

Role of Metro in the Reduction of Private Vehicles: A case study of Multan



Supervised by;

Dr. Zulfiqar Ali

Submitted by;

Mujahid Ali

PIDE2016FMPHILDS32

Department of Development studies

Pakistan Institute of Development Economics

Islamabad



Pakistan Institute of Development Economics

P.O. Box 1091, Islamabad, Pakistan

CERTIFICATE

This is to certify that this thesis entitled: "*Role of Metro in the Reduction of Private Vehicles: A Case Study of Multan*" submitted by Mujahid Ali is accepted in its present form by the Department of Development Studies, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree in Master of Philosophy in Development Studies.

Supervisor:

Dr. Zulfiqar Ali
Assistant Professor
Department of Development Studies
Pakistan Institute of Development Economics
Islamabad

External Examiner:

Dr. Abid Ghafoor Chaudhry
Associate Professor
Department of Anthropology
PMAS-Arid Agriculture University
Rawalpindi

Head,
Department of Development Studies:

Dr. Zulfiqar Ali
Assistant Professor
Pakistan Institute of Development Economics
Islamabad

Table of Contents

Chapter 1	1
1.1 Introduction.....	1
1.2) Statement of the Problem	5
1.3) Research Problem	6
1.4) Research Question	6
1.5) Objectives of Research	6
1.6) Explanation of Key Terms.....	7
1.6.1) BRT (Bus Rapid Transit).....	7
1.6.2) MRT (Mass Rapid Transit).....	7
1.7) Limitations of the study	7
1.8) Significance of the Study.....	8
1.9) Thesis outline.....	8
Chapter 2	10
Review of Literature	10
2.1) Introduction	10
2.2) Conceptual Framework.....	27
2.2.1) Diagrammatical Explanation	27
Chapter: 3	30
Research Method and Methodology	30
3.1 Introduction.....	30
3.2) Research Methodology	30
3.3) Research Design	30
3.4) Data collection methods	31
3.5) Units of Data Collection	31
3.5.1) Unit of Data Collection 1.....	31
3.5.2) Unit of Data Collection 2.....	32
3.5.3) Unit of Data Collection 3.....	32
3.6) Procedure of Data Collection	32
3.7) Data collection.....	33

3.7.1) Rapport Building	34
3.7.2) Key informants	34
3.7.2) Interviews	34
3.7.3.1) Semi-structured Interview	35
3.7.3.2) Un-structured Interview	35
3.7.3.3) In-depth Interviews	36
3.7.3.4) Interview Guide	36
3.8) Sampling	36
3.8.1) Convenience Sampling	37
3.8.2) Purposive Sampling	37
3.9) Data Analysis	38
3.9.1) Thematic Analysis	38
3.9.2) Framework analysis	39
3.9.3) Transcription	39
3.9.4) Familiarization	39
3.9.5) Indexing and coding	40
3.9.6) Identifying the Themes	40
3.9.7) Memo writing	40
Chapter: 4 Locale Description	42
4.1) Introduction	42
4.2) Multan	42
4.3.1) Chungi No 9	45
4.3.2) Chungi Number 6	46
4.3.3) Vehari Chowk	46
4.3.4) BCG Chowk	46
4.3.5) Chowk Kumharan Wala	48
Chapter: 5	49
Research Findings and Discussion	49
5.1 Introductions	49
5.2 Impact of People Preferences	49
5.3 Impact of Quality of Life	50

5.4 Impact of shorter routes	52
5.4.1 Multi-Tasking	54
5.5 Lack of awareness.....	55
5.6) Economical way of travel.....	56
5.7) Time consumption.....	57
5.8 Capacity of Travel.....	59
5.8) Impact of Family Trips	60
5.9) impact of unavailability of parking place	62
5.10) Impact on visitors	64
5.11) Discussion.....	65
Chapter: 6	71
Conclusion and Recommendations	71
6.1) Introduction	71
6.2) Conclusion.....	71
6.3) Recommendations	73
Chapter: 7	75
Ethical Considerations	75
References.....	76
Appendix1	77
Appendix2.....	78
Appendix3.....	79

List of Figures

4.1 Multan.....	39
4.2 Multan Metro Bus Route.....	40
4.3 Chungi Number 9.....	41
4.4 BCG Chowk.....	42
4.5 Chowk Kumharan Wala	44

Acronyms

BRT- Bus Rapid transit

DPR- Detailed Project Report

MRT- Mass Rapid Transit

MBS- Metro Bus service

TOD- Transit Oriented Development

WBSD- World Business Council for Sustainable Development

Acknowledgement

I would like to thank my supervisor, Dr, Zulfiqar Ali, for the worthy advice, encouragement, and freedom he provided me. The door of his office was always open for me whenever I ran into a trouble or had a question about my research or writing he was always there for me. He steer me in the right direction. I was so lucky to have him as my supervisor as he is my inspiration my role model as a researcher.

I am also grateful to my family members who supported me really well especially my elder brother for both financial and moral support. I would like to thank my elder brother for accepting nothing less than excellence from me. The words can't express that how grateful I am to my brother for all of the sacrifices he made just for me to support me financially. I would like to thank all of my respondents for their patience and kind information, without their help I would not have been able to do it. I would like to acknowledge administrative staff members of PIDE who have been generous enough to advise me in their respective roles. And last but not the least I would like to thank Sir Fahad Zulfiqar for their lot of support and help during the whole research process; he was always there for me whenever I asked for his help.

Mujahid Ali

Abstract

Traffic congestion is a major problem being faced by the many growing economies. The numbers of vehicles on the road is increasing day by day due to the rapid increase in population and the rural urban migration. As Punjab is the largest province of Pakistan, numbers of vehicles on the road are increasing rapidly. Punjab government has taken initiative to reduce the traffic related problem in major cities like Multan, Rawalpindi and Lahore by introducing the BRT system there. The purpose behind these types of mega projects is to reduce the traffic related problem by decreasing the number of vehicles on the road. This study investigates the role of Multan Metro Bus service in the reduction of the use of private vehicle along the metro route. This study investigates this phenomenon with the following objectives such as is the level of travel satisfaction provided by MBS according to the expectation of private vehicles users. This study investigates the factors preventing the private vehicle user from using the MBS and the factors that are attracting the private vehicle owners as well. In this study Private vehicle owner includes both the users of two-wheeler and four-wheeler. This study uses qualitative methods to find the answers of research questions. Framework analysis has been used to analyze the data. The findings shows that Multan metro bus service failed to attract the user of four-wheeler. The users of two-wheeler mostly now prefer MBS over their bikes. Different problems are being faced by the users of four-wheeler in using the MBS such as shorter route problem, time consumption and unavailability of parking places and many more. These factors are directly affecting the people preference for the mode of travel.

Keywords: BRT, MBS, Four-wheeler, Two-wheeler

Chapter 1

1.1 Introduction

Traffic congestion is a major problem being faced by the many growing economies. Increasing wealth of the citizens and the people coming from the rural areas that go along with the stable economic growth has resulted in an explosive increase in urban households owning cars. While on the other hand the road infrastructure cannot keep up with this rapid growth. Many countries are facing the rapid growth problem and China is one of them as the cities of China are more densely populated cities in the world. According to a report in 2010 the overall vehicle population growth in China was 27.5% as compared to the earlier year (Alam & Ahmad, 2013). Similarly there were more than 11.3 million motor vehicles in Jakarta in 2011 while the population of the city was far below than the population of vehicles 9.6 million (Arditya, 2011). Like these countries the idea of mass-transit in Delhi was given due to shocking growth of private vehicles. Because according to a survey government data suggested that motorized vehicles in Delhi was 3.5 million in 2001 and these numbers have increased to 6.45 million in 2010 more than any other Indian city (Randhawa, 2012). According to a survey there was a decrease in the demand of personal vehicle in New Delhi after the introduction of the metro train (Singh & Dhavla, 2006).

Urbanisation is the common phenomena worldwide and urban population is growing at the rate of 2 percent annually (The World Bank, 2014). It is predicted that the 70% of the world population will live in the urban areas by 2050. Main idea behind the introduction of metro was by looking at the population ratio of major cities and increasing population of motor vehicles one can think that there will be a need of MRT (Mass Rapid Transit) in future. Because due to

growing population and urban migration the number of housing colonies are increasing and the space for roads are decreasing with the passage of time and this urban growth limits individual mobility. In Pakistan traffic situation is severe in the mega cities and urban population is growing at the rate of 3.3% (The World Bank, 2014). So, in this situation these cities need such a BRT (Bus Rapid Transit) system that should be efficient, comfortable and it should be sustainable and environment friendly also. Such a project which has widest coverage to the people and people do not have to pay the higher fares. And the use of private vehicles and other means of public transport will decrease. Such type of projects are for the people who travel on daily basis within the city by using the other means of transportation so that they could use the public mode of travel instead of their own vehicle.

Punjab the largest province of Pakistan has taken initiative to reduce the traffic related problem in major cities like Multan, Rawalpindi and Lahore. With the increase in population the numbers of registered vehicles are also increasing in these cities. In Punjab 13,485,482 vehicles were registered in 2014. In which Lahore (3,991,517) Multan (1,121,000) Rawalpindi (721,868) are leading the list (Punjab Development Statistics, 2015). This could be a good step towards reduction of private vehicles. According to a survey after the start of metro train in Bangalore the number of private vehicles reduces and this city is now being counting in one of the carbon emission reduction cities in few years (S.P & Karupana, 2012). Because with the less use of private vehicle there will be less fuel consumption less pollution and less poisonous gases will be produce. Moreover, the road accidents will reduce because personal vehicles will reduce. But the impact of this metro can alter with the passage of time because with the passage of time the service attributes does not remain the same in this case government and managers should maintain the efficiency of the project same. Other public transport like vans, rickshaws and other

means of transportation which are causing a lot of traffic congestion tend to decrease. But this study will only focus on the reduction of private vehicles through people preferences towards MBS when people will prefer MBS instead of their own vehicles than the number of private vehicles on the road will automatically decrease. Such type of projects are very beneficiary for the local people but now it is up to the local community how they response to it. Response of the local community also decides the efficiency and worth of such projects.

As we know from last few decades the interest for travel satisfaction has rapidly increased. This study also tries to analyze the satisfaction level of the local community with MBS. Because they will prefer the MBS if this meet their satisfaction levels. It is quite difficult for a car rider to shift from car to public transportation so the traveler who had their personal vehicles will have less intention to use BRT unless they got enough travel satisfaction from MBS. This is what this study tries to find that are the people satisfied with the factors like time consumption, service quality, and available space which represents the preferences of the people. Are those services attributes good enough to attract the commuters, by leaving their own vehicles and start using BRT. As this mega project has been built after spending billions of dollars by government and by neglecting many other important required investments so this study tries to see that this investment of billions of dollar reducing the use of personal vehicle along the metro bus route or not. The travelers choose a traveling mode based on their travel satisfaction and the psychological factors can also influence their preferences. This is how this study tries to see the role of MBS in reduction of private vehicles by knowing the people preference for the mode of travel along the metro route.

This study also tries to investigate the problems being faced by the users of private vehicles in shifting from their personal vehicles to the MBS. And also tries to know government point of

view, their observations and further the future policy intervention by the metro officials to attract more private vehicle users towards metro. And what steps are being taken to overcome the problems they noticed during this period of one and half year.so this study basically tries to investigate the role of metro bus service in the reduction of private vehicles along the metro route and tries to know the reasons for being preferred or for not being preferred by the private vehicles users as well.

1.2) Statement of the Problem

Metro bus service is constructed with the investment of billions of dollars. The purpose of such projects is to attract the dwellers to use public transport rather than their own vehicles. This research studies that has with the start of metro bus service the people have left using their private cars or motor bikes and instead using metro bus service. This study further explains the satisfaction level of commuters with the metro bus service. This satisfaction level helps them to decide about the mode of travel. Basically this study tries to investigate the reduction of private vehicles after the introduction of metro bus service by knowing the preferred mode of travel by the owners of private vehicle along the metro bus route. According to a survey there was a decrease in the demand of personal vehicle in New Delhi after the introduction of the metro train (Singh & Dhavla, 2006).

1.3) Research Problem

Based on the statement of the problem i have narrowed down my research topic to '*The role of Metro in the reduction of private vehicles case study of Multan*' and i have operationalized my research problem into the following research questions.

1.4) Research Question

1. Has metro reduced the use of private vehicles in the selected locale and what role has it played in reducing the use of private vehicles along the route of MBS?
2. How the people onboard explain the quality and capacity of travel in MBS?
3. What are the factors refraining private vehicle owners from using MBS?

1.5) Objectives of Research

The objectives of the current study are to:

1. Find out has metro reduced the use of private vehicle in the selected locale along the Metro bus route. And to find out its role in reducing the use of private vehicles.
2. Investigate whether the level of travel satisfaction delivered by MBS is according to commuters expectations or not.
3. Find out the problems being faced by the private vehicle owners in shifting from their private vehicles to MBS.

1.6) Explanation of Key Terms

1.6.1) BRT (Bus Rapid Transit)

A bus base mass transit system that provides fast, comfortable and cost-effective urban mobility. By the provision of excellence in the customer services and exclusive right of way lanes BRT essentially emulates the performance and characteristics of the modern rail based transit system (wright, L).

1.6.2) MRT (Mass Rapid Transit)

A fast and efficient way of transportation it is a most important mode of transportation in modern cities. It is also named as Metro, or subway. It use electric-powered rolling stock running in its own right of way on guide way facilities under ground or elevated free from the interference from the other traffic from the ground. For this reason it transports large number of commuters at high speed and in less time in the city and adjacent areas (Tang, Y, 2016).

1.7) Limitations of the study

1. The current study was conducted after one and half year after the introduction of this project.it is conceivable that long term benefits may not be coopted in short term. Because awareness process in these types of projects is very slow so it is conceivable that with the passage of time results from these type of project can be changed.
2. Metro officials did not allow me first to conduct interviews neither within the metro bus nor in the station premises but after some time they did gave me some excess. May be the findings could've been little better if they had gave me easier excess to related field. Because initially they were considering me a press reporter or a government official who was here for some sort of secret mission so they were little

bit hesitant to allow me into the station premises. So it was very difficult for me initially because I had to show my authority letter and explain why I am here to each and every guard every official existing at the station.

1.8) Significance of the Study

This research is significant in terms of defining the role of metro bus service in minimizing the road congestion and traffic issues. Due to the lack of prior knowledge in this study area this study has collected primary data. This study explored the factors preventing the private vehicle users from using the MBS. By doing so this study may help the government institutes and TOD (Transit oriented Development) in developing strategies to cope with those factors and to attract more private vehicle users and to increase commuter satisfaction. As the next phase of the Metro bus service is expected in Multan so this study may provide useful input to assist the transport policy makers which will help them to make the next phase of metro bus service more attractive for private vehicle users specifically in Multan.

1.9) Thesis outline

The thesis outline is about the whole thesis description. Chapter one includes the overview of the research such as statement of the problem, key terms, and most importantly the research questions. Chapter two reviews the relevant literature which has discussed the role of metro bus service in the reduction of private vehicles worldwide. In chapter three research methods and methodology have been detailed. Chapter four targets the locale and it gives all of the details about the stations selected for the research by showing their exact location with the help of maps. Chapter five is about the discussion and analysis in which in the light of conceptual framework

data is interpreted into the themes. Finally Chapter six gives some recommendations, conclusion and information about the areas for future research.

Chapter 2

Review of Literature

2.1) Introduction

To fulfill the requirements of research questions and research objectives literature review has discussed the role of different previous metro projects in the reduction of private vehicle used worldwide that how the local people responded to MBS. The role of metro bus service in most populated countries like India and China where BRT was introduced to reduce the use of private vehicle and further demand for private vehicles. Moreover literature review has discussed the factors that play significant role in the preferences for mode of travel along the metro route and the role of travel satisfaction in attracting the private vehicle users to MBS.

Maria and Bismi (2016) attempted to analyze that how metro is an ideal solution for the traffic congestion. Study found that metro is efficient, reliable, fast and modern and affordable mode of urban transport .But in this study importance was given to understand the benefits of metro in the reduction of road congestion. This study was based on the Kochi Metro a project by the government of Kerala with 25 km length and 22 stations. This project proved most efficient in the reduction of road congestion energy consumption. Kochi is one of the seventeen industrial cities of India and easy for business. And rapid urban growth of this city put enormous pressure on the traffic and main reason which was causing these congestions was increasing number of private vehicles. The study found that although the metro system is better than all other road based system and reducing the traffic congestion but the cost of this project in Kochi was overrunning and underutilization of capacity. This study further found that a number of considerations should be kept in mind in order to run a successful metro system first viability of

metro project technology adaptation and most importantly acceptance of mode by the commuters.

However after discussing that metro is an ideal solution for the traffic congestion some studies have also discussed the development of transit system as new approach. As according to Alizaedh, Shahmuradi, Abdi and Rahimi (2013) the transit oriented development which has been developed as new approach based on sustainability concept. This Study found that after the Industrial Revolution car and automobile dependency frequently increased in this era city centers as the core of the cities become the main arena of vehicle daily trips for different types of trips. Due to such values traffic congestion become the main problem of the city centers in the developing countries. To cope with this problem policy makers suggest that car dependency in the center of the cities must be decreased. And for this a new effective approach was Transit Oriented Development (TOD). This emphasised on the public transportation. TOD (Transit Oriented Development) strategy integrates land use and transport function to prevent urban sprawl and transform a city. Many of the Iranian cities are facing urban sprawl problem resulting from the rural urban migration. The main approach for this study was descriptive case-study Data was collected from the Sanandaj master plan and direct observation. During this case study Naser-Khosro was the main center area with 3700 m² with 9 bus lines for the whole city. And after that one of the analytical method developed in the urban studies SWOT analysis was done and some strategy recommendations were proposed including the consideration of public sector role in planning processes. Finally this study found that TOD (Transit Oriented Development) development had been increasingly promoted as a solution to the urban growth throughout the world. Basing on the result obtained from the process of SWOT analysis TOD (Transit oriented

development) development emphasizes on the bus rapid transit in the center of the city Sanandaj of Iran.

After discussing the transit oriented development literature has discussed the contribution of this transit system in urban dynamics as according to Sekar and Krupanan (2012) the contribution of metro rail project in the urban dynamics in the Indian metro cities Chennai and Bangalore. Study found that Indian cities have spread over the unmanageable area with the passage of time. And this unmanageable spreading causes many problems like cost of traveling, more wastage of time and the traffic congestion. But with the introduction of the mass transit system many traffic related issues like attraction towards the private cars and buses were solved. As the city was designed before the introduction of the metro system this is the reason many impacts were not interpreted. This study tried to analyze the development scenario in the Chennai and Bangalore. Chennai is the capital of the Indian State Tamil Naidu the fourth largest city of the India with 9 million populations. Comprehensive traffic and the increasing number of private vehicles for almost 11 million trips per day in 2011 indicated the need of the metro system. And according to a report by the DPR (Detailed Project Report) these trips were going to exceed to 20.6 million in the 2026. But with the introduction of Chennai Metro it was estimated by the DPR (Detailed Project Report) that this project will decrease the 28000 trips 2000 buses and the 40,000 cars by 2024 apart from the 0.2 million two wheelers. And in case of Bangalore which is the capital of the Indian state Karnataka with the population of 9 million this is the 5th largest city of the India and 33rd in the world. First ever bus rapid transit in this city was built in 1994 which was abandoned due to some reasons. The population of the vehicles in the city was estimated to move to 2 million in 2012. But it was expected that with the introduction of Metro Bus Service there

will be a shift of 1.6 million vehicles to MBS. This was the main motive behind the introduction of metro.

As India and China are most populated countries of the world so most of the studies have discussed the role of metro in the Asian urban dynamics as Alam and Ahmad (2013) attempted to analyze the traffic scenario in the Asian cities and the policy measures taken by their governments. Due to rapid urbanisation Asian cities are facing many problems. Traffic congestion is one of them affecting the urban agglomerations and had worse effect on the urban economy. This study found that that average speed at the roads of Asian cities was 15km/h in Bangkok and 18km/h in Singapore. This study further discussed the status of congestion in the Indian cities and discussed the policy gaps that hinder the effectiveness of different projects. According to Asian Development Bank 44 million people added to the Asian urban population its best example was Dhaka which became most populated city of the world in the last decade and Mumbai was at number two. And with such rapid increase in the population there was also increase in the demand of mobility and number of motorised vehicles on the road. This Study also found that total vehicle operation in China climbed up by 16.8 million units to 78 million. And Indian vehicle population underwent second largest growth by 8.9 to 20 million. This was 30% in China and 10% in case of India. And this high number of vehicle growth was causing the congestion. But as compared to the developed countries car ownership remain low in many developing Asian economies because they tried to shift the people to alternate traveling mode or some of them widen the roads to accommodate the large number of vehicles. This Study also found that Indian cities were expected to increase the travel demand to 27.9 million passengers by 2021 as compared to 13.9 million in 2001. Moreover this study found some policies which may be expected to ease congestion in Indian cities which had better integrated urban planning,

fuel subsidies and most importantly promotion of public transport for which metro rail transit was operational already in Indian cities. And these policy interventions decreased the number of vehicles at the road but the metro and other bus rapid transit services were still underutilised. And discriminatory measure was needed to eliminate the intake of diesel subsidies for private cars.

As mentioned above that most of the studies have discussed the role of metro in the urban dynamics of Asian cities so in this aspect Eswaran, Bosco and Lakshmi (2016) scrutinized the traffic forecast for the further expansion of the Chennai metro rail service. Chennai is one of the fastest growing industrial cities in Asia. And with the significance of this city migration was also increasing which caused a huge vehicle population. And the availability of the attractive two wheeler vehicles at affordable price increased the number of vehicles on the road. Study found that due to poor availability of metro rail in the many areas there was less use of the public transport. A city with the population of 7 million should have 70 % of its people on the public transport. This study presented the traffic forecast of the (Porur-kamarajarslai) corridor of metro rail in Chennai city. And the immediate and long term of the metro rail were unmatched with the other modes of the transport including public buses and private means of travel. For this study data was collected from the 700 people of different age groups. And this Chennai city had the highest vehicles density in the country 2000 vehicles per kilometer and 78% of them were two wheelers. This study found that with the growth of population and the number of vehicles the heavy investment on the project like this will bring the long term benefits. This study found a clear demand of metro rail and found people not worrying about the price of the ticket. And this study suggested the speedy implementation of this metro rail in the selected corridor.

After discussing the role and need of expansion of metro in Chennai many other studies have discussed the role of metro in other heavily populated cities of India like Singh, Ghosh and Dhavala (2006) did the social cost benefit analysis of Delhi metro. Study found that with the increasing population the demand of public transport was also increasing. In response to this metro system was introduced which was really appreciated. Study found that Delhi metro played a very important role in pollution and traffic reduction and in time saving also. This social cost benefit analysis was based on just two phases 1 and 2. Study found that the main thing which was being predicted as a benefit of metro system was there will be less use of private vehicles and the investment of government on roads and public transport will also decrease. In this aspect the study found that only 28 percent of vehicles were being used out of registered cars they all diverted to metro. So this diversion caused a lot of reduction in fuel consumption. Metro caused income gains for many government private passengers but they caused a little bit loss to the private passengers.

India have metro system in almost every big city of it and they are planning to expand those routes as well because of the benefits they are obtaining from it like in a report Bundhun (2015) tried to discuss the advantages that the five BRT system causing in India. Report said that the metro system not only helped to ease the congested roads it also attracted many investments. With the increasing population it was very difficult for India to manage the transport system at this situation metro system was the proper solution because it was also going to solve the pollution problem emerging from the transport system because MRT system was environment friendly. First metro was built in 1984 in India now it has 8 metro systems in operation and prime minister of India recently said that they are going to start metro system in 50 cities of India. Canada's Bombardier was heavily involved in the construction of Delhi's metro which is

world's biggest manufacturers of planes and trains. France's Alstom is another company which was capitalizing on the expansion of the metro project.

While discussing about the role of metro in the Asian cities several studies have discussed the challenges being faced by metro system as Loo and Li (2006) attempted to analyze the challenges being faced by the metro system in China. In 1978 China experienced a rapid growth in terms of number and size. In 2001 China had the population of 1.3 billion (CSSB 2003 in LOO & Li 2006). Study found that due to this rapid sprawl there were two choices in front of China first to provide its people with the sustainable and good transportation plan first one was the construction of road network and other one was mass transit system which was already being followed by the Singapore and Hong Kong. In the first plan there was a lot of increase in personal vehicles while second plan was based on the public transport. In this situation metro system had the advantages of higher efficiency and environment friendly. Study also found that metro system in China was divided into three stages first was opened in 1969 second with the economic reforms in 1980 and third one in 1997. And the challenges which were faced by the Chinese government were technology gap, financing gap, affordability gap. Study concluded that although it was never been so easy for the developing countries to afford metro system but its most savings are in form of time which we can use in other economic beneficial activities.

After discussing the role of metro system in the urban dynamics of Asian cities especially and the challenges being faced by the metro system there few studies have discussed that what Pakistan metro system can learn from the metro systems of India and China as Haider (2015) in his report tried to compare the BRT system of Pakistan and India and furthermore report described that what Pakistan BRT system can learn from the Indian metro buses. Report said that it is same at the both sides of the border either in India or Pakistan circumstances are same.

Looking at the two mega projects of Rawalpindi and Lahore critics referred to follow India's example in order to make the BRT system better although Indian BRT system was far from the perfect. This report further discussed the study of the five BRT system of the India and that study showed that except Ahmadabad other four implementations went short for BRT system. Barriers like lack of ownership by local authorities, debate about the metro bus or metro rail system and land acquisition. Moreover this report said that the BRT system was not being used by the poor those who were earning 100\$ per month they were preferring walk or cycling. Report concluded that Pakistan has to give subsidies in order to facilitate most poor commuters instead of giving subsidies to the operators. And we have to keep in mind the problems faced by the five BRT projects of India

And Javed (2014) in his report also described the concern of metro service report said that MRT was growing need of the big cities with respect to increasing population. Report also said that the system government opt for must be sustainable and environment friendly. And the metro project of Islamabad and Rawalpindi was the example of that how not to build an MRT. Report said that this project was made in such haste that they did not seek any input from the local people. Cost of this project was 44 billion rupees while according to the estimate of Asian Development Bank in Asia any bus-based metro project could be built in 4 billion this thing shows the in efficiency of the project. And in environmental prospect the government destroyed all of the green belts and thousands of trees to build a new lane of metro.

As mentioned above the environmental aspect of the metro system some studies have also discussed the environmental effect of metro system in Asian cities like Sajor and Andog (2015) investigated the impact of metro project in reduction of carbon emission from the transportation sector. Study found that at international level debate urban transport was considered as one of the

main reasons of carbon emission. With the lot of increase in urban population it was very necessary to examine those factors which were causing carbon emission in urban areas. Study found private cars, inefficiency of fuel travel distance, as main factors which were participating more in carbon emission. Study found that the sprawl of the cities has increased the travel distances from the houses to workplace the only way which was considered was to move towards the mass transit system like rapid trains, metro buses and further more policies were decided to develop in order to prevent the cities sprawl.

And IGES (2007) also gave a report at urban environmental management project in its third phase this report argued about the reduction in air pollution in the transportation sector. This report said that air pollution caused a lot of diseases and deaths which automatically caused low productivity lead (Pb) dust particles and the nitrogen etc. causing various diseases and transport system was the main contributor.in developing country the pollution was estimated by the amount of carbon emission. After this Bangkok, Jakarta, Beijing tried to reduce the number of personal vehicles and introduce the mass transit system .India and China was one of the most effected countries by carbon emission due to their large size according to the WBCSD (World business council for sustainable development) report in 2000 and this report also said that these two countries will face same problem till 2050 that's the reason both countries focused at the MTR system seriously.

However some studies have also discussed the role of metro system in the European cities just like Senfit (2009) explored the relationship between the traffic congestion and the change toward the sustainability in metro in Vancouver. The study found that traffic congestion is unique among the problems associated with the urban development even drug addiction does not harm so much the citizens as the traffic congestion problem. And understanding the change toward

sustainability in cities required the consideration of social and behavioral norms in the urban context. The study found number of factors which relate the metro Vancouver to the traffic congestion and change toward sustainability and main factor was the reputation of the Vancouver region on the sustainability issues that's why traffic congestion was topical issue for the Vancouver region because during the interviews and different point of views study found that the traffic congestion had significance influence on the individual behavior and metro Vancouver had developed significant policy influence in its regional planning function despite of the environment where land use planning was dominated by the municipal level and transportation was dominated by the province.

Moregenroth (2009) discussed the impact of metro project north in Irish which was initiated by the (NDP). Basically two projects were initiated but this study just focused at the project of north side. Purpose of this study was to focus on those aspects which were not focused before like cost benefit analysis of this project was not published before. Study found that the cost of the project is much higher than the benefits. However methodology omitted some of the benefits like employment and to the people not living in the proximity area of metro line this argument suggested that the project should be continued. The results were dependent upon the assumptions based on the sound arguments.

Eliasson, West and Cat (2015) attempted to analyze the appraisal of increased public transport capacity. Study found that insufficient capacity was main problem in the public transport system resulting in unreliability and crowding. This thing raised the need of rapid transit system replacing the old bus system. But it was not easy to replace the bus system with the metro line because millions of euros were required. Study used the case study of Stockholm, Sweden to illustrate the cost benefit analysis of the replacement of metro line with bus system. Insufficient

capacity caused three major problems. First was that the numbers of vehicles was increasing second when one vehicle was full passengers had to wait for another wasting their time. Third was the wastage of time by boarding the passengers in spite of fully loaded vehicle and wasting their time on stops to un-board them. The model used for this study demonstrated that the rapid bus system or the replacement of buses with metro line constituted more than half of the benefits in time saving. And benefit to the capacity problem was less.

However after discussing the need and role of metro system in the Asian and European cities as well several studies have discussed the factors that affect the people preferences for the mode of travel and those factors affect the demand of the MBS and its role in the reduction of the use of private vehicles as Polat (2012) described the demand determinants of the urban public transport services. Public transport mainly resulted from the rapid urbanization, population growth and modern life styles and economic conditions. And the modes that provide mobility not only influenced the degree of flexibility but also the quality of people lives. So the basic problem for decision maker was one side and how to provide those people effectively and efficiently in order to increase the satisfaction level to attract more people to satisfy the predetermined goals was the other side. Study found that to maximize the demand for the services PT (Public Transport) organizations have to use the sources effectively and efficiently. Transportation is very important aspect of people lives in the modern age this study discussed the factors affecting the demand for the public transportation. Different factors were playing different roles in different situations. The main purpose of this study was to review the current literature on the demand determinants for the PT. This study discussed the following determinants like fares, cost of travel, travel time, service quality, comfort and reliability. Factors like price and time elasticity had received considerable attention in the recent literatures on the urban public transportation. But this study

tried to focus and cover many aspects. First of all the cost of travel in case of Public transport was divided into two main components the fare and time. The study found that the effect of fares on the PT patronage was relatively least to observe literature divided this into three main terms short term (1-2 years) medium term (5 years) and long term (around 10 years or longer) because the elasticity of the fares depends upon the modes and the time period over which it is being observed and specific conditions in which mode is operating. Unlike the price and other factors time was very important attribute because people don't want to increase their time of travel. Travel time included several things line access time waiting time and the time spent on board. travel time was found as most important factor influencing the use of PT. Second one was service quality service quality was also one of the most important factors that can affect the demand of public transport the term service quality included the access time waiting time and the comfort and reliability. Study found these attributes in different literatures regarding the public transport demand. Later it discussed the comfort as one of the main attribute of service quality. The study also used the example of car to define the comfort required by people and found that comfort provided by the public transport was limited. Some of the important attributes of comfort was convenient in terms of seating, storage capacity and ventilation. And another main factor was overcrowding that can affect the comfort during travel. Although the demand for the comfort during travel was not same for every traveller it was different for a person traveling to his work and a person who was traveling in the peak or off-peak hours. in the conclusion study had approached the issues of public transport which were affecting the demand of public transport. There were many influential element affect the PT demand and some of them was not easy to measure and quantify.

While discussing the demand determinants for the MBS Ollison, Fuji and Friman et al (2013) conducted a survey of satisfaction with travel as a mean of determining the degree to which public transport met various travel needs. The first aim of the project was to understand that how the people living in different areas of Sweden evaluate the daily work commute and how their evaluations were related to the characteristics of the work commute which was travel time, changes in work destination, and multi-tasking. In this survey total 996 respondents answered the questionnaire. This survey found that the satisfaction with the work commute contribute to overall happiness. An informal research of transport studies reveal that average commute time varies between 40-80 minutes because public transit taking longer time than car commutes. Several US studies has found that longer work commute in congested space leads to stress (Novaco, 1990). This study found that people were more satisfied with the slow modes of commuting (walking, biking) than the car and public transit. And the daily commute time from (10 to 180) minutes reduced the satisfaction with the work commute. The key finding of this survey was that the satisfaction with the work commutes had important influence on the overall happiness of life and this influence was positive for those who are satisfied with the work commute and negative for those who are not satisfied with the work commute. Study found that overall satisfaction average was high thus a positive contribution was made to happiness although the negative feeling was raised with the length of the work commute. And the present results added to the previous finding by suggesting that affect associated with the ordinary routine activities in different life domains can play important role in the overall happiness.

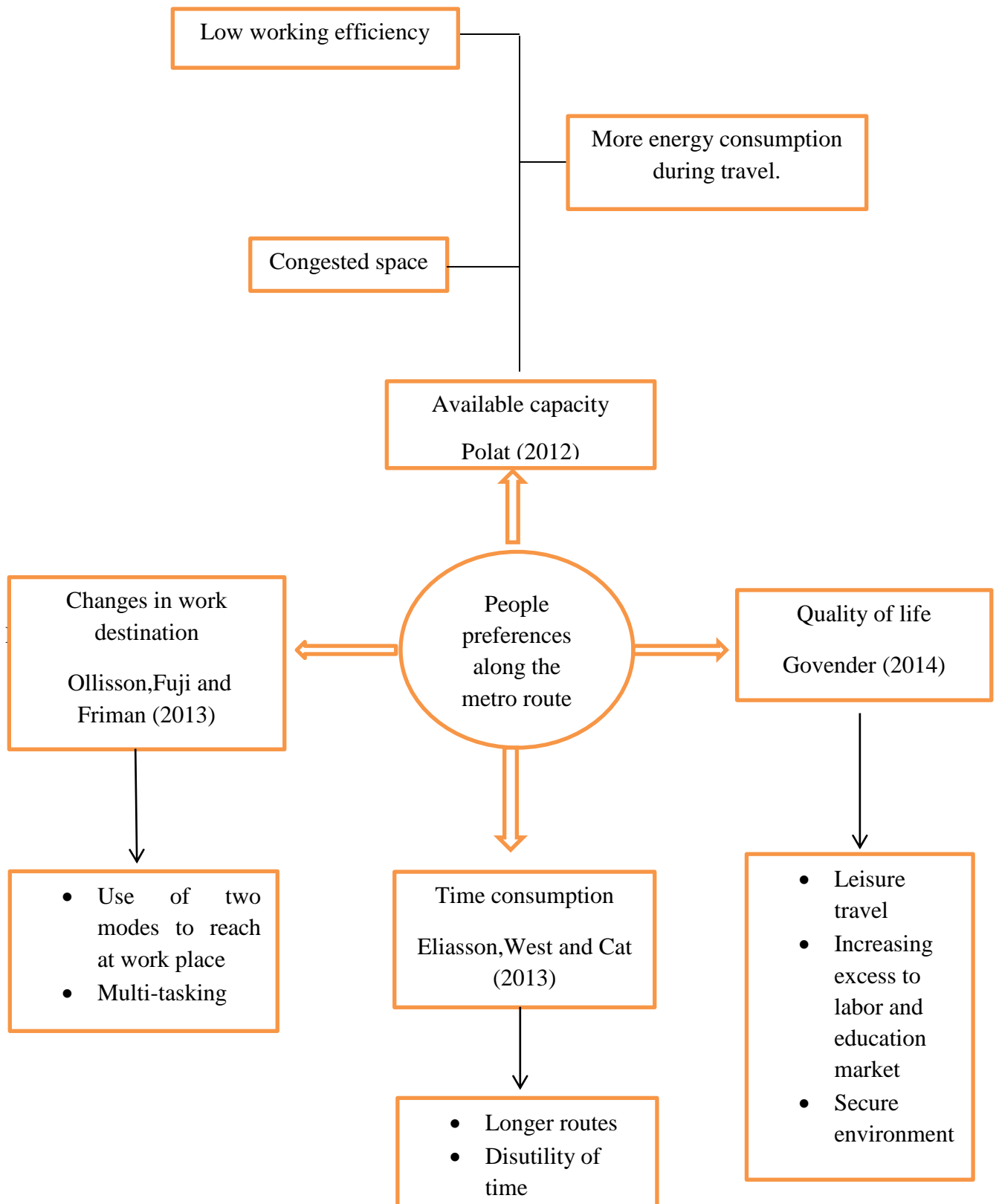
And when we talk about happiness there are many other factors which affect the overall happiness during travel as Govender (2014) gave the theoretical overview of public transport service quality by focusing on the mini bus and the taxi service in South Africa. This study

discussed that public transport should be differentiated by other means of transport like private vehicles by providing the commuters with the better service and standards that is being offered by the other modes of transportation. Different surveys highlighted the key factors that play a significant role in the decision making about the mode of transportation. For more than a decade researchers and practitioners has been trying to conceptualize the quality of service. Like (Parasuraman et al., 1986) argued that the quality of service is an abstract and elusive construct and cannot be measured objectively it can be measured by the people perceptions of quality. According to the literature at the quality of service the expectations were the desire and want of commuters.in other words what passengers feel that service provider should offer rather than would offer. This study further discussed the dimensions of the expectations of the commuters for the quality of service named reliability, which meant that the promises made by the public transport operator about being punctual and on time will be delivered. And for this scheduling process would be very effective. And the second dimension was comfort. Public transport researcher had found that service comfort was the main issue while deciding about which modes of transport to use. Service comfort included availability of seats and space, smooth journey, and the availability of air conditioning. Research on consumer satisfaction showed that service comfort was one of the main four factors that were positively correlated to the overall satisfaction (Budiono, 2009).And the third was the extent of the service. The extent of services involved the service availability and its excess to the labor and the education market or taking commuters to the exact destinations. And the availability of the service in the week days, public holidays, evenings and weekends. And the fourth dimension of the service quality was the safety of the service. And the safety during travel involved the less fear to be involved in an accident, condition of the vehicles. The goal of the safety during travel was to reduce the vehicle fatalities

and injuries to provide the safe and secure environment to commuters during the travel. And in the conclusion this study found that these dimension that effect demand of public transport and the preferences of the commuters were important as gaps often emerged between service perceptions and expectation

And many of the studies have shown the effect of these factors on the demand of public transport and in the selection for the mode of travel like Kaewkluegklom, Satiennam and Jaensirisak (2016) analyzed the influence of psychological factors on the mode choice behavior by using the case study of the BRT system of Khon Kaen city Thailand. In order to explore the effect of psychological factors of the modes choice this study integrated the factors according to the TPB (theory of planned behavior) and habit as latent variables and the service attributes as explanatory variables. A guiding philosophy in these developments was that the incorporation of psychological factors led to more behaviorally realistic representations of the choice process. Studies showed that travel mode choice explained by the psychological factors both as reasoned action and habitual behavior. Studies also showed that the TPB (Theory of planned behavior) also had significant effect on the intention and travel behavior. In Khon Kaen BRT was introduced to solve the traffic related problems. A new system which had new lanes, environment friendly and convenient .It has five routes covering the urban area of the city. Total 600 private vehicle and public transport users were surveyed in this study. The questionnaire used in this survey was consisted of three parts first collected the socio-economic information of the respondents, second part measured the psychological factors and TPB's constructs and habitual constructs. And the third part contained the detail of travel time and travel cost about the mode of transport chosen. The study found that at this early stage participant had positive opinion about the BRT system as a new better alternative source of transportation. People had

the habit to use the personal vehicles because the motor bikes were easily purchasable. And habit had negative effect on intention to use BRT. This study supported the psychological factors incorporation in the choice model. Study found that the model with latent variables can explain the BRT choice behavior better than the traditional model. The mode BRT choice not only depended upon the service attributes (travel time and cost) but also affected by the perceived social pressure. BRT system was found more reasoned action rather than habitual action.



2.2) Conceptual Framework

While explaining the conceptual framework Miles and Huberman (1984:33) argue that they are just the current version of the researcher's map of the territory being investigated without this map the researcher is sloppy and if more researchers are involved fruitless empirical anarchy can be resulted. Frameworks emerged from the experience they are revised and corrected through research and refocused to meet the need of the study. In this sense they guide the research and coordinate research activities in a multi-researcher and multi-site context. The structure of the conceptual framework varies case to case but in general it contains the following elements. (1) It explains the main dimensions of the study (e.g. key factors, variables). (2) It describe the presume relationship between the factors and the variables. (3) It specifies who and what is to be studied as well as events, settings and processes. (4) It guides the researcher through the research process at the same time being respective to change by focusing and re-focusing and analysis. (5) It coordinates the research activities by the members of the research team.

2.2.1) Diagrammatical Explanation

This diagram shows main dimensions of the study and shows that how they are linked to each other. We can see in this diagram that there are number of factors or dimensions which are related to the preferences of the people either directly or indirectly. This diagram shows that people preferences along the metro route is directly related to the quality of life and quality of life further includes the concepts of the leisure travel and the excess to the labour and education markets so these two factors are indirectly related to the people preferences along the metro route. This diagram further shows the direct relation of the people preferences with the time consumption and time consumption has further two concepts disutility of time and longer routes so these factors are indirectly related to the people preferences along the metro route. This diagram also shows a

direct relationship of people preferences with the available capacity and the available capacity is further divided into the congested space, low working efficiency and more energy consumed during travel so these factors are indirectly related to the people preferences. This diagram further shows the direct relationship of the people preferences with the changes in working destination which is sub-divided into two more aspects with multi-tasking and use of two modes and the indirect relationship of these factors with the people preferences.

Now I will explain the concepts of conceptual framework one by one. Quality of life has direct relation with the people preferences along the metro bus route because people will choose the mode of travel which will provide them better quality of life. Quality of life includes the leisure travel, secure environment and the easy excess to the labour and education market. While making a choice for the mode of travel people will prefer the mode offering more and easy excess to labour and education market. These two aspects indicate the quality of life during travel. So these two factors got indirect relationship with the people preferences along the metro route. This study borrowed the concept of quality of life from the Govinder (2014).

Now explanation of the time consumption time consumption is directly related to the people preferences for the mode of travel along the metro route. Because time consumption is a major factor which affects the people choice for the mode of travel and they will definitely choose the mode of travel which will help them to reach at their destination in minimum period of time. Time consumption is divided into the disutility of time and longer routes and these two factors are indirectly related to the people preferences along the metro route because the amount of time they will spend during traveling or waiting at the stops they can use this amount of time in some creative activity and the length of routes of public and private means of travel can also effect the

preference of people. I have borrowed this concept from West and Cat (2015) for the current study.

Next in the discussion is the concept of the available capacity. Available capacity is directly related to the people preferences along the metro route. Because the available capacity in the public modes of travel matter a lot when it comes to selection of mode of travel. The relation of available capacity can be explained by the concept of congested space and more consumption of energy during travel which means if available capacity is not good enough the space will be congested and people will consume more energy during travel. And their working efficiency will decrease as well because their half of energy will be wasted during their travel to work place. For current study I have borrowed this concept from the Polat (2012).

Now I am going to explain the concept of changes in the work destination. Changes in work destination got direct relationship with the people preferences along the metro route. Because the people who have to perform multi-task during the whole day so sometimes it is necessary for them to carry their own vehicle with them that's how it affects the demand of BRT. And those who have to use two modes of transportation to reach at their work place due to limited coverage of the public mode of transport so using two modes of transportation is quite difficult and time consuming so this factor effect their decision about the mode of travel. So the changes in work destination and the use of two modes due to limited coverage also affect the people choice for the mode of travel. For the current research I have borrowed this concept from Ollison, Fuji and Friman (2013).

Chapter: 3

Research Method and Methodology

3.1 Introduction

In this chapter the research methodology and the research design has been explained and justified in details. It also consists of the justification of the research tools for data collection, procedure for data collection and the Units of Data Collection. And in last part the qualitative analysis and the stages of framework analysis have been explained.

3.2) Research Methodology

Methodology section of a research paper answers two main questions how was the data collected or generated and how it is analyzed and the process or tools used to collect the data is known as method. Qualitative research strategy has been used in this study because qualitative research is effective in obtaining the specific information about the values, opinions and behaviors of particular population.

3.3) Research Design

A research design is a plan specifically created to answer the research questions and to control the variance. Research designs are categorised into different groups depending upon the purpose of the research (Dulock, 1993).According to Babbie (2013) there are several research design but generally are three exploratory, descriptive and explanatory are very common to deal with the research problem. When a researcher wants to study a new interest then he adopts a research design. The selection of research approach depends upon that which type of study would be conducted. A qualitative approach was more suitable to my work because the aim was to know

the role of Metro bus service in the reduction of the use of private vehicles by knowing the preferences of local people. And it deals with the people preferences their ideas and expectations which are difficult to find out by the quantitative research. Qualitative methods take into account the phenomena thoroughly and comprehensively (Walliman, 2017).

However among these research designs I have used descriptive research design because descriptive study deals with the questions like how, what, where. This design is used to describe systematically and accurately the facts and characteristics of the given population or the area of interest (Issac & Michae, 1979). For conducting a study with maximum control over the factors that may influence the findings research design is a blueprint and the descriptive research design is the mean of discovering new meanings and describing what exist describing the frequency with which something occurs (Burns & Grove, 1987). Descriptive research design suited to my study because I have studied that “what” role metro has played in the reduction of private vehicles and “how” the people onboard explain the capacity and quality of travel.

3.4) Data collection methods

All those methods that used to collect data are the research methods. All those methods that researcher use during his study (Kothari, 2004).

3.5) Units of Data Collection

3.5.1) UDC 1

The first unit of data collection was the people on board. Those people who were using the MBS instead of their private vehicle. For this UDC study has used the semi-structured interview, un-structured interview and interview guide to collect data. And convenient sampling was used for

this UDC. This UDC was selected to know the travel satisfaction and experiences of the people who preferred MBS over their personal vehicle. Basically this UDC was selected to answer my first research and second research question.

3.5.2) UDC 2

The second unit of data collection was the people who were travelling in their personal vehicles along the MBS route. For collection of data from this UDC study has used the same method as for UDC 1 semi-structured interview, un-structured interview and interview guide was used too. And convenient sampling was used for this UDC as well. And this UDC was selected to answer my second research question.

3.5.3) UDC 3

Third unit of data collection was the officials from the MBS. To collect information from this UDC study has used in-depth interview and purposive sampling was used for this UDC. This UDC was selected to know the government observations, results and future policies to attract more commuters towards MBS. Basically it covers all my research questions.

3.6) Procedure of Data Collection

In the initial phase I went to a family friend who was working at the head office of the Multan MBS because before conducting of interviews permission from the metro officials and the security chief was necessary. That family friend helped me to meet Security Chief of MBS. After a long discussion he gave me the permission to conduct interviews. But after five minutes he referred me to the Head of policy department for permission and that person did not allow me to conduct interviews. After a long debate he told me that i cannot conduct interviews within the

bus or in the stations premises. He told me that if i want to conduct interviews you can do it outside of the station. This problem was faced in initial days but after a while when they make sure that I am not a press reporter of a government official they gave me the easy excess. After that I targeted and identified my respondents. For few days I went to the stations and observed the situation that which time and which place would be better to conduct interviews as I was not allowed to conduct interviews within the station premises initially. After observing for few days I started conducting my interviews from the people coming out of the stations. But after few days I met the metro official again and they granted me the access into the station premises. The duration of those interviews was not so long because it was being very difficult to hold them for a while. And before i started interview I had to tell them the details of my topic and the purpose behind conducting these interviews I conducted unstructured and semi-structured interviews from the people who were using MBS (my first UDC). And after that it was not easy for me to get information from my second UDC I mean those who were travelling in their personal vehicles along the metro route. I took some help from a traffic warden to conduct interview from the people who were traveling in their personal vehicle. I used semi-structured, un-structured and interview guide to get information from this UDC. And in last phase I conducted in-depth interviews from the metro officials. It was comparatively easy for me to conduct interviews from my third UDC than the first and second one.

3.7) Data collection

Data collection can be of primary and secondary type. According to Bryman and Bell (, 2015) information collected by using questionnaire, interviews is primary data. While secondary data is that we get from the research articles, reports and documents. In this study primary data has been

collected by conducting interviews by using qualitative research methods like semi-structured interviews, unstructured interviews.

3.7.1) Rapport Building

Rapport building is very important part of the qualitative research it can be defined as a state of harmonious understanding with another individual or groups. It helps to be a part of the society under study. Rapport building enables the researcher to communicate with the society and to tell them about his research. It is all about matching yourself with others. Researcher makes sure that his attitude and behavior with the local people of community is not awkward. During this study my rapport was built with some participants with the help of my family friends.it made my communication process easier.

3.7.2) Key informants

Key informant interviews are the In-depth qualitative interviews of the people who know the community very well. The purpose of key informant interviews is to collect the information from the people who have first-hand knowledge. Trembly (1955) defines the key informant in a way *“key informants are interviewed intensively on an extensive period of time for purpose of providing a complete description of social and cultural patterns of their group”*. My key informants were UDC1 people on board and UDC2 the people using their personal vehicles along the metro route. They provided me extensive knowledge about the people preferences for the mode of travel along the metro bus route.

3.7.2) Interviews

One of my tools was qualitative interview to collect primary data. Because Qualitative interviews allow respondents to response freely new questions may arise during the interview.

Qualitative interviews are less structured than the quantitative interviews and it is very different from the quantitative interviews (Bryman & Bell, 2015).

3.7.3.1) Semi-structured Interview

Semi-structured interview is qualitative data collection strategy in which researcher asks a series of predetermined but open-ended questions from the respondent (Lisa, 2008). In this type of interview the respondent and researcher engage in a formal interview the interview guide is used by the researcher to cover all the aspects of topics during the conversation (Cohen & Crabtree, 2006). This strategy has been used to collect data from the UDC1 and UDC2 (people onboard and the people using their private vehicles at metro route). This technique was used to engage the respondents in a formal interview to collect information about the commuter's experiences, satisfaction with the MBS and the information about the factors which are preventing them from using the MBS.

3.7.3.2) Un-structured Interview

In this type of interview research ask few broad questions to engage the respondent. The interviewer has no specific guidelines, restrictions or any predetermined list of questions in this type of interview. To gather in-depth information on a topic a researcher probes with further questions. For getting the stories behind respondent experiences the un-structured interview is very useful (Zarinpoush, 2006). This technique has been used to collect data from UDC1 and UDC2 to gather in-depth information about the travel satisfaction level and about the reasons which were holding them back from using MBS respectively.

3.7.3.3) In-depth Interviews

This is a qualitative research technique in which researcher conducts intensive individual interviews with the small number of respondents to explore their perspective on a particular idea programme or situation (Boyce & Neale, 2006). This technique was used to collect data from UDC3 (the officials of the MBS). This technique has been used to explore their perspective about the people response to MBS and which steps were being taken to attract more commuters.

3.7.3.4) Interview Guide

Interview guide is the list of questions that researcher asks his/her respondents during the interview. The order of the question and the level of the degree will differ based on the type of interview you choose to conduct (Angus). This technique has been used while conducting the semi-structured and un-structured interviews from the UDC1 commuters on board and the UDC2 people using their personal vehicles along the metro route. And for UDC3 as well the list of question was also used during conduction an in-depth interview to cover all related aspects.

Study got the personal perspectives and experiences by interviewing the different individuals/commuters and officials of metro bus service.

3.8) Sampling

Sampling is the process of selecting samples from a group or a population to become the foundation for estimating and predicting the outcome of the population. A sample is the sub-unit of the population involved in one's research (Trochim, 2007).

3.8.1) Convenience Sampling

This technique is one of the main types of non-probability sampling it consists of the people who are easy to reach. This technique is used to collect data from the population conveniently available (Dornye, 2007). This study has used this technique to collect data from the people onboard and the people who were using their personal vehicles along the metro route. Reason behind the selection of this technique as it allows the researcher to obtain basic trends and data about his work without any complication of using randomize sample.

3.8.2) Purposive Sampling

This is the non-probability sample which is selected on the basis of the characteristics of the population and the objective of the study. It occurs when elements selected for the sample are chosen by the judgment of the researcher. This sampling is also known as judgment sampling (Saunders & Lewis, 2012). This study has used this sampling to collect data from the officials of the MBS because information I needed was held by the only certain numbers of officilas.

Units of data collection	Sampling Technique	Sample size
People onboard	Convenience sampling	33
People using their personal vehicles along metro route	Convenience sampling	33
Metro Officials	Purposive sampling	05
Total UDC=3		Total=71

3.9) Data Analysis

Data analysis is a process a researcher uses to reduce the data to a story and its interpretation. Data analysis is the process of reducing the large amount of collected data to make sense of them (Lecompte & Schensul, 1999). There are three things that occur during the data analysis first one is organization of data, reduction of data through summarization and categorization and patterns and themes in the data are identified. (Patton, 1987). In this study I have used thematic analysis for data analysis.

3.9.1) Thematic Analysis

I have used thematic analysis for this study to generate codes and data interpretation. Method for systematically identifying and offering insight into patterns of a meaning across a dataset is known as thematic analysis. It allows a researcher to make sense and see collective and shared meanings and experiences by focusing on the meaning across a dataset. The two main reasons to use the thematic analysis is its flexibility and accessibility. It offers a way into qualitative research that teaches a mechanics of coding and analyzing qualitative data (Braun & Clarck, 2006).

In thematic analysis there are two approaches first one is inductive and the second one is deductive. Inductive approach for coding and analysis is the bottom to top approach and driven by what is in the data. It means that codes and themes derive from the content of data. While on the other hand deductive approach is top to bottom approach in this approach researcher brings a series of concepts to a data that they use to code and interpret the data.

I have used both the deductive and inductive approach on this study because it allowed me to generate themes from the existing body of knowledge and interview.

3.9.2) Framework analysis

In this study I have used framework analysis as framework analysis is flexible during the analysis process it permits the user either to collect all the data and then analyze it or do data analysis during the data collection process. Data is sorted in accordance with the key issues and themes during the data analysis this involves a few steps process given below.

3.9.3) Transcription

An action providing the written account of spoken words is known as transcription. There are two main types of transcription simple transcription and detailed or complex transcription. In the first one the focus is upon readability it is easier to learn and takes less time. This type of transcription prioritizes the content. The Hoffman (1984) and Kallmeyer (1976) focus on this goal. The second one is complex or detailed transcription in which prosodic element (e.g. intonation, primary and secondary emphasis, volume, speed, and pitch) is included. In this study I have used the simple way of transcription in this study as it is easier to learn and time saving. And it allows faster access to the content of the conversation.

3.9.4) Familiarization

It is a process in which a researcher becomes familiar with the transcripts of the collected data by listening audio tapes and studying the field. Throughout this process researcher becomes familiar with the ideas and themes to make a note of them (Srivastva & Thomson, 2009).

In order to search for meaning and patterns in the data I have read the transcripts in an active way to get familiar to them. I have also reviewed the literature widely to inform myself to the potential themes rooted in the data.

3.9.5) Indexing and coding

Codes are the building blocks of the data analysis. Code can provide a summary of a portion of a data. And tagging initial codes to the data is called indexing. The portion of data to be coded during first phase coding process can range in magnitude from single word to a full sentence or an entire page. And in the second phase the portion that can be coded are the longer passages of the text and reconfigurations of the codes themselves (Strauss, 1987).what is important for all codes is that they are relevant to the research question coding is something we get better at by practice (Braun & Clarke, 2006). There are different ways to code your data manually and by different software. I have done it manually in my study.

3.9.6) Identifying the Themes

When you move from codes to themes your analysis starts to take shape. A theme capture something important about the data in relation to the research question and represents some level of patterned response or meaning within the data (Braun & Clarke, 2006). Another important aspect of this stage is that how themes will work together in telling overall story about data.in this study the potential these were eminent and grown throughout the whole coding process for producing the final report. The process of identification and characterization of themes was done by applying codes to the transcripts of the interviews. After identifying the themes connection between each theme were described on a thematic structure.

3.9.7) Memo writing

It is an additional pre-writing or free writing phase in which researchers are likely to come up with ideas or thoughts about their codes or relationships between the themes during gathering, coding and analyzing the data. The theorizing write-up of ideas about codes and their

relationships as they strike the analyst while coding (Glaser, 1978). During the re-reading of the transcripts of interviews I had started writing memos.

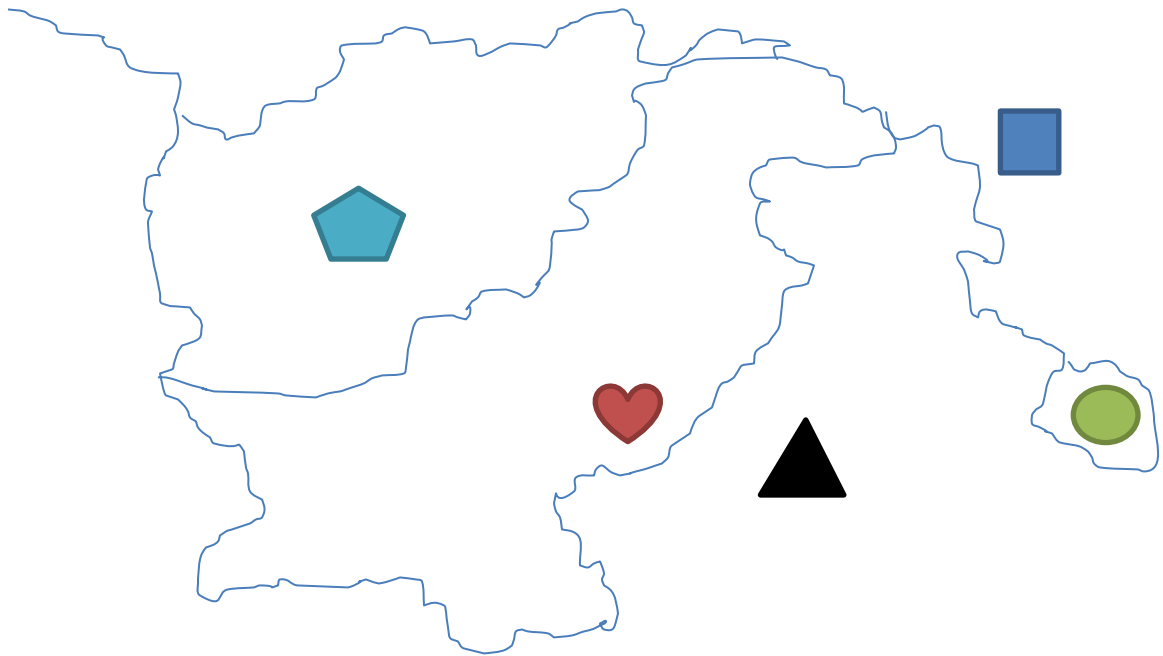
Chapter: 4 Locale Description

4.1) Introduction

This chapter consist of the location of the Multan city, the map of complete Metro route and the map and details of the selectd stations.

4.2) Multan

In the province of punjab Multan is the headquater of Multan district .located on the banks of the chnab river. Multan is pakistan’s seventh most populus city and the major cultural and economic center of southern punjab.it spread on the area of 3721 square kilometer. The map below shows the location of multan city of pakistan’s map.



♥ : Multan □ : china ⬠ : Afghanistan

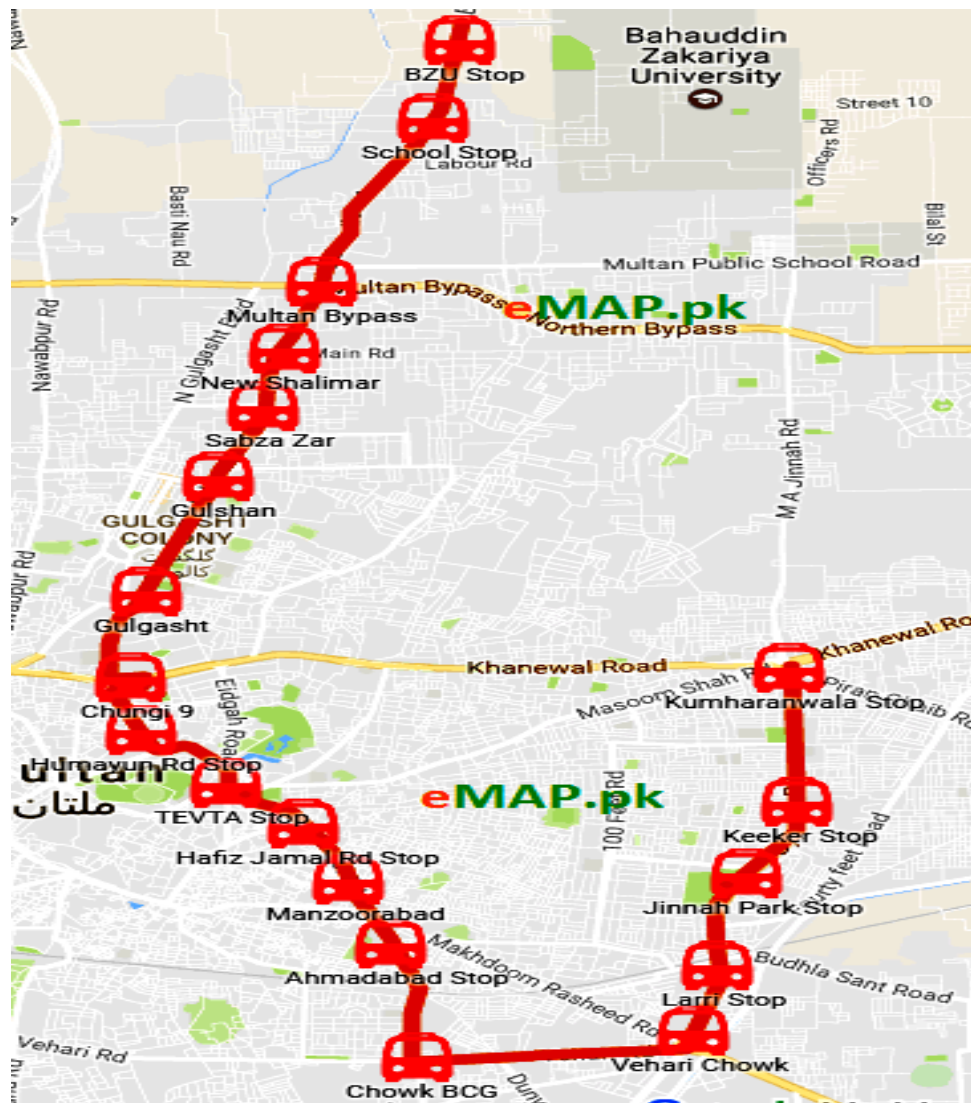
▲ : India ○ : Nepal



Map 4.1 Multan District

Source: Map data2018 Google

Multan districts has three tehsils and those are Multan, Jhalpur peerwala and shujabad. nearest major cities of Multan are Dera Ghazi khan, Bahawalpur and Muzafargarh. it is third largest city of Pakistan by area.



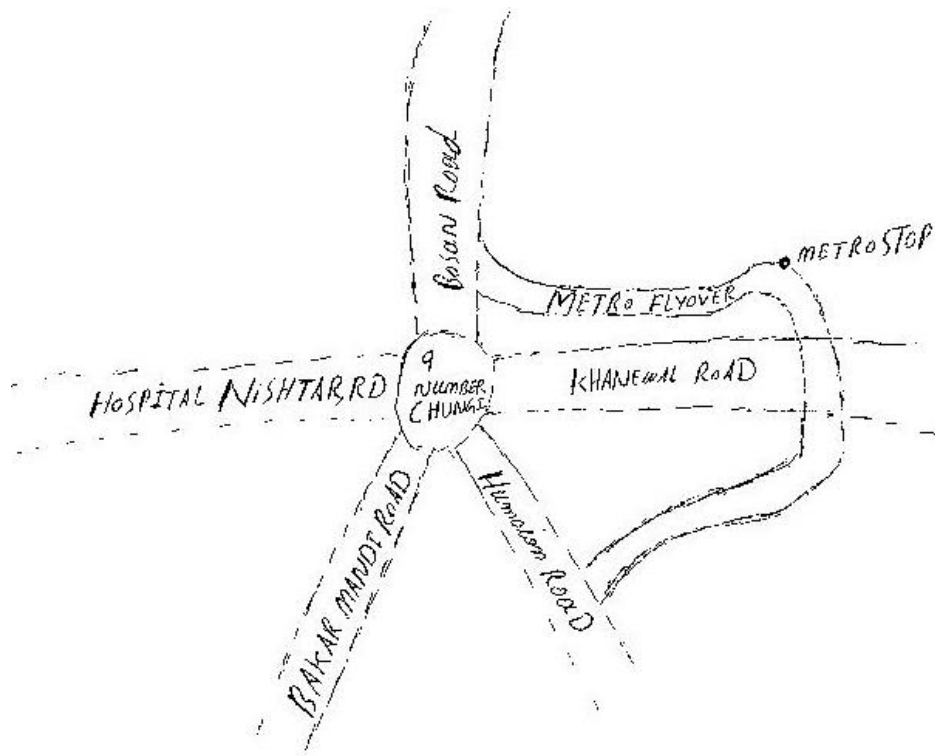
Map 4.2 Multan Metro Bus Route

Source: emap.pk

The metro route of Multan is 18.5 kilometer. It has 21 stations with 14 elevated stations and 7 ground level stations. The cost of the introduction of this Metro bus service is 29 billion according to official reports making it 1.61 billion per kilometer. This study has focused upon the five stations from 21 stations of the Metro bus service. Detail of these stations as follows.

4.3.1) Chungi No 9

This is very famous and well known place in Multan because this stop connects the all main roads of Multan like university road, Nishtar hospital road, and Humayun road. The reason behind the selection of this station was also that it connects the main roads of Multan. Everybody has to pass through this station to reach at Nishtar hospital, to university and to the famous Bahauddin zakriya tomb.



Map 4.3 Chungi Number 9 Multan

Source: Author

This Bosan road leads to university and LMQ road leads to Nishtar Hospital and others are Khanewal and Humayun road which leads to the tomb of Bahauddin akriya tomb.

4.3.2) Chungi Number 6

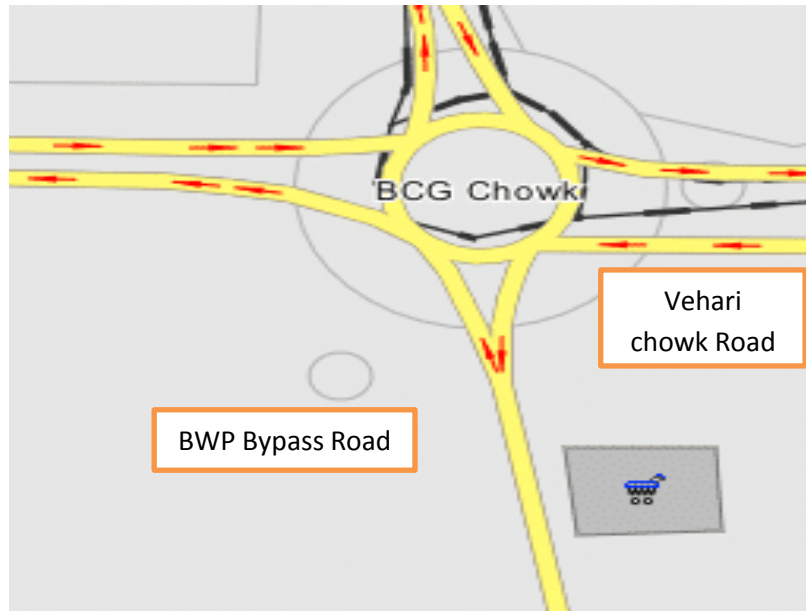
This is also one of the famous and most visited places in Multan. The metro station of Metro bus service at chungi number 6 provides easy excess to Gardezi market and some colleges as well and to the famous shopping center of Multan which is known as chase up. It is at the same road which leads to university. The reason behind the selection of this station is its excess to both shopping and education market. This place chungi number 6 remains busy as people visits the shopping mall, Gardezi market and because of students as well.

4.3.3) Vehari Chowk

This is the main transportation market of Multan. This is the first place you see when you enter in Multan. And this place remains always busy with the passengers going out of town and coming back home. The road that leads to Vehari Chowk and Vehari Chowk itself remains always congested with traffic. That is the main reason behind the selection of this station.

4.3.4) BCG Chowk

This place covers the one of the main labor markets and commercial areas of Multan. Different types of employers and the private businessmen and workers visit this place on daily bases. The area adjacent to BCG Chowk is known as Mumtazabad which is one of the oldest housing areas of Multan as well it is well developed and populated area. Several shops can be find in this area aswell as school and polytechnics.



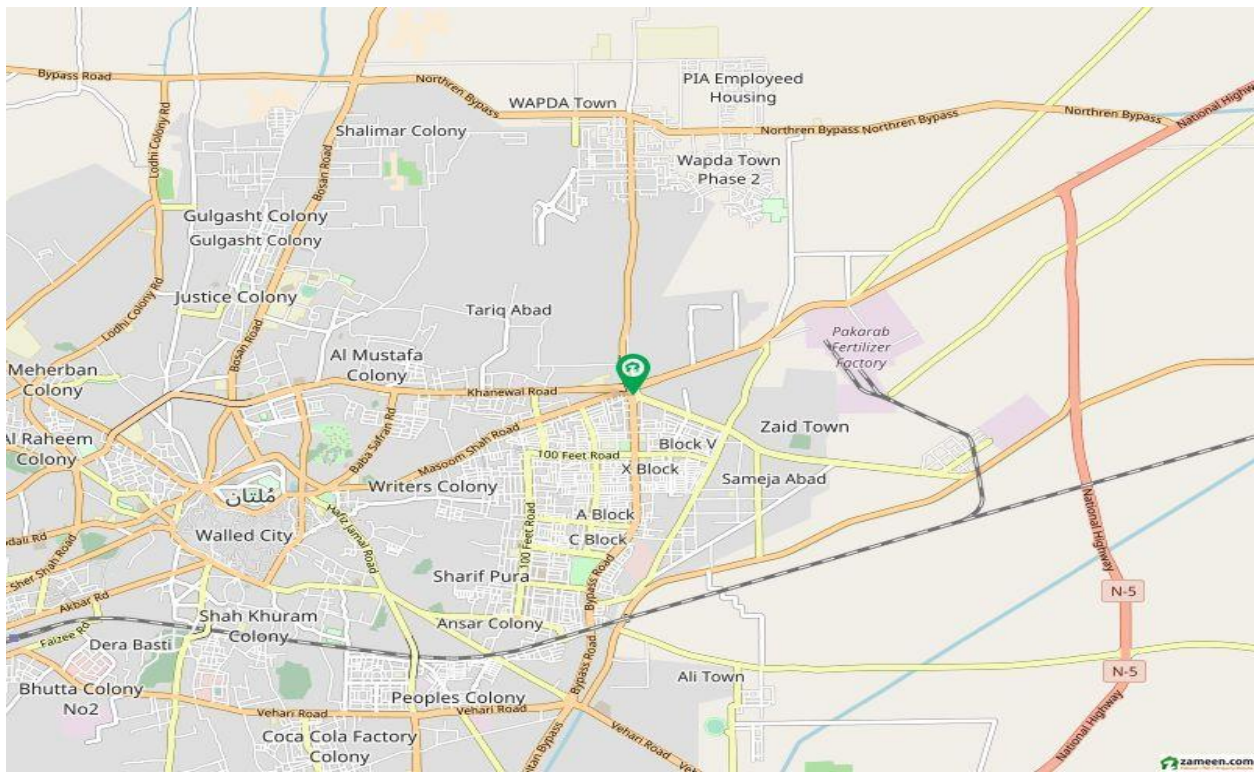
Map 4.4: BCG CHOWK

Source: Wikimapia.org

Vehari chock road leads to the main bus stop, Bahawalpur bypass road leads to main exit of the city.

4.3.5) Chowk Kumharan Wala

Chowk Kumharan wala is also one of the main labor markets of Multan. Several shops, mobile markets are here. Areas adjacent to it are very populated and the the reason behind the choosing this station is that metro route starts from this place. instead of going into the city the Metro route route from here moves towards outside of the city. a person who want to visit BZU, 9 number Chungi and 6 Number Chungi have to pass through 21 stations while from chowk Kumharan wala at his personal vehicle it will not take him so much time to reach at 9 Number Chungi.



Map 4.5: Chowk Kumharan Wala

Source: zameen.com maps

As we can see in the (Map 4.4) that his khanewal road from chowk Kumharan wala gives easy and quick access to Chungi Number 9 and to the university road. While the metro route is at the bypass road totally in opposite direction so this is the main reason behind the selection of this stop.

Chapter: 5

Research Findings and Discussion

5.1 Introductions

This chapter includes the data analysis and the discussion in the wake of findings. Following pages describes the factors that are very important in deciding the role of metro bus service in the reduction of private vehicles. These factors play a very important role while deciding about the mode of travel. This chapter will also put a light on that how these factors making some people to use MBS (Metro Bus Service) instead of their personal vehicles and restraining some people from using the MBS. The data is distributed into themes which completely reflect the conceptual framework which was discussed above. These themes are designed according to the flow of conceptual framework.

5.2 Impact of People Preferences

Researcher designed this theme under main argument of conceptual framework. Although the purpose behind the introduction of BRT (Bus rapid transit) is to solve the traffic related problems and to decrease the number of vehicles on the road, by attracting the users of the personal vehicles towards public transports. But the people preferences along the route of MBS are playing very important role in deciding the impact of MBS on the use of personal vehicles. Because the commuters are comparing the MBS with their existing mode of travel and after this comparison the people who got two wheelers are more satisfied and they are ready to prefer MBS over their personal mode of travel because MBS providing them what they expected from

it. I have met many commuters who have quit their two wheelers. I met an old man who was using Metro Bus Service for 6 months. He remarked;

It was very difficult for me to travel on a bike because of the pain in my back bone. I had to travel on my bike two or three times a day before the introduction of Metro and my back pain was getting worse day by day. But after the introduction of metro this is lot easier for me to travel now the only hurdle I have to face are these few stairs (stairs at the start of station).

The old man was very happy while telling me his story he was behaving like this MBS was biggest blessing and comfort of his life. These preferences about the mode of travel varies person by person I met a student who was using MBS since its introduction. He stated;

I am using this metro bus service since its introduction before its introduction I used to travel on my bike. I left using bike because in Multan's heat and dust it was very difficult to travel on my bike especially in the afternoon.in this direful heat of Multan if u returns your home in A.C bus what else you can demand.

People preferences are playing very important role in defining the role of metro bus service in the reduction of private vehicles.

5.3 Impact of Quality of Life

Researcher design this theme according to the second argument of the conceptual framework in which it discussed the impact of quality of life on the people preferences while deciding about the mode of travel (Govender, 2014). Quality of life during travel is a major factor which attracts many people towards a specific mode of travel. The quality of life during travel helps people to decide about the mode of travel. The role of Metro in the reduction of the use of personal vehicle

depends upon the quality of life it provides to the people which is different for different people because the demand for quality of life and travel satisfaction for a person using four wheelers is higher than a person using two wheelers. And there are different categories in the four wheelers as well. People who are using four wheelers of 1000 cc or below are more satisfied with the quality of life provided by MBS than the people who have more than 1000cc four wheelers. I met different users of private vehicles who were using metro bus service instead of their personal vehicle most of them were the users of two wheelers. Because the expected level of quality of life by the users of two wheelers was quite lower to match. One of those respondents stated;

I am a shopkeeper before the metro bus service it was very difficult for me to drop my kids to school first at my bike. And at the middle of the day it was very difficult for me to drop my kids back home during my working and peak hours. Other means of transportation were not secure enough to use for kids like vans. But now this metro bus service is secure enough that my wife travels with my kids to school and also pick them from the school. Life has become much easier for me.

For this man the travel satisfaction and the quality of life during travel was a safe and secure travel which he was not getting before other than his personal vehicle. This expectations for quality of life during travel varies with the mode of travel people were using before metro. I met a user of four wheelers vehicle below 1000cc he stated;

Before metro bus service I used to travel in my four wheeler and now I am using metro bus service because I have Mehran (800cc) so the comfort level of metro is far better than my vehicle. Before MBS there was no choice other than using my own vehicle because you can't

travel in congested vans and rickshaws and not even at a bike in this direful heat of Multan but now I found an alternate mode of travel so I am very satisfied with it.

As this person had a mini car and quality of life provided in the metro bus service was according to his expectations so he left his personal vehicle and converted to MBS. This is how the quality of life during travel is playing a significant role in the decision making for the mode of travel. I met some people who were using their personal vehicles along the route of metro bus service and one of the respondents who was using a 1800cc vehicle said;

I cannot waste my time by standing in a queue to purchase a coin. And the comfort level of metro bus service has no match with my personal vehicle. Honestly there was no need of Metro in Multan.

This person was not satisfied with the quality of travel provided by the MBS. Because quality of life during travel basically includes a leisure travel, secure environment, and easy excess to labor and education market and the mode of travel that person was using before and after the introduction of metro bus service was far better than metro in these qualities. So the MBS is not exciting the users of such luxury vehicles.

That is how quality of life is playing an important role in attracting the private vehicle users to MBS.

5.4 Impact of shorter routes

Researcher designed this theme according to the third argument of conceptual framework in which changes in work destination, multi-tasking affect the demand for MBS or the preferred mode of travel (Ollison, Fuji, and Friman, 2013). The length and coverage area of metro routes is

very important as means to increase the demand for MBS and to decrease the number of private vehicles on the road. There are a number of people who are facing these shorter route problems and they have no other option except for using their personal vehicles. There is reasonable variation in the car use within the route and going away from the route because metro route in this city is not good and long enough to cover the all education and labor market. I met some vehicle owners at the different metro stations and one of them narrated;

I do have my personal vehicle (car) and I do prefer MBS when I have to go somewhere along the metro route. But this route is very shorter most of the time I have to use my personal vehicle because if I use metro then I have to take two modes for transportation to reach at my destination because of the shorter route.

This was first aspect of the shorter route problem as this person was using MBS along the metro route at least because that person had a metro station near his house. Now the other aspect of the shorter route is that I have met many people who were using their personal vehicle along the metro route as they don't even have a station near their residence. They have to use their personal vehicle even traveling along the metro route. one of the respondent narrated;

I am using my vehicle because I don't have other option for the reason that MBS route don't cover my area. I would like to use it if it covers my area.

I heard this story from many people who were using their vehicle along the route of MBS. There is another aspect which comes under this shorter route problem

5.4.1 Multi-Tasking

Multi-tasking is another important factor which is restraining the private vehicle user from using the MBS. It includes those people who have to perform different tasks during the whole day. Although they have a metro station near their residences but they cannot prefer MBS over their personal vehicles because of the shorter route and its limited access to the labor market. As if they prefer metro they have to use different modes for transportation during the whole day so to avoid the inconvenience they prefer their personal vehicles. I met a person who was using his four wheelers along the metro route on asking the reason behind using his vehicle along the metro route. He stated;

I am a teacher by profession I do have different academies at different places of Multan some of those places don't come under metro route that is why I am using my personal vehicle.

This man was of the view that he could've think about using MBS if it covers his area. Many of the people told me the same story. I met an old man who was using his bike along metro route and he said;

I have travelled in MBS twice, this is a good service for old men like us but its route is incomplete. I would have to take two buses to reach at my work place and to return home If I prefer MBS over my bike. And my health doesn't allow me to do so.

And if we talk about the metro officials they are of the view that measures are being taken to overcome this shorter route problem. A feeder bus service was launched few months ago to overcome the problems to people are facing to reach at their destinations. One of the officials stated;

We have launched feeder bus service to overcome the shorter route problem. This bus service is almost covering the all main labor and education markets of Multan. We have noticed a slight improvement in the demand of specific areas.

5.5 Lack of awareness

Lack of awareness is also one of the main reasons which are becoming a hurdle between the MBS and owners of private vehicle. As i mentioned before metro officials and policy makers are taking different steps to overcome the problems people face while using MBS. But most of the people are not aware of those measures. If we talk about the introduction of the feeder bus service to attract more commuters by providing them easy excess to their destination in the whole city most of the people don't even know what benefits this feeder bus service is providing. Most of them are unhappy with the card system being used in the feeder bus service. I asked some people about feeder bus service and one of them stated;

This feeder bus service should be stopped or its card system should be changed and simple ticketing system should be used.no one is using this feeder bus you can hardly see three or four person in that bus because it is very difficult understand their card system.

Many of them told me the same story. And few of them are those who never sit on feeder buses never used that card system they just believe on words of mouth. They are just not ready to accept it. And when I met a metro official who was from policy making department and asked about his point of view at this card system problem he said;

When we launched feeder bus service we also noticed that people are hesitant to use card system then to overcome this we issued 127,000 free cards for three month and we launched a campaign also to spread this news everywhere.

Now most of the people don't even know about this offer and as they are saying that hardly three or four persons are travelling in those feeder buses I have personally observed this. The reasons behind this as people are not aware enough. And this lack of awareness is affecting the demand MBS by the private vehicle owners.

5.6) Economical way of travel

The cost during travel is a big factor that can affect the people preferences in the selection of the mode of travel, because the increase in the cost of other means of travel will increase the demand of MBS. And there is a huge difference between the travel cost of MBS and the travel cost of personal vehicle so there is a lot of chances for the conversion of private vehicle user to MBS. But in a city like Multan the results are according to expectations when we talk about private vehicles especially. It is more effective in case of those people who were using other means of public transportation before the introduction of MBS. But in the case of private vehicles (four wheelers) there are very few people who prefer MBS for some of their trips over their four wheelers to decrease the travel cost. I have met a user of four wheeler and he said;

Yes no doubt it is an economical way of travel but I cannot use this every time due to its shorter route. Sometimes I do prefer to travel on it when I am not in a hurry to reach somewhere, especially the places where I used to go on my bike now I am using metro for those places. But as far as four wheeler is concerned I don't think I prefer MBS over it.

This man was of the view that the comfort level of MBS is match able with my vehicle its travel cost is less than my personal vehicle but due to its shorter route he was neglecting the economical aspect of MBS.I have met many bike users and some car users as well who have quit using their vehicles to minimize the travel cost because their destinations comes under the route of MBS.I met a doctor who was using MBS he said;

I prefer MBS over my personal vehicle because my hospital comes under its route so this is lot easier for me to get there at MBS instead of my personal vehicle it saves me from the congested traffic.

When I asked metro officials about their effort to make MBS more economical and more attractive to attract even those people who are dealing with shorter route problem he said;

A person who use MBS and his house or work place does not comes under the metro route he can use our feeder bus service and can reach his destination in just 5 rupees because of our offer. Right after the use of MBS the card system of feeder buses will only deduct 5 rupees instead of 20.Other public transport will take 100 rupees for that distance and even your personal vehicle will cost you 50 to 60 rupees for that destination.

MBS is an economical way of travel but there are some reasons and lack of awareness which are not allowing many of them to shift from their personal vehicles to MBS.

5.7) Time consumption

This theme was designed according to the fourth argument discussed in the conceptual framework in which time consumption during travel affect the demand of that mode of travel and also plays very important role in selection of preferred mode of travel (Eliasson, west & Cat,

2013). Time consumption is the factor which has most important role to play in the demand for the MBS. In most of the studies at BRT researcher have mentioned the time consumption as a most important of all factors. The time that people consume during travel is directly affecting their preferences for the mode of transportation. Now there are two aspects of time consumption the first the time commuters consume within the vehicle during travel and the second the time they spent on the stations waiting for a vehicle. In these two aspects second aspect matters more because people are not ready to waste their time in waiting for vehicles they are of the view that they can use this time in some sort of productive activity by using their personal vehicles. Multan metro bus service is covering the main education market of Multan so I met some students at metro stations as well who were using their personal vehicle before the introduction of metro bus service. One of them stated;

As you know MBS covers whole education market and now this is very easy to reach my college on time because before MBS I used to travel on my bike, and in school timing there used to be a lot of traffic on the roads especially at university road. So the travelling on MBS helps me to be there on time.

As far as students who are mostly the users of two wheelers are concerned they are satisfied with the travel time they consume in MBS but some of them are of the view that after decreasing the numbers of buses available in Multan the waiting time is increasing little bit. But if we talk about the work commuters those who used to travel on bike and now their houses and work places comes under metro route they prefer MBS over their personal vehicle. I met a person from BZU administration at a metro station and he said;

For me the comfort level, time consumption and all other things are perfect because before MBS I used to travel on my bike and it took more travel time than metro. Now the MBS drops me right in front of university.

But if we talk about the users of four wheelers few of them who have mini cars are preferring the MBS over their car as the MBS consumes less time than their vehicle and travel satisfaction of MBS is more than their vehicles and most importantly their work places comes under the MBS route. And the people who have luxury cars are of the view that waiting at the station for bus will consume their more time than the personal vehicle and few of them are of the view that this metro route is very short for Multan city one of them said;

I am using my personal vehicle because my house comes under the route of MBS but my work place doesn't. I would have love to use MBS as it would have save my money my time. But I can't rely on their feeder buses as I am a managing director so I don't want to give my employers a chance to say that our boss is always late.

Decreasing the number of buses available in Multan city is making people to wait little bit more at the stations. And this is the reason mentioned by the users of four wheelers even by those who have their houses and work places at the metro route.

5.8 Capacity of Travel

This theme was designed in response to the fifth argument of the conceptual framework which says that available space during the travel also affects the demand of public transport (Polat, 2010) For those who are traveling into MBS either they are user of two wheeler or four wheeler capacity of travel is a thing which really matters to them because the capacity available in the

MBS will lead people to more satisfactory travel. Traveling in a congested space leads to more energy consumption during travel and if a person using MBS to travel to his work and the space is congested he will consume half of his energy during travel in the start of his day. This energy consumption further leads to stress and the less working efficiency in the office. Those who are using MBS for commuting to their work places are satisfied with its capacity of travel. They are of the view that they can reach at their working places without facing huge traffic, dust and other environmental effects. one of the them stated;

Before metro bus the alternate modes of public transportation vans and rickshaws were congested and expensive those were not good to prefer so there was no choice other than using own bike. Now I don't have to face traffic and dust while commuting to work.

As far as capacity of travel is concerned the commuters are pretty satisfied with it. It has become easier for them to travel to work and other places as well in an honorable way.

5.8) Impact of Family Trips

Researcher designed this theme from his findings. This theme does not exist in the existing body of literature this is new finding. The term family trips consist of the people who travel with their family for different types of trips like dropping your family members to work places, schools, bus stops or taking them to picnic points that all comes under the family trips. This family trip factor also has deep impact on the people preferences for the mode of transportation. It depends upon the environment being provided by the MBS because in a city like Multan people are pretty much conservative about their families.

If we talk about the impact of MBS on the family trips of the people of Multan the users of two wheelers who used to drop their family members especially at school colleges are pretty happy. Because now all they have to do is to drop their family at the metro station. They think that this MBS is secure enough to travel for their family. They are of the view that after the introduction of MBS the use of their personal vehicle (bike) for family trips has definitely reduced. I have met some people who were waiting for their family member at the metro station one of them said;

I am here to receive my mother. She is a teacher, before MBS I used to drop my mother all the way to school. But now all I have to do is to drop her and pick her from this station.

He was pretty satisfied with the environment in the MBS but they were still hesitant to use the feeder bus service that is the reason he was here to pick her mother. And on other hand the point of view of the users of four wheelers was totally different. They are not ready to let their families travel in the MBS. They are still using their personal vehicles for family trips. Some of them are of the view that we cannot allow our ladies to travel in buses. One thing I observed that in the evening most of the vehicles along the metro bus service are being used for family trips especially at shopping places. I met a person who was using his personal vehicle for a family trip along the metro bus route he stated;

Do you want me to purchase a feeder bus card for each and every member first and then to wait at the station for metro bus with my family members and after that again I would have to walk for five minutes to reach my destination even after all this effort. No brother I am very satisfied with my car i will never prefer metro over it.

This person was of the view that it is very difficult to travel in metro with their family women especially when your house is not at the route of MBS. That is the reason he still prefers his

personal vehicle over metro. Most of them share the same story with me few of them are of the view that yes sometime we can prefer metro for our personal travel but we can't prefer it for family trips.

And during the interview with the metro official he told me the very interesting story. He said;

Travelling environment in MBS is so secure that we are observing the more number of female riders than the male. I am sorry we are not allowed to share our statistics but this is the fact.

This thing can be true in the first aspect I discussed above that those ladies who use to travel with their family members at their bikes, local transport, rickshaw, vans are now transferred to MBS. Because satisfaction level and environment level of MBS for them is higher than their previous mode of travel. But if we talk about the people who used to travel on four wheelers for family trips are still using their personal vehicles they are not much satisfied with MBS.

5.9) Impact of unavailability of parking place

This theme was generated from the findings of this study this theme does not exist in the conceptual framework or the existing body of literature. The other reason that is affecting the demand of the MBS to some extent is the unavailability of parking place at the stations. If we talk about the impact of the unavailability of the parking places in Multan at the demand of the MBS by the users of private vehicles, it is affecting a lot as I mentioned above many times that Multan metro is facing the problem of shorter route and people are hesitant to use the feeder bus service which was launched to overcome the problems raised by shorter route. If there is a parking place at the station people can use their vehicle to reach at the station and can park it over there and use MBS to reach at their work destination or wherever they want to go. some of

the People who are using MBS instead of their vehicle they are parking their vehicles at the shops of their friends and relatives near the stations as they are not ready to use feeder bus service so this unavailability of the parking and complicated card system of the feeder bus service pushes people to use their personal vehicle even along the metro route. When I was conduction interviews at the stations I have personally observed that people are parking their bikes at the nearby shops and using MBS for further travel. As the goal of this MBS is to maximize the number of travellers and to minimize the number of vehicles on the road the availability of the parking places could've be very beneficial to achieve this goal.

People who are complaining the unavailability of the parking place are totally car users because the bikers somehow can manage to park their bike at some shops but a four wheeler need more space and security to be parked.one of the car users along the metro route stated;

The government should have widened the roads first and should have built some parking places for vehicles. Then it would have been very easy to travel in it. The feeder bus service itself is a hurdle between metro and people.

This person was of the view that many other car users like me think that it is a honorable way of travel but there are some gaps which needs to be filled to attract the car users like us. Many previous studies at BRT demand have shown that availability of parking place is very important for maximization of the BRT demand. For example a person who establishes large retail stores shopping malls secure a number of adequate numbers of parking places.

5.10) Impact on visitors

This theme was also generated from the findings of the study it does not exist in the conceptual framework or the existing body of literature. This visitor term includes those who are coming into the city and those who are going out of station. As the Multan metro is covering the main bus stop of the city so some of those people who used to travel to bus stop in their personal vehicles are preferring this because they are of the view that before metro the other modes to reach at the bus stop very not so good so that is the reason they were using their vehicles to reach at the bus stop or to pick someone. Now those people are using their vehicles to reach at any of the metro station now they don't have travel to bus stop in their vehicle as the metro drops them right in front of the main bus stop of Multan. I met a person he was coming out of the station. He said;

I don't prefer metro over my personal vehicle(car).The only difference is before metro I had to use my vehicle to reach at the bus stop also or someone had to drop me there but now I use my vehicle just to reach at metro station as it drops me right in front of bus stop.

I heard the same story by some four wheeler users. They are also using metro to reach at the bus stop instead of their vehicles to avoid the traffic.so somehow in this aspect MBS managed to get some attention by the users of four wheeler. There is another aspect of visitors which is responding to MBS to some extent. The people who are coming to Multan from nearby villages most of them are students or the people who are coming to city to drop their kids and for shopping. As I mentioned earlier that MBS is covering most of the educational market of Multan and some famous shopping centers as well. But most of them are users of two wheelers.

5.11) Discussion

People preferences plays very important role when we talk about the role of MBS (metro bus service) in the reduction of the use of private vehicles along the route of MBS. As it is evident from our results that different people have different preferences which gives them different reasons to prefer their personal vehicle on the MBS (Metro Bus Service) and gives reason to some people to prefer MBS over their personal vehicle as well. It is discussed in the study that private vehicles include both the two wheelers and four wheelers. It is apparent from the results that these preferences and the expectation from the MBS depend upon the previous mode of travel of the commuters. People who had bikes before the introduction of the MBS are showing more fondness for the MBS than the four wheelers and if we talk about the people who used four wheelers before the introduction of MBS there are two categories in them. First one is those who have mini cars and second one is those who have luxury cars. To some extent some users of mini cars prefer MBS over their personal vehicle because they are of the view that the comfort level of their personal vehicle and the MBS can be paralleled. But MBS does not excite the users of luxury four wheelers. Their satisfaction and preference levels are higher than the level being provided by the MBS. And it is obvious from the results that metro is playing its role in reducing the use of only two wheelers the most. As far as the use of four wheelers is concerned MBS is not that operative.

Now we talk about the hurdles being faced by the most of the vehicle owners. It is evident from our results that the main problems being faced by the vehicle owners are.

Shorter route is one of the main excuse or reason for not preferring MBS Over their personal vehicle. Relative literature and conceptual framework shows a link between the shorter routes and the people preferences for the mode of travel because due to shorter route they have to use

two modes for transportation to reach their destination (Ollison, Fuji, & Friman, 2013). This consumes their more time more money and more energy as well. And this is evident from our results that these factors directly affect the people preferences for the mode of travel and coverage area of MBS plays very important role in increasing the demand of the MBS. Owners of private vehicles especially of four wheelers are not satisfied with the area it covers. This shorter route problem leads to a problem that the private vehicle users who have to perform multi-task during the whole day do not prefer metro over their personal vehicle literature shows a link between the multi-tasking and the choice for the mode of travel. And it is obvious from the results that Multan MBS is not covering the target labor market.

Metro officials and policy makers are aware of this shorter route problem and they have launched some policies to overcome this problem like the introduction of feeder bus service to feed the metro bus service from the areas which does not come under the metro route. This thing appears as new finding which is affecting the people preferences for the mode of travel as this does not exist in the existing body of literature. This step is becoming an obstacle between the private vehicle owners and MBS. And this is all because of lack of awareness.

Lack of awareness has emerged as an unexpected finding as it is obvious from result that how the lack of awareness is becoming a hurdle between the MBS and the private vehicle owners. As I mentioned earlier the officials are taking measures to overcome the shorter route problem but the problem is people are not aware of it. The basic problem is when the feeder bus service was introduced a card system was installed in it initially some people tried to use it but its card system was complicated for them. They left using it by saying that there should be ticketing system in it. And after that to overcome this problem metro official launched some offers for example free cards for every one for three months, reducing the travelling cost of feeder bus

service from twenty to five rupees. But I have observed that private vehicle owners are not even aware of it they are still complaining about the card system and it is apparent from the results. Instead of these free cards offer the ticketing system would have been better to attract the private car users towards MBS. In a city like Multan where everyone wants a leisure travel due to its dust and direful heat but this installation of feeder bus service is making things more complicated for them. Meanwhile the feeder bus service itself is a burden at traffic while the purpose of the BRT system is to reduce the use of vehicles.

Even those who are preferring the MBS are not using the feeder bus service to reach at the station they are using their bikes to reach at the station.as I mentioned earlier the most of the users of the MBS are used to be bike users. And most of them are students as MBS almost covers the main education market of Multan.

In a city like Multan everyone wants a quick and leisure travel to reach at their destinations because of direful heat and dust. If the MBS wants to attract private vehicle user they need to offer more comfortable and quick way to travel to them but meanwhile they are making things more complicated for people especially for private vehicle owners.it is increasing their others problems like time consumption they cannot rely on MBS for a family trip it is increasing their travel cost as well. MBS officials have to come with some bright ideas and policies. As the next phase of feeder bus service is also expected they should use ticketing system rather than the complicated card system. Because people are not demanding the concession in the travel cost at feeder buses the only thing they are demanding is the elimination of card system.

Another big imperfection which emerged as a new finding in the Metro bus project of Multan which is affecting its demand by the users of private vehicle owner is unavailability of the

parking place. Many people are of the view that this project was completed in rapidity to meet their political purposes and it is apparent from the results as well. As the previous studies all over the world have shown that the purpose of the MBS is to diminish the number of vehicles at the road then how can government neglect such an important factor. Even if a person built a shopping center he provides people with parking places to make them comfortable in visiting his center. If there would have been a parking place for private vehicles. The results for the reduction in private vehicle use due to MBS would have been lot healthier. Even bike users who prefer MBS are parking their bikes at nearby shops of their relatives of friends. But a four wheeler cannot be parked like this it needs more space and security to be parked. As it is patent from the results that owners of private vehicle are of the view that government should have widened the road should have built some parking places at least at half of its stations. The money government have spent at the feeder bus service is actually looks like a penalty cost for not providing parking places at the stations.

And things are getting more complicated even after paying that penalty cost. Instead of becoming a solution, this feeder bus service is becoming a delinquent itself. As another phase of MBS is probable in Multan and it is evident from results of this study that addition of parking places in the next phase will help MBS a lot to play its part in reducing the number of private vehicles at the road. Because the most of the private vehicles possessor are of the view that it is an honorable way of traveling it can be preferred if these glitches get sort out.

One more thing which toughens this argument of parking place is, to some extent private vehicle owners prefer MBS to reach at the bus stop by leaving their vehicles at home. The reason is MBS covers the main bus stop the transportation market of Multan and that road is always remains congested with traffic so the private vehicle owners are now preferring MBS to reach

there, leaving their vehicles at home. They would have done the same for their other trips by parking their cars at the stations and would have use MBS to grasp at their destinations to avoid the traffic if there any parking place available.

Capacity of travel and the service quality during travel is being appreciated by those who are using it. Even the capacity and the environment of the MBS during travel is being admired by those who are not using it they admits that it is an honorable and luxury way of travel as compare to other means of public transportation. It is not capacity or quality of service which is preventing them to use MBS the reasons I have mentioned above are the main hurdle. Users of two wheelers are declaring this as a safe secure way of travel for women of their houses as well. As it is evident from the results that they are not using their bikes now to drop their women all the way to their work destinations they are just dropping them at the metro stations. As the relative literature and conceptual framework shows the link between the capacity of travel and people preferences for mode of travel (Polat, 2010).Now here the point to be noted is that they are still using their bikes to drop someone at the station instead of feeder bus service. Because to ride at feeder bus they have to get their selves registered by paying 200 rupees in advance and after that they can travel in feeder bus service. That is the main reason that people are not traveling in feeder buses.

And as far as the family trips of the car users which emerged as a new finding are concerned they are still using their personal vehicles especially for family trips although they are praising the capacity and environment of MBS during travel but the reasons I have mentioned above are restraining them from using MBS. And during my fieldwork I have observed that in the evening most of the private vehicles at the metro route are being used for family trips. Because it is difficult to get a card for each and every member for their family first to just reach at the metro

station this whole thing increases their time consumption. And in a city like Multan people are very conservative about their families so they prefer their personal vehicles especially for family trips.

Some changes in the service of feeder bus can attract all those bike riders who are using it to reach at the metro stations and also those who are using their bike for their whole trips. Because feeder bus service no doubt is covering the most of the areas which are not attached to the route of metro bus service it can be used at least by bike riders to reach at metro stations and to commute in the MBS further.

Chapter: 6

Conclusion and Recommendations

6.1) Introduction

In the light of the findings, this chapter consists of conclusion, some recommendations and road map for future studies. The aim of this study was to find the role of metro bus service in the reduction of private vehicles. In other words has the metro reduce the use of private vehicles in the selected locale. According to the findings of this study conclusion and recommendations are given below.

6.2) Conclusion

In Pakistan traffic related problems are increasing day by day due to the rapid growth of population and rural urban migration. Numbers of households with personal vehicles are increasing specially in Punjab. Government of Punjab has taken some initiatives in previous years to solve this problem by introducing MBS (Metro Bus Service) in the three major cities of Punjab Lahore, Rawalpindi, Multan.

This study targeted at finding the role of Multan Metro Bus Service in the reduction of the private vehicles on the road and how does people onboard explain the capacity and quality of travel. The commuters were interviewed from the five main stations of the Multan those who were coming out of station and those were also interviewed that were using their personal vehicles along the MBS route. Some metro officials were also interviewed.

The analysis showed that MBS has only succeeded in attracting the users of two wheelers it failed in attracting the users of four wheelers especially those who had luxury vehicles. Because a few people who had mini cars they were preferring MBS over their personal vehicles but not all of them. Analysis showed that the main reasons behind this failure were incomplete route, limited excess to labor market, unavailability of parking places for personal vehicles, lack of awareness and unwise policies by the Metro officials.

It is also obvious from the results that mostly the MBS was being used by the students as it covered the main education market of Multan and before this they used to travel on their bikes. That is the reason that Metro has succeeded in reducing the use of two wheelers mostly. Because for those students and many other bike users it is resulted in time saving, secure travel for their ladies as now they don't have to drop them at their work places at their own bikes they are trusting MBS, and in providing comfortable mode of travel in the atrocious heat and dust of Multan.

The analysis also showed that people onboard are satisfied with the capacity of travel available in the MBS. Even those who were not travelling the MBS admitted that its capacity and quality is good to travel but there were other factors I have mentioned above which were restraining them from using MBS.

6.3) Recommendations

On the basis of this study some recommendations are as follows

Private vehicle users are hesitant to use feeder bus service because of its advanced complicated card system. The card registration system in the feeder bus service should be eliminated as soon as possible. Simple ticketing system should be introduced to attract the users of private vehicle so that they could use feeder bus service to reach at metro stations by leaving their vehicles at home.

As Study found lack of awareness as one of the reason for not preferring metro and feeder bus service over personal vehicles.to overcome this, advertisements at the local TV channels and at the public places are very necessary to make people aware of the new policies being introduced to facilitate them. Some media policies needed to be introduced.

As the next phases of feeder bus service is about to launch. These phases should start after conducting complete surveys to know the people opinion. Because in the current route of MBS the parking places cannot be installed so feeder bus service has a vital role to play in attracting the users of private vehicles and feeding them to MBS.

As per metro officials saying another route of Multan metro bus service is expected.so the installation of the parking place in the next phase of Multan metro bus service will be beneficial in terms of attracting the users of private vehicles.

Scope for Future Research

This study not covers the all aspects of MBS (Metro Bus Service) in the Multan city. There is a need of more research to recognize the impact of this project on local people. Further possibilities for future research are given below.

This study only focused at the users of private vehicles.so the impact on the other public mode of transportation after the Introduction of the Metro Bus Service can also be seen.

A social cost benefit analysis can also be done to estimate the overall impact of the project.

For future research the culture within the Metro bus and feeder buses in the light of daily commuters can be explored as well.

Chapter: 7

Ethical Considerations

Ethics are the norms and values. We can specify the ethical consideration as one of the most important part of the research. If this part is missing from the research then the dissertation may be doomed (Bryman and Bell, 2007). To ensure that the study was conducted ethically researcher made friendly environment and introduced himself completely verbal consent were taken as follows.

Interviews of every individual were recorded with his/her consent. Those who were not ready for recording they were not forced to do so.

The participants were informed about the purpose of the research. The authority letter given by the department was shown them for their satisfaction.

They were told that how their data will be used.

Their privacy was protected.

Confidentiality of the data was ensured.

Any deception and exaggeration about the objective of the research was avoided.

References

- Alam, M., & Ahmed, F. (2013). Urban transport systems and congestion: a case study of Indian cities. *Transport and Communications Bulletin for Asia and the Pacific*, 82, 33-43.
- Alizadeh, H., Shahmoradi, B., Abdi, M. H., & Rahimi, A. (2014). Developing Transit-oriented Strategies for Sanandaj City Center, Iran. *International Journal of Transportation Engineering*, 1(3), 141-150.
- Andong, R. F., & Sajor, E. (2017). Urban sprawl, public transport, and increasing CO2 emissions: the case of Metro Manila, Philippines. *Environment, Development and Sustainability*, 19(1), 99-123
- Babbie, E. R. (2013). *The basics of social research*. Cengage Learning.
- Bismi, P. J., & Kurian, M. (2016). Metro: An Ideal Solution for Traffic. *International Journal of Innovative research in Computer and Communication Engineering*, 4(12), 20741-20745.
- BiBi, H., Yasmeen, S., Chaudhry, A. G., & Hadi, S. A. (2015). Effects of Mega Metro Project on Rawalpindi's Socio-economic and Cultural life. *Science International*, 27(1), 621-623.
- Boyce, C., & Neale, P. (2006). Conducting in-depth interviews: A guide for designing and conducting in-depth interviews for evaluation input.
- Burns, N., & Grove, S. K. (2009). *The practice of nursing research : appraisal, synthesis, and generation of evidence*. St. Louis, Mo: Saunders Elsevier
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Bryman, A., & Bell, E. (2015). *Business research methods*. Oxford University Press, USA.
- Bundhun. (2015). *Business*. Retrieved December 15, 2017, from The National Business: Business@thenational
- Cohen, D., & Crabtree, B. (2006). Semi-structured interviews. *Qualitative Research Guidelines Project*, NJ: Robert Wood Johnson Foundation.
- Cats, O., West, J., & Eliasson, J. (2015). *Appraisal of increased public transport capacity: the case of a new metro line to Nacka, Sweden* (No. 2015: 2). CTS-Centre for Transport Studies Stockholm (KTH and VTI).

- Dulock, H. L. (1993). Research design: Descriptive research. *Journal of Pediatric Oncology Nursing*, 10(4), 154-157.
- Dhavala, K. K., Ghosh, M., & Singh, R. (2006). Social cost-benefit analysis of Delhi Metro.
- Dresing, T., Pehl, T., & Schmieder, C. (2015). Manual (on) transcription: Transcription conventions, software guides and practical hints for qualitative researchers. *Marburg: Self-published. Retrieved on June, 12, 2015.*
- Eswaran, S., & Bosco, M. A. J. (2016). A Study on Traffic Forecast for Metro Railway Expansion in Chennai. *Indian Journal of Science and Technology*, 9(39).
- Glaser, B. G. (1978). Advances in the methodology of grounded theory: Theoretical sensitivity.
- Haider. (2015, May 27). *Blogs*. Retrieved December 15, 2017, from Dawn News: www.dawnnews.com
- javed. (2014, may 15). *Blogs*. Retrieved December 15, 2017, from Dawn news: www.Dawnnews.com
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.
- Whiting, L. S. (2008). Semi-structured interviews: guidance for novice researchers. *Nursing Standard*, 22(23).
- LeCompte, M. D., & Schensul, J. J. (1999). *Analyzing & interpreting ethnographic data*. Rowman Altamira.
- Loo, B. P., & Li, D. Y. (2006). Developing metro systems in the People's Republic of China: policy and gaps. *Transportation*, 33(2), 115-132.
- Morgenroth, E. (2009). *Estimating the impact of metro north* (No. 301). ESRI working paper.
- Olsson, L. E., Gärling, T., Fujii, S., Ettema, D., Lekedal, H., & Friman, M. (2011). Relationship Between Satisfaction with Daily Travel and Subjective Well-Being in Three Urban Areas in Sweden: Description of Survey Questionnaire, Sample Characteristics and Preliminary Results.
- Patton, M. Q. (1987). *How to use qualitative methods in evaluation* (No. 4). Sage.

- Polat, C. (2012). The demand determinants for urban public transport services: a review of the literature. *Journal of Applied Sciences*, 12(12), 1211-1231.
- Randhawa, P. (2012). Delhi Metro Rail: Beyond Mass Transit. *Economic and Political Weekly*, 25-29.
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Pearson education.
- Sirgy, M. J. (2010). Toward a quality-of-life theory of leisure travel satisfaction. *Journal of Travel Research*, 49(2), 246-260.
- Sekar, S. P., & Karuppanan, S. (2012). Contributions of Metro Rail Projects in the Urban Dynamics of Indian Metro Cities: Case Study of Chennai and Bangalore. In *Proceedings of the 48th ISOCARP Congress*.
- Senft, G. (2009). The conscious city: Traffic congestion and change toward sustainability in metro Vancouver. *Environnement Urbain/Urban Environment*, (Volume 3).
- Strauss, A. L. (1987). *Qualitative analysis for social scientists*. Cambridge University Press.
- Strategies, I. o. (2007). *Air pollution control in transportation sector: Third phase research report of the Urban Environmental management Project*. Japan: Institute of Global Environmental Strategies.
- Srivastava, A., & Thomson, S. B. (2009). Framework analysis: a qualitative methodology for applied policy research.
- Tang, Y. L. (2016). A Discussion on the Naming of Mass Rapid Transit Systems: Metros in Taiwan. *Open Journal of Modern Linguistics*, 6(05), 420.
- Trochim, W. K. (2007). *Research method tutorials* [Electronic version] <http://www.socialresearchmethods.net/kb/sampling.php>
- Walliman, N. (2017). *Research methods: The basics*. Routledge.

Appendix: 1

Interview

People coming out of Metro stations

Name: _____

Occupation: _____

Age: _____

Date: _____

Time: _____

Guide questions for semi-structured interviews.

1. Do you have your personal vehicle?
2. Which type of vehicle you got two wheeler or four wheeler?
3. Do you prefer Metro bus service over your personal vehicle?
4. Do you prefer metro over your personal vehicle every time or offftenly?
5. What is the reason behind your preference?
6. What is your opinion about the capacity and quality of travel in MBS?

Appendix: 2

Interview

People using personal vehicle along the Metro route

Name: _____

Occupation: _____

Age: _____

Date: _____

Time: _____

Interview guide for semi-structured interview

1. What is the reason behind using your personal vehicles along the MBS route?
2. Which factors are restraining you from using the MBS?
3. Do you think that the comfort level of your personal vehicle and MBS can be matched?
4. Is the MBS not an economical way to travel for you?

Appendix: 3

Interview

Officials of Metro Bus service

Name: _____

Occupation: _____

Age: _____

Date: _____

Time: _____

Guide for in-depth interview

- 1: what is your observation about the use of MBS by the private vehicle users?
- 2: what are the factors you think becoming hurdles between the MBS and the private vehicle users?
- 3: which steps are being taken to attract more private vehicles owners?
- 4: Did you notice any change in the demand of MBS after taking those steps?
- 5: what is the reason behind the failure of your feeder bus service?

Appendix: 4

Images from field work



Image:1 Chungi Number 9 station





Image:2 and 3 Traffic along the Metro route at Bosan Road



Image: 4 and 5 Vehari Chowk Terminal



Image: 6 BCG Chowk Terminal