BENEFITS OF THE METRO BUS SERVICE (MBS) IN RAWALPINDI/ISLAMABAD

By

Muhammad Waqar Ali Shafqat

27/M.Phil-Eco/PIDE/2014

Supervised By

Dr. Idrees Khawaja

Senior Research Economist,

PIDE, Islamabad

A Dissertation Submitted to the Pakistan Institute of Development Economics, Islamabad, in partial fulfilment of the requirements of the Degree of Master of Philosophy in Economics

Department of Economics

Pakistan Institute of Development Economics, Islamabad

(2017)

BENEFITS OF THE METRO BUS SERVICE (MBS) IN RAWALPINDI/ISLAMABAD

By

Muhammad Waqar Ali Shafqat

27/M.Phil-Eco/PIDE/2014

Supervised By

Dr. Idrees Khawaja

Senior Research Economist,

PIDE, Islamabad

Department of Economics

Pakistan Institute of Development Economics, Islamabad

(2017)

Dedicate to My Parents…….

Acknowledgments

I express my profound thanks to Almighty Allah, who granted me courage, determination, and potential to undertake and accomplish this piece of applied research work. In fact, it was not possible for me to perform this difficult task without His blessings and help. So, I am indebted to Him from the core of my heart.

It is hard to overstate my gratitude to my MPhil. Supervisors Dr. Idrees Khawaja, without his inspirational guidance, enthusiasm, encouragements, thought provoking criticisms, I could never finish my research work. For me, he is not only my teachers, but also lifetime mentor and advisor. I, once again, express my heartfelt gratitude to Him and pray for His health and services for the nation as well as for the noble profession.

I want to express my appreciation to my parents for their love, understanding, patience, endless financial support, and never-failing faith in me.

In the end, I thank my friends and fellow students at PIDE; Wasim Salim, Syed Arslan Abbas, Muhammad Shahid, Muhammad Sheeraz, Hassan Sardar, Mujahid Iqbal and Sajid Imran for their encouragements, thought provoking discussions, help and support.

Muhammad Waqar Ali Shafqat

Department of Economics,

Pakistan Institute of Development Economics (PIDE)

Islamabad, Pakistan.

Pakistan Institute of Development Economics

CERTIFICATE

This is to certify that this thesis entitled: **"Benefits of the Metro Bus Service (MBS) in Rawalpindi/Islamabad"** submitted by Mr. Muhammad Waqar Ali Shafqat is accepted in its present form by the Department of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Philosophy in Economics**.

External Examiner:

Dr. Anwar Shah
Assistant Professor
Quaid-i-Azam University
Islamabad

Supervisor:

Dr. M. Idrees Khawaja
Senior Research Economist
PIDE, Islamabad

Head, Department of Economics:

Dr. Attiya Y. Javid
Head
Department of Economics
PIDE, Islamabad

Contents

List of Tables

Table

List of Figures

Figure

Abstract

Transport problems are emerging with the rapid population growth in big cities of Pakistan. Punjab government has taken different initiatives and came up with the idea of Metro Bus Service to reduce the transport related problems in these cities. In this study, we have estimated the benefits gained by the users of MBS and entrepreneurs doing businesses along the track of MBS in Rawalpindi and Islamabad. The analysis showed that MBS has resulted in expenditure and time saving of the commuters and impact the leisure activity and productivity of commuters. The benefits of entrepreneur include increase in business activity, employment generation and higher profits for the entrepreneurs.

Chapter 1

Introduction

Urbanization is common phenomenon worldwide and urban population is growing at the rate of 2 percent annually (The World Bank, 2014). It is predicted that nearly 70 percent of world's population will live in urban areas by 2050 particularly in megacities of developing world. Economic development, industrialization, rural to urban migration and similar factors have caused a major change in urban centers throughout the world (Shirazi, et al. 2014).

Urban growth limits individual mobility (Vermeiren, et al., 2015). Transportation is crucial for the economic development of megacities, and for the social and economic wellbeing of their inhabitants. Public transportation networks, mostly in developing countries, are not enough for providing basic mobility to citizens. People depend more on motorcycles, cars, and other motorized vehicles. Increased dependency on private motorized vehicles result in road congestion, parking issues, increase in travel time, more road accidents and health and environmental problems. This situation is worsening with the passage of time as it is stated that cost of congestion will increase by 50 percent till 2030 (Guerrini, 2014).

To deal with these problems, many countries in Asia, Africa, and Europe have come up with mass rapid transit (MRT) solutions. These rapid transits are faster than other modes due to enjoying dedicated tracks and these are cost effective as well. MRT case studies proved that these projects are very efficient in alleviating traffic pressure at reasonable costs, for example MRTs in North America, Latin America and Europe reported 25-30 percent saving in travel time (Levinson et al., 2003).

In Pakistan, traffic problems are severe in big cities. Urban population is growing at the rate of 3.3 percent annually (The World Bank, 2014). Lagging infrastructure and increasing number of motorized vehicles in urban areas of Pakistan is causing severe traffic congestion and travel related problems. According to World Health Organization (WHO) data published in 2014, deaths due to traffic accident reached to 30,310 annually, which is 2.69 percent of total deaths in that year. Use of wrong ways, sharp curves on roads, little use of indicators by motorists and helmets by riders are a few reasons that lead to fatalities.

Punjab, largest province of Pakistan, has taken initiatives to reduce travel related problems in major cities like Lahore, Rawalpindi, and Multan. With increasing middle income group in Pakistan, particularly in Punjab, motorized vehicle ownership has increased many fold in last few years. In 2014, total number of vehicle registered in Punjab were at 13,485,482. Lahore (3,991,517), Faisalabad (1,038,083), Multan (1,121,000) and Rawalpindi (721,868) are leading the list with total number of registered vehicles (Punjab Development Statistics, 2015). Road infrastructure is not keeping pace with increase in number of vehicles and in some areas maximum capacity seems to have been achieved. This has worsened the traffic situation on the roads. Traffic jams, congestion and increased travel time are common. Travelers have to bear additional financial, economic as well as social costs. The policy makers need to think about the alternatives to reduce commuters cost for benefit of the society.

In the past few years, to cater these problems, Government of Punjab has invested a huge amount of development budget to develop rapid bus transit service (which is commonly known as Metro Bus Service) in Lahore, and Rawalpindi/Islamabad. These projects were developed in the areas with large number of daily travelers who use public transport to reach their destinations (offices, educational institutes, etc.). This research is focused on studying the benefits gained by

daily commuters of MBS in the twin cities of Islamabad and Rawalpindi of Pakistan. In these cities, previously no such transport service, from both government and private sector, was available for public transport. Intercity migration was also a problem before the launch of MBS project. Now it helps to connect the people of both cities.

1.1 Public Transport in Punjab

Punjab is the most populous province in Pakistan with estimated total population 100.5 million in 2015 (Punjab Development Statistics, 2015). Most of its population lives in big cities. More than two-third of its total urban population is concentrated in 4 large cities which makes it the most urbanized province in Pakistan. Continuous changes in the organizational and functional characteristics of urban areas are making them a tougher place to live and survive. The traditional high density, walkable and prosperous urban localities are becoming overcrowded, deficient in local service provision with rising levels of urban poverty. A lower average income means that only the well-off Pakistanis can afford private cars at home. As a result, nearly half of the work or job-related trips use the poor public transport system of the country. Public transport system in Punjab was deregulated in early 1980s (Adeel et al., 2014). Since then, private operators provide the urban transport services and the government plays a role in fare control and route licensing. These individual transport operators prefer low cost, small size transport vehicles to maximize profits. Transport authorities have consistently failed to supervise the quality and efficiency of the public transport system due to lack of institutional capacity to supervise transport operators. Lack of transport system mostly affects students, unemployed, elderly, and young. Together these disadvantaged groups form a large portion of population.

1.2 Metro Bus Service in Rawalpindi/ Islamabad

The rapidly growing population of the twin cities i.e. Rawalpindi – Islamabad needs modern and safe public transport service to provide relief/benefit to all segments of the society. In the near future, it is estimated that total population of the twin cities will increase to 7.0 million from the current level of 4.5 million inhabitants. Traffic volumes of over 210,000 vehicles ply on three major corridors connecting the twin cities carrying around 525,000 passengers. It is estimated that a public transport system that could cater 153,000 passengers per day between the two cities is required.

The entire length of 8.6 km of Metro Bus corridor in Rawalpindi area is an elevated structure whereas about 14 km in Islamabad is at-grade level. The entire 22.6 km network has been made signal free by constructing grade separations at various intersections. Ten metro bus stations are in Rawalpindi while fourteen in the Islamabad. Facilities at the stations include ticketing booths, concourse level passenger transfer, escalators, platform screen doors turnstiles for automatic fare collection and other amenities for passenger convenience.

1.3 Objective of the Study

This study aims to find the benefits of MBS project from the prospective of commuter and its impact on productivity and leisure activity of commuters. It also finds the effect on entrepreneurs doing businesses in adjoining areas along the track of MBS.

Chapter 2

Literature Review

Rapid population growth particularly in the urban areas is now a severe problem for researchers and policy makers. World's total population has reached 7.3 billion in 2015 and addition of 86 million more people is expected in 2016 (DESA, 2011; United Nations, 2014; United Nations, 2015). There is a high probability (80 percent) that world population will reach 8.6 billion in 2030, 10 billion in 2050 and 12.5 billion in 2100 (Dociu, et al., 2012). Now more people live in urban areas than in rural areas. According to United Nation's report (2014), 54 percent of total world population resides in urban areas which is predicted to reach 66 percent in 2050. America, Latin America and Caribbean and Europe has the highest number of people living in urban areas with the percentage of 82 percent, 80 percent, and 73 percent respectively (Graeml, et al., 2004; Pucher, et al., 2004). In contrast, Asia and Africa are mostly rural with 48 percent and 40 percent of their population residing in urban areas. About half of the world's urban residents live in small settlements of less than half a million people (Zhao, 2010; Hea, et al., 2003; Glaeser, 2014; Singh, 2012).

Urbanization and growth have very strong relationship (Browne, 2014). No country has achieved a status of middle or high income without a significant shift in population towards cities (Turok, et al. 2013). Urbanization also helps in reducing rural poverty. Relevant research suggests that cities are hubs of economic growth and helps in reducing the overall level of poverty. Labor demand is higher in cities due to more economic activity. In first stage, people migrate from rural to urban areas and in second stage, due to remittances received by residents of rural areas and development occurs in adjoining areas of cities, living standards improve in rural areas as well

(Hildebrand, et. al., 2013; Annez, et al., 2009). Urbanization also facilitates social development like provision of basic facilities to the residents including healthcare and education. These facilities are impossible for the state authorities to provide for a dispersed population than to concentrated population in cities or towns (Session, 2012; Bryceson, et al., 2003; Cali, et al., 2012; Browne, 2014).

Urbanization leads to many social, economic, and environmental problems mostly in developing countries (Dociu, et al., 2012; Bhatta, 2010, Linn, 1982). When urban population increases, government services and infrastructure do not grow at the same pace due to inadequate investment by the authorities. Thus, more pressure come on the existing structure and situation become worse as time passes. Policymakers are very concerned about the problem arising from urbanization like difficulty in providing and maintaining basic services, creation of informal settlements, worsening environmental conditions, lack of transportation networks, deprived sanitation, deteriorating health facilities and increasing social problems including under-employment or unemployment (IFS[1], 2010; Ali, et al., 2006; Modak, et al. 2012; Kötter, 2004; Ren, et al., 2014; Mavropoulos, et al., 2015; Biswas, et al., 2004; IFS, 2010; DESA, 2011).

One of the emerging problem of urbanization is intra city and inter city transportation (IFS, 2010). Movement of people depend upon motorized and non-motorized means of transportation. Our urban transport is skewed in the favor of road transport. Motorized vehicle ownership increases with the increase in income of inhabitants in urban areas (Briggs, et al., 2000; Zavitsas, et al). Problems of road congestion, parking, increase in number of accidents and travel time increases with increase in the vehicular transport. Moreover, vehicles spend most of the time

[1] International Federation of Surveyors (IFS)

parked, which increase demand for parking space. This creates land use problems mainly in central areas, as parking consumes lot of space. Another problem is locating parking spaces. Vehicle spend unnecessary fuel and time in search for parking, while, at the same time, contribute to road congestion. However, with increasing number of car ownership and hence increasing travel demand that existing infrastructure cannot support, the problems of congestion and lack of parking space adversely influences business and city life. Road safety has also become a matter of concern with increasing number of motorized vehicles on roads. Most significant factors that affect the fatality rate are speed, number of vehicle ownership, condition of the infrastructure, drivers' attitude, and condition of the vehicle (IFS, 2010; Bester, C. J., 2001).

If we look back into history, roadways have been the important part of the earlier civilizations. Before the emergence of motorized vehicles, most of the urban traffic comprised horse-drawn vehicles, coaches, and carriages. In the late eighteenth and early nineteenth century, mobility shifted to self-propelled vehicles. Newer faster modes made significant changes in urban transportation and city development. This growth in urban transport encouraged the need for wider urban roads and new urban transport system. Many larger cities in Europe developed trams, underground metro, and high capacity rail systems from late nineteenth to early twentieth century to meet increasing travel demand, such as London in 1890, Liverpool in 1893, Glasgow in 1896, Paris in 1900, Berlin in 1902 and Hamburg in 1912 (Garrison, 2003; Morichi, et al., 2012; Schrijver, 2002; Weiner, 1992).

The general use of automobile started after the World War I when these became accessible to public which were previously used exclusively by military and elites. Industrial revolution in car manufacturing made cars easier to be acquired by public. In 1962, car ownership in USA stood at one car per two persons which was at one car for five persons in 1948. This put a tremendous

pressure on roads. To deal with problem of road congestion, road pricing became a popular policy. The latter half of twentieth century saw rapid expansion of road networks in rural and urban areas which were designed for higher speed and capacity. But urban growth happened at much higher pace than expected. The primary incentive for expansion in road network was to establish high level of transport supply. But, it created a vicious circle of congestion, which required additional road construction and resulted in increased dependence on cars. Certainly, cities reached their saturation level where the infrastructure cannot be expanded. (Morichi, et al. 2012; Xi, 2008).

Policy makers came up with the idea of mass rapid transit systems (MRTS) to cater to the increasing problem of transportation in mega cities. These systems are efficient and effective in reducing pressure on roads and enhancing the mobility of travelers and improving accessibility and livability of region. Investment in these projects are supported on the basis of its role in reducing congestion on roads and improving air quality. Many countries in developed and developing world have invested a huge sum of money in building and operating bus based or rail based transit systems in the world. As United States has invested $18.2 billion on public transit and $39.7 billion on its operation in 2012 (APTA, 2014; Beaudoin, et al. 2015).

Metro projects provide an alternative comfortable, secure, safe, and affordable mode of transport to a large portion of commuters using the road transport. It also reduces the travel time, number of accidents, air pollution, road congestion and saves travel expenditure. Highway expansion tends to reduce congestion in short term, but this benefit declines over time, and the resulting traffic generated can increase other costs such as downstream congestion, accidents, and pollution emissions. Transit benefits tend to be smaller in short term, but increase over time. Thus, evaluations that focus on short-term impact tends to favor highway expansion, while those that take a longer-term perspective tend to favor transit improvements. Transit improvements also

improve mobility for non-drivers, particularly where transit provides a catalyst for more walkable neighborhoods. Metro project development also have an impact on economic development of the region. This can support development in several ways like increased business activity, more productivity, increase in income, employment generation, and increase in property values (Litman, 2015; Kamruzzaman, et al. 2014; Lavee, 2015; Zhao, 2010; Gwilliam, 2003)

It is estimated that metro investment projects will continue to grow globally mostly in developing countries such as China where huge urbanization is expected. Metro projects have a significant impact on social and economic development of urban areas in China. It is estimated that investment of 1 Yuan on metro resulted in increase of 2.63 Yuan of GDP in Chongqing, China and has provided 8466 jobs (Zhou, 2004). A case study examines the factors that affect utility efficiency of metro presents correlation between economic development and metro systems. The authors showed the utility efficiency of 17 cities. Results showed that utility efficiency varies significantly among the cities based on different[2] attributes (Shen, et al. 2015)

India, the second populated country in the world, also faces the problem of rapid urbanization and associated traffic problems. An integrated rail based mass rapid transit system is developed in its capital city of Delhi. Institute of economic growth, Delhi, have done a social cost benefit analysis of metro and found that government, public, passengers and unskilled labor register income increases while conventional transporters register revenue losses due to metro. Financial cost-benefit ratio is calculated as 2.30 and 1.92 at 8 and 10 percent discount rates respectively while its financial internal rate of return is 17 percent. It additionally gives incremental

[2] These factors include length of metro, annual ridership, ticket price, population of city and GDP per capita of the city.

income to the Delhi pubic which has per-capita income more than two times the national per-capita income (MN, 2006).

Another study on Istanbul metro evaluates metro infrastructure using Wider Economic Impact (WEI) technique. WEIs analyses the socio-economic inequalities generated by transport infrastructure in the region. The results raise important issues regarding spatial inequalities generated by the Metro and provide some evidence for the weakness of planning strategies in the metro corridor. The paper revealed that metro has generated indirect economic benefits, especially in terms impact on business growth, population, and employment in adjoining areas of metro track. Analysis also shows that the Istanbul Metro has generated sectoral transformation especially from industry and manufacturing related sectors to service based high profile businesses within its catchment areas (Beyazit, 2015).

After having a detailed survey of literature, the study has found that with the urbanization, the emergent problems are transportation, provision of basic facilities, environmental issues and lack of water and sanitation facilities. There is a dire need to address all of these problems but transportation issues are at highest priority. Different countries in the world have come up with different solutions. These projects have increased the time and output efficiency of commuters.

In Pakistan, the first metro bus service was constructed in Lahore in 2013 at the cost of Rs.29.8 billion. It is believed that this project has benefited in many ways especially in electoral process. After having seen the real and electoral benefits of Lahore MBS, government has decided to construct another project in Rawalpindi/ Islamabad.

Chapter 3

Public Transport in Pakistan: A Historical Overview[3]

This chapter reviews the public transport planning and development in Pakistan. Section one looks at Public Transport before the Independence of Pakistan or British India and section two reviews Public Transport system after independence (after 1947).

3.1 Public Transport before Independence

The development of public transport started in 1853 with the development of railway system in British India when first passenger train was started from Howrah to Hoogly (in India). Railway system in region which currently forms Pakistan started in 1861 with construction of railway track between Karachi and Kotri. By 1865, important cities of this region were connected to rest of the country by railway. In 1878, the railway network existing here in British India was extended to Afghan border and in 1918, to Iran. The British laid down a total of 41000 miles of railway track in India from which 8070 miles track fell in the region that become Pakistan in 1947 (Vakil, 1944).

In addition, urban public transport was introduced by British government in number of cities of Pakistan. In 1885, first steam tramway was operationalized in Karachi and Lahore was connected through railway network in 1904. Wider roads were also constructed in Lahore and bus based transport service was started to connect the major markets and government buildings. Prior to that only tonga[4] was the mean of public transport in Pakistani cities until late 19th century but

[3] This chapter is preliminary based on a study done by Imran, 2009.

[4] A Tonga is a light carriage drawn by two horses used for transportation in India, Pakistan, and Bangladesh (Wikipedia). https://en.wikipedia.org/wiki/Tanga_(carriage)

by early 20th century, most of the public transport was revolutionized in most of the regions in Pakistan.

3.2 Public Transport after Independence

Pakistan inherited a huge mileage of railway track from British government. After independence, railway was considered as the most valuable asset and was the only mode of transport which carried a large number of passengers in the country. The first five-year plan (1955-1960) also acknowledged this and considered railways as the backbone of the country. In this plan, 70 percent of total investment in land transport was made in railway sector and only 30 percent investment was meant for roads. But in second five-year plan (1960-1965), road infrastructure development was given priority over railways by allocating more financial resources to this sector. In this plan, government realized that road transport is more suitable to the conditions of Pakistan than railways and hence a new era of road construction was initiated in Pakistan. New roads were constructed in large cities and road based public transport was started. For this purpose, a considerable amount of money was allocated to Pakistan road transport board to introduce 500 new buses for intercity public transport. For urban public transport, money was allocated to Karachi Road Transport Corporation (KRTC) to build a fleet of 1200 buses. Private sector was also encouraged to invest in road based public transport for the first time in the second five-year plan. The reason behind this initiative was the increase in demand for public transport due to rapid increase in population. Private wagons started operation on signed routes to fulfill the increasing demand for public transport. In the beginning, service quality of this mode was good but eventually its quality fell and the wagons became crowded and unsafe. Moreover, the second five-year plan also included Karachi Circular Railway (KCR) as first rail based urban public transport. Some

section of KCR were built and it was very successful in first 15 years. In Lahore city, a circular railway project was also proposed in 1965 but this was not realized.

In 1970s, public transport was deregulated to increase competition of private sector with public owned bus service but public transport services were given priority over private service in the allocation of routes. In 1977, Punjab Road Transport Corporation (PRTC) and Punjab Urban Transport Corporation (PUTC) were established. The functions of these two corporations were to provide efficient, economical, and properly coordinated system of road based intercity and urban public transport. PUTC developed its own maintenance and body building workshops, stores, offices, and transport training institute. There was always a deficiency of buses due to lack of investment. To overcome this deficiency, PUTC signed an agreement with Volvo and designed a model urban transport system in Lahore. Swedish government gifted 350 Volvo buses to Lahore which were added to the fleet of PUTC. The PUTC tried to attract investment from private sector by starting leased buses scheme for specific routes. This effort was unsuccessful and the quality of PUTC services declined in 1980s and it was disbanded in 1998.

In 1990s, Punjab government conducted an innovative experiment in Lahore and Faisalabad to run public transport by collaborating with private sector. Faisalabad Urban Transport Service (FUTS) and Lahore Transport Service (LTS) were created in 1994 and 1997 respectively. The most interesting feature was to allow the FUTS and LTS to set their own fares without requiring approval from the government. This experiment was very successful in the beginning but due to lack of investment by public and private sector in new bus fleets made the project unsuccessful in the end.

In 1991, national transport policy was made by national transport research center (NTRC) which suggested a road based public transport system in metropolitan cities of Pakistan. The

government at that time launched an incentive scheme to uplift the public transport by allowing duty free import of buses and taxis. In 1996, the government introduced a rail-road mix mode of public transport system in Rawalpindi and Islamabad. In this system, a rail link was made between twin cities along with feeder coasters in Islamabad. National Transport Research Center (NTRC) used old buses to develop a bus train to provide service in peak hours on main corridors of cities. For the first time in Pakistan, this bus train used an imaginary line on the left side of the road.

In 1999, Small and Medium Enterprise Development Authority (SMEDA) developed a National Transport Strategy under Ministry of Industries and Production. The government formally approved this strategy document. Under this strategy bus based public transport was started and incentive package was given to attract private investment in road transport. Similar type of public transport policy on franchise bases was started by Punjab Transport Department. These policies were highly appreciated by the users of public transport.

In 2000s, Planning Commission of Pakistan prepared a transport policy which like other policies in the past, also recommend bus based public transport service in metropolitan cities and proposed special lanes on roads for buses. Planning Commission also prepared a Ten-Year Perspective Development Plan and Medium-Term Development Framework (MTDF) which was to be implemented between 2001 and 2011. The plan recommended a transport system based on buses but no money was allocated for this proposed transport system.

An integrated master plan was prepared in 2000 for future development of Lahore. This plan also favored the development of road networks but ignored the development of public transport. Transport department, government of Punjab, did study in 2005 and proposed a four-lane rail transit system called Lahore Rapid Mass Transit System (LRMTS). In this regard Punjab Metro Bus Authority (MBA) was established in Lahore in 2012. This authority established first

rapid bus transit service in Lahore in 2013 and afterwards second project was completed in Rawalpindi and Islamabad in 2015. MBA recently completed its third project (Multan Metro Bus Service) in Multan in 2017 and also plans to launch its fourth project in metropolitan city of Faisalabad.

Chapter 4

Theoretical Framework

A theory proposed by Stortz (1957, 1959) states that an individual household decision making is based on additive separable utilities. Consumers allocate their expenditures on different commodity groups (food, housing, leisure) to maximize utility subject to their budget constraint. Small price changes of goods and services do not affect the decision making but some substantial changes in prices which affect the relative price indices lead to reallocation among the commodity groups.

$$u = u(x, c, t) \qquad (1)$$

where *u* is the utility of household, *x* is the total quantity of travel, *c* is composite consumption and *t* is leisure time. Economic theory states that the utility function *u* is monotonically increasing and quasi-concave (i.e. diminishing marginal utility).

Price indices for travel and composite consumption are p_x and p_c respectively. The household faces the following budget constraint:

$$p_x\, x \;+\; p_c\; c \;\leq\; Y \qquad (2)$$

where Y is the household disposable income. Similarly, the time budget constraint is

$$t_x\, x + t \;\leq T \qquad (3)$$

where t_x is, total time spent on traveling and *T* is the total time available to consumer. Presumably, *T* is the total clock time for the analysis period, minus time required for the nondiscretionary activities like sleeping and income generation.

The consumer decision is to maximize his utility eq. (1) subject to constraints given in eq. (2) and eq. (3). Assuming additivity, this decision becomes:

$$\max \mathrm{u}(x, c, t) = \max[\phi(x) + \psi(c) + \xi(t)] \qquad (4)$$

subject to all non-negative quantities and

$$p_x * x + p_c * c \leq Y$$

$$t_x x + t \leq T$$

where ϕ, ψ and ξ represents the utilities due to travel, composite consumption, and leisure, respectively. The additivity assumption indicates that marginal rate of substitution among various goods and services in one commodity group is independent of marginal rate of substitution within any other commodity group. Actual level of consumption in one group is dependent upon the overall price index of other commodity group because all commodity groups compete for the same resource. It can also be stated that the shift in prices of various consumer products would not be expected to affect the expenditure on travel unless it changes the overall price index of general consumption relative to price index of transportation.

Income which is saved or not consumed has no intrinsic value. Same is true for the time, which is not allocated to leisure or some other activity. The budget constraint can be considered binding and inequality sign vanishes.

Solving for consumption *c* and leisure time *t*, and substituting in utility function, the maximization problem becomes

$$c = \frac{Y}{p_c} - \frac{p_x * x}{p_c}$$

$$t = T - t_x * x$$

Substitution of the above in eq. (4) yields

$$max = \max\left\{\phi(x) + \psi\left[\frac{Y}{p_c} - \left(\frac{p_x}{p_c}\right)x\right] + \xi(T - t_x x)\right\} \qquad (5)$$

where the budget constraints are internalized and remaining decision variables involve transportation commodities *x* and p_c. It is also possible to set $p_c=1$ because all monetary variables can be measured relative to general price index.

Assume that some travel is optimal (x>0), the necessary and sufficient conditions for maximization of eq. (5) is

$$\phi'(x) - (p_x)\psi'(Y - p_x\, x) + tx\, \xi'(T - t_x x) = 0 \qquad (6)$$

Where prime signs denote the first derivative of the functions.

Economic theory requires that the utility components ϕ, ψ and ξ to be monotonically increasing and quasi-concave. Following qualitative properties can be derived from the solution in eq. (6).

- As income *Y* increases, travel *x* can never decrease.
- As time *T* increases, travel *x* can never decrease.
- Travel *x* decreases with increasing costs.
- Travel *x* increases with increasing speed.

This model has certain limitations as it does not allow the net substitution that is lesser time spent on travel with increase in income and same is true for the increase in time T. In terms of

distance travelled on various modes, *i=1,…,m,* and model speed v_i and costs c_i, the utility model can be restated as

$$max\ u = \sum_{i=1}^{m} \phi i(x_i) + \psi[Y - \sum_{i=1}^{m} c_i * x_i] + \xi(T - \sum_{i=1}^{m} x_i/v_i) \quad (7)$$

and necessary and sufficient conditions for an optimum are

$$\phi'_i(x_i) + c_i\psi'[Y - \sum_{i=1}^{m} c_i * x_i] - \frac{1}{v_i}\xi'(T - \sum_{i=1}^{m} x_i/v_i) = 0 \quad (8)$$

$where\ i = 1, \dots\dots, m$

This conditions states travel on each mode is adjusted to the point that marginal benefits gained is equal to marginal costs incurred. Marginal cost is comprised of marginal money cost and marginal time cost, where marginal money costs are the function of income and travel cost on all modes, and marginal time cost is a function of total available time and speed on all modes.

4.1 The Logarithmic Utility Function with One Constraint

Utility model in equation eq. (7) and eq. (8) explain the travel decision which exhibit stable price and time budgets. This can be clearly understood by introducing a simple case with one constraint either money or time. The money budget model applies to those travelers to whom money is scarce relative to time, while in time budget model, time is scarce relative to money. With this development, only natural logarithm of the functional forms of utility model yields results which are consistent. These functional forms are homogeneous. In addition, these functional forms also fulfill the requirement of monotonicity and concavity (Zahavi, 1979).

In the presence of money budget, a constraint on household income implies a budget proportional to income on travel expenditure

$$u = \sum_{i=1}^{m} a_i \log x_i + b_1 \log(Y - \sum_{i=1}^{m} c_i x_i) + const. \quad (9)$$

Intuitively, in the presence of time budget,

$$u = \sum_{i=1}^{m} a_i \log x_i + b_2 \log(T - \sum_{i=1}^{m} x_i / v_i) + const. \quad (10)$$

Now, first focusing on interpretations in terms of money budget, the necessary and sufficient conditions for maximum of eq. (9) are

$$a_i / x_i - \frac{b_1 c_i}{(Y - \sum_{i=1}^{m} c_i x_i)} = 0 \quad (11)$$

$$c_i x_i = \left(\frac{a_i}{b_1}\right)(Y - \sum_{i=1}^{m} c_i x_i) \quad (12)$$

which states that total expenditure on a travel mode is a constant proportion of income minus total travel expenses.

Summing both sides of eq. (12) over all modes

$$\sum_{i=1}^{m} c_i x_i = \left(\frac{1}{b_1}\right)(Y - \sum_{i=1}^{m} c_i x_i) \sum_{i=1}^{m} a_i \quad (13)$$

Since utility may be monotonic transformation, the a_i coefficients can be standardized as $\sum_{i=1}^{m} a_i = 1$, then total travel expenditures become

$$\sum_{i=1}^{m} c_i x_i = \left(\frac{1}{b_1 + 1}\right) Y \quad (14)$$

Substitute this in eq. (12), then distance travelled on mode *i* is

$$x_i^* = \left(\frac{1}{c_i}\right)\left(\frac{a_i}{b_1 + 1}\right) Y \quad (15)$$

In the presence of single budget model, total travel expenditure is fixed proportion of income regardless of costs. Furthermore, total distance traveled on any mode is inversely proportion to costs of that mode.

Similarly, in case of travel time budget, necessary and sufficient conditions for maximum of eq. (10) are

$$\frac{a_i}{x_i} - \left(\frac{b_2}{v_i}\right)\left(\frac{1}{T - \sum_{i=1}^{m} x_i/v_i}\right) = 0$$

The following two relationships can be derived:

$$\sum_{i=1}^{m} \frac{x_i}{v_i} = \left(\frac{1}{b_2+1}\right) T \qquad (16)$$

and

$$x_i^{**} = v_i \left(\frac{a_i}{b_2+1}\right) T \qquad (17)$$

In the presence of single time budget, total time spent on travelling is a fixed proportion of total time available. Moreover, total distance traveled on any mode is directly proportional to speed of that mode.

Substituting travel distances at which utility is maximized from eq. (15) and eq. (17) into the original utility forms explained in eq. (9) and eq. (10), respectively. This yields indirect utility function or achieved utility level. In the case of money budget:

$$u^* = \sum_{i=1}^{m} a_i \log\left[\frac{1}{c_i}\left(\frac{a_i}{b_1+1}\right) Y\right] + b_1 \log\left[Y - \left(\frac{1}{b_1+1}\right) Y\right] \qquad (18)$$

Simplifying,

$$u^* = \sum_{i=1}^{m} a_i \log a_i - \sum_{i=1}^{m} a_i \log c_i + (b_1 + 1) \log Y \qquad (19)$$

Household's achieved utility is decreasing convex function of costs and increasing concave function of income.

Similar relationships can be derived for consumers with abundant time as compare to money.

$$u^{**} = \sum_{i=1}^{m} a_i \log a_i - \sum_{i=1}^{m} a_i \log v_i + (b_2 + 1) \log T - (b_2 + 1) \log(b_2 + 1) + b_2 \log b_2 \quad (20)$$

This describes the total utility or achieved utility of household after travel is adjusted to yield maximum benefits. It is an increasing concave function of travel speed and available time.

These achieved utility equations eq. (19) and eq. (20) can be interpreted as policy implications. Focus on eq. (20): it can be concluded that achieved utility increases with increase in travel speed and total available time but in diminishing marginal rate. Moreover, impact on achieved utility of consumers with lower time is higher when travel speed increases.

4.2 The Logarithmic Utility Function with Two Constraint

Given two constraints (time and money) simultaneously in the utility model, travel time and money are not constant as costs or time varies. In other words, flexible expenditure patterns are to be expected.

Utility model with two constraints is specified as follows:

$$\max u = \sum_{i=1}^{m} a_i \log x_i + b_1 \log(Y - \sum_{i=1}^{m} c_i x_i) + b_2 \log(T - \sum_{i=1}^{m} x_i / v_i) \quad (21)$$

Necessary and sufficient conditions for the maximum are

$$\frac{a_i}{x_i} - \frac{b_1 c_i}{(Y - \sum_{i=1}^{m} c_i x_i)} - \frac{b_2}{v_i\left(T - \sum_{i=1}^{m} \frac{x_i}{v_i}\right)} = 0 \quad (22)$$

Travel expenditures are relatively small proportion of total income and time spent traveling is also a small proportion of total available time (Zahavi, 1979).

$$\sum_{i=1}^{m} c_i x_i \ll Y \qquad (23)$$

and

$$\sum_{i=1}^{m} \frac{x_i}{v_i} \ll T \qquad (24)$$

Equation (22) becomes:

$$\frac{a_i}{x_i} = \frac{b_1 c_i}{Y} + \frac{b_2}{v_i T}$$

$$x_i^* = \frac{a_i}{\left(\frac{b_1 c_i}{Y}\right) + \left(\frac{b_2}{v_i T}\right)} \qquad (25)$$

Comparing equation (25) with two single budget constraints equation (15) and eq. (17), simultaneous presence of two constraints presents non-linearity between travel distance and income, and between travel distance and available time. Income, available time, and speed exhibit diminishing marginal effect on travel distance. A certain change in income will have a greater impact on consumers with lower income level than consumers with higher income group.

As it is evident from above discussed model that commuters have two types of constraints, income constraint and time constraint. It is observed in our survey that many commuters used plenty of their daily time on traveling before the launch of MBS. Congestion, traffic jams and unavailability of reliable public transport system in Rawalpindi and Islamabad waste their valuable time as they have to reach their offices and academic institutions. For example, travelers come in search for transport early in the morning because traditional modes of transport take more time to

reach their destinations[5]. This wasted time can be used in many alternative ways or in leisure activities. There is a famous saying that "time and tide wait for none". So, time once gone, can't be recovered. This also leads to decline in efficiency and productivity of the commuters. Saved time leads to increase their leisure activity.

Users of the public transport are mostly from middle income group which have scarce income. A significant portion of monthly expenditure is spent on traveling. As we have observed in our survey that commuters who travel from Rawalpindi to Pakistan Secretariat (mostly travelers are office job holder) spend Rs. 100 to Rs. 150 on daily traveling[6]. Reduction in travel expenditures will increase the income level of the commuter. Positive income effect will increase the demand for other composite commodities. As we have mentioned in the start of the chapter that change in the price of one commodity will increase the demand for other commodities. So, positive income effect increase purchasing power of the commuter and in this way his utility is maximized.

The following hypothesis emerge from the model:

- The use of MBS will lead to expenditure saving of commuter
- The use of MBS will save the travel time of commuter
- The use of MBS will change the preference of commuter in choosing a transport mode.
- Expenditure saving and travel time saving will increase the productivity of commuter.
- Expenditure saving and travel time saving will increase the leisure activity of commuter.

[5] Reasons might be longer routes, bad road conditions (traffic jam, congestion, etc.).
[6] Details of these expenditures will be discussed in next chapter.

Chapter 5

Data and Methodology

This chapter is organized as follows. Section 5.1 explains the data required while section 5.1.1 is devoted to discussion of the relevant sampling issues. Section 5.2 discussed the methodology to be used for econometric investigation.

5.1 Data

The aim of the study is to find the benefits gained by the users of MBS and its impact on the business activity along the adjoining areas of MBS track in the twin cities of Rawalpindi and Islamabad. To achieve this objective, we need to know the views of the users of MBS and entrepreneurs along the track. For this purpose, two structured questionnaires[7] were designed. The questionnaire meant for users of MBS had questions about basic characteristics of user, expenditure on traveling, travel time on MBS and on other mode of transport and satisfaction level with service quality of the project. It also asked them about change in their travel pattern after construction of the project. The questionnaire meant for entrepreneurs consists of questions about the business activity influenced by the MBS. To get response for these questionnaires, we have to choose respondents. About 80,000 passengers travel daily using the MBS. We cannot interview all the population. So, a sample is selected from the whole population.

[7] Questionnaires are given in Appendix - I

5.1.1 Sample Size and Sampling Technique

In this study, we use convenient sampling technique to collect the data from the target population. Convenient sampling technique takes the sample from the population who are conveniently available to participate.

This study used the sample size calculator to determine the sample size. According to an official of metro bus authority, on average 80,000 passengers travel daily using metro bus service in twin city. This population size yields a sample of 271 at 90 percent confidence level[8] and 5 percent margin of error[9] (ME).

A total number of 271 commuters of MBS were interviewed in the survey conducted on the stations of MBS. Five stations (Secretariat, PIMS, Faizabad, Shamsabad and Saddar) were chosen from a total of 24 stations. 55 respondents were interviewed from each of the selected station.

For the second questionnaire, we selected Saddar, Sixth Road, Shamsabad and Faizabad markets in Rawalpindi region and Centaurus and Blue Area markets were selected in Islamabad region. These are big markets in twin cities and were mostly affected by the MBS project. A total of 35 businessmen were interviewed in this survey.

5.1.2 Description of Study Area

Rawalpindi and Islamabad forms the third largest metropolitan area in Pakistan, called Rawalpindi Islamabad Metropolitan area. It has a population of approximately 1.8 million and land

[8] Confidence level is a measure of how certain you are that your sample accurately reflects the true population.
[9] ME is a percentage that describes how closely the sample size correspond to the true value of population at a given confidence level.

area of 278 square km. According to Adeel (2014), only Rawalpindi houses 61 percent of total RIMA's[10] population on just 9 percent of land with an estimated density of 6600 persons/square km. This city is an example of high density and mix use Asian cities where facilities and services always remain inadequate. Also, about half of the population is categorized as urban poor (Adeel, et, al. 2014). Thus, majority of the residents find it hard to pay for their mobility needs.

While Islamabad, on the other side, houses only 39 percent of RIMA's total population on 91 percent area with an estimated density of 2800 persons/square km. This is the only planned city in Pakistan. As a whole, at least 40 percent of the population of this city faces problems of accessibility and affordability in transport related difficulties (Adeel, et al., 2014).

5.2 Methodology

This study uses both the quantitative and qualitative techniques to access the benefits gained by the metro bus user. Firstly, descriptive analysis will discuss the benefits in the form of expenditure and time savings to the commuters. Secondly, it is important to analyze the impact of these savings on productivity and leisure activity of the commuter. Logistic regression technique will be used for the analysis.

5.2.1 Logistic Regression Analysis

We want to investigate the impact of expenditure saving and time saving separately on productivity and leisure activity of the commuter. Logit model is suitable for econometric investigation in this setting where dependent variable is in the form of '0' and '1'. We take

[10] Rawalpindi Islamabad Metropolitan Area (RIMA).

productivity and leisure activity as dependent variables while expenditure saving and time saving are independent variables.

5.2.2 General Logit Model

General derivation of logit model is given below

$$P = (0\,,1)$$

$$odd = \frac{P}{1-P} = \frac{Probabilty\ of\ occurance}{Probability\ of\ non-occurance}$$

$$odd = (0\,,\infty)$$

$$\ln\left(\frac{P}{1-P}\right) = [\ln(0)\,,\ln(\infty)]$$

$$\ln\left(\frac{P}{1-P}\right) = (-\infty,\infty)$$

$$\ln\left(\frac{P}{1-P}\right) = \alpha + \beta x$$

Solving it for 'P'

$$\frac{P}{1-P} = e^{\alpha+\beta x}$$

$$P = e^{\alpha+\beta x}(1-P) = e^{\alpha+\beta x} - Pe^{\alpha+\beta x}$$

$$P + Pe^{\alpha+\beta x} = e^{\alpha+\beta x}$$

$$P\left(1 + e^{\alpha+\beta x}\right) = e^{\alpha+\beta x}$$

Let $Z = \alpha + \beta x$

$$P = \frac{e^Z}{1+e^Z} \qquad \text{……..(1)}$$

The above equation is logistic distribution. If equation (1) represents the probability of productivity increase, then the probability no increase is $(1 - P)$ would be as

$$1 - P = \frac{1}{1 + e^Z}$$

So, we can write these equations collectively as

$$\frac{P}{1-P} = \frac{1+e^Z}{1+e^{-Z}} \qquad \text{…… (2)}$$

The above equation represents the odd ratio in favor of productivity increase to the probability of no increase in productivity.

$$L_i = \ln\left(\frac{P}{1-P}\right) = \ln\left(\frac{1+e^Z}{1+e^{-Z}}\right)$$

After manipulation, final equation is

$$L_i = Z_i \qquad \text{…… (3)}$$

In the above equation, L_i is the log of odd ratios. This is not only linear in X, but also in parameters. L in above equation is termed as logit. And hence we call this as logit model.

Important characteristics of logit model.

- Probability ranges between '0' and '1' but the logit is free from these boundaries. As P ranges, between '0' and '1', L of above logit model then ranges between -∞ to +∞.
- In our general model, there is a single regressors but we can include more than one regressors.

- If L is positive in logit model, it illustrates that as the regressor(s) value increases, the odd in favor of interested event increases and vice versa.
- We can interpret the above logit model in equation (3) as; parameter β which is slope shows the change in L to per unit change in regressor.

5.2.3 Logit Models

The Logit regression used in this study are defined as follows:

$$P_i = f\ (\ age, gen, prof, ser, exp, time) \qquad (1)$$

$$L_i = f\ (\ age, gen, prof, ser, exp, time) \qquad (2)$$

Where P_i is productivity of the commuter and L_i is leisure activity of the commuter which are the function of explanatory variables including age of the commuter (age), gender (gen), profession (prof), service quality index value (ser), expenditure saving (exp) and time saving (time) of the commuter. We refer to first model as productivity model and second as leisure activity model.

5.2.4 Description of Variables

Variable	Purpose	Question Num. in Questionnaire
Dependent Variable		
Productivity (Takes the value one if increases and zero otherwise)	To capture the perception of commuters whether their productivity increases or decreases	Q 31- Responses are taken on Likert scale. If response is 'Agree=4' or 'Strongly Agree=5', we take them as value '1' otherwise 'o'

Leisure activity (Takes the value one if increases and zero otherwise)	To capture the perception of commuters whether their leisure activity increases or decreases	Q 32 - Responses are taken on Likert scale. If response is 'Agree=4' or 'Strongly Agree=5', we take them as value '1' otherwise 'o'
Independent Variable		
Age (Continuous)	To capture whether age affects productivity or leisure activity	Q 2
Gender (Takes the value one if male and zero otherwise)	To capture the presence of gender discrimination	Q 3
Profession (Takes the value one if job holder and zero otherwise)	To capture the impact on productivity or leisure activity of job holders	Q 4
Service quality index value (Continuous)	To see the impact of enhanced service quality on the productivity or leisure activity of commuter	We calculated index value from responses in Q 34
Expenditure Saving (Continuous)	To capture the impact of expenditure savings on productivity or leisure activity as these savings have many alternative uses	Expenditure save is difference between daily travel expenditure before and after MBS in Q 20
Time Saving (Continuous)	To capture the impact of time savings on productivity or leisure activity as these savings have many alternative uses	Time save is difference between daily travel time before and after MBS in Q 30

Chapter 6

Results

This chapter is organized into two sections. The section 6.1 is devoted to analyses of Descriptive Statistics and section 6.2 examines the econometric results.

6.1 Descriptive Statistics

This section further consists of two parts. First part deals about demographics and benefits gained by the user of MBS in RWL/ISB. And second part analyzes the benefits of business activity influenced by the MBS in the adjoining areas of MBS track.

6.1.1 Analysis about User Benefits of MBS

A total of 271 passengers were interviewed. After data cleaning, we have 267 questionnaires to analyze. The analysis is presented below.

6.1.1.1 Demographics

Age Group

This study includes people from all age groups. Minimum age of the respondent is 14 and maximum is 64. We have divided it into 9 age groups. As shown in Figure 6.1. Age groups are shown on the horizontal axis while percentage of commuters is shown on vertical axis. The largest user group is between the age 19 and 24. As the figure shows, 40 percent of users are from this group. The reason for highest user from this group is students[11] from different academic institutes

[11] See Profession, table 5.4 in section 5.2.1.1for details.

and job holders traveling to and fro between Rawalpindi Saddar and Pakistan Secretariat Islamabad station.

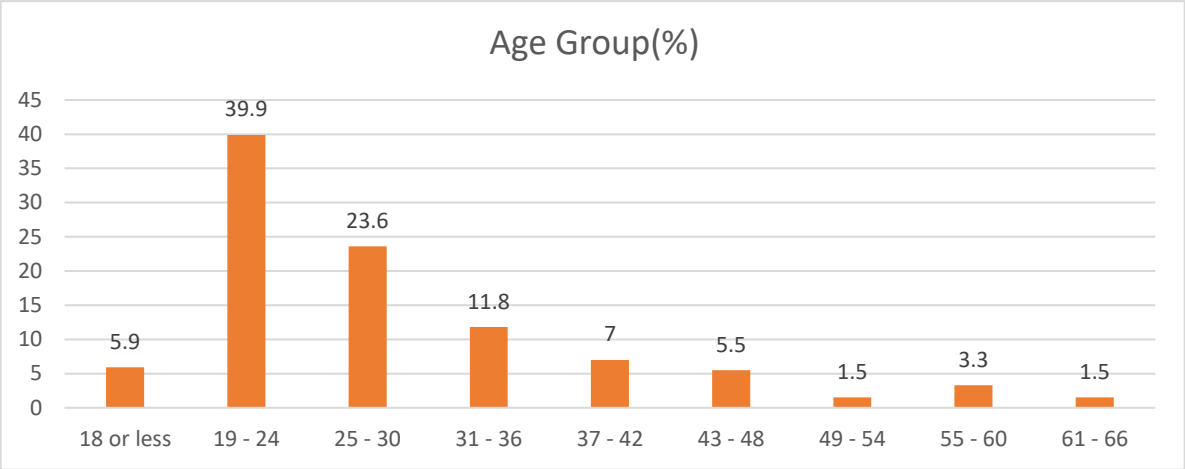


Figure: 6.1 Classification of Age Groups (In Years)

Gender

The population census of 1998 shows that share of women in the total population is 51 percent. In this modern era, women are actively participating in all fields of life. Before the launch of metro bus project, mobility for women was rather cumbersome. Sociocultural context of our country makes female mobility through public transport a sensitive subject and constraints mobility. In this scenario, women prefer to use transport facilities which are highly accessible, comfortable, and safe.

Figure 6.2 shows that 34 percent of total users in our sample are female and 66 percent are male. Given sociocultural context, females mostly hesitate to respond to survey. Otherwise their representation might have been much higher.

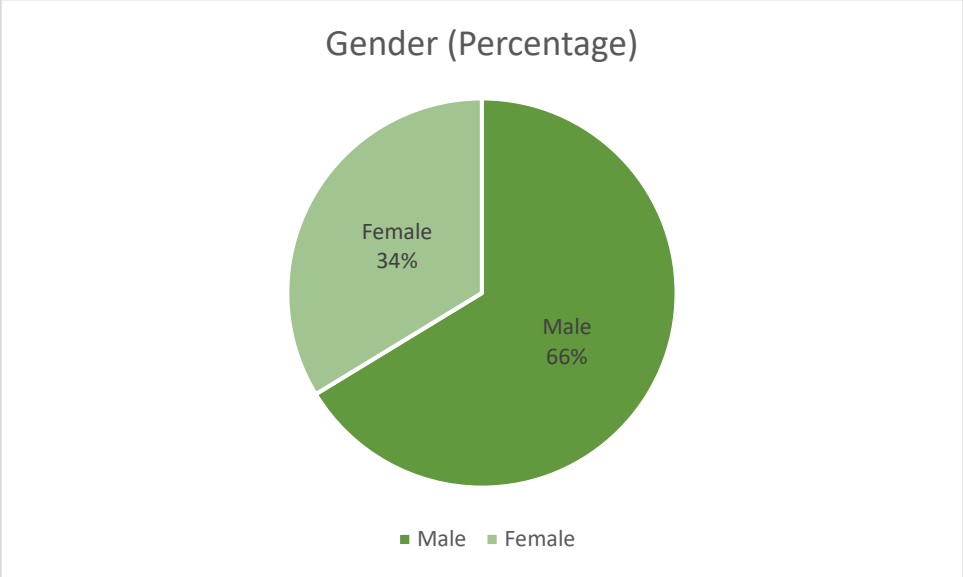


Figure: 6.2 Gender Classification

Expenditure Level

This study involves respondents from diverse expenditure groups. Expenditure level is used as proxy of income level of the commuters[12]. Average monthly expenditure of commuters is Rs. 28,861 (Table 6.1). This is also consistent with Household Integrated Economic Survey (HIES) data (HIES 2013).

Table: 6.1 Average Monthly Expenditure

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Monthly Expenditure (In Rupees)	242	1500	150000	**28861.57**	27588.531
Valid N (listwise)	242				

We have classified total monthly expenditures into ten deciles. As shown in the Table 6.2 shows that mostly commuters have expenditure level between Rs.7,000 and Rs.20,000. Almost all

[12] We did not ask them about their income level because mostly people hesitate to tell about their income. 10.7 percent respondents denied to tell their monthly expenditures.

the students and a small portion of job holders fall in these four deciles. Interestingly, people having higher expenditure level also use this facility. These people mostly have their own vehicles but they prefer to use MBS.

Table: 6.2 Classification based on Expenditure Level

Monthly Expenditures (In Rupees)	Frequency	Percent
7000 or Less	26	9.6
7001 to 10000	36	13.3
10001 to 15000	30	11.1
15001 to 18000	10	3.7
18001 to 20000	34	12.5
20001 to 25000	20	7.4
25001 to 30000	15	5.5
30001 to 40000	30	11.1
40001 to 60000	22	8.1
More than 60000	19	7
Total	242	89.3
Not Responded	29	10.7
Total	271	

Profession

Users of metro bus service are mostly from the services sector (private or government employees). But there is also a large share (33.6 percent) of students who daily travel to their academic institutions (Table 6.3). This study involves diverse set of respondents. We have classified them into four major groups (Govt Job, Private Job, students, and Housewives). Government or private job holders mostly aged between 19 to 42 while majority of students are aged between 19 to 24 (Table 6.4). These are the students who go to colleges or universities using MBS.

Table: 6.3 Profession of MBS Users

Profession	Frequency	Percent
Govt Job	55	20.3
Housewife	10	3.7
Private Job	115	42.4
Student	91	33.6

Table: 6.4 Different Age Groups and Profession[13]

Age of Commuters (In Years)	Profession			
	Govt Job	Housewife	Private Job	Student
	(Percentage of Respondents)			
18 or less	0	0	1	17
19 - 24	20	20	29	68
25 - 30	24	0	34	13
31 - 36	18	40	15	1
37 - 42	13	30	8	0
43 - 48	9	10	8	0
49 - 54	6	0	1	0
55 - 60	4	0	5	1
61 - 66	7	0	0	0

6.1.1.2 Profile of Metro Bus User

Different characteristics of MBS users are discussed in this section.

How Commuters reach to Bus Station?

The mean distance from home to station of a commuter is 4 kilometers and the mean time to reach station is 16 minutes (Table 6.5). Commuter use different modes to reach the station. As the distance from residence of the commuter to metro station increase, use of motorized vehicle becomes essential. Following Table 6.6 shows very interesting results. Passengers who walk to the

[13] Percentage within profession.

station, their average time to reach station is 11 minutes. Those who use motorized modes to reach the station, their maximum average time to reach station is 30 minutes. Most of such commuters prefer to use public van[14].

Table: 6.5 Mean Distance and Time to Reach Station

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Distance (km)	268	0.1	35	4.1966	5.13487
Time to Reach Station (mins)	268	2	230	16.57	17.812

Table: 6.6 How the Commuters Reach to MBS Station?

How you reach Station?	Distance (km)	Time to Reach Station (mins)
	(Mean)	(Mean)
Bike	5.18	14
Car	6.7	16
Rickshaw[15]	3.75	12
Taxi	6.11	17
Van	8.48	30
Walk	1.23	11
Wheel Chair	0.1	3

Table 6.7 shows average cost of different modes. Bike and van costs the commuter Rs.31 and Rs.41 respectively, while personal car costs Rs.93.

Table: 6.7 Cost to Reach Station by Different Modes

How you reach Station						
	Bike	Car	Rickshaw	Taxi	Van	Walk
	(Mean)	(Mean)	(Mean)	(Mean)	(Mean)	(Mean)
Cost to Reach Station (Rs.)	31	93	55	187	41	0

[14] A van is a type of road vehicle used for transporting goods or people (https://en.wikipedia.org/wiki/Van).
[15] A rickshaw motorized development of the traditional pulled rickshaw or cycle rickshaw (https://en.wikipedia.org/wiki/Auto_rickshaw).

Preferred Mode of Transport Before Metro Bus Service:

Almost all the commuters of MBS were using some mode of transport before the launch of MBS. The following table 6.8 shows the percentage of commuters that shifted from other traditional modes of transport to MBS. The highest shift, 56.6 percent, occurred from the traditional public transport system. What is striking is that 26.5 percent of current commuters of MBS were using personal vehicles before the launch of MBS. My personal observation is that some passengers are using park and ride facility. As in Rawalpindi Saddar, a parking plaza has been built for commuters to park their vehicle and ride the MBS. These could be the vary passengers who were earlier using personal vehicle as the only mean of transport to reach destination (as shown in table 6.6).

Table: 6.8 Preferred Mode of Transportation When MBS was not Available

Preferred Mode of Transportation Before MBS	Frequency	Percent
Personal Vehicle	71	26.5
Cab/Private Service	45	16.9
Public Transport	151	56.6
Total	267	100

As we have mentioned in section 6.1.1.1 that sociocultural context of our country restricts the mobility of female using traditional modes of transport which are not safe and comfortable. This fact is also evident from the table 6.9 given below that two-third of the females who use MBS currently, used personal vehicle or cab services in the past.

Table: 6.9 Gender with Preferred mode of transport before MBS[16]

Gender	Preferred Mode of Transportation		
	Personal Vehicle	Cab/Private Service	Public Transport
	(Percentage of Respondents)		
Male	25.6	8	66.5
Female	27.5	34.1	38.5

Financial status of commuters play an important role in choosing the mode for traveling. Commuters of MBS with low monthly expenditure used the public transport before the launch of this project. People with higher monthly expenditure level used personal vehicle before the launch of MBS. As it is evident from table 6.10 that users of personal vehicle belong to last three deciles of monthly expenditure level of commuters. These are the commuters who shifted from personal vehicles to MBS. While on the other side public transport users were from low income as higher percentages can be seen in first five deciles of monthly expenditure.

Table: 6.10 Financial Status and Travel Mode Preference before MBS[17]

Monthly Expenditure (In Rupees)	Preferred Mode of Transportation		
	Personal Vehicle	Cab/Private Service	Public Transport
	(Percentage of Respondents)		
7000 or Less	19.2	19.2	61.5
7001 to 10000	19.4	11.1	69.4
10001 to 15000	16.7	10	73.3
15001 to 18000	10	10	80
18001 to 20000	26.5	11.8	61.8
20001 to 25000	40	15	45
25001 to 30000	13.3	20	66.7
30001 to 40000	41.4	27.6	31
40001 to 60000	31.8	13.6	54.5
More than 60000	47.4	15.8	36.8

[16] Percentage within Gender.
[17] Percentages are within Monthly Expenditure Levels.

Use of MBS

Most of the commuters of MBS use it on daily basis as shown in Table 6.11. About half of the commuters are daily users while remaining use it once of a week, once a month or only occasionally.

Table: 6.11 Use of MBS

Use of MBS	Frequency	Percent
Daily	143	53.5
Once in Week	59	22
Once in Month	24	8.9
Occasionally	41	15.3
Total	267	100

Daily users are job holders (in public or private sector) and students who use this facility to go to their places of work and academic institutes (Table 6.12). Most of the people also use this facility to visit their friends, relatives, and recreational places such as parks, markets, shopping malls etc. Looking at the vehicle ownership of the metro bus users in Table 6.13, results show that 42.8 percent of daily users own some type of personal vehicle and 66.7 percent of occasional users also own vehicle.

Table: 6.12 Use of MBS and purpose of visit[18]

Use of MBS	Purpose of Visit				
	Go to Office	Educational Institute	Recreational Places	Public Services	Visit Friends/Relatives
	(Percentage of Respondents)				
Daily	62	38	0	0	0
Once in Week	22.6	17.7	27.4	3.2	29
Once in Month	15.4	11.5	42.3	3.8	26.9
Occasionally	19	19	28.6	0	33.3

Table: 6.13 Use of MBS and Personal Vehicle Ownership[19]

Use of MBS	Personal Vehicle	
	Yes	No
	(Percentage of Respondents)	
Daily	42.8	57.2
Once in Week	50	50
Once in Month	57.7	42.3
Occasionally	66.7	33.3

6.1.1.3 Expenditure Saving Analysis

Monthly Transport Expenditure

We compute a variable X which tells the monthly transport expenditure as percentage of commuter's total expenditure.

$$Xi = \frac{Average\ Monthly\ Travel\ Expenditure}{Total\ Monthly\ Expenditure} \times 100$$

[18] Percentage within Use of MBS.
[19] Percentage within Use of MBS.

$$X_i = Transport\ Expenditure\ as\ percentage\ of\ Total\ Monthly\ Expenditure$$

Average value of X is higher for the group with lower expenditure levels. But as the expenditure level increases, travel expenditure of commuters as percentage of their total expenditure decreases. As it is shown in the Table 6.14 given below, the average value of X for the expenditure group 'Rs. 7,000 or less' is 35 and for the next decile, the mean value is 29.8. These two groups use a high portion of their monthly expenditure on transportation. After the second decile, value starts decreasing and last decile uses the least amount on transportation. It can also be concluded from our analysis that the last decile uses one third of the first decile on transportation.

Table: 6.14 Transport Expenditure as Percentage of Monthly Expenditure

Monthly Expenditure (In Rupees)	Average Monthly Expenditure	Average Monthly Travel Expenditure	Transport Expenditure as % of Monthly Expenditure
	(Mean)	(Mean)	(Mean)
7000 or Less	5058	1828	35.1
7001 to 10000	9694	2892	29.8
10001 to 15000	14300	2750	19.2
15001 to 18000	17600	2920	16.8
18001 to 20000	20000	2979	14.9
20001 to 25000	24550	3625	14.8
25001 to 30000	29333	4447	15.3
30001 to 40000	37433	5724	15.3
40001 to 60000	52500	6341	12.2
More than 60000	105789	13421	12.9

Comparative Analysis of Expenditure Saving

On average a commuter saves Rs.138 (Table 6.16). Before the MBS project, commuters used on average Rs.223 on traveling daily (we may mention that the daily travel expenditure

indicated here are based on figures indicated spontaneously by commuters). But this project has reduced their daily expenditures. Now, commuter's expenditures are reduced to Rs.84 on average (Table 6.15).

Table: 6.15 Description of Travel Expenditure Before and After MBS

	Minimum	Maximum	Mean	Std. Deviation
Cost to Reach Station	15	500	79.7	91.5
Travel Exp. Before MBS	15	1500	**223.5**	220.3
Travel Exp. After MBS	20	540	**84.2**	80.6
XX[20]	2.9	1160	61.7	78.2

Table: 6.16 Total Expenditure Saving analysis

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Travel Expenditure Saving (Rs)	264	-265	1160	**138.7879**	188.92745
Valid N (listwise)	264				

We compute a variable XX which calculates travel expenditure after MBS as percentage of expenditure before MBS.

$$XX_i = \frac{Travel\ Expenditure\ after\ MBS}{Travel\ Expenditure\ before\ MBS} \times 100$$

Table 6.17 shows that first expenditure decile on average use 67 percent of their expenditure on transportation relative to when MBS was not built. On the other hand, it can also be concluded that this decile now saves their 33 percent of previous expenditures. Last expenditure decile is most benefited from the MBS as it saves 60 percent of expenditures. These are the commuters who previously use personal vehicle before the launch of MBS which is costlier then

[20] Travel Expenditures after the launch of MBS as percentage of Travel expenditure on traditional modes of transport. It states the total expenditure savings by the commuters.

public transport. While first five deciles, on average, saves 30 percent of travel expenditures of what they use on traditional public transport.

Table: 6.17 Daily Travel Expenditure Saving within different groups

Monthly Expenditure (In Rupees)	Travel Exp. Before MBS	Travel Exp. After MBS	Travel Expenditure After as % of Travel Expenditure Before (XX)
	(Mean)	(Mean)	(Mean)
7000 or Less	179	69	67.62
7001 to 10000	185	79	94.59
10001 to 15000	193	65	61.99
15001 to 18000	75	49	66.82
18001 to 20000	164	58	63.57
20001 to 25000	224	68	50.8
25001 to 30000	252	69	45.9
30001 to 40000	269	122	52.25
40001 to 60000	337	138	48.85
More than 60000	312	82	40.19

6.1.1.4 Travel Time Savings Analysis

Metro Bus Service project has decreased the travel time of the commuters. On average commuter saves 21 minutes of travel time daily (Table 6.18). Table 6.19 below shows the travel time saving due to MBS with respect to different expenditure groups. Fourth decile saves most (50 percent) of travel time by using MBS and first and sixth quartile are the least beneficiaries of the MBS.

Table: 6.18 Travel Time Saving

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Travel Time Saving (mins)	267	-40	150	20.8577	23.97089
Valid N (listwise)	267				

Table: 6.19 Travel Time Saving from MBS Use

Monthly Expenditure (In Rupees)	Travel time from other transportation		Travel time from MBS		Time Saving	Time Saving Due to MBS
	(Mean)	(Valid N)	(Mean)	(Valid N)	(Mins)	(%)
7000 or Less	45	26	34	26	12	26
7001 to 10000	53	36	31	36	22	42
10001 to 15000	49	30	30	30	19	39
15001 to 18000	64	10	32	10	32	50
18001 to 20000	41	34	22	34	19	46
20001 to 25000	36	20	27	20	9	26
25001 to 30000	61	15	31	15	30	49
30001 to 40000	56	29	34	29	22	39
40001 to 60000	62	22	32	22	30	48
More than 60000	52	19	33	19	19	37

Table 6.20 below shows the travel time saving with respect to commuter's profession. Government job holder are the most beneficiary and private job holders are the least beneficiary among all commuters.

Table: 6.20 Travel Time Saving within Professions

Profession	Travel Time Saving
	(Mean)
Govt Job	37.17
Housewife	38.33
Private Job	26.34
Student	34.49

6.1.1.5 Service Quality

We asked the commuters a set of questions regarding service quality of MBS. The questions referred to issues like availability, security, travel Speed, reliability, affordability, and comfort. Commuters were requested to like these on Likert scale of 1 to 5 (i.e. 1= highly dissatisfied, 2= dissatisfied, 3= neutral, 4= satisfied, 5= highly satisfied).

To evaluate their responses, we have computed an index of service quality using the following:

$$SQI = \frac{Max\ Value - Sum\ of\ all\ Response}{Max\ Value - Min\ Value}$$

$$SQI = \frac{30 - \sum_{i=1}^{6} Ri}{30 - 6}$$

Where, *SQI = Service Quality Index*

Max value = Highest value which can be obtained by summing up all the responses

Min Value = The minimum value which can be obtained by summing up all the responses

R_i *= Response of ith Commuter*

$\sum R_i$ *= Sum of all responses by ith commute*

Index values ranges from 0 to 1. If the value is '0' that means commuter is highly satisfied from all the facilities of MBS and if its value is '1' then the commuter is highly dissatisfied from services provided by MBS. This implies that the lesser the value of index, more satisfied is the commuter and vice versa. The computed average index value is 0.21, which shows that commuters are quite satisfied with the facilities available.

Table: 6.21 Service Quality Index

	SQI Value	
Monthly Expenditure	**Mean**	**Median**
7000 or Less	0.25	0.25
7001 to 10000	0.28	0.25
10001 to 15000	0.21	0.19
15001 to 18000	0.18	0.19
18001 to 20000	0.17	0.17
20001 to 25000	0.24	0.25
25001 to 30000	0.24	0.21
30001 to 40000	0.21	0.17
40001 to 60000	0.19	0.19
More than 60000	0.20	0.17

Discussion

A total of 80,000 passengers travel using MBS daily in Rawalpindi/Islamabad. As it is evident from our results that most of the commuters are job holders and students. These commuters are not new on this route. Traditional modes of transport are not easily available and reliable either. Travelers used a significant portion of their monthly expenditure on daily traveling. On average Rs.223 was spent on daily traveling by a commuter on these traditional modes. This is a huge saving for the commuters who have lower income levels (mostly students and low-grade job holders) as their income is low. But the launch of this project has reduced daily expenses by 38.3 percent (Table 6.15). As it is described in our model that a commuter utilizes his income on different commodities to maximize utility[21]. Savings, given their travel expenditure increases their income. Now commuters can either buy more units of traveling (i.e. increase in trips) or increase the demand for composite commodities. Travelers on average incur expenditure of Rs.79.7 to reach metro bus station (Table 6.15). These expenditures differ with different modes of transport

[21] Expenditure level is taken as proxy of income level in our study.

(Table 6.7). The reason of these expenses is mainly the non-availability of proper transport connecting MBS with inner part of the city.

Saved travel time is also one of the important benefit of MBS. Time wasted during traveling has a high opportunity cost[22]. Relevant literature shows a link between travel time saved and increased leisure activity and productivity of the commuter. These projects are developed to reduce the travel time of commuter especially in the peak hours when the traffic conditions on the road are difficult. On average, a commuter used 52.6 minutes[23] daily on traveling. This time is now reduced to 30.7 minutes using MBS (saving of 20.8 minutes). So, this time can be utilized on leisure activities.

Quality of transport service provided also plays an important role in deciding a particular mode for traveling. If the service is of poor quality than commuters will prefer to travel on personal vehicle. As it is shown in table 5.8 that a large portion of travelers, on this route, used personal vehicle before the launch of MBS. Now the situation has changed. Now even commuters who own personal vehicles prefer to use MBS. This indicates a change in individual's preference towards choosing a transport mode (Table 6.13). An important finding also shows that females are encouraged to travel on MBS who use mostly personal vehicle or private services for their traveling (Table 6.9). So, this new facility has changed the traveling patterns of residents of twin city of Rawalpindi and Islamabad. It not only facilitates the existing commuters but also encouraged personal vehicle owners to travel on MBS.

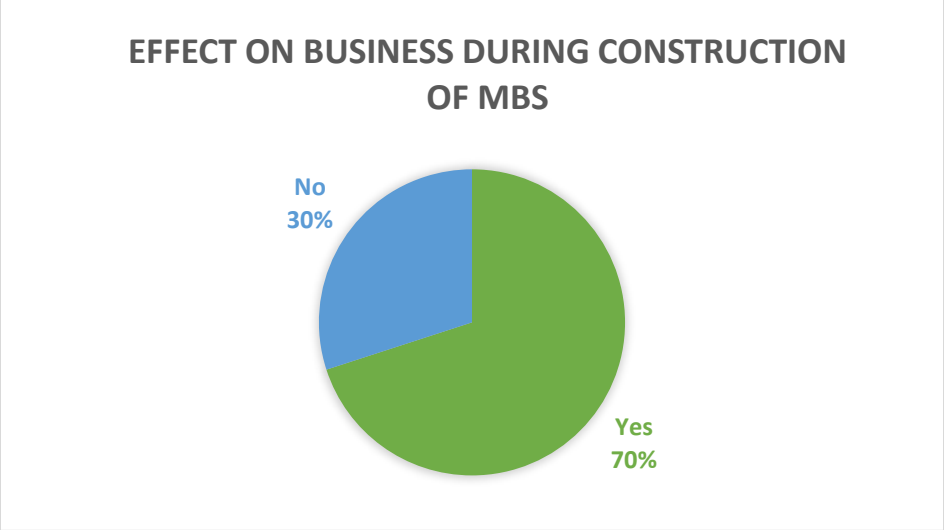
[22] Saved time has many alternative uses.
[23] This average time is commuters' one side trip.

6.1.2 Analysis about Business activity along the MBS Track

Economic theory suggests that enhanced mobility and easy access to markets have a positive impact on business activity in the adjoining areas. The construction of MBS helps in improving these conditions in some specific areas of Rawalpindi and Islamabad. Saddar, Shamsabad, Faizabad, Sixth Road, Centaurus and Blue Area are the major markets located along the track of MBS. We selected these markets in our survey for the opinion of businessmen about their economic conditions during and after the launch of MBS. We have surveyed 30 businessmen along the adjoining areas served by MBS. These businessmen are not new in these markets and were doing businesses there before the launch of MBS on current places. The average time period of these businessmen on their current location is about 7 years. Majority of the businessmen were affected during the construction of the project but they also gained benefits after the launch of MBS. This analysis is given below:

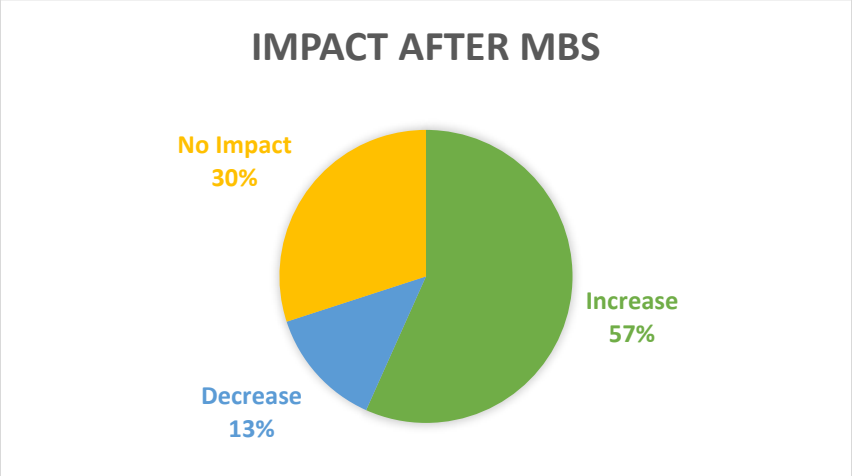
About 70 percent of the businessmen were directly affected during the construction of the MBS. By direct affect we mean that their shops were fully or partially demolished or construction material and waste affected their business activity (Figure 6.3). Some shopkeepers also reported that due to non-availability of parking space, dust and blockage of roads reduced the number of customers in affected markets. It is important to note that all these businessmen did not move to other places but worked at the same place and survived the said period.

Figure: 6.3



But after the launch of the MBS, 57 percent reported an increase in their businesses whereas 30 percent felt no impact as shown in Figure 6.4. Only a minor portion, 13 percent perceive a decrease in business.

Figure: 6.4



When business activity is increased then profits will also go up. But here some of the cases show a reduction in profits because of some other reasons. One reason is the number of customers increased or decreased due to MBS. After the MBS, a customer has access to other markets like Saddar in Rawalpindi or Blue Area in Islamabad which previously used to purchase goods from the sixth road in Rawalpindi. This is also true in the case of Saddar markets whose customers have

moved to Centaurus or Blue Area markets in Islamabad. Another reason for the adverse impact on businesses is the shortage of parking along the MBS track in Rawalpindi. As we have mentioned in previous chapter that commuters park their vehicles near MBS station to ride the bus. This creates a shortage of parking space for the customers of nearby markets and customers prefer to go other places. Some markets like furniture market and sanitary market in Faizabad and Shamsabad in Rawalpindi have not been affected in any way by MBS.

If a businessman earns profit, rational decision of businessman would be to invest a certain portion of these profits rather than consume it or hold it idle. About 57 percent businessmen state a positive increase in their profits. Majority of them utilized these profits to expand[24] their current businesses and others have invested in some other[25] businesses.

Table: 6.22 Profit and Loss Incurred to Businessmen and its Reasons

Profit 57 %		Loss 43 %	
Reasons			
Expansion of Business	52.9	Profit reduce to half	36.4
Invested in Some Other Business	29.4	Profit reduce to quarter	9.1
Hold profit with you	17.6	No profit/ No loss	27.3
		Business is in loss	27.3

Increasing profits and expansion of businesses, helps in employment generation. In these markets, employers do not provide transport services to their workers. Either they have to use their personal vehicles or rely on public transport networks. 58 percent of workers surveyed use MBS while a significant number of the workers use their personal vehicle to reach work stations

[24] Increase in number of products of same category and diversification of products.
[25] For example, if a person was doing gents garments business, now started females and kids. All the new businesses are nearly matched with their previous business.

It is evident from the foregoing discussion that the area serves by the MBS benefited a lot from this service. The benefits include increase in business activity, employment generation and higher profits for the entrepreneurs.

6.2 Empirical Analysis

This section discusses the empirical results of our study to analyzes the impact of expenditure saving and travel time saving separately on productivity and leisure activity. Productivity varies with different profession groups. For instance, productivity increase for job holder means more work efficiently and effectively while for students better educational outcomes are productivity gains. Leisure activity is time spent with friends and family or some recreational places. The logistic regression model is used as a tool to examine the effects of these savings on productivity and leisure activity.

6.2.1 Logistic Regression Analysis

Output table 6.23 given below shows that age and gender of commuter are positively associated with the productivity of the commuter while profession is negatively related to productivity. All of these variables are statistically insignificant in our model.

An important attribute of MBS is its service quality which motivates the commuters to prefer MBS over other traditional modes of transport. This variable has appeared with expected sign and significant in our regression. Service quality index variable has a positive impact on productivity of the commuter as it is shown in table 6.23 that if there is one unit increase in service quality, productivity is likely to increase by 67 percentage points. Enhanced comfort, reliability, and secure service helps workers to reach at their work stations with greater energy then under traditional modes of transport.

Another important variable that comes next to service quality is expenditure savings due to MBS which has a negligible and insignificant impact on the commuter's productivity. One unit change in expenditure saving will lead to 3 percentage increase in productivity which leads to the conclusion that it does not have a decisive role in determining the commuter's productivity increase or decrease.

Time saving is also very important variable in this regression. Results suggest that it is positively and significantly associated with commuter's productivity which implies that one unit increase in saved time is more likely to increase the chance of productivity increase by 9 percentage points. On average commuter saves 20 minutes of travel time daily and job holders saves 33 min of travel time daily. This saved time has many alternative uses and commuters can utilize saved time to do many other tasks.

Table 6.23 Logistic Regression Analysis – Productivity Model

Variable	dy/dx	Std. Err	z	P> |z|
Age	0.09	0.03	0.28	0.78
Gender	0.40	0.06	0.07	0.94
Profession	-0.05	0.06	-0.67	0.50
SQI	0.67	0.22	-3.13	0.00
Expenditure save	-0.03	0.02	-0.50	0.62
Time save	0.09	0.01	5.18	0.00

Results of our leisure activity model are shown in table 6.24 below. Age and profession of commuter are positively and significantly associated with the leisure activity of the commuter which implies that leisure activity will increase as the age or number of job holder increases. Gender has an insignificant impact in this model.

Service quality, an important characteristic of MBS, has an insignificant and is less likely to impact the leisure activity of the commuter. As result shows that leisure activity is less likely to increase by 21 percentage points if service quality is changed by one unit. Time saving is also insignificant in this model and has negligible impact on leisure activity of commuter.

Expenditure saving is only important variable which has significant impact on leisure activity of commuter. With one unit change in expenditure saving of commuter, leisure activity is more likely to increase by 3 percentage points which is a minor but statistically significant impact on leisure activity of commuters. Increase in commuter's savings i.e. increase in income, then they have more to spend on leisure goods. So, when they have more money they tend to consume more leisure. Time has no impact on leisure activity of the commuter.

Table 6.24 Logistic Regression Analysis – Leisure activity Model

Variable	dy/dx	Std. Err	Z	P> |z|
Age	0.09	0.02	-2.77	0.01
Gender	0.06	0.29	0.01	0.99
Profession	0.21	0.3	2.94	0.00
SQI	-0.21	0.91	-0.96	0.34
Expenditure save	0.03	0.07	1.69	0.09
Time save	0.08	0.05	0.06	0.95

It can be concluded from the above that time saving and service quality index (SQI) have a significant impact on productivity and other variables do not significantly impact the productivity of the commuter. While expenditure saving has a significant impact on the leisure activity of the commuter.

Chapter 7

Conclusion and Policy Recommendations

This chapter is divided into three sections. In the first part conclusion of the study is given while the second part presents policy recommendations on the basis of this study's finding. Scope for further research is given in third section.

7.1 Conclusion

In Pakistan, transport related problems are increasing with the rapid growth of urban areas. In few cities of Punjab, government has taken some initiatives to provide convenient, comfortable, and affordable public transport and developed MBS in this regard. This study aimed at finding the direct and indirect impacts of MBS in twin cities of Rawalpindi and Islamabad. A total of 271 commuters were interviewed from 5 main metro bus stations and 35 businessmen were also interviewed from the adjoining areas served by MBS.

The analysis showed that MBS has resulted in expenditure and time saving of the commuters. These commuters are daily travelers on this route and most of the beneficiaries belong to low income group and are job holders or students by profession. The MBS also helped in changing the preference of individuals towards choosing a particular mode of transport – many people using personal vehicles, public cabs and vans have shifted to MBS.

Saved time and expenditure have many alternative uses and have an impact on the productivity and leisure activity of commuters. We investigated this hypothesis using logit regression model. Results of this regression shows that time saving has a statistically significant

impact on the productivity of commuter while expenditure saving has a significant impact on the leisure activity of commuter.

It is also evident from our results that the businessmen also benefited a lot in the area served by the MBS. The benefits include increase in business activity, employment generation and higher profits for the entrepreneurs.

7.2 Policy Recommendations

On the basis of this study's finding some policies are recommended as follows:

- Commuters get net gains in form of expenditure saving from MBS project. Government can increase the fare to the level of these gains and can cover its expenditures as this project is heavily subsidized by the state. It will remove the extra burden from the state resources.
- Metro bus is used by the commuters from all expenditure groups and even those expenditure groups also enjoy the subsidy who can afford to travel on this project. Government can issue a card that only benefit the deserving and rest will pay the full fare to travel.
- Most of the commuters spend a significant amount of their daily travel expenditures to reach MBS station by private or public transport. Government must start feeder bus routes from other areas of twin cities to connect with MBS track with same service quality.

7.3 Scope for Future Research

This study does not cover all aspects of the metro bus service in twin cities. There is a need for more research to understand the impact of this project on community. Possibility for further research is given below:

- Before the launch of this project, traditional mode of transporters were doing their businesses on the area served by MBS. Some will remain in business and other will have to switch to other businesses. Impact on these transporters can also be seen and how the labor is allocated after the launch of this project.
- MBS also reduced traffic from roads as many commuters switch from personal vehicles to MBS for travelling. So, MBS has many environmental impacts which can be investigated in detail.
- There is also a need for social cost and benefit analysis of this project so that the overall impact of the project can be estimated.

7.4 Limitations of the study

- This study finds the impact of saved travel time and expenditure on productivity and leisure activity of commuter but these two variables can also be affected from various other factors which are not included in this study.
- Study was conducted after few months of completion of the project. It is possible that long term benefits may not be internalized in short period. So, a detailed study must be conducted after few years.

References

Adeel, M., Yeh, A. G., & Feng, Z. Towards an Inclusive Public Transport System in Pakistan. Transport and Communications Bulletin for Asia and the Pacific, 33.

Ali, M. H., & Sulaiman, M. S. (2006, October). 'The causes and Consequences of the Informal Settlements in Zanzibar'. In a conference on 'Shaping the Change', Munich, Germany (pp. 8-13).

American Public Transportation Association (2014). Public transportation fact book, Washington, DC.

Annez, P. C., & Buckley, R. M. (2009). Urbanization and growth: Setting the context. Urbanization and growth, 1, 1-45.

Battaglia, M. P. (2011). Non-probability sampling: Encyclopaedia of survey research methods.

Beaudoin, J., Farzin, Y. H., & Lawell, C. Y. C. L. (2015). Public transit investment and sustainable transportation: A review of studies of transit's impact on traffic congestion and air quality. Research in Transportation Economics, 52, 15-22.

Bester, C. J. (2001). Explaining national road fatalities. Accident Analysis & Prevention, 33(5), 663-672.

Beyazit, E. (2015). Are wider economic impacts of transport infrastructures always beneficial? Impacts of the Istanbul Metro on the generation of spatio-economic inequalities. Journal of Transport Geography, 45, 12-23.

Bhatta, B. (2010). Analysis of urban growth and sprawl from remote sensing data. Springer Science & Business Media.

Biswas, A. K., Tortajada, C., Lundqvist, J., & Varis, O. (2004). The water challenges of megacities. Stockholm Water Front, 2, 12.

Briggs, D. J., de Hoogh, C., Gulliver, J., Wills, J., Elliott, P., Kingham, S., & Smallbone, K. (2000). A regression-based method for mapping traffic-related air pollution: application and testing in four contrasting urban environments. Science of the Total Environment, 253(1), 151-167.

Browne, E. (2014). Benefits of urbanisation in Asia. GSDRC Helpdesk Research Report 1082). Birmingham.

Bryceson, D. F., Mbara, T. C., & Maunder, D. (2003). Livelihoods, daily mobility and poverty in sub-Saharan Africa. Transport Reviews, 23(2), 177-196.

Cali, M., & Menon, C. (2012). Does urbanization affect rural poverty? Evidence from Indian districts. The World Bank Economic Review, lhs019.

DESA, U. (2011). Population distribution, urbanization, internal migration and development: an international perspective. New York.

Dociu, M., & Dunarintu, A. (2012). The Socio-Economic Impact of Urbanization. International Journal of Academic Research in Accounting, Finance and Management Sciences, 2(Special 1), 47-52.

European Environment Agency. Annual European Community LRTAP Convention emission inventory report 1990-2014.

Garrison, W. L. (2003). Historical transportation development.

Glaeser, E. L. (2014). A world of cities: the causes and consequences of urbanization in poorer countries. Journal of the European Economic Association, 12(5), 1154-1199.

Graeml, K. S., & Graeml, A. R. (2004). Urbanization Solutions of a Third World Country's Metropolis to Its Social Environment Challenges. Journal of urban Economics, 8, 36-51.

Guerrini, F. (2014). Traffic congestion costs Americans $124 Billion a year, report says. Forbes. October 14, 2014 http://www.forbes.com/sites/federicoguerrini/2014/10/14/traffic-congestion-costs-americans-124-billion-a-year-report-says/#5e7a47c66252.

Gwilliam, K. (2003). Urban transport in developing countries. Transport Reviews, 23(2), 197-216.

Hea, K., Huob, H., & Zhangc, Q. (2003). A Comparative Study on Urban Transport system and Related Environmental Impact in Asian Mega-cities: Beijing, Shanghai and Tokyo. Population (million), 13(16.0), 26-4.

HIES (2012). Household Integrated Economic Survey 2011-2012. Government of Pakistan, Statistics Division Pakistan Bureau of Statistics, Islamabad. MAY- 2013

Hildebrand, M., Kanaley, T., & Roberts, B. (2013). Sustainable and Inclusive Urbanization in Asia Pacific. UNDP Strategy Paper. New York: United Nations Development Programme.

Imran, M. (2009). Public transport in Pakistan: a critical overview. Journal of Public Transportation, 12(2), 4.

International Federation of Surveyors. FIG Commission 3. (2010). Rapid Urbanization and Mega Cities: The Need for Spatial Information Management: Research Study. C. Potsiou (Ed.). International Federation of Surveyors (FIG).

Kamruzzaman, M., Wood, L., Hine, J., Currie, G., Giles-Corti, B., & Turrell, G. (2014). Patterns of social capital associated with transit oriented development. Journal of Transport Geography, 35, 144-155.

Kötter, T. (2004). Risks and opportunities of urbanisation and megacities. Proceedings of the FIG Working Week, Athens, Greece, http://www. fig. net/pub/athens/papers/ps02/ps02_2_kotter. pdf.

Lavee, D. (2015). Land use for transport projects: Estimating land value. Land Use Policy, 42, 594-601.

Leeming, J. J., & Mackay, G. M. (1969). Road Accidents: Prevent Or Punish?: Prevent Or Punish?. Cassell.

Levinson, H. S., Zimmerman, S., Clinger, J., & Gast, J. (2003). Bus Rapid System: Synthesis of Case Studies. Annual Meeting of the Transportation Research Board, Washington, DC.

Lewis, W. Arthur. (1977). The Evolution of the International Economic Order. Discussion Paper 74, Research Program in Development Studies, Woodrow Wilson School, Princeton University, Princeton, NJ.

Linn, J. F. (1982). The costs of urbanization in developing countries. Economic Development and Cultural Change, 30(3), 625-648.

Litman, T. (2013). Smarter Congestion Relief in ASIAN Cities. Transport and Communications Bulletin for Asia and the Pacific, 1.

Litman, T. (2015). Evaluating public transit benefits and costs. Victoria Transport Policy Institute.

Mavropoulos, A., ISWA, S., & SA, C. E. (2015). Megacities Sustainable Development and Waste Management in the 21st Century.

MN, M., Dhavala, K. K., Ghosh, M., & Singh, R. (2006). Social cost-benefit analysis of Delhi Metro.

Modak, P., Jiemian, Y., Hongyuan, Y., & Mohanty, C. R. (2012). Shanghai Manual–A Guide for Sustainable Urban Development in the 21st Century. United Nations. Vol.

Morichi, S., & Acharya, S. R. (2012). Specialties of Asian Megacities. In Transport Development in Asian Megacities (pp. 33-50). Springer Berlin Heidelberg.

Neuman, W. L. (2014). Social Research Methods: Qualitative and Quantitative Approaches, US: Pearson Education.

Pucher, J., Korattyswaroopam, N., & Ittyerah, N. (2004). The crisis of public transport in India: overwhelming needs but limited resources. Journal of Public Transportation, 7(3), 5.

Punjab Development Statistics (2015). Bureau of statistics, Government of Punjab, Lahore.

Ren, L., Cui, E., & Sun, H. (2014). Temporal and spatial variations in the relationship between urbanization and water quality. Environmental Science and Pollution Research, 21(23), 13646-13655.

Schrijver, A. (2002). On the history of the transportation and maximum flow problems. Mathematical Programming, 91(3), 437-445.

Session, F. (2012). 4Th Session of the African Ministerial Conference on Housing and Urban Development.

Shen, L., Jiao, L., He, B., & Li, L. (2015). Evaluation on the utility efficiency of metro infrastructure projects in China from sustainable development perspective. International Journal of Project Management, 33(3), 528-536.

Shirazi, S. A., & Kazmi, S. J. H. (2014). Analysis of Population Growth and Urban Development in Lahore-Pakistan using Geospatial Techniques: Suggesting some future Options. South Asian Studies, 29(1), 269.

Singh, S. K. (2012). Urban transport in India: issues, challenges, and the way forward. European Transport/Trasporti Europei (2012) Issue, 52.

Tacoli, C., McGranahan, G., & Satterthwaite, D. (2015). Urbanisation, Rural-Urban Migration and Urban Poverty. Human Settlements Group, International Institute for Environment and Development.

The World Bank, World Development Indicators, 2014b. Urban Population Growth (Annual %) [Data file] http://data.worldbank.org/indicator/SP.URB.GROW.

Turok, I., & McGranahan, G. (2013). Urbanization and economic growth: the arguments and evidence for Africa and Asia. Environment and Urbanization, 25(2), 465-482.

United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352)

United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP.241.

Uttara, S., Bhuvandas, N., & Aggarwal, V. (2012). Impacts of Urbanization on environment. International Journal of Research in Engineering and Applied Sciences, 2, 1637-1645.

Varis, O., Biswas, A. K., Tortajada, C., & Lundqvist, J. (2006). Megacities and water management. Water Resources Development, 22(2), 377-394.

Vermeiren, K., Verachtert, E., Kasaija, P., Loopmans, M., Poesen, J., & Van Rompaey, A. (2015). Who could benefit from a bus rapid transit system in cities from developing countries? A case study from Kampala, Uganda. Journal of Transport Geography, 47, 13-22.

WBCSD, M. (2004). 2030: meeting the challenges to sustainability, Full Report 2004, The Sustainable Mobility Project. World Business Council for Sustainable Development.

Weiner, E. (1992). History of urban transportation planning. Public Transportation, 2.

Xi, X. (2008). Comparative study on visual conveying design in the subway of London and Nanjing. Hundred Sch. Arts 6, 140–143.

Zahavi, Y. (1979). The umot-project. US Department of Transportation. Report DOT-RSPA-DPB-2-79-3, Washington.

Zavitsas, K., Kaparias, I., Bell, M. G. H., & Tomassini, M. (2010). Transport problems in cities. ISIS, 6, 05.

Zhou, W. (2004). The role of urban rail transit construction on urban economic development. Sci. Technol. Prog. Policy 58–60.

Appendix - I

1. Questionnaire for Daily Users of Metro Bus Service:

Basic Characteristics:

Q1. Name: _____ **Q2.**Age _____

Q3. Gender: 1) Male 2) Female **Q4.** Profession: _____

Q5. Level of Education: _____ **Q6.** Monthly Expenditure: _____

Q7. Average Monthly Expenditures on transportation: _____

Q8. Address: _____ **Q9.** Nearest MBS Station: _____

Q10. Distance: _____ **Q11.** How you reach to bus station? _____

Q12. How much time does it take to reach the bus station? (In minutes) _____

User Profile:

Q13. Do you have personal vehicle? 1) Yes 2) No › **Q15**

Q14. If Yes, which type of vehicle do you have? 1) Motorcycle/ Scooter 2) Car/Jeep

Q15. Which Mode of transportation you prefer to use before MBS?

1) Personal Vehicle 2) Cab/Private Service

3) Public Transport 4) Others _____

Q16. You use MBS. 1) Daily 2) Once in week

3) Once in a month 4) Occasionally

Q17. How many times you use MBS in a day? _____

Q18. You use MBS for what purpose?

1) Go to office 2) Educational institutes 3) Recreational places

4) Public Services (Hospitals, etc.) 5) visit Friends/ Relatives

6) others _____

Expenditures:

Q19. How much does it cost to reach metro bus station? Rs. _____

Q20. Your average daily traveling expenditure? Before MBS? Rs. _____

After MBS? Rs. _____

Q21. Do you have a metro bus card? 1) Yes» **Q22** 2) No» **Q23**

Q22. What is the reason you use a card to pay for the MBS?

1) It saves time 2) Due to long lines on ticketing booth

3) Other _____

Q23. Why you don't have metro bus card?

1) Card is costly 2) No time saving 3) Recharge problem

4) Other _____

Q24. If the Metro Bus Authority provides a card with monthly payment option for employees/workers and students, will you prefer it or not? 1) Yes 2) No

Q25. What will be the reason that you switch to this new mode of payment? _____

Q26. Would you prefer metro bus if it costs more than other transport services

1) Yes 2) No

Q27. If metro bus price is equal to other transportation mean, will you prefer to use MBS?

1) Yes 2) No

Q28. If it costs less than other transportation source, then by how much? _____ (percentage)

Travel Time:

Q29. Did MBS reduce your daily travel time? 1) Yes 2) No

Q30. Your travel time from Other Transportation Service _____ (min) and from Metro Bus _____ (min)?

Q31. Do you think time saving has increased your productivity?

1) Strongly disagree 2) Disagree 3) Neutral 4) Agree 5) Strongly Agree

Q32. Do you think time saving increased your leisure activity?

1) Strongly disagree 2) Disagree 3) Neutral 4) Agree 5) Strongly Agree

Service Quality:

Q33. What type of facilities you look for when you decide to travel on a particular type of transport? (Select multiple options if applicable.)

1) Availability 2) Security 3) Travel speed 4) Reliability

5) Affordability 6) Comfort 7) Others (Specify) _____

Q34. How you rank MBS facilities.

	Highly satisfied (5)	Satisfied (4)	Neutral (3)	Dissatisfied (2)	Highly Dissatisfied (1)
1. Availability					
2. Security					
3. Travel Speed					
4. Reliability					
5. Affordability					
6. Comfort					
Others					

(For Disabled persons only.)

Q35. Do you have any Disability? 1) Yes 2) No › **End Questionnaire**

Q36. Are you satisfied with the MBS facility?

1) Strongly disagree 2) Disagree 3) Neutral 4) Agree 5) Strongly Agree

Q37. How you rank MBS facility for disable person as compare to other transport facilities?

1) Excellent 2) Good 3) Average 4) Poor

Q38. Design of stations and buses help you in travel through the MBS. 1) Yes 2) No

Q39. Problems which you face when you travel on other transport.

_____

(Thank You)

2. Questionnaire for Business activity affected from MBS

Basic Characteristics:

Q1. Name: _____

Q2. Nearest Metro Bus Station: _____ **Q3.** Distance from MBS: _____

Q4. Nature of Business: _____ **Q5.** Timing: From_____ To _____

Q6. From how long you are working at current location? _____

Q7. Place of Business: 1) Owned 2) Rented

Q8. How many employees do you have? _____

Part-time: _____ Full Time: _____

User Profile

Q9. Which type of vehicle do you have? 1) Motorcycle 2) Car/Jeep

3) Don't have a personal vehicle

Q10. Do you have access to MBS from your home? 1) Yes 2) No

Q11. Which mode of transport you use to reach your business?

1) Personal vehicle 2) taxi/Van 3) MBS

Q12. If you use it, how was your experience with travelling the MBS?

1) Excellent 2) Average 3) Poor

Q14. Which Mode of transportation you prefer to use before MBS?

1) Personal Vehicle 2) Cab/Private Service 3) Public Transport 4) Others

Q15. You use MBS. 1) Daily 2) Once in week

3) Occasionally 4) Never Use

Q16. How many times you use MBS in a day? _____

MBS and it Impact on Productivity:

Q17. Did your business directly affected during MBS construction? 1) Yes 2) No

Q18. If Yes, then How? _____

Q19. How you survive the period during construction?

1) Work at same place 2) Move to other place temporarily
3) Other _____

Q20. How the MBS affects your business activity After Construction?

1) Increases 2) Decrease 3) No impact

Q21. Did you hired more workers/employees to work with you after the project completes?
1) Yes 2) No

Q22. What was the reason behind that you have to hire more workers?

_____

Q23. How your employees reach to work?

1) Own vehicle 2) You provide transport 3) MBS 4) Public Trans.

Q24. How this project affects the performance/productivity of the workers?

1) Enhances 2) Diminishes 3) No impact

Q25. This new project helps your workers to reach in time which previously blame bad transport for their late arrival. 1) Yes 2) No

Q26. Do you give your employees travel allowance? 1) Yes 2) No
Allowance _____

Q27. If Metro Bus Authority provide you a card for employees with special monthly package, will you prefer to provide those cards to employees? 1) Yes 2) No

Profit/Loss

Q28. Did Your Profits Increase after the construction of MBS Project? 1) Yes 2) No

(For those whose profit has been increased)

Q29. Where did you invest these profits?

1) Expansion of existing business ❯ **Answer Q30**

2) Invested in some other business ❯ **Answer Q31**

3) Holding profit with you ❯ **Answer Q33** 4) Other _____

Q30. How you expanded your business? _____ (If the answer is '1' in previous question)

Q31. Which new business you started with your profit? (If the answer is '2' in the previous question)

Specify the business: _____ Area: _____

Q32. What is the reason behind holding your profit with you?
_____ (Only answer if you hold your profit with you)

(For those whose profit has been decreased)

Q33. How much reduction in your profit with the constriction of MBS as compare to what you earn before?

1) Profit reduces to half 2) Profit reduces to a quarter 3) No profit/no loss

4) Business is in loss 5) Other: _____

Q34. What is the reason behind the reduction in profit? _____

Q35. How this reduction in profits affect your business? _____

Q36. Are you expecting to increase your profit in the future? 1) Yes 2) No

Q37. Which initiatives have you taken to boost up your business again? _____

Q38. Are you planning to shift your business to some other area? 1) Yes 2) No

Q39. Which area do you think is better? _____

Q40. You do a business which involve customer from middle or lower income group.

1) Yes 2) No

Q41. Now they have more affordable and comfortable public transport. Now you receive more people from that group for shopping/purchasing your products. 1) Yes 2) No

Q42. How it affects your daily sales? 1) Increases 2) Decreases

3) Remains the same

Appendix - I

1. Questionnaire for Daily Users of Metro Bus Service:

Basic Characteristics:

Q1. Name: _____ **Q2.**Age _____

Q3. Gender: 1) Male 2) Female **Q4.** Profession: _____

Q5. Level of Education: _____ **Q6.** Monthly Expenditure: _____

Q7. Average Monthly Expenditures on transportation: _____

Q8. Address: _____ **Q9.** Nearest MBS Station: _____

Q10. Distance: _____ **Q11.** How you reach to bus station? _____

Q12. How much time does it take to reach the bus station? (In minutes) _____

User Profile:

Q13. Do you have personal vehicle? 1) Yes 2) No › **Q15**

Q14. If Yes, which type of vehicle do you have? 1) Motorcycle/ Scooter 2) Car/Jeep

Q15. Which Mode of transportation you prefer to use before MBS?

1) Personal Vehicle 2) Cab/Private Service

3) Public Transport 4) Others _____

Q16. You use MBS. 1) Daily 2) Once in week

3) Once in a month 4) Occasionally

Q17. How many times you use MBS in a day? _____

Q18. You use MBS for what purpose?

1) Go to office 2) Educational institutes 3) Recreational places

4) Public Services (Hospitals, etc.) 5) visit Friends/ Relatives

6) others _____

Expenditures:

Q19. How much does it cost to reach metro bus station? Rs. _____

Q20. Your average daily traveling expenditure? Before MBS? Rs. _____

After MBS? Rs. _____

Q21. Do you have a metro bus card? 1) Yes» **Q22** 2) No» **Q23**

Q22. What is the reason you use a card to pay for the MBS?

1) It saves time 2) Due to long lines on ticketing booth

3) Other _____

Q23. Why you don't have metro bus card?

1) Card is costly 2) No time saving 3) Recharge problem

4) Other _____

Q24. If the Metro Bus Authority provides a card with monthly payment option for employees/workers and students, will you prefer it or not? 1) Yes 2) No

Q25. What will be the reason that you switch to this new mode of payment? _____

Q26. Would you prefer metro bus if it costs more than other transport services

1) Yes 2) No

Q27. If metro bus price is equal to other transportation mean, will you prefer to use MBS?

1) Yes 2) No

Q28. If it costs less than other transportation source, then by how much? _____ (percentage)

Travel Time:

Q29. Did MBS reduce your daily travel time? 1) Yes 2) No

Q30. Your travel time from Other Transportation Service _____ (min) and from Metro Bus _____ (min)?

Q31. Do you think time saving has increased your productivity?

1) Strongly disagree 2) Disagree 3) Neutral 4) Agree 5) Strongly Agree

Q32. Do you think time saving increased your leisure activity?

1) Strongly disagree 2) Disagree 3) Neutral 4) Agree 5) Strongly Agree

Service Quality:

Q33. What type of facilities you look for when you decide to travel on a particular type of transport? (Select multiple options if applicable.)

1) Availability 2) Security 3) Travel speed 4) Reliability

5) Affordability 6) Comfort 7) Others (Specify) _____

Q34. How you rank MBS facilities.

	Highly satisfied (5)	Satisfied (4)	Neutral (3)	Dissatisfied (2)	Highly Dissatisfied (1)
1. Availability					
2. Security					
3. Travel Speed					
4. Reliability					
5. Affordability					
6. Comfort					
Others					

(For Disabled persons only.)

Q35. Do you have any Disability? 1) Yes 2) No › **End Questionnaire**

Q36. Are you satisfied with the MBS facility?

1) Strongly disagree 2) Disagree 3) Neutral 4) Agree 5) Strongly Agree

Q37. How you rank MBS facility for disable person as compare to other transport facilities?

1) Excellent 2) Good 3) Average 4) Poor

Q38. Design of stations and buses help you in travel through the MBS. 1) Yes 2) No

Q39. Problems which you face when you travel on other transport.

_____

(Thank You)

2. Questionnaire for Business activity affected from MBS

Basic Characteristics:

Q1. Name: _____

Q2. Nearest Metro Bus Station: _____ **Q3.** Distance from MBS: _____

Q4. Nature of Business: _____ **Q5.** Timing: From_____ To _____

Q6. From how long you are working at current location? _____

Q7. Place of Business: 1) Owned 2) Rented

Q8. How many employees do you have? _____

Part-time: _____ Full Time: _____

User Profile

Q9. Which type of vehicle do you have? 1) Motorcycle 2) Car/Jeep

3) Don't have a personal vehicle

Q10. Do you have access to MBS from your home? 1) Yes 2) No

Q11. Which mode of transport you use to reach your business?

1) Personal vehicle 2) taxi/Van 3) MBS

Q12. If you use it, how was your experience with travelling the MBS?

1) Excellent 2) Average 3) Poor

Q14. Which Mode of transportation you prefer to use before MBS?

1) Personal Vehicle 2) Cab/Private Service 3) Public Transport 4) Others

Q15. You use MBS. 1) Daily 2) Once in week

3) Occasionally 4) Never Use

Q16. How many times you use MBS in a day? _____

MBS and it Impact on Productivity:

Q17. Did your business directly affected during MBS construction? 1) Yes 2) No

Q18. If Yes, then How? _____

Q19. How you survive the period during construction?

1) Work at same place 2) Move to other place temporarily
3) Other _____

Q20. How the MBS affects your business activity After Construction?

1) Increases 2) Decrease 3) No impact

Q21. Did you hired more workers/employees to work with you after the project completes?
1) Yes 2) No

Q22. What was the reason behind that you have to hire more workers?

_____

Q23. How your employees reach to work?

1) Own vehicle 2) You provide transport 3) MBS 4) Public Trans.

Q24. How this project affects the performance/productivity of the workers?

1) Enhances 2) Diminishes 3) No impact

Q25. This new project helps your workers to reach in time which previously blame bad transport for their late arrival. 1) Yes 2) No

Q26. Do you give your employees travel allowance? 1) Yes 2) No
Allowance _____

Q27. If Metro Bus Authority provide you a card for employees with special monthly package, will you prefer to provide those cards to employees? 1) Yes 2) No

Profit/Loss

Q28. Did Your Profits Increase after the construction of MBS Project? 1) Yes 2) No

(For those whose profit has been increased)

Q29. Where did you invest these profits?

1) Expansion of existing business ❯ **Answer Q30**

2) Invested in some other business ❯ **Answer Q31**

3) Holding profit with you ❯ **Answer Q33** 4) Other _____

Q30. How you expanded your business? _____ (If the answer is '1' in previous question)

Q31. Which new business you started with your profit? (If the answer is '2' in the previous question)

Specify the business: _____ Area: _____

Q32. What is the reason behind holding your profit with you?
_____ (Only answer if you hold your profit with you)

(For those whose profit has been decreased)

Q33. How much reduction in your profit with the constriction of MBS as compare to what you earn before?

1) Profit reduces to half 2) Profit reduces to a quarter 3) No profit/no loss

4) Business is in loss 5) Other: _____

Q34. What is the reason behind the reduction in profit? _____

Q35. How this reduction in profits affect your business? _____

Q36. Are you expecting to increase your profit in the future? 1) Yes 2) No

Q37. Which initiatives have you taken to boost up your business again? _____

Q38. Are you planning to shift your business to some other area? 1) Yes 2) No

Q39. Which area do you think is better? _____

Q40. You do a business which involve customer from middle or lower income group.

1) Yes 2) No

Q41. Now they have more affordable and comfortable public transport. Now you receive more people from that group for shopping/purchasing your products. 1) Yes 2) No

Q42. How it affects your daily sales? 1) Increases 2) Decreases

3) Remains the same