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# ATTRACTING THE MOTORIST TO MASS TRANSIT SYSTEM FOR SUTAINABLE URBAN DEVELOPMENT OF PESHAWAR

A PUBLICATION OF

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#### ATTRACTING THE MOTORIST TO MASS TRANSIT SYSTEM FOR SUTAINABLE URBAN DEVELOPMENT OF PESHAWAR

By

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#### Abstract

The main purpose of the study is to explore post BRT scenario from the motorist perspective to address their concerns. The intent is to guide future decision making in attracting this larger group of road users toward BRT as otherwise the project of BRT would fail to yield its potential benefits of congestion mitigation, reducing intra city journey time delays and betterment of overall environment of the city.500 motorist of the city were interviewed through a structured questionnaire. The respondents were randomly selected from various shopping areas and other parking sites along the major arterial road of the city which is also proposed route of the BRT project that is currently being constructed. Majority of the respondents were male, under 45 years of age and educated. Mostly were either students or entrepreneurs and were from lower middle to middle class with earning of up to Rs.100,000/= per month. Family size of almost half of the respondents is 4 to 6 persons while remaining half are either smaller families with 1 to 3 persons (20%) or larger families with 7 to 10 persons (28%). Almost half of the respondent were single car owners and two third of the respondents were using cars larger than 1000cc to 1800 cc engine size. While remaining one third were using smaller engine size cars. Half of the respondent started their journey from two ends or population hubs of the city along the East West corridor, i.e., City (in the East) and Hayatabad (in the West). However, the destination of almost three quarter of the respondents were two major commercial centers of the city, namely University road and Cantonment area. Trip timing is focused in the morning peak whereas scattered in the evening. Majority of the respondent ride alone though a significant number (29%) also sharing their ride with others. Parking does not seem to be a big problem in the city as the statistics reveal that it takes less than 5 minutes for 86% of the respondents to find a place for their cars to be parked and that too in 70% of the cases is free. The top most common problems with the existing public transport system in the city ranked by the respondents were delays, poor services, not family friendly, unprofessional or uncourteous staff and uncertainty regarding availability of services. Almost 80% responding motorist indicated their intent to use BRT and in case of even longer time for the same journey, 70% of the motorist are ready to switch to this mode. Only a thin minority of 10% respondents showed their willingness to use their own car in the post BRT scenario in the city. Almost one third of the respondents were ready to walk to the BRT station while use of other modes like taxi (10%), Cycle (13%), public transport (9%) personal vehicle (11%) was also suggested by percent of respondent indicated in brackets nest to each mode. Over 31% respondents were ready to walk up to 1 kilometers to reach to the BRT station while same numbers were ready to walk from 1km to 2km. 81% of the respondents are happy with the existing route of BRT .Almost half of the 131 respondent who opted not to use BRT suggested that an efficient feeding network should be associated with the BRT while about a quarter of the respondent proposed a regular and reliable ser

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#### 1. Introduction

Traffic congestion, delays, accidents and deteriorated environment on the roads of Peshawar is the manifestation of a number of fundamental problems relating to the social behaviors, institutional arrangements and economic compulsions besides many others. Various authorities in the past have been taking up a number of initiatives to address these problems and make the city more vibrant and responsive to the socio economic needs of its residents. The hitherto attempts mainly focused on meeting the demand for space resulting from rapid motorization during the last two decades with the additional supply of roads and allied physical infrastructures including underpasses, overhead bridges and so on. However as per *Triple Convergence Phenomenon* of intra city traffic mobility, these supply side measures are always short lived and any benefit envisaged from such provision gets neutralized in a short time with additional traffic generated by change of *mode, time and route* (Downs, 2004).

The other possible approach which is being applied in most of the developed countries, emerging economies and even developing countries similar to Pakistan is of *demand management*, i.e., if demand cannot be reciprocated with supply, let it be adjusted as per available resources. Mass Rapid Transit (MRT) is one such tool that can provide a cheaper, comfortable and punctual source of mass mobility in a city. It is attractive to poor as being affordable and to richer segment of society as being comfortable, convenient and regular. Thus on the one hand MRT addresses the problems of needy and poor segment of the society with a cheaper mode of intra city mobility to meet their economic needs. On the other hand it also appears attractive to those who have their own cars and other means or have the potential to buy their own mode of mobility as a decent and comfortable alternative. All in all, it makes the urban mobility efficient, economical and environment friendly with reduced number of vehicles on the road but the same or even more number of daily trips.

#### 1.1 Background:

The Government of Khyber Pakhtunkhwa (KP) with a slogan of CHANGE is desirous to address all issues related to masses including that of urban mobility in a cost effective and efficient manner and has shown its willingness to employ all the available means including mass-transit services (MTS). In this context the provincial government instigated the construction of a mega project of Bus Rapid Transit (BRT) November last year with the financial and technical assistance of the Asian Development Bank (ADB). It is anticipated that this project would help the city in better economic functioning with more efficient traffic flows. However, any such transition from the orthodox and familiar mode to a new and different mechanism needs a careful socio-cultural assessment to incorporate the views and concern of all stakeholders including motorist without whose cooperation and support the present traffic congestion and delays and deteriorated ambient environment along the major transport corridors cannot be improved.

Peshawar is the capital of Khyber Pakhtunkhwa province and is one of the ten largest cities of Pakistan with a population of 4.27 million including 1.97 million urban and 2.3 million rural population (GoP, 2017 census). The total area of the district Peshawar is 1257 square kilometers comprising of about 1100 square kilometer rural settlements mostly in the north and south while remaining area comprising mostly of urban settlements. The urban footprint lies mainly along the east-west corridor known as GT Road which is the main arterial road of the city. Peshawar district has a good network of roads comprising of main GT road which is major arterial road running along the East - West corridor through the center of the city. Other major roads include Ring Road, Charsadda Road, Warsak Road, Bara Road and the Indus Highway (also referred to locally as Kohat road as shown in the Figure 1. The Ring Road provides a dual function. It is the major international freight corridor through to the Khyber Pass and into Afghanistan in the west. It also serves a significant proportion of local freight traffic.



Figure 1: Peshawar Urban Footprint and Major Road Arterial Network (Google Earth)

#### **1.2 Problem Statement:**

Peshawar is in a process of constructing Bus Rapid Transit (BRT) and it is estimated that about four to five hundred thousand passenger trip shall be daily made and most of the commuters will be from low and middle income group. However considering the recent exponentially increasing vehicular volume, expansion of the city along its radial roads, development of new urban centers and growth of the city economy under the influence of CPEC, a tremendous growth of road traffic can be anticipated.

In this backdrop motorists will remain part of the problem if not attracted to use the mass transit systems. However it need a though investigation and data to understand their perception and problems so that they could be attracted to use the intra city improved transport service. What policy approach is needed for this shift? How the socio cultural trends and values can be changed in the post BRT scenario? Are questions that need to be answered?

#### **1.3** Aim and Objectives:

The study is an attempt to assess the perceptions of motorists who are the major road users and can play a pivotal role in the success of the whole project. The idea was to explore post BRT scenario from the motorist perspective and guide future decision making in attracting this larger group of road users toward BRT as otherwise the project of BRT would fail to yield its potential benefits of congestion mitigation, reducing intra city journey time delays and betterment of overall environment of the city. The aim of this study is to collect essential data required for a comprehensive analysis regarding motorist who need to be attracted to newly constructed BRT.

## **1.4 Methodology:**

This study is mainly based on primary data, which was collected from the motorist of district Peshawar. The minimum sample size with 95% confidence level and 5% confidence interval is 384 respondent for Peshawar. In order to make the study unbiased and more representative, 500 sample size was used to cover a large number of respondents. Data from the motorist was obtained through a questionnaire (Annex I) by using personal investigation method. In this method an investigator obtain data through personal interviews to insure confidentiality of the observations. The main benefit of this method is accuracy in collecting complex and individual data that may vary from person to person.

A team of enumerators visited various parking lots and motorist were inquired about their perception of the BRT. This approach not only helped in the random and unbiased selection of

respondents from the whole city but provided the survey team as well as respondents ample time to discuss all issue that were encompassed in the questionnaire in an ease and relax environment. This is evident from Table 1 wherein respondents of various economic backgrounds were selected from 28 neighborhoods or settlements of the city. These settlements along with the number of respondents from each are shown on the Peshawar city map in Figure 2.

S.No	Name of	Name of corridor	Number of	Economic status of the settlement
	settlement		Questionnaire	
1	Gulbahar	Grand Trunk	41	Relatively new settlement with
		road		resident from rich to middle income
				group
2	Serki Gate	City Circular	8	Old settlement; Mostly slum; Poor to
		Road		middle income
3	Hashtneghri	Grand Trunk	21	Old settlement; Mostly slum; Poor to
		Road		middle income
4	Faqirabad	Dalazak Road	17	Relatively new settlement with
				resident from rich to middle income
				group
5	Lahori Gate	City Circular	11	Old settlement; Mostly slum; Poor to
		Road		middle income
6	Peshtakhara	Ring Road	13	Old settlement; Mostly slum; Poor to
				middle income
7	Alharam	Ring Road	27	New settlement with resident from
				rich to middle income group
8	Hazarkhwani	Ring Road	7	Old settlement; Mostly slum; Poor to
				middle income
9	Kohat Road	Ring Road	12	Respondent mostly poor to middle
				Income Group
10	Jameel chowk	Ring Road	4	Old settlement; Mostly slum; Poor to
				middle income
11	Sppenawaray	Ring Road	7	Old settlement; Mostly slum; Poor to
				middle income
12	Bahadar kalay	Ring Road	5	Old settlement; Mostly slum; Poor to
				middle income
13	Landi Arbab	Ring Road	6	Old settlement; Mostly slum; Poor to
				middle income
14	Sadar	Saddar Road	25	Relatively new settlements, Middle to
				rich class
15	Cantt	Grand Trunk	18	Relatively new settlements, Middle to
		Road		rich class
16	Defense	Grand Trunk	16	Respondent mostly High Income
		Road		Group
17	Shami Road	Grand Trunk	18	Respondent mostly High Income
		Road		Group
18	University	GT Road-Jamrod	45	Respondent mostly High Income
	Campus	Road		Group

Table 1: Selected settlements for surveys along the three major road and one Railway corridor

19	Board	GT Road-Jamrod	6	Relatively new settlements, Middle to
20	Arbab Road	GT Road-Jamrod Road	6	Relatively new settlements, Middle to rich class
21	Chamkano	Grand Trunk Road	9	Mainly rural settlement; Mostly slum; Poor to middle income
22	Shaheen Town	GT Road-Jamrod Road	18	Old settlement; Mostly slum; Poor to middle income
23	Tehkal	GT Road-Jamrod Road	17	Mainly rural settlement; Mostly slum; Poor to middle income
24	University town	GT Road-Jamrod Road	8	Respondent mostly middle to High Income Group
25	Warsak Road	Warsak road	9	Relatively new settlements, Middle to rich class
26	Charsadda Road	Charsadda road	16	Relatively new settlements, Middle to rich class
27	Karkhanu	GT Road-Jamrod Road	35	Poor to middle income
28	Hayatabad	GT Road-Jamrod Road	75	Satellite town of Peshawar. Respondent mostly middle to High Income Group
Total			500	



Figure 2 : Spatial distribution of respondents

#### CHAPTER 2: LITERATURE REVIEW

#### 2.1 A global perspective of BRT:

Cities across the world will have a greater number of urban population and by 2050 the urban dwellers will increase further. (UN-HABITAT, 2016). Sustainable transport empirical conducive urban environment, equity and efficient urban functioning as reflected in the Curitiba city in Brazil. It is famous for its cost effective and integrated transit oriented development model of Bus rapid Transit system (BRT). The system is so efficient that after every 90 seconds bus is available on station and 70% of Curitiba commuters use it daily for its day to day activities. Hence a modal shift has happened from motors to buses. (Joseph Goodman, n.d.)

Another important benefit of a BRT project is its lesser time of implementation in providing a citywide reach which is very significant from political and administrative perspective. However this benefit of quick implementation makes its vulnerable as well if a BRT fails, it provide none of these benefits rather may result in loss of both physical as well as financial resources. Rather it may intensify the existing problems of congestion, delays and environmental degradation. Unfortunately several BRT projects in developing countries have performed below expectations and few are even an outright failures with no net benefit to either public transport passengers or other road users. The origin of a failed or poorly performing BRT system can usually be traced back to errors made during the conceptual and preliminary planning stages which are propagated through the later stages of the project (Wu and Pujani, 2016). Some of the common errors identified in various such projects from the developing countries have been highlighted below.

A trunk only BRT in Hanoi with just one corridor was a factor that led to the failure of the BRT project (Anderson, L. T., 1995). Delhi BRT was also a one corridor bus system and not a full-fledged BRT. The operational pilot corridor was only 5.6 km, which was insignificant to tend to approximate 58,000 commuters that used buses on this corridor (King 2013). Kuala Lumpur's BRT system has a fully elevated route with high cost electric bus fleet and has no signals, but due to design deficiencies the operational speed is limited to just 21km/hour (Website 1) Bangkok BRT has two major drawbacks of route design firstly it operates in mixed traffic in crowded areas causing delays and effecting the flow of buses and secondly most of

the route runs through areas where land acquisitions were easy. Both these factors have had a grave effect on the BRT system and its ridership (Satiennam et al, 2006).

Station design is another important aspect in the success of a BRT project, without the proper station access it is hard to believe that a poorly accessible BRT will attract car or motorcycle users, and even existing bus users are likely to consider shifting to other modes. Yet another very significant negative impact of this is the walking distances in harsh weather. Station doors for proper boarding and station capacity also plays a vital role in the effectiveness of a BRT system, Hanoi BRT did not possess these features which led to its demise. The Kuala Lumpur Sunway BRT due to elevated route fails to provide a physical connection to access the Federal Highway causing hurdles for the effectiveness of the BRT. (op cit.) In Delhi BRT the road was left with just two lanes which interrupted the flow of the traffic, buses would break down causing hour long traffic jams on daily bases creating anti BRT sentiments in the general public. Even the dedicated bus lanes of the BRT projects had to suffer from hurdles; mixed traffic would often create an obstacle for the buses to move Another problem Delhi BRT faced was Level boarding meaning that buses did not have boarding platforms that were on the same level as that of the station platforms. Apart from being a great aid to physically challenged people, this makes it easier for commuters to get on the bus with greater ease and speed. Passengers are also able to de-board the bus more easily (ibid.).

Management of BRT project is very important for its success. Delhi BRT also had poor management the BRT caused huge traffic jams. Delhi BRT did not have off board fare collection which would increase travel time. The Delhi BRT also allowed any and every bus to use the BRT corridor which resulted in lack of operations planning and controls, Cars and rickshaws would often enter the bus-only lane.

There are two main competition and opposition to BRT, private vehicles and existing transit operators. Focus on road construction and widening along with high car ownership rates facilitates the rise in car dependency. Policies play a key factor in terms of rise in car dependency. For example, in Bangkok car import duties were reduced from 300% to 50% (and in some cases even 25%) (Wu and Pujani, 2016). Furthermore, by mid-2000s, fuel prices along with tolls charges were significantly subsidized resulting in rapid motorization in Bangkok (ibid.). Despite of greater demand from traffic managers and other stakeholders, congestion as well as parking fees were not imposed resulting in promoting the use of private vehicles thus

undermining the use of BRT with more vehicular traffic along with supplementing traffic problems violation of traffic rules, illegal parking and illegal lane changing (ibid.).

The non-supportive political setup and lack of administrative as well as operational institutional structure delayed the implementation of the Bangkok BRT project. At least three different agencies were involved in the operational services of the BRT that resulted in ambiguity and clear cut understanding of the responsibilities resulting in chaos in the operation and subsequent failure (ibid.).

#### 2.2 Traffic growth in Peshawar:

Peshawar is increasingly transforming into a city of congestion and traffic related problems due to growing number of vehicles coupled with lack of expansion in the existing road network and effective traffic management. Recent available statistics published by the Bureau of Statistics, Khyber Pakhtunkhwa reveals that in total 9 categories of vehicle, the number increase from 577232 in 2014 to 306868 in 2015 (GoKP, 2017). Thus a net increase of 5.13% was observed. This increase may look moderate but considering the urban structure of the city with overwhelming dependency on the major East-west arterial road, the city may not be able to accommodate additional traffic of next 5 years with the prevailing physical infrastructure. As is evident from the Figure 3, all sorts of traffic is increasing but there is a significant increase in the size of two wheelers which is about 12 % (shown in blue color) followed by vans and pickups (8.4% shown with green color).



# Figure 3: Traffic growth in Peshawar during 2014-15

#### 2.3 BRT project of Peshawar:

Peshawar BRT project was instigated in 2013 with the prefeasibility study the Mass Transit System (MTS) by the Asian Development Bank TA 6293 REG, 2014).. Various option were explored along with 6 major mobility corridors. The present project along corridor 2, i.e., from Chamkani to Hayatabad was inaugurated on 20<sup>th</sup> October, 2017 and is expected to be completed in a couple of months time. It is 26 kilometers track with underpasses and flyovers and at grade dedicated track for the buses to daily carry a passenger load of 400000 to 500000 (TransPeshawar, 2017). A total of 31 stations with around 400 buses would be plying on the route to provide, safe, efficient and comfort mode of mobility to daily commuters (ibid.).Route of BRT Peshawar is shown below as Figure 4.



Figure 4: Peshawar BRT route map (Source: Website 2)

# **CHAPTER 3: STATISTICAL REPORT OF ESSENTIAL DATA**

#### 3.1 Prelude:

Bus Rapid Transit (BRT) offers capacity, passenger service and speed at a fraction of the cost of other transit systems. BRT also has a much faster implementation time frame and can rapidly provide a citywide reach. But if a BRT fails, it provide none of these benefits rather may result in loss of both physical as well as financial resources. Rather it may intensify the existing problems of congestion, delays and environmental degradation. Unfortunately several BRT projects in developing countries have performed below expectations, and few are even an outright failures with no net benefit to either public transport passengers or other road users. The origin of a failed or poorly performing BRT system can usually be traced back to errors made during the conceptual and preliminary planning stages which are propagated through the later stages of the project (Wu and Pujani, 2016). 500 questionnaires were filled by TWO survey teams from respondent from various parts of the city as shown on the map. Majority of the respondents were living in congested settlements with narrow streets and poor living conditions. A synoptic view of the survey findings are given below:

#### **3.2** Socio economic profile of the respondents:

During the survey about 90% of the randomly selected respondents were male<sup>4</sup> and young under 45 years of age. This include 37% of the respondents below 25 years of age while similar number below 35. Their family size in almost half of the cases lies between 4 to 6 persons. One fifth of the respondents were from smaller families of up to three persons while remaining one third of the respondents were from larger families of 7 persons and above. (Figure 5).





All except 6 of the respondents were educated with education level varying from matric to masters and above. This include 33% post graduate and 44 % graduates. A little more than 39% respondents were students while almost 29% were entrepreneurs. Others were employed in either government (17%) or private sector (13%) as shown in Figure 6.

<sup>&</sup>lt;sup>4</sup> This dominance of male respondents reflects a realistic figure of Peshawar where most of the drivers are male and there is no gender biasness here.



Figure 6: Education and profession of the respondents

#### **3.3** Motorization in the city:

71% respondents were earning up to Rs.100,000/= per month which included 23% earning between Rs. 50000 and 70000 while remaining 48% were earning between Rs. 70000 and Rs. 100,000/=. This shows that a person who is earning up to Rs. 100000/= PM, can afford to have her/his own vehicle, though it is in majority or the cases is smaller cars with engine size up to 1000CC. Nonetheless there were about 15% of the respondents who were earning up to Rs.150000/= while slightly less than this (14%) were earning more than this Rs. 150000/= (Figure 7). However still almost 60% of the cars plying on her roads were found 1000cc to 1800cc about 5% respondents were using larger cars. This shows the potential of Peshawar being rapidly motorized in near future as people with average or slightly above average level of earning are using their personal vehicles that can attract other folks with this level of earning.

Almost half of the respondents were owning one car while a slightly more than one third (36%) were having two cars in their family. Remaining almost 15% of the respondents reported were having three or more cars in their houses. When the responding motorist were inquired of having more cars in their family, a significant number, 38% showed their willingness while remaining were content with one.



Figure 7: Income and cars engine size

# **3.4 Trip Distribution:**

When motorist were asked about origin and destination of their daily travelling, it was found that in almost 31% of the cases trips are starting from the city, the eastern part of the city while in 21% of the cases these are started from Western end of the city, i.e., Hayatabad. Settlements along the University Road including University Town, Danishabad, University Campus, Shaheen town and Tehkal are generating almost 17% of the trips while similar number of trips are produced from the Cantonment area. Destination of 57% respondents were major business areas (MBA) as well as residential settlements along the University road. 18% of the respondents were heading toward Cantonment areas while 15% were destined to Hayatabad. For clear perception of the areas the following Figure 8 can be seen with seen along with Table 1.



**Figure 8: Origen and destination of trips** 

# 3.5 Daily travelling time:

Most of the urbanites in Peshawar start their economic and social activities early in the morning and thus most of the home to work trips are concentrated in the morning peak hours, that is, from 7 am to 10 am. This was observed in the survey as well wherein two third of the respondents were using these hours. However the homeward trips are more distributed in the afternoon till late evening as can be seen from the Figure 9 below. Hence any policy intervention has to appreciate the daily travelling timing for the BRT service to be cost effective and efficient.



Figure 9: Trip timing of motorists in Peshawar

#### 3.6 Motorists' resilience:

Motorists' resilience dependence on psychology of the drivers which here in this study has been determined through route selection during peak and off peak hours, travelling behavior time anticipation for the routine travelling. The motorists' survey reveals that during off peak hours 88% of the respondents were opting main route while only remaining mere 12% of the respondents were using alternate route. However during rush hour these statistics changes drastically wherein almost half of them reported shifting to alternate routes. About 12% informed that their choice would be shifting to other mode like taxi etc. while only about 9% reported to change time (Figure 7). This also indicates that only 12 respondents were willing to walk or use a somewhat "inferior" mode of bicycle that poses a big challenge for policy makers to attract status conscious motorist community to public transport that may involve walking to bus station as well. Thus the motorist in Peshawar have more patience to drive on the major routes that need to be acknowledged in designing tools to attract them to BRT.

A significant majority of motorist in Peshawar drive alone. This behavior was also observed when 284 out of total 500 respondents (almost 57%). Only 19% are using pick and drop service while a slightly more than 29% reported sharing their ride with others. When the motorist were asked about the loss of time during the rush hours, their response are shown in the Figure 7. About two third of the respondents reported that during traffic jam scenario their anticipated time could easily go twice or beyond of the normal travelling time

ACH RAFFIC	WALK OR USE BICYCLE	×
	GO ON WITH THE USUAL ROUTINE	34.8
RO/ D TI	WAIT FOR THE TRAFFIC JAM TO END	<b>8.6</b>
APP VIN(	TAKE ALTERNATIVE ROUTE	42.4
DUF	TAKE A TAXI OR BUS	
ME G G IRS	WITHIN ANTICIPATED TIME	
PAT FAT	SLIGHTLY MORE THAN ANTICIPATED TIME	23,22
	MORE THAN DOUBLE OF THE ANTICIPATED TIME	
AN' NN RUS	DOUBLE OF THE ANTICIPATED TIME	44.8
TRIP ROUT E	ALTERNATIVE ROUTE	
	MAIN ROUTE	83
TRAVELIN G BEHAVIO R	PICKED AND DROPPED BY DRIVER	
	DRIVE ALONE	56.8
	RIDESHARE	2.9,4

Figure 10: Motorists resilience to traffic jams in Peshawar

# 3.7 Parking problem and cost:

Parking is one of the most significant problem faced by the traffic mangers in most of the cities all around the world. However in Peshawar the respondents reported that 70% of them are using unpaid parking and it takes less than 5 minutes to more than 86% of respondent for finding parking space with no cost whatsoever. Only 11% have reported paying Rs. 40 or more as parking fee (Figure 11).





# **3.8** Problems with the existing Public Transport Services:

Peshawar had a decent Government Transport Service (GTS) a couple of decades earlier and most of the intra city and intercity mobility needs of general public were duly taken care of. However since the abolishment of that service due to losses, there is no service in the city in the public sector. However the service is provided by the private transporter has certain problem that were identified by the respondents during the field and are shown here in the Figure 12.



Figure 12: Problem with the existing transport

#### **3.9** Willingness to use Improved Transport System:

As many as 79% respondents nodded positively if their respective problems with the existing system are resolved in the BRT and in the case of even longer time for the same journey, 70% of the motorist are ready to switch to this mode. This shows the eagerness of the motorist to use a better quality or improved transport system (ITS). Only a thin minority of 10% respondents showed their willingness to use their own car in the post BRT scenario in the city. (Figure 13 below)



Figure 13: Willingness to use BRT

A slightly more than one third of the respondents showed their readiness to walk to the BRT station while use of other modes like taxi (14%), Cycle (17%), public transport (%) personal vehicle (11%) was also suggested by percent of respondent indicated in brackets nest to each mode. Over 31% respondents were ready to walk up to 1 kilometer to reach to the BRT station while same numbers were ready to walk from 1km to 2km. 81% of the respondents are happy with the existing route of BRT.

#### 3.10 Policy measures for intensive BRT usage from motorist:

Almost half of the 131 respondent who opted not to use BRT suggested that an efficient feeding network should be associated with the BRT while about a quarter of the respondent proposed a regular and reliable service of BRT. If Government impose a congestion pricing scheme and require motorist to pay an amount between Rs. 50 to Rs. 100, two third of the respondent showed their willingness to use BRT instead of their personal vehicles. A further increase between Rs. 100 and Rs. 300/= may push remaining to use BRT.

About half of those respondents who were not willing to use BRT earlier nodded positively if a Parking fee of Rs. 50/= was imposed. The remaining half reported to switch to BRT if the parking varies between Rs.50/= to Rs.100 /= (See Figure 14)



Figure 14: Steps to be taken for more intensive usage of BRT by motorist

#### **CHAPTER 4 FINDINGS AND POLICY RECOMMENDATAIONS**

#### 4.1 Prelude:

Cities need to be designed for people not for its cars. The economy of the cities across the world is dependent on efficient mobility offered by its transportation system. On average, a city can save 28 days per year by shifting from other modes particularly cars to Bus rapid transit system. (King, 2013). The City of Mexico, for example, replaced 350 standard buses from roads with 97 BRT vehicles which reduced travel time from 1.5 hour to 1 hour on busiest routes (Wolfe, 2016, Affairs, 2011). However in some case cities of the world, the BRT projects have not yielded the desired results.

Thus the main objective of BRT of making intra city transportation more sustainable, cost effective and efficient can be achieved if motorist are either attracted (pulled) or forced (pushed) to leave their vehicles either at home or any of the parking facility in the vicinity of the BRT station. Furthermore, a comprehensive implementation of the BRT system in the city involving all stakeholders including motorist is essential. This include provision of an integrated transport system that must serve the feeder areas to ensure home or work place to BRT station transportation service. Lesson must be learnt from the failed BRT projects where in some cases harsh weather was one of the major cause of failure.

#### 4.2 Findings:

The efficiently designed and managed BRT service ensure punctuality and higher quality of service besides being family friendlier. Most of the motorist in Peshawar encountered in this study assured to shift to BRT instead of using their cars if their concerns regarding the existing poorly operated, poor quality and less family friendly service replaced with better quality mass transit system (MTS). However, there will be still some motorist left who can avoid using their cars but still behave irresponsibly and will not use this service. These motorist are offsetting the potential benefits of this high cost project as well as incur a net economical cost upon the overall urban economy. In these scenario some countries have used a policy called as road pricing or congestion pricing. These are the additional amount that a motorist is required to pay if s/he opt to use his personal car during peak hours or /and through certain designated, e.g., commercial areas. A good number of motorist agreed to shift to the BRT who were earlier unwilling. Considering the socio-economic profile of the city where most of the motorist are from the middle class and any such pushing force can bring substantive changes in the attitude. Another such measure could be imposing parking fees. At the moment most of the motorist are parking their vehicle along the road or any other public areas and free of cost. Most of them reported to find a parking place within five minutes. This "luxury" of free parking has played its due role in the increase of motorization in the city and this need to be intervened. In this regard motorist reported that they can bear up to Rs. 100/=. However if the increase goes beyond this amount, very few will be willing to pay and thus shall be forced out of the traffic flows assuring lesser volumes and efficient mobility and efficient functioning of the city.

This study of Peshawar is an attempt to understand the dynamics of BRT from the socio economic perspective of the motorist and devise a policy framework for the decision makers to make BRT a pivotal mode of mobility in the city. The focus is not to repeat the mistakes that have been done elsewhere and help BRT managers in developing a public transport system on sustainable footings in the city of Peshawar. The strategic policy initiative based on the findings of the study are proposed below:

# 4.3 **Policy initiatives:**

- Socio economic determinants must be realized in the policy formulation through an intensive investigation before proposing any policy solution in Peshawar regarding urban mobility. For example, slight increase in the income level can attract enhanced motorization that need to be discouraged to make BRT sustainable and cost effective.
- An integrated mobility network must be established in the city ensuring provision of frequent and efficient access to the areas off the BRT corridor.
- Other radial roads or major transport corridors shall also be linked with the existing service through by providing BRT infrastructure.
- Areas should be designated as "sensitive" from the congestion perspective and all motorist using those areas and particular hours, e.g. (Peak traffic flow hours) must be asked to pay a fee which could be Rs. 100. The areas could be major transport corridors in morning peak hours and Major Business Areas (MBAs, e.g., Saddar area, University road, Khyber bazar etc.) in evening peak hours.
- Parking in designated areas should be either banned or made expensive. The study proposed a price tag of Rs. 100. Besides parking fee must also be determined on the length of stay.

# 4.4 Limitations:

- The finding of the study are area specific to Peshawar and its implications to other cities of Pakistan may be limited.
- Furthermore the time limitation for the proposed study has also limited the methodology to conduct larger based surveys and modelling of real traffic flows.
- The findings can also be used to suggest similar and more comprehensive studies for other cities

# 4.5 Anticipated use of the results:

The study can be used for the policy makers and practitioners to propose a statutory framework for the effective adoption of mass transit system in Peshawar.

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