective data collection tool that can help researcher converse with the participants in an effective environment, and can further allow participants to get at ease. Furthermore, it can provide the researcher with a chance to observe the tone and body language of the participants which can help in evaluating the authenticity of their responses.

8. Conclusion

Public transport is regarded as an important requirement of cities as it accounts for safe and organized mobility of public, all the while, minimizing pollution and utilizing efficient land-use policies. However, recently there has been a modal shift towards private vehicles that has not only decreased the use of public transport, but has also added to the traffic, pollution, and congestion, increased use of non-renewable resources, and an increase in risks of accidents. An overall analysis of public transportation in Karachi and preferred mode of transportation of people of Karachi helped in providing important trends and factors that are prevalent in the city's mass transit system issues.

The survey findings showed that preference towards use of private vehicles is fueled by dissatisfaction towards quality of public transport. Prolonged transit time, lack of comfortability, and poor quality were found to be the key factors that fuel this preference. Fare charges and walking distance to stop were not found to be in correlation with preference of private vehicles, nevertheless, public dissatisfaction was reported. Therefore, in order to attract more consumers towards the use of public transport and to minimize the number of private vehicles on road, it is recommended to introduce more buses on road as per needs of public, improve the quality of these buses, and develop an efficient transport system that may facilitate the masses effectively.

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Appendix

Survey Questionnaire

This survey is being carried out for a research project which intends to find out the impact of increased private vehicles on mass transit. All responses will be used for research purposes and confidentiality of these responses will be strictly maintained.

Q.1 Gender:

- Male
- Female

Q.2 Your age group?

- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 to older

Q.3 Do you use public transportation?

- Yes
- No

Q.4 How often do you ride the bus or use public transportation?

- Never
- Every day
- 2 - 3 times a week

- Once in a month
- Only when I have no other option

Q.5 What form of transportation do you use?

- Bus
- Auto Rickshaw/Taxi
- Own Vehicle
- Careem/Uber/Bykea
- Airlift/Swvl

Q.6 What do you use public transport for?

- Travelling to school/university
- Travelling to work
- Shopping/Outing
- Other: _____

Q.7 If you do not use public transportation, why not?

- I drive my own vehicle
- I'm not sure how to read the bus schedule and don't know when the next bus will arrive
- I feel that I might get lost
- There is no bus close to where I live or work
- It is too expensive
- Transportation provider does not run on time
- I ride with family and/or friends
- Inconvenient
- Invasion of privacy
- Other: _____

Q.8 Do you have your own vehicle?

- Yes
- No

Q.9 Do you prefer to use your vehicle?

- Yes
- No

Q.10 If you use our own vehicle, why?

- Comfort
- Cost
- Convenience
- I ride with family and/or friends
- Time management
- Nature of work

Q.11 What do you think about public transportation in Karachi?

- Fares too expensive
- No bus service
- Lack of Safety
- Cleanliness
- Commute takes too long
- Other

Q.12 On average how much do you spend on your travel per month?

- 2000-4000
- 4000-6000
- 6000-8000
- 8000-10000
- 10000-12000
- 12000+

Q.13 Consistency of transit time (Likert Scale)

- Very Satisfied
- Somewhat Satisfied
- Neutral
- Somewhat Dissatisfied
- Very Dissatisfied

Q.14 Quality of public transportation (Likert Scale)

- Very Satisfied
- Somewhat Satisfied
- Neutral
- Somewhat Dissatisfied
- Very Dissatisfied

Q.15 Comfortability (Likert Scale)

- Very Satisfied
- Somewhat Satisfied
- Neutral
- Somewhat Dissatisfied
- Very Dissatisfied

Q.16 Fare charges (Likert Scale)

- Very Satisfied
- Somewhat Satisfied
- Neutral
- Somewhat Dissatisfied
- Very Dissatisfied

Q.17 Walking distance to stop (Likert Scale)

- Very Satisfied
- Somewhat Satisfied
- Neutral
- Somewhat Dissatisfied
- Very Dissatisfied