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Assessment of gender patterns in public transport: A case study of Pune City

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1. *Introduction*

The cities are considered to be the drivers of economic growth and development. The sustainable development of cities largely depends on their social, physical and economic and institutional infrastructures. In 2011[1], the rate of urbanization in India was estimated at 31.16 per cent from 28.53 per cent in 2001. The process of urbanization is often accompanied by challenges of water, sanitation and governance among others. One of the major challenges associated with urbanization is the stress which it levies on the urban transportation systems. The cities have become synonymous to congestion with increasing levels of noise and air pollution. The heavy reliance on private modes of transport has created the atmosphere for unsustainable growth of cities' modal share. The investments which have taken place in the transportation sector in India have mainly focused on moving vehicles by making space on the road. The disintegration of land use and urban transport has moved the people to the peripheries of the cities causing urban sprawl and increasing the trip lengths within the city.

Access to mobility in urban India is constrained by gender and the travel patterns are derived through these constraints. The existing transport planning typically does not address differences in men and women. Also, the design and the planning of public transport systems are unfavorable to the vulnerable users such as the poor, the differently abled and people who have reduced mobility. This issue becomes even more relevant in the current phase of rapid urbanization and motorization. The choices of travel for men and women are different across the globe and are guided by their differences in social and economic roles. The characteristics of earning opportunities, household and domestic work and access to social and health services are gender sensitive and thereby influence the travel patterns. The studies conducted in this regard have shown that women have access to fewer transport choices and also spend heavily on transport when compared to men, since their reliance on intermediate public transport in the evening peak hours is high.

There are certain inherent methodological challenges which do not provide a comprehensive data on urban travel; the travel data are rarely gender disaggregated. Further, in an urban travel, one trip is consisted of more than one mode of transport in order to achieve first and last mile connectivity. Also, the travel pattern on different modes of transport varies with social classes, economic situations and cultural backgrounds; further, the gender

[1] As per Census 2011 Survey statistics released by Office of the Registrar General & Census Commissioner, India

differences in the usage of public transport could exist intra household or between the households. The division of household responsibilities brings about visible differences in the travelling pattern of men and women (Mauch & Taylor, 1997).

The studies from around the world show that women rely on public transport for their daily commute more than men. In Pakistan, a study conducted showed that, women's travel on public transport is high when compared to men, although the proportion of the walking trips to other trips is low (Sajad et al., 2017). In a pilot survey conducted as a part of the survey in Lahore, 30 per cent of respondents concluded that it was extremely unsafe for women to walk in their neighborhood. Women's mobility outside the house is correlated with several overlapping factors, such as fear of harassment, social stigma and discomfort. These constraints have an impact on their choice to participate in the labour force or to pursue education. For the women who belong to the low-income group, this issue is further aggravated since they mostly rely on public transport or non motorized transport mode, alone. A study conducted to study the differences in rider age and gender showed that in both Germany and the USA the women use public transport more than men. A similar study suggests that in France, two thirds of the public transit passengers are women and in the United States, women constitute 55 per cent of the transit passengers

It is a well established fact that men and women have different travel patterns and often the difference is observed in the travelling time, the route preferred and the mode of transport. The existing studies on gender and mobility have focused on the travel behaviour of women without laying much focus on the causes and consequences of their travel behaviour.

To achieve sustainability and inclusiveness in transport, many factors including gender is considered to be one of the important dimensions. With the growing demand for transport in the cities, there is a variation observed in the manner in which women and men experience transportation. In developing countries, like India, there is a need to focus on including the gender dimension while designing the transport policy (Uteng and Priya, 2012). A review of the literature in this aspect provides a deeper understanding with attention to the factors contributing to the rising gender gaps in the mobility space. The travel requirements for women are correlated with the differences which exist in labour market. Therefore, women's travel pattern is driven by the level of wage, overtime working hours and part time roles among others. In many of the developed and a few developing countries the focus of transport has been shifted from being a public good to a private good. Para-transit transport mechanisms which are

offered by the private companies such as: taxis and auto-rickshaws are intended to serve the travel requirements of women to a greater extent. However, these modes of transport are scarcely offered by the Governments (Peters, 2013). Studies conducted in this regard have recognized that gender sensitive issue is relevant in transport, as it is prominent in other sectors of the economy. While there have been an increasing effort to incorporate gender perspectives especially into the health, education and agricultural sectors, much fewer attempts have been made in the transport sector. This seems particularly unfortunate since transport plays such a vital role in most women's daily routines.

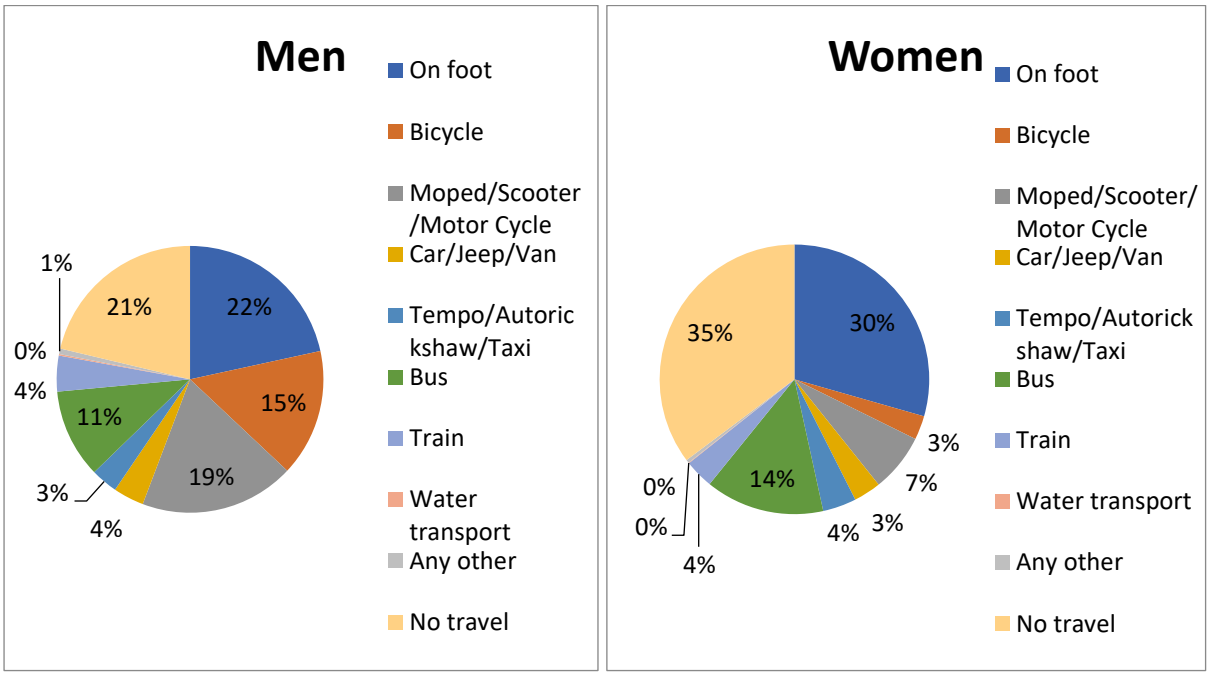
A few studies conducted to understanding the trips made by women and men on a normal business as usual day show that women are more likely to trip chain, meaning that when they traveling back from work, women make several stops in one trip to run household errands (Hanson, 2010). Women, since they are involved in housekeeping and play the role of caretakers, their travel needs are different from that of men. A few similar studies in this regard have shown that women, who are not a part of labour force, often tend to travel off peak hours and this travel is inclusive of trip chains which lead to a greater variety of destinations than men's. This trip changing behaviour is specific to women's travel, where women make multiple stops during their one trip to run errands or meet the needs of the dependents. Trip chains are characterized by travel having stops of less than 30 minutes. In London, for example, 61 per cent of the shopping trips and 71 per cent of the trips made to drop off children were made by women. At the same time, work-related travel by women is shorter, as women live in closer proximity to their jobs due to their time constraints and reduced access to private cars (Uteng and Priya, 2012). The study in Lima revealed that while women base their travel decisions on personal safety and protection from harassment, men's travel priority is speed.

1.2 Travel pattern in India:

The 2011 Census Survey collected data on the work travel in India, which was a significant step in breaking the speculation in understanding how men and women travel for work. The report categorized modes of transport and also included the distance travelled to work. The pattern of travel to work for women and men were observed clearly in the Census report. In India, 80 per cent of the men use all modes of transport to travel to work, while women's usage is about 20 per cent. The differences in the usage of the modes of transport between the two genders become more apparent when compared with one another.

In Urban India, 14 per cent of the women use buses to travel to work as against 10 per cent men. Further, the percentage share of women who travel to work is 8 per cent higher for women when compared to men; whereas, the share of two wheelers, and bicycles are higher for men. The Indian Census of 2011 recorded in an official survey for the first time how men and women travel to work. The differences in the travel pattern across the different modes of transport are visible when the two genders are compared in Figure 1.1

Figure 1.1 - Modal split for men and women, Census, 2011

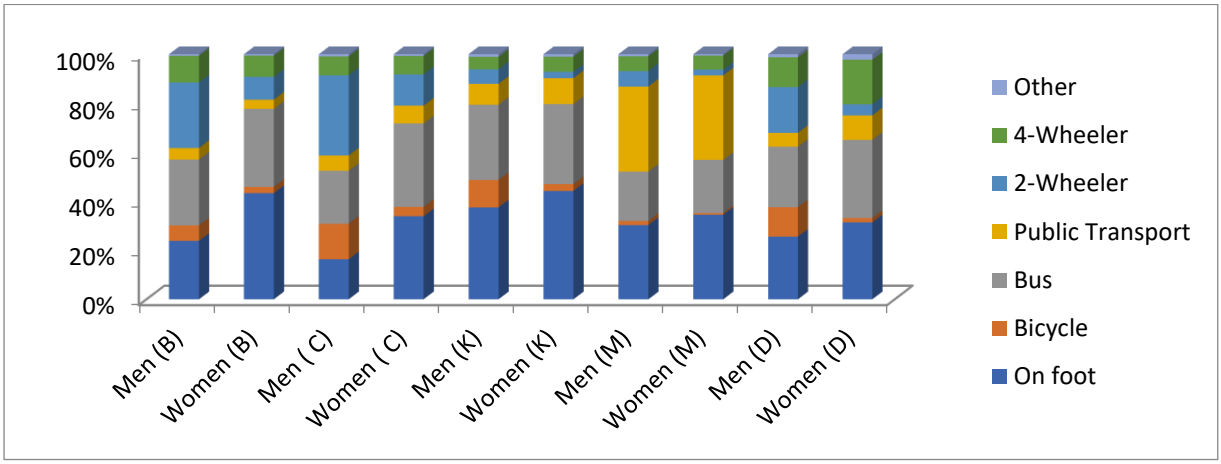


Source: Data – Census 2011, graphical representation by the researcher

~ 30 per cent of the women in Urban India travel to work on foot. The percentage share of women who do not travel to work is higher when compared to men. The Census, 2011 data shows that aross the metropolitan cities, the percentage of women who rely on buses to travel to work is higher for women when compared to men.

Among the women who travel to work, a large proportion of them rely on walking or on public transport to reach their destination when compared to men. Across the five cities compared here, on average, 37 per cent of women, compared to 27 per cent of men, walk to work and 30 per cent of women as compared to 25 per cent of men use public transport.

Figure 1.2 - *Modal split for men and women in 4 Indian cities*



Source: Data – Census 2011, graphical representation by the researcher

Note. B- Bangalore, C- Chennai, K- Kolkata, M- Mumbai, D- New Delhi

The above analysis puts forth an understanding that across countries, women and men have different travel patterns and the variations is observed in the way they negotiate travel – time, distance, duration and purpose. Women in urban India travel to work mostly on foot and public transport. This shows that women have lower accessibility to the private mode of transport and women depend on the non motorized mode of transport to travel to work. Even amongst the users of public transport there are variations observed with respect to the travelling patterns which are not captured in the Census data. Although women travel on public transport in higher numbers than men, the perception of safety, the travel time and the purpose of travel is not same as that of men. In this backdrop, the following study intends to understand the differences in the travel pattern on public transport (buses) of men and women.

This study is conducted in Pune city, through a primary survey. The objectives and the methodology adopted in the analysis of the study are outlined below.

Objectives

The objectives for the study are:

- Based on primary survey, assess the gender patterns on PMPML buses in Pune.
- To analyze the travel behaviour i.e., purpose of travel, trip changing, frequency of travel, last mile connectivity options for men and women travelling on PMPML buses.
- To assess the priorities for men and women on PMPML buses and bus stops.

Methodology

- To assess the gender patterns on public transport in Pune, a primary survey was conducted through a questionnaire. The questionnaire was administered on 200 users of PMPML across 10 depots. The study has used the Cross tabulation analysis to represent the data.

Major findings of the study.

Through the study, it is established that men and women in Pune have varying travel needs and their travel pattern on Public transport is different. The findings from the study show that:

- Men in Pune use public transport more to travel to work whereas women use it for running household errands and for recreational purpose
- Women in Pune make shorter trips on public transport which involves trip changing
- Women in Pune spend lesser proportion of their monthly income as travel expense
- Women who are homemakers and not employed travel during the off peak hours of the day
- Men and women have different level of priorities regarding the amenities at the bus stops and on buses
- With increase in levels of income, women tend to shift from public transport to para-transit, while men shift to personal modes of transport

2. Literature Review

2.1 Gender and Travel Pattern

Differences in travel patterns between men and women are different which have been earlier studied in cities of Delhi (Anand and Tiwari, 2006) and Chennai (Srinivasan, 2008). Wachs believes that men and women have different travel patterns and mode choices, attributable to the distinct economic and social roles of the two genders (Wachs, 1998). women rely heavily on cheaper modes of transport, such as public transport systems (buses especially); these modes of transport are often less reliable and therefore increases the travel time. Whereas, men who have a higher proportion of disposable income at their end, have access to intermediate public transport systems and private vehicles (Kudat, 1996). Women make up the major share of transit riders in developed countries, whereas in the developing countries, public transport is considered to be an expensive modal choice available to the households. Therefore, low-income women tend to use public transport less than men, opting for cheaper, yet typically less attractive intermediate or non-motorized modes

A study conducted in Guwahati to oversee the gendered nature of public transport showed that 75 per cent of women who work as domestic servants walked to work and the average distance walked was 3.5 km per day. Majority of the homemakers used public transport for shopping as well as to drop and pick their children from the school; further, 83 per cent of the women did not travel more than 20 km per week (Mahadevia et al., 2016). There is an inherent relationship between the commuting distance and choice to take up work outside home. A study based in the slums of Delhi illustrated that women spend more time travelling on slower modes of transport, mostly non motorized transport, to access work since the faster modes of transport are more expensive. Therefore, they seek jobs which are closer to home and for which they do not have to travel longer distance (Anand and Tiwari 2005).

The lack of accessibility and affordability to transport is a multi-dimensional problem for women (Anand and Tiwari 2005). For addressing livelihood and poverty issues among the low income households, the options for safe travel for women in general and specifically low income group women are important (Tiwari, 2014). Studies have also shown that low income women tend to travel less when compared to men who belong to the same income group. The women are more dependent on walking and also lack accessibility to bicycles and motorcycles

in a household (Gopalan, 1998). The study conducted in Ahmedabad to study the gendered nature of BRTS system shows a striking difference in the usage of service between the two genders. While 55 per cent of the men travelled for work purpose on BRTS, 38.5 per cent of the women travelled on BRTS for the other purposes which included social, recreational and religious. The service has kept the low income group, specifically women from the lower income group households away from its day to day usage (Mahadevia et al., 2013)

In the city of Visakhapatnam, a survey conducted to understand the travel pattern of men and women (ITRANS, 2012) showed that women travel on public transport mainly for religious purpose as compared to men whose main travel purpose is work. Further, the survey concluded that walking has the highest share of trips for women as compared to men. The trend in Visakhapatnam is similar to the ones observed in Chennai, where 83 per cent of women chose walking as the mode of transport as against 63 per cent of the men (Srinivasan, 2008). Similarly, in Delhi, a 2006 study reported that 52 per cent of women walk to work as against 26 per cent of men (Anand and Tiwari, 2006).

2.2 Gender and Trip changing

The daily schedule of women is directed by various requirements; and therefore, their travel pattern and the activities included during travel are often more complex and heterogeneous than those of their male counterparts. The problems associated with women's mobility have highlighted the need to treat males and females separately when travel behavior is represented, especially when transportation policy interventions are concerned. A recent study conducted in Italy shows, in line with international findings, that Italian women travel shorter distances to work compared with men (Cristaldi, 2005). Women tend to have lower disposable income at their ends while compared to their men counterparts coupled with limited access to private modes of transport; further, the household duties and the care component is higher for women which forces them to seek employment closer to their house (Hjortho et al., 2010). Therefore, transportation plays a crucial role in deciding women's mobility to ensure their dual role outside and central pivot for family life.

One of the major differences in the travel patterns of men and women are guided by the phenomenon of 'trip-chaining' (i.e. making journeys with more than one purpose). Although the trip changing behaviour is present among both the men and women travelers, the purposes for which the trip changing occurs differ widely between the two genders (Hamilton, 2001).

Further, the activities which are pursued by men and women post the working hours also influences their travel pattern. Men are more likely to go home directly after work while women make stops to pursue household activities such as shopping, personal business and recreation. These differences in the role decide the travel pattern for the two genders (Hamed and Mannering, 1993). Using a sub-sample of activity data, Golob and McNally in 1997 found a number of significant differences between men and women in their travel times during the day for various purposes. Another study established that, women who are married are more likely to make stops in their daily commute than the men who are married (Bhat, 1997). While, Niemeier and Morita in 1996 found that women were 1.32 times more likely than men to spend more time shopping.

2.3 Gender and Safety on Public Transport

Within the aspect of mobility, men and women have different priorities which affect their travel pattern. Therefore, a single policy cannot ideally capture these priority differences. The travel patterns of men are mostly guided by speed as against the treatment by the transport officials or personal safety; whereas for women, their travels are centered on the aspects of personal safety, comfort, courteousness and hygiene, and treatment by the transport officials. Speed, however, is not among the top priorities for women. Conversely, the expense of transportation is important to women and not among men's priorities (World Bank, 2000). The concept of safety has to be understood from a multidimensional purview which takes into account road safety alongside with personal safety while travelling; therefore suitable infrastructure facilities need to be provided since, the users' (especially women) travel experience is reliant on the perception of level of safety. A survey by Tokyo Metropolitan Policy and East Japan Railway Company showed that two-thirds of female passengers between the ages of 20–39 said that they had been groped on trains, many of them frequently. One most commonly used policy response to this issue around the cities is introduction of women only coaches or women only seats on Public transport (Peters, 2013).

The provision of women only coaches in trains/metros and reserved seats for women on buses are a common phenomenon and the requirement in the transport system of a city. However, studies undertaken to understand the effectiveness of women-only coaches have shown that women, although women are aware of such facilities, they are of the opinion that such facilities fall short in capacity. In a study conducted in Klang Valley, Malaysia, showed three major problems in Women-only coach which were: (i) the lack of enforcement in

Women-Only Coach, (ii) the insufficient capacity to accommodate increasing demand and (iii) the poor visual quality of the signs indicating and distinguishing women only coaches from the rest (Bachok et al, 2014). Another important area of gender difference on public transport is observed in the times during the day when men and women prefer to travel: peak and off peak travel, and day- and night-time travel (Hamilton, 2001)

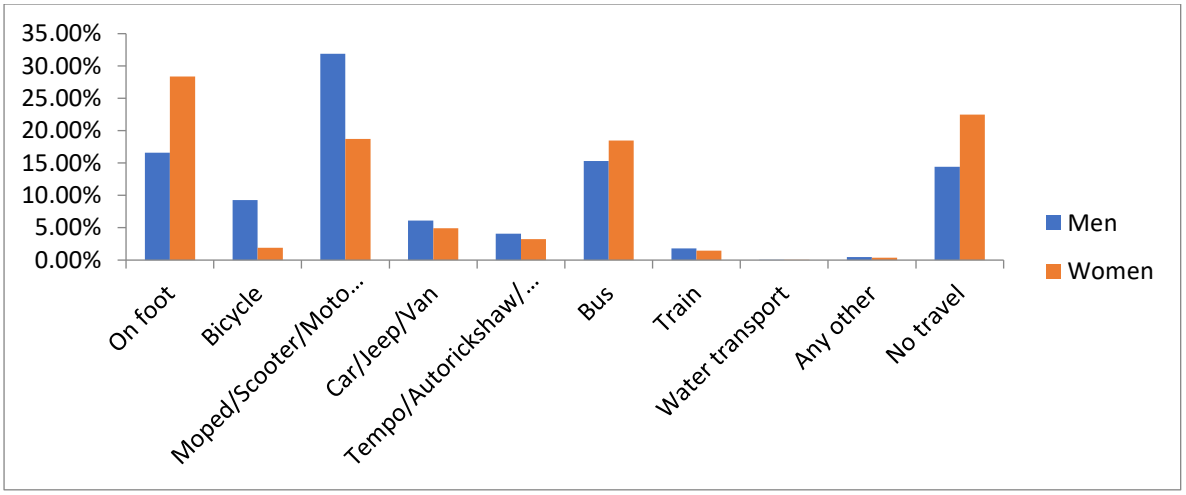
Planning and designing a safe and inclusive transport systems for women requires interventions at three levels: street designs, public transport infrastructure and land use planning (Murthy, 2011). In designing inclusive public transport system, focus need to be laid on access to public transport stops, design and the facilities at the bus stops, vehicle design and the personal safety infrastructures need to be considered. The safety on public transport must be ensured in the entire leg of the journey: on vehicles, during the waiting time, and on the routes of access to stations and stops (Cardia, 2012).

3. Pune city and Public transport

As per the recent study conducted by PMC as a part of the Comprehensive Mobility Plan in 2017, it was observed that approximately, 47 per cent of the trips in the city are walking trips, followed by the trips made on two wheelers which constitute 29 per cent. Further, buses, including the BRTS constitute ~ 11.5 per cent of the total trips made in the city. The trips made on four wheelers and auto rickshaws which are intermediate public transport constitute 5.5 per cent and 4 per cent respectively; with cycle contributing ~ 3 per cent of the total trips.

The analysis of the travel to work pattern in Pune, as represented in Figure 3.1, shows that in the usage of modes of transport in the city for commuting has a gender angel to it. Among the men who travel to work in Pune 31 per cent of them commute via two wheelers while ~ 16 per cent commute on foot. While for women walking (28 per cent) forms the largest share of mode of transport followed by buses (19 per cent). Further, the percentage share of women who do not travel to work is higher for women compared to men.

Figure 3.1 - Modal share for men and women in Pune city



Source: Data compilation, Census 2011. Graphical representation by the author

The development of Pune and Pune Municipal Transport (PMT) took place simultaneously. In July 1961 the Panshet and Khadakwasla Dam tragedy endangered Pune city and the people residing on the Mula Mutha banks had to be rehabilitated in places away from the river banks. This led to the emergence of settlements away from the main city. After the floods of 1961, there has been a tremendous growth in the development of the city which has also caused the increase in demand for transport services. With rapid industrialization and

urbanization, the city of Pune grew at a rapid pace. Gradually, the fleet of public transport increased proportionately with increasing population.

Because of increasing demand from the citizen Pimpri Chinchwad Municipal Transport (PCMT) was formed on 4th March 1977. Gradually the number of commuters between the two municipal corporations increased, and therefore the buses increased. Before 2007, PMT and PCMT were separate transport undertakings; there was intense competition on starting of new routes in their respective areas and overlapping of routes where buses of the two undertakings plied needlessly on some routes. Hence it was decided to merge these two companies. In 2007 both the organizations have merged and Pune Mahanagar Parivahan Mahamandal Ltd. (PMPML) came in to existence.

3.1 Pune Mahanagar Parivahan Mahamandal Ltd. (PMPML)

PMPML has been dedicated towards providing commuters with a safe, affordable and convenient transportation service. The formation of PMPML was initiated in order to reduce the unhealthy competition between PMT and PCMT and to further strengthen the urban public transport system in Pune.

The PMPML at present has 13 depots with a fleet of 2045 buses as of 2017. Of the total buses held, 1378 buses are on road per day. ~ 18 – 20 per cent of the people in PMC and PCMC use the bus service by PMPML.

Parisar, a Pune based organization conducted a survey in 2012-13 and published a report card to assess the accessibility, reliability, affordability, convenience and comfort on the PMPML among the users. The study found that, approximately 26 per cent of the scheduled bus trips in the day are cancelled without any notice. Further, the lack of buses aggravates the situation by extending the wait time. The reason for fewer buses on the road as against the scheduled ones is because of the breakdowns which accounts to 28 per cent of daily trips scheduled.

As of March 2017, about 1 million passengers travel on buses in Pune. The number of travelers have in fact has come down from 1.2 million in 2014-15. This shows the shift from public transport to other modes of transport in Pune.

The PMC and PCMC along with PMPML jointly launched the Rainbow Bus Rapid Transit System in August 2015. Rainbow BRT is operational in Pune and Pimpri Chinchwad and is managed by PMPML. The project has a planned network length of 68.80 kms. The corridors operational in Pune are Sangamwadi to Vishrantwadi of 8 km length, and Yerwada-Wagholi Corridor, which has a 7.86 km segregated section from Yerwada to Aaple Ghar on Nagar Road. The project when sanctioned in 2006 had envisaged a length of 113 km across 6 lines. However, at present there are only four operational routes and the others are still under construction. In a few routes with intermediate BRTS stations, owing to construction work and road expansion, the buses have been deviated to the normal road

In this study, the gender pattern on buses managed by PMPML is assessed. As the literature suggests, women have different travel purpose and time preferred to travel. This variation could be observed in public transport as well. The study assesses the priorities of men and women on bus stops and on PMPML buses

4. Research Design and Methodology

4.1 Research design

The present study is an exploratory research which has employed both quantitative and qualitative method, such as personal interviews, of data collection in order to address the research question. The aim of the study is to assess the gender patterns on public transport in Pune by examining the differences in the travel purpose and patterns of men and women. To do so, a questionnaire was administered on 200 individuals, 100 men and 100 women. In addition to the questionnaire, the samples were asked to throw light on their suggestions which would result in improving their travel experience on public transport in Pune. The sample characteristics and the methodology adopted to arrive at findings are discussed in detail in the following sections of this chapter.

4.1 Defining the Sample

In this study, the researcher has adopted the method of purposive sampling wherein the questionnaire was administered on men and women who commute on PMPML buses regularly or occasionally. The questionnaire was administered on the regular commuters because this would provide the actual numbers of men and women travelling on buses on a Business as Usual (BAU) days. Further, the percentage share of men and women on PMPML buses was obtained from the routes surveyed by interviewing the drivers and the depot managers.

4.2 Sample area and Procedure

The sample was collected on 10 routes of PMPML buses originating from 10 depots. The routes were selected on a random sampling basis and in each route, two trips were made. From each of the route, 20 samples were collected – 10 men and 10 women. The ten depots covered as a part of the survey are:

- Swargate
- N T Wadi
- Kothrud
- Pune Station
- Market Yard
- Katraj
- Balewadi
- Nigadi

- Pimpri
- Bhosari

The routes which originate from the three depots falling under the administrative boundary of PCMC – Nigadi, Pimpri and Bhosari were selected in addition to the seven routes from the depots under the PMC area. The routes chosen for the sample also included a few BRTS stops. The sample for the study was collected across the time slots of days, covering peak and non-peak hours. The survey was conducted in January and February, 2018.

The sample for the study was collected on the journey, at the bus stops and few prominent transit points in the city, such as, MaNaPa, Deccan, Vanaz, Pune University and Jagtap Dairy.

4.3 Research Instrument

The study adopted a well defined questionnaire to assess the gender patterns on Public transport in Pune. Through the questionnaire, the information on the travel details such as – the purpose, distance, duration, preferred time of commuting and the priorities on buses and bus stops were collected. The questionnaire used for the survey is attached in the Appendix for reference.

4.4 Designing the Research Instrument

The questionnaire was constructed to answer the research questions raised. The main parameters addressed in the study are –

- Psychological barriers
- Infrastructure for bus accessibility
- Infrastructure on the buses
- Usage Pattern – time, duration and distance travelled
- Priorities while travelling – comfort, speed, courteousness
- Safety and Security
- Income and percentage spending on commuting

The above questions were given the gender dimension and the varying responses received for men and women have been compared in the following chapter.

4.5 Pilot survey (pre exercise)

The structured questionnaire was administered on pilot basis on 20 individuals in the bus stops on Senapati Bapat Road during the second week of January 2018. Based on the responses received, certain parameters were modified and accommodated to the final questionnaire. The pilot survey helped to channelize the study and the sample size.

4.6 Data Collection

The study collected data over the span of three weeks on all the days of the week except for Saturday and Sunday. The rationale for doing so was because the number of trips and the purpose of trip on these two days vary significantly from the rest of the days in the week. Therefore, the data was collected on five days a week across the hours of the day.

4.7 Sample characteristics

The study has collected responses from 200 individuals across the age group and socio-economic group. Certain prominent socio economic characteristics of the sample population are detailed out below –

Figure 4.1 - Age, Gender, Marital Status Distribution of Study Sample Population

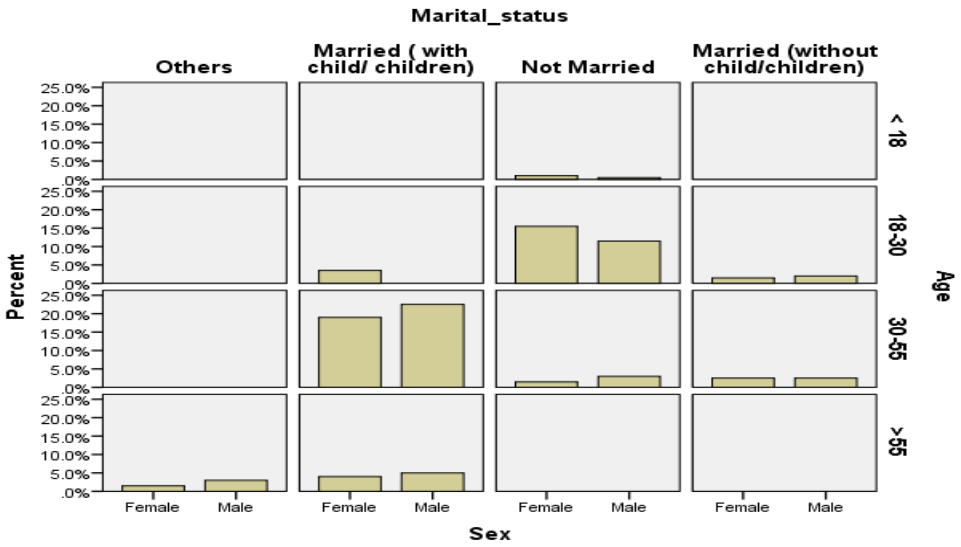
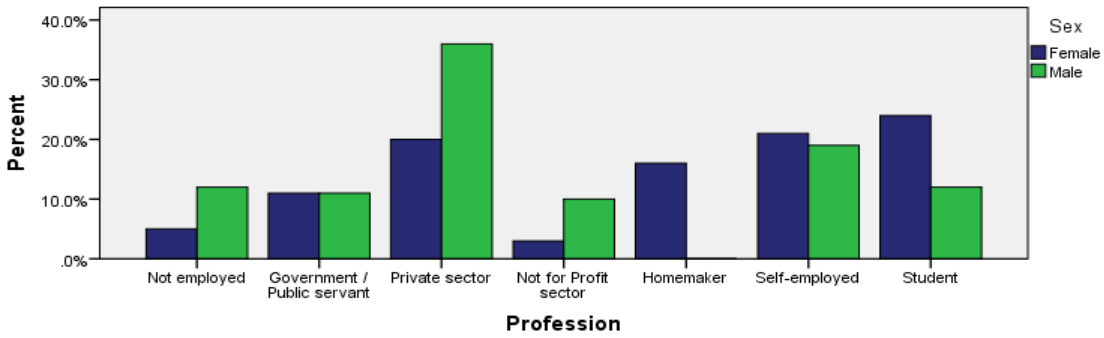


Figure 4.1 details out the specific characteristics of the sample population. In the sample collected, 15.5 per cent of the women fall under the bracket of the age group 18-30 and are not married. 22.5 per cent of the men sample population fall under the age bracket of 30-55 and are married with children. Two per cent of the men in the age group of 18-30 are not married;

five per cent of the total sample population fall under the age bracket of 30-55 and are not married. ~ 13 per cent of the sample population falls in the category of above 55 years.

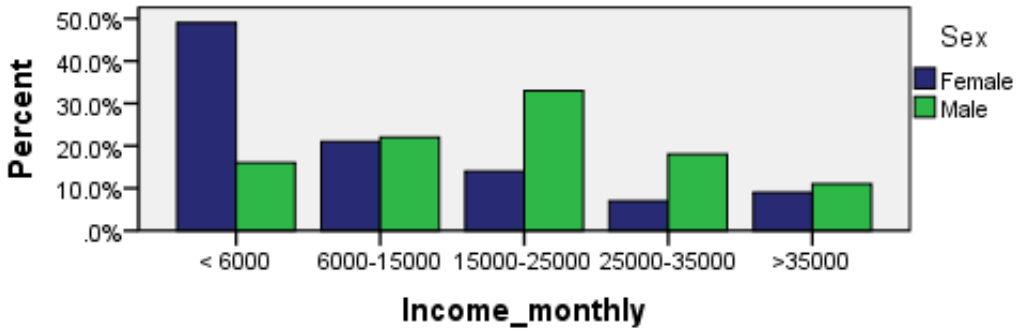
Figure 4.2 - Profession and Gender Distribution of Study Sample Population



The distribution of the sample across professions is represented in Figure 4.2. Thirty six per cent of the men in the sample population work in the private sector, while the share of employment among the women is high in the self-employed group. Further, 12 per cent of the women in the sample population are not employed in any sector, while 5 per cent of the men are not employed and are seeking employment.

The income level of the population is another important socio-economic characteristic which defines the sample population and as represented in Figure 4.3. In the sample collected, ~ 50 per cent of the women fall in the income bracket of less than 6000 INR per month; while among the men, 33 per cent of the sample population fall in the income group of INR 15000 – INR 25000 per month. At all income levels in the sample population, the share of women is lower than that of men.

Figure 4.3 - Income distribution of the sample population



The above defined socio economic characteristics impacts the travel patterns of men and women differently which is discussed at length in the following chapters.

4.8 Data analysis

The responses received on variables such as age, income and expenditure on travel expense were grouped together in the first step of data analysis. In the second step, all the responses were coded on SPSS to make it convenient for analysis. The coding cue is attached in the Appendix for reference.

The data tables and the graphical representations from the cross tabulations are further supported by the insights obtained by the staff of PMPML regarding the gender differences observed in public transport. The quantitative analysis supported by a comprehensive literature review and interviews with the stakeholder has helped this study to arrive at recommendations which could improve the existing condition of women's travel on public transport. Such a policy recommendation would promote inclusive transportation in the cities.

4.9 Summary

The study has adopted a method of primary survey to collect information on the differences in travel patterns on public transport in Pune. While administering the survey, the differences were observed in the way men and women negotiate public transport in the city. While the differences in travel time and purpose of travel are visible in other modes of transport in Pune, the variation is evident in public transport as well.

5. Analysis and Findings

The analysis of the primary data is done in different steps to establish the differences in the gender patterns on public transport in Pune. In the first part of the analysis, the purpose of travel, distance and duration travelled and the percentage of income spent on travelling on public transport in a month has been analyzed with gender comparison. In the second part of the analysis, the experiences of women and their assessment of personal safety on public transport has been discussed. The findings have been arrived at from the survey of 200 individuals and from the personal interaction with the officials on PMPML.

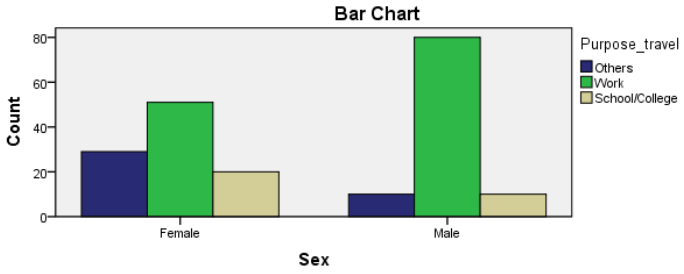
5.1 Analysis of gender differences in travel patterns

5.1.1 Gender and travel purpose

The literature suggests that women and men have visible differences in the purpose of travel (Peters, 2002; Anand, 2008). While differences exists across the mode of transport, in Pune, this study suggests that even on Public transport, the purpose of travel of men and women vary. Even within the age groups, the purpose of travel is distinctly visible for both the genders.

The purpose of travel in the survey was divided into three categories – work, school/college and others. The other category captured all the responses where travel was made for the purpose of religious activities, hospital visit or for the purpose of shopping. In the survey conducted, 80 respondents said that they use public transport to travel to work, whereas 51 respondents said that they travel to work on public transport, which is also shown in Figure 5.1.

Figure 5.1 - Purpose of travel and gender



This study conducted in Pune shows that there is a wide difference among the users of public transport and the purpose for which they travel. 40 per cent of the men use public transport on a frequent basis to travel to work as against 25 per cent of women. Of the 100 men interviewed for the survey, 76 per cent are employed in various sectors and hence the travel to work ratio in public transport is higher for men. Among the 100 women interviewed, 16 per

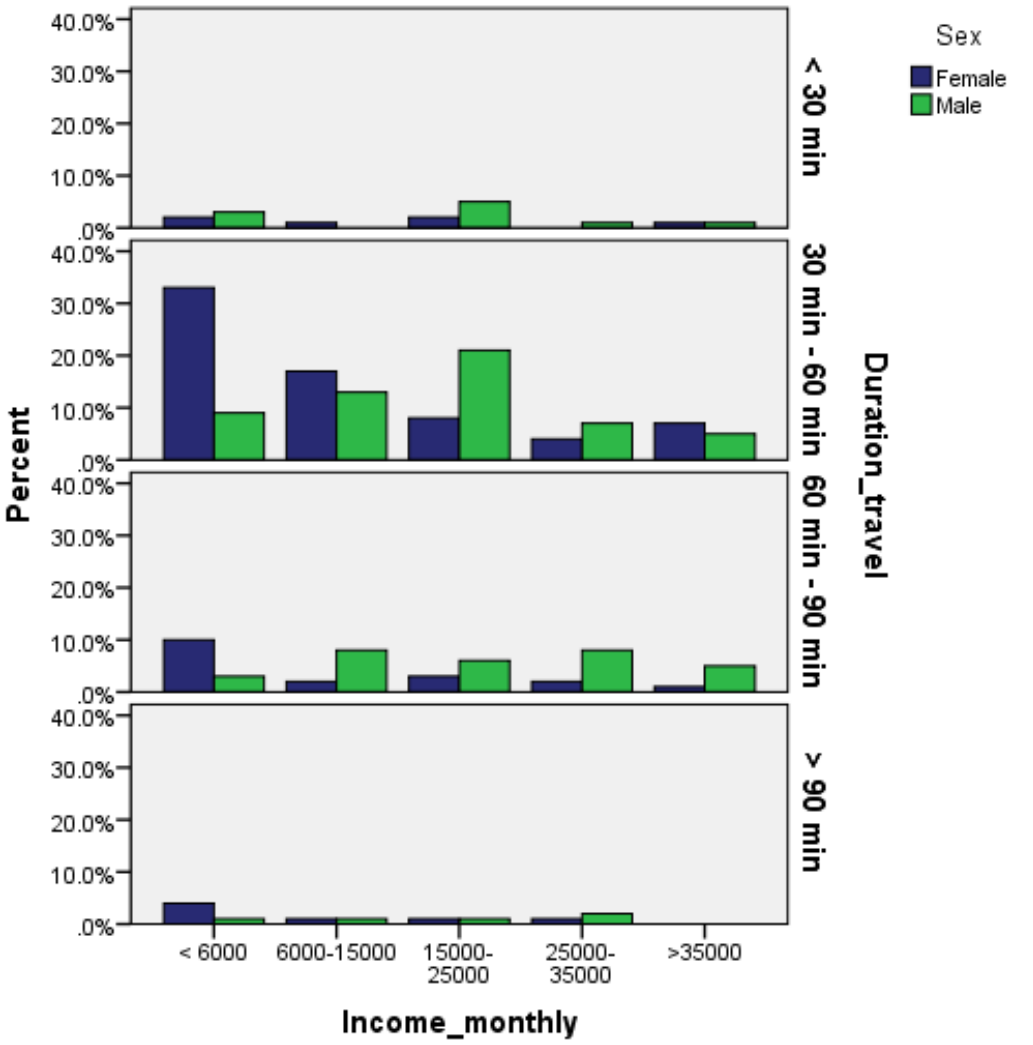
cent of the women are homemakers who often use public transport for the purpose of shopping or to drop their kids to schools. Among the people surveyed as a part of this study, men make more work trips on public transport than women, and women who are homemakers and who are retired from service mainly use public transport for other purposes apart from work.

The purpose of travel also varies with age between the two genders. 55 per cent of the men in the age group 30-55 travel to work on public transport, whereas 30 per cent of the women in this age group use public transport to travel to work. In the age group above 55 years, 30 per cent of the men continue to use public transport to travel to work. But, women in this age group mainly use public transport for religious and hospital purposes.

5.1.2 Gender aspect in Distance and duration travelled on Public Transport

In this study, through the primary survey conducted, it was observed that the average distance travelled by women on public transport in Pune is 5-10 km per trip. To make this journey, an average of 30 minutes commuting time is needed. Whereas men travel an average distance of 10-15 km per trip; spending an average of 90 minutes for commuting. Figure 5.2 shows the cross-tabulation analysis of monthly income of the respondents with the duration travelled on public transport.

Figure 5.2 - Cross tabulation analysis – Gender, Monthly income and duration of travel



Among the women interviewed as a part of the survey, 37 per cent of them, who fall under the income bracket of INR < 6000, travel a distance of 5 km – 10 km per trip either for the purpose of work or education or for other general purposes. The distance travelled for men and women on the buses is inversely proportional to increase in incomes.

Figure 5.3 Cross tabulation analysis – Gender, Monthly income and distance travelled

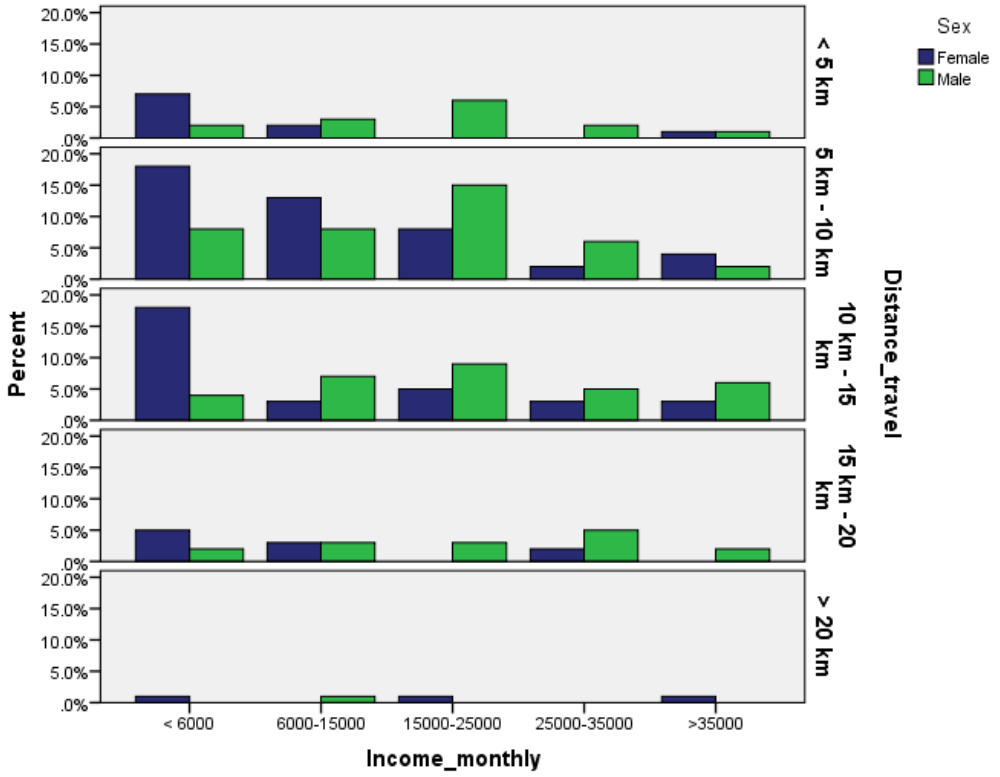
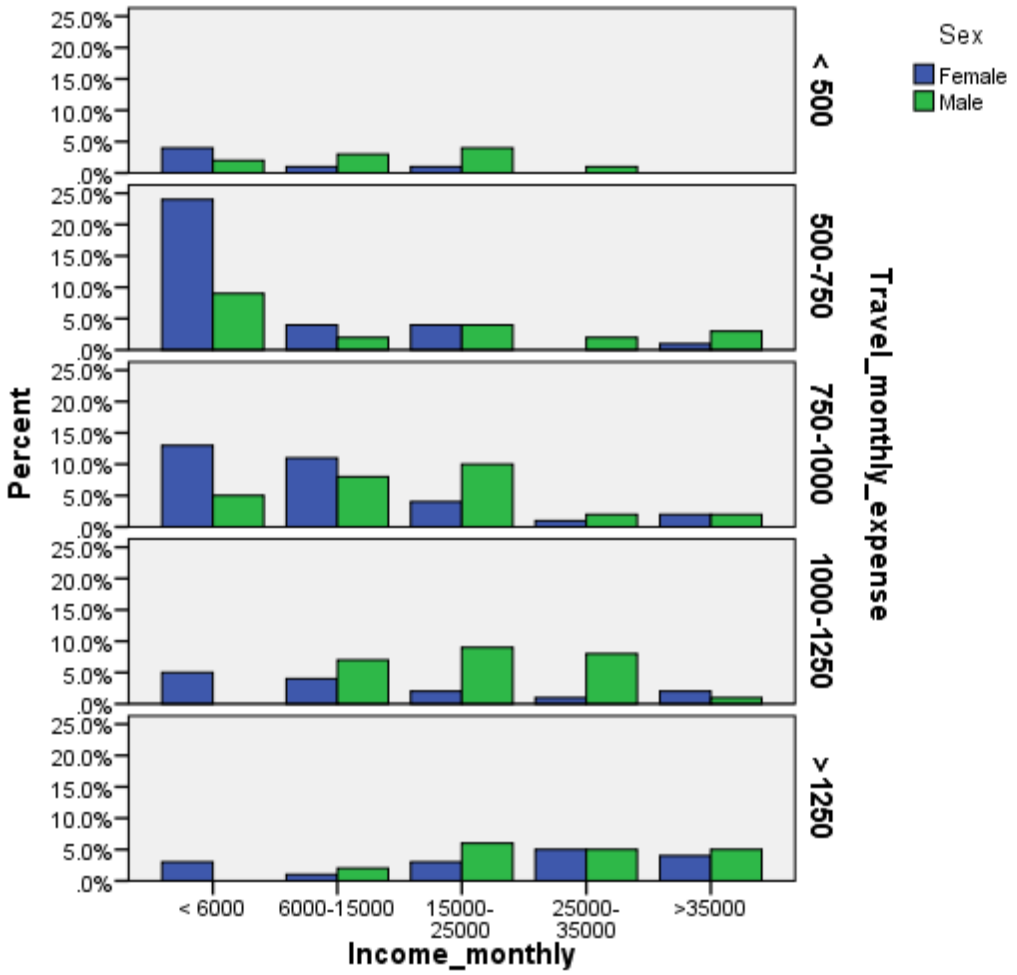


Figure 5.3 shows the cross-tabulation analysis of monthly income of the respondents with the distance travelled on public transport. The individuals with higher disposable income prefer other modes of travel over buses. Men, who belong to the income bracket of INR 15000 – INR 25000, travel longer distances compared to women from the same income bracket, whereas women under the income category of below INR 6000 per month travel shorter distance, but the proportion of them travelling is high.

5.1.3 Gender nature of monthly travel expense

The literature in this regard suggests that women often incur less expense on travelling when compared to men (Sanchez and Gonzalez, 2016). In this study, the travel expense on access, egress and the expenses incurred on public transport are considered to make the analysis. In Pune, the monthly pass costs INR 1400 for regular travelers, INR 750 for students and senior citizens (as of March, 2018)

Figure 5.4 - Cross tabulation analysis – Gender, Monthly income and travel expense



The monthly expenditure incurred on travel is proportional to the distance travelled by the users as shown in Figure 5.4. Since 37 per cent of the women from lower income households travel shorter distance, a similar proportion (39 %) paid lower share for commuting. The average cost per trip incurred for such travel is approximately INR 10 per trip. The same relation holds good for individuals from higher income group. The individuals, who fall under the income bracket INR 25000 – INR 35000 and INR 35000 and above, incur an expense of INR 37.5 per trip in a day including the expenditure made on access and egress. Men in the high income group spend higher share on commuting in a month as compared to women.

Table 5.1. Cross tabulation analysis of Gender and monthly travel expense

% within Sex

		Sex		Total
		Female	Male	
Travel_monthly_expense	< 500	6.0%	10.0%	8.0%
	500-750	33.0%	20.0%	26.5%
	750-1000	31.0%	27.0%	29.0%
	1000-1250	14.0%	25.0%	19.5%
	>1250	16.0%	18.0%	17.0%
Total		100.0%	100.0%	100.0%

Table 5.1 shows the percentage share of men and women who spend different amounts to travel on public transport. In Pune, the primary survey conducted shows that majority of women (64 %) spend between INR 500 – INR 1000 per month, whereas the 52 per cent of the men spend anywhere between INR 750- INR 1250 per month. The proportion of the sample population spending more than INR 1250 per month is higher for men.

5.1.4 Gendered nature of access and egress to bus stops and transit

Last mile connectivity is one of the deciding criteria for the use of public transport. The access and egress also determine the way in which the individuals negotiate public transport. The Census travel to work data for Pune suggests that the percentage share of women who walk to work in the city is higher for women as compared to men. The primary survey conducted as a part of the study captured the modes of transport used by men and women to access the bus stops. The results from the primary survey suggests that 70 per cent of the women across all the income groups walk to the bus stops or the transit points while 10 per cent and 11 per cent of them use shared autos and two wheelers respectively to access the bus stops. An average of 25 per cent of the women from the higher income group use two wheelers as a mode of transport to access the bus stops. Whereas, men rely more on private autos (17 per cent) to access bus stops; and 60 per cent of them walk to the bus stops or transit points. The usage of two wheelers is observed higher amongst women to access bus stops when compared to men.

With respect to egress, it was observed that walking and private autos are the two modes of transport which is used by both men and women to reach the destination from the bus stops or the transit points. Women in the lower income group walk to and from the bus stops more

than the men in the same income group. 96 per cent of the women across all the income groups were found to be walking to their destination from the bus stops; while the remaining opted for private autos.

Figure 5.5 - Cross tabulation analysis – Gender, Monthly income and modes of transport for access and egress

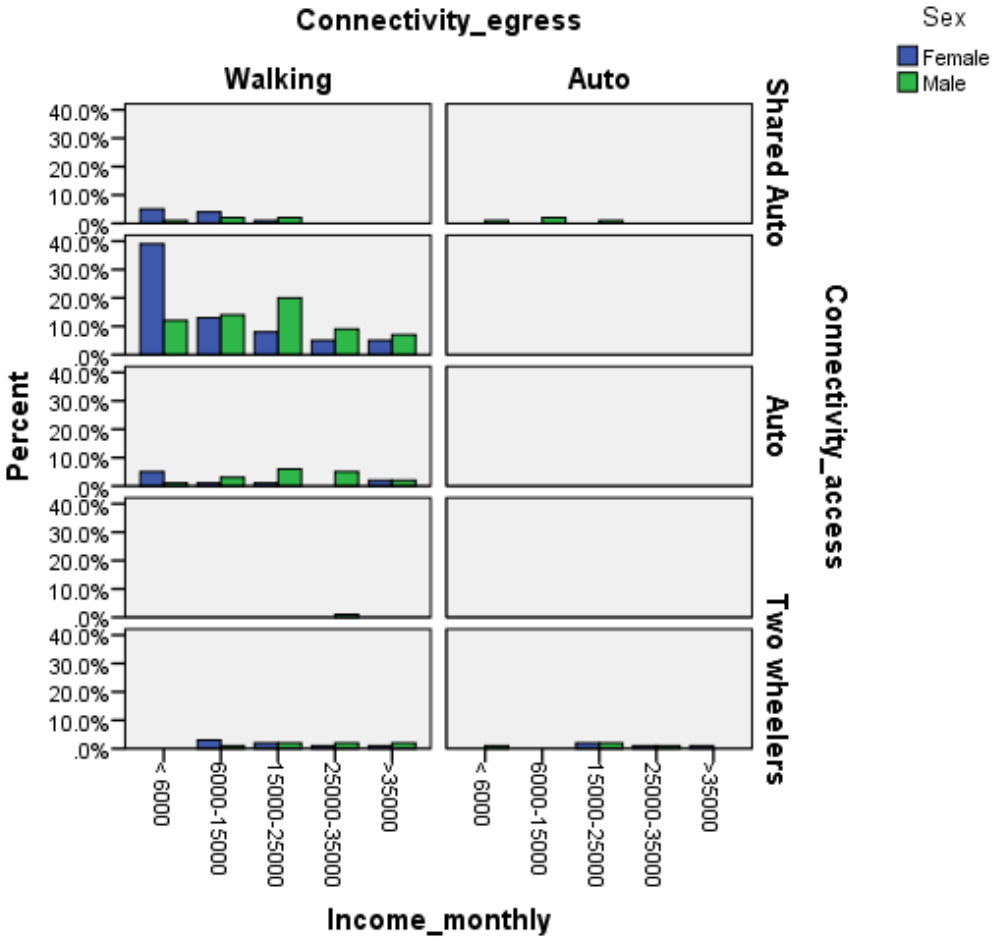


Figure 5.5 represents the cross tabulation analysis from the monthly income, connectivity options – first and last mile and gender.

5.1.5 Gender and trip changing behaviour

The available literature of trip changing (Taylor and Mauch) suggests that women tend to make more stops on their daily trips to run household errands or to attend to children and the old aged. This behaviour, although can be observed in men's daily travels, it is however more prominent among women. The primary survey conducted obtained responses on the frequency of trip changing and the reasons for such trip changing. 69 per cent of the men surveyed for the

study said that they do not experience any kind of trip changing during their daily commute on the buses. The number however is low for women. Out of the 100 women surveyed for this study, 57 per cent said that they experience no trip changing in their daily commute, while 32 per cent said that they experience trip changing once a week or lesser. Among the men, the trip changing behaviour was observed in a few professions wherein trip changing was induced by their kind of work. (E.g.: Cooks who were surveyed as a part of the study said that they make a stop during their trip to buy groceries and vegetables).

Table 5.2 *Cross tabulation analysis of Gender and Reasons for trip changing*

% within Sex

		Sex		Total
		Female	Male	
Reasons_for_TC	NA	57.0%	69.0%	63.0%
	Household (Pay bills, groceries, etc)	27.0%	21.0%	24.0%
	Drop or pick up kid (s) from school	11.0%	6.0%	8.5%
	Others	5.0%	4.0%	4.5%
Total		100.0%	100.0%	100.0%

Table 5.2 explains the reasons for trip changing behaviour across the two genders. While understanding this trip changing behaviour it is inevitable to also understand the reasons for the behaviour. Among the women who do experience trip changing, 27 per cent of them make a stop on their daily commute to run household errands such as paying the bills or buying groceries, while, 11 per cent of them travel with their children to school to drop them and pick them up. For men, 21 per cent of the trip changing is to run household errands, 6 per cent for dropping picking up their children from school and 4.4 per cent for other reasons.

Figure 5.6 - Cross tabulation analysis – Gender, Trip changing and reasons

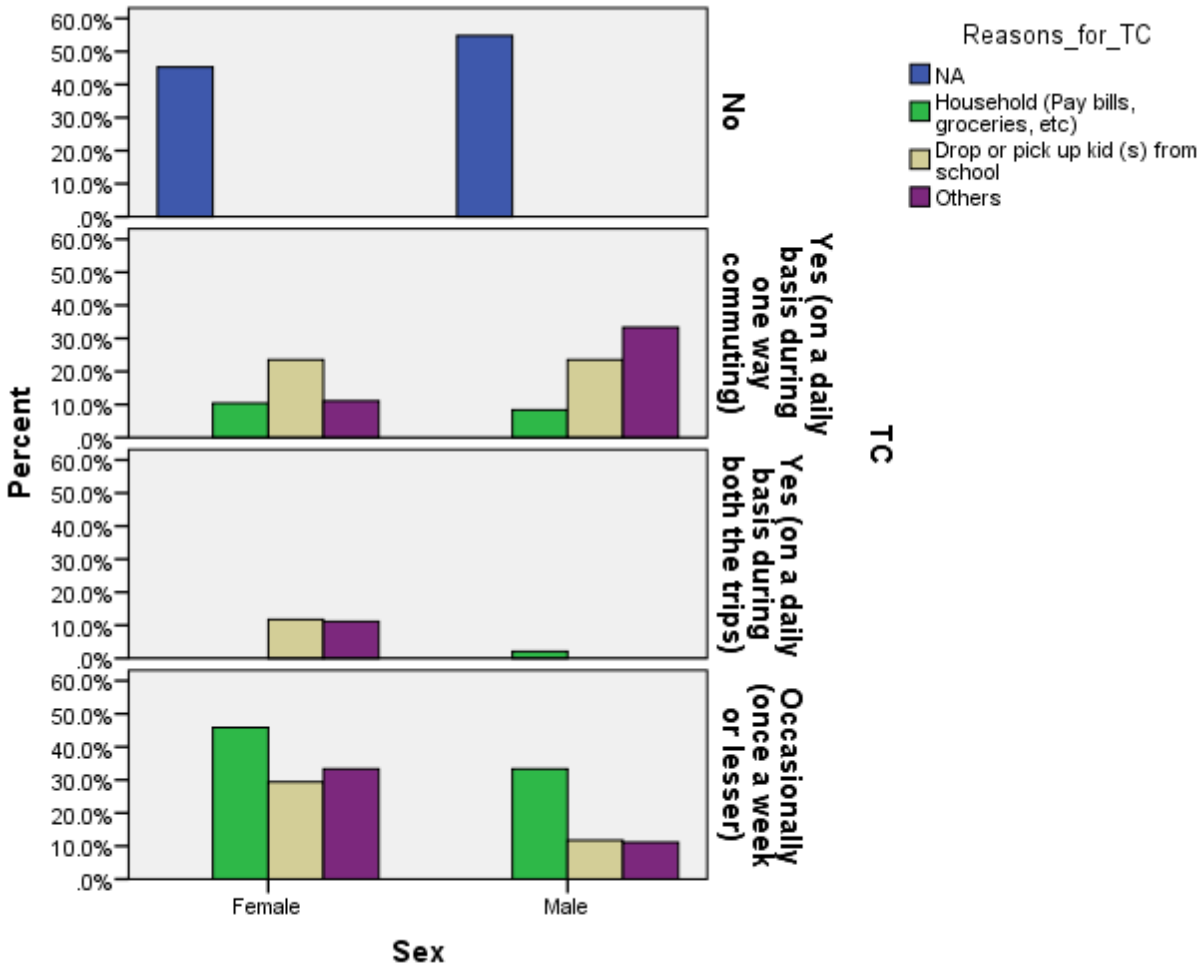


Figure 5.6 explains the trip changing behaviour of men and women by outlining the reasons for such behaviour and the frequency with which it takes place. The pattern of trip changing behaviour is more prominent among women in Pune. While men do experience trip changing behaviour on a day to day basis, the reasons for trip changing is different from that of women. Of the respondents who experience trip changing on an occasional basis, 45 per cent of the women make a stop to buy groceries or run a household errand, however, this number is much lower for men.

5.1.6 Gender and Travel time on Public transport

The usage of modes of transport among men and women also depend on the time during the day in which they prefer to travel. Often infrastructure constraints like low lighting at bus stops and on buses, infrequent buses after the evening peak hours limit the travel of women. In the survey conducted, the travel time in the day was categorized under 5 time slots – Morning Peak hours (6:30 am – 11:00 am), Mid afternoon off peak hours (11:00 am – 4:00 pm), Evening peak hours (4:00 pm – 7:30 pm), Evening off peak hours (7:30 pm – 10:00 pm) and Night hours (10:00 pm onwards). The categorization of time slots were done based on a similar study in Bhopal by WRI and also with consultation of PMPML officials regarding the peak hours on buses. The breakdown of the frequency of travel across all the time slots is detailed out in Table 5.3 below.

a) Morning peak hour: During the morning peak hours, 56 per cent of the female respondents said that they travel regularly while 52 per cent of the male respondents travel in this time slot on a regular basis.
b) Mid afternoon off peak hours – In this time slot, the regular travelers among men and women are low; 66 per cent female and 56 per cent of male respondents travel on a once in a while basis in this time slot.
c) Evening peak hour – As the categorization suggests, this time slot is considered to be the busiest even by the PMPML workers. However, from the survey conducted, the number of regular commuters and the ones who commute on an infrequent basis in this time slot is not variedly different. 26 per cent of the women travel back from their workplace during this time slot, as against 11 per cent of men.
d) Evening off peak hour – In the evening off peak hour, 35 per cent of the women and 31 per cent of the men travel regularly, while 21 per cent of women and 16 per cent of the men respondents said that they never travel in this time slot.
e) Night hour – Among the women surveyed for the study, 77 per cent of them responded that they have never travelled on public transport buses post 10:00 pm. This number is relatively low for men (31 %), as 69 per cent of them responded that they travel on buses regularly or once in a while during this time slot.

Table 5.3 - Cross tabulation analysis of Gender and travel frequency across time slots

	Female					Male				
	Morning Peak	Mid afternoon off peak	Evening peak	Evening off peak	Night	Morning Peak	Mid afternoon off peak	Evening peak	Evening off peak	Night
Regularly	56%	16%	26%	35%	5%	52%	20%	11%	31%	29%
Once in a while	27%	66%	53%	44%	18%	34%	56%	58%	53%	40%
Never	17%	18%	21%	21%	77%	14%	24%	31%	16%	31%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

5.1.7 Gender and Perception of Safety

This study obtained responses from the individuals on their perception of safety while accessing the bus stops, at the bus stop while waiting and while on transit. The perception of safety impacts the way men and women negotiate public transport. In the survey conducted, majority of women (71%) and men (91%) were of the opinion that they felt safe while accessing the bus stops. Since the access and egress involve participation from the private vehicles and intermediate public transport service providers. Whereas 9 per cent of the women felt that at night they feel unsafe while accessing the bus stops. Among the women who travel during the evening off peak hours, 24 per cent of them felt that the journey made to reach the bus stops are unsafe. This number is relatively low for men (9 %).

While at the bus stop, merely 11 per cent of the women perceive their surrounding to be safe, whereas 44 per cent and 45 per cent felt somewhat safe and unsafe respectively while waiting at the bus stop. Amongst men, 81 per cent of them felt safe while waiting at the bus stop. Among the women who travel in the evening off peak hour and at night, 45 per cent of them felt unsafe while waiting at the bus stop; 19 per cent of the men travelling during these hours felt unsafe waiting at the bus stop.

The perception of safety level is different for men and women when on transit as well. 50 per cent of women and 28 per cent of men were of the opinion that they felt unsafe on buses. In Pune there are no separate entrances for men and women, which often create congestion at the entry and exit of the buses. 50 per cent of the women who travel at evening off peak and at night time responded that they feel unsafe while being on transit as well.

5.1.8 Gender and priorities at the bus stops

The literature on the gendered nature of transport suggests that men and women have different priorities while travelling (Peters, 2002). In this study, the respondents were asked to state according to their experience, which of the amenities are of high priority, medium priority or low priority. The amenities listed were – shelter at the bus stops, benches and chairs at the bus stop, public toilets located closer to the bus stop and display of the routes and the frequency of the buses at each bus stop.

Table 5.4 – Table 5.7 represents the results from the cross tabulation analysis regarding the different priorities for men and women at the bus stops. In the survey conducted, 50 per cent of the female respondents consider all the amenities to be of high priority. 65 per cent of the women and 36 per cent of the men have responded to public toilets as one of their high priority needs at the bus stops. Overall, for women, the priorities at the bus stops follow the order - chair and benches, shelter, toilet and display board. And for men the priorities are in the following order – shelter, chairs and benches, display board and toilet.

Table 5.4 - Cross tabulation analysis of Gender and Shelter at bus stops

% within Sex

		Sex		Total
		Female	Male	
Shelter_busstop	High Priority	71.0%	53.0%	62.0%
	Medium Priority	18.0%	21.0%	19.5%
	Low Priority	11.0%	26.0%	18.5%
	Total	100.0%	100.0%	100.0%

Table 5.5 - Cross tabulation analysis of Gender and Chairs/Benches at bus stops

% within Sex

		Sex		Total
		Female	Male	
Chairs_benches	High Priority	74.0%	44.0%	59.0%
	Medium Priority	13.0%	34.0%	23.5%
	Low Priority	13.0%	22.0%	17.5%
	Total	100.0%	100.0%	100.0%

Table 5.6 Cross tabulation analysis of Gender and Provision of public toilets
% within Sex

		Sex		Total
		Female	Male	
Toilets	High Priority	65.0%	36.0%	50.5%
	Medium Priority	20.0%	33.0%	26.5%
	Low Priority	15.0%	31.0%	23.0%
	Total	100.0%	100.0%	100.0%

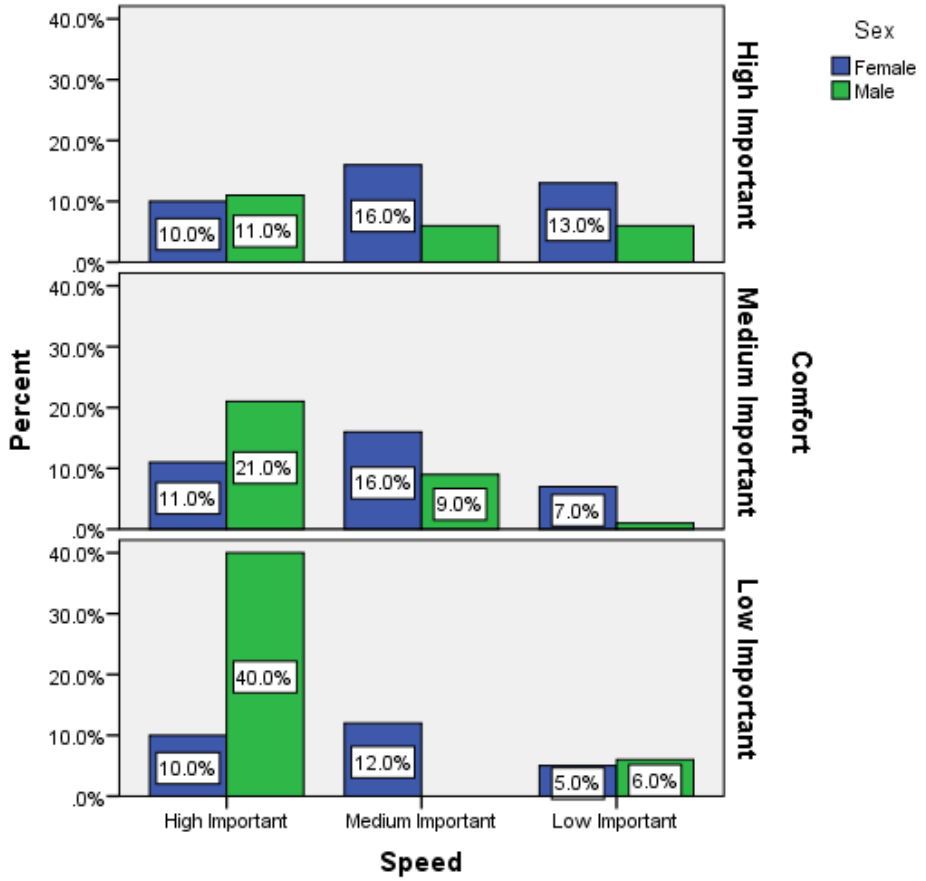
Table 5.7 - Cross tabulation analysis of Gender and display and information board at bus stops
% within Sex

		Sex		Total
		Female	Male	
Display	High Priority	50.0%	38.0%	44.0%
	Medium Priority	34.0%	37.0%	35.5%
	Low Priority	16.0%	25.0%	20.5%
	Total	100.0%	100.0%	100.0%

5.1.9 Gender and priorities while travelling

While women and men have different priorities with respect to amenities in the bus stops, they express varying priorities on travelling on buses as well. The study asked the respondents about the level of importance they attach to comfort on public transport, CCTV cameras, and courteousness of the PMPML staff on the bus, speed and order/schedule. The comfort in the study is defined as the preference of the commuters of public transport to have access to seating facility or air conditioned buses. The literature in this regard shows that often, men prefer speed over comfort; whereas for women, comfort is one of the important aspects which influence their travel behaviour (Peters, 2002). Women are more concerned by the environment around and hence invest importance in the level of safety around them.

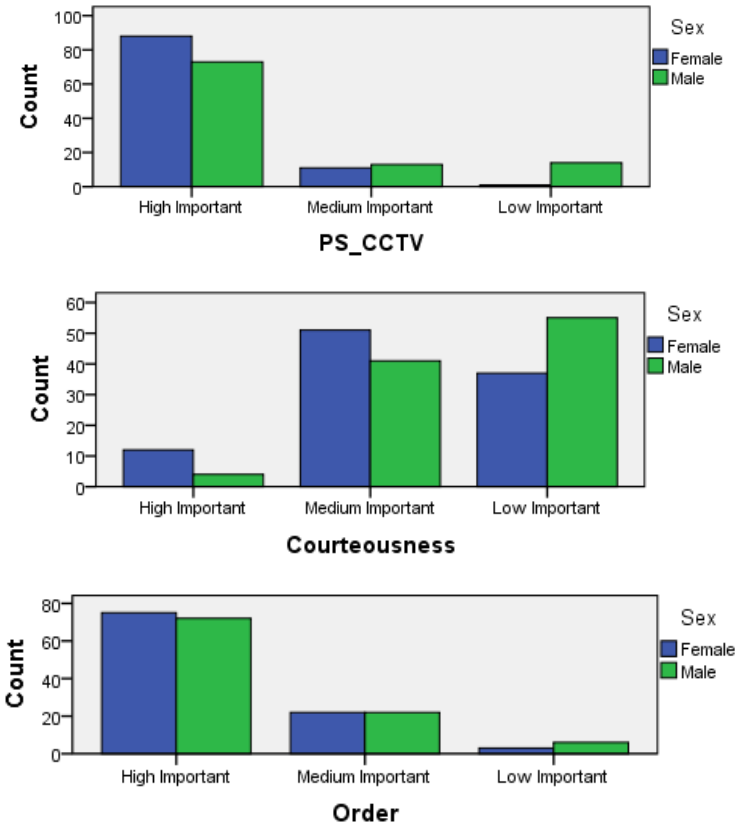
Figure 5.7 - Cross tabulation analysis of Gender and importance of speed and comfort



In Figure 5.7, the results from the cross tabulation analysis of gender and the importance associated with speed and comfort is represented. 16 per cent of the female respondents assign high importance to comfort while medium importance to speed, whereas, 40 per cent of the male respondents consider speed as high importance as with comfort being the low importance. Further, 13 per cent of the women who consider comfort to be their priority while travelling consider speed to be at the lowest level of importance. The tradeoff between comfort and speed has been extensively written in the literature of public transport and gender differences. In this study it was observed that as men travel longer distances on public transport, they tend to tradeoff comfort for speed in order to reach their destination quickly. 14 per cent of the men respondents, who travel the distance of 10-15 km on their daily one way trip, assign high importance to speed and low importance to comfort. However, 3 per cent of the women respondents traveling a distance of 15 km – 20 km placed comfort as their high importance over speed.

With regard to CCTV on buses to ensure safety, 88 per cent of the female respondents said that they assign high importance as against 73 per cent of the male respondents. Further, 92 per cent of male and female respondents assigned low importance to courteousness of the PMPML staff on bus to impact their travel pattern. And, 75 per cent of the overall respondents were of the opinion that the order and the schedule of the buses impact their daily travel pattern.

Figure 5.8 - Cross tabulation analysis of Gender and importance of CCTV, courteousness of PMPML staff and the order and schedule of bus



5.2 Analysis of women's travel experiences and priorities on buses

In the survey conducted as a part of the study, 100 women respondents were asked questions on their specific travel requirements and how these impact their travel pattern on a day to day basis. In Pune, the PMPML runs women only buses in 6 routes as of 2018 in peak hours. The women interviewed were asked if such an option would impact their daily travel pattern, and if they would travel more frequently on buses if such services are provided. 90 per cent of women interviewed for the survey responded that women only buses would have a high impact on their everyday travel pattern. Table 5.8 below shows the cross tabulation analysis of reserved seats for women on buses and the impact it has on the travel pattern of women.

Table 5.8 - Cross tabulation analysis of Gender and Reserved Seats for women on buses

% within Sex

		Reserved_seats				Total
		No Impact	High Impact	Medium Impact	Low Impact	
Sex	Female	1.0%	54.0%	36.0%	9.0%	100.0%

In Pune, the left side of the bus is reserved for women, however, men occupy these seats and there is no strict enforcement by the PMPML staff against such violation. 54 per cent of the women who were interviewed said that the reservation of seat will have a high impact on their daily travel pattern. However, 45 per cent of the women were of the opinion that separating seats for women and men will have medium impact or low impact on their travel. Similar studies conducted in Malaysia suggested that women's safety on public transport cannot be assured completely by segregating men and women.

Table 5.9 - Cross tabulation analysis of Gender and Separate bus entrance for women on buses

% within Sex

		Bus_entrance				Total
		No Impact	High Impact	Medium Impact	Low Impact	
Sex	5.0%	61.0%	22.0%	12.0%	100.0%	

Table 5.9 shows the cross tabulation analysis of separate entrance for women and the impact it has on the travel pattern of women. Further, when asked about the impact of separate entrances for men and women on buses, 61 per cent of the women stated that this will further enhance their travel experience. Whereas, 44 per cent of the women opined that this will have medium or no impact on their travel pattern.

In terms of infrastructure facilities – lighting, CCTV on buses and safety alarms on buses, majority of the women (84 %) said that presence of these on the buses will have a high impact on their current travel pattern and would enhance their travel experience. Although the existing PMPML buses have lighting on the bus, women, who travel in evening off peak hours assign high importance to lighting and said that better lighting at the bus stops and on the bus

impacts their travel positively. 36 per cent of the women who travel in off peak hours once in a while mentioned that lighting has a high impact on their travel pattern.

Figure 5.9 - Cross tabulation analysis of frequency of night time travel and lighting

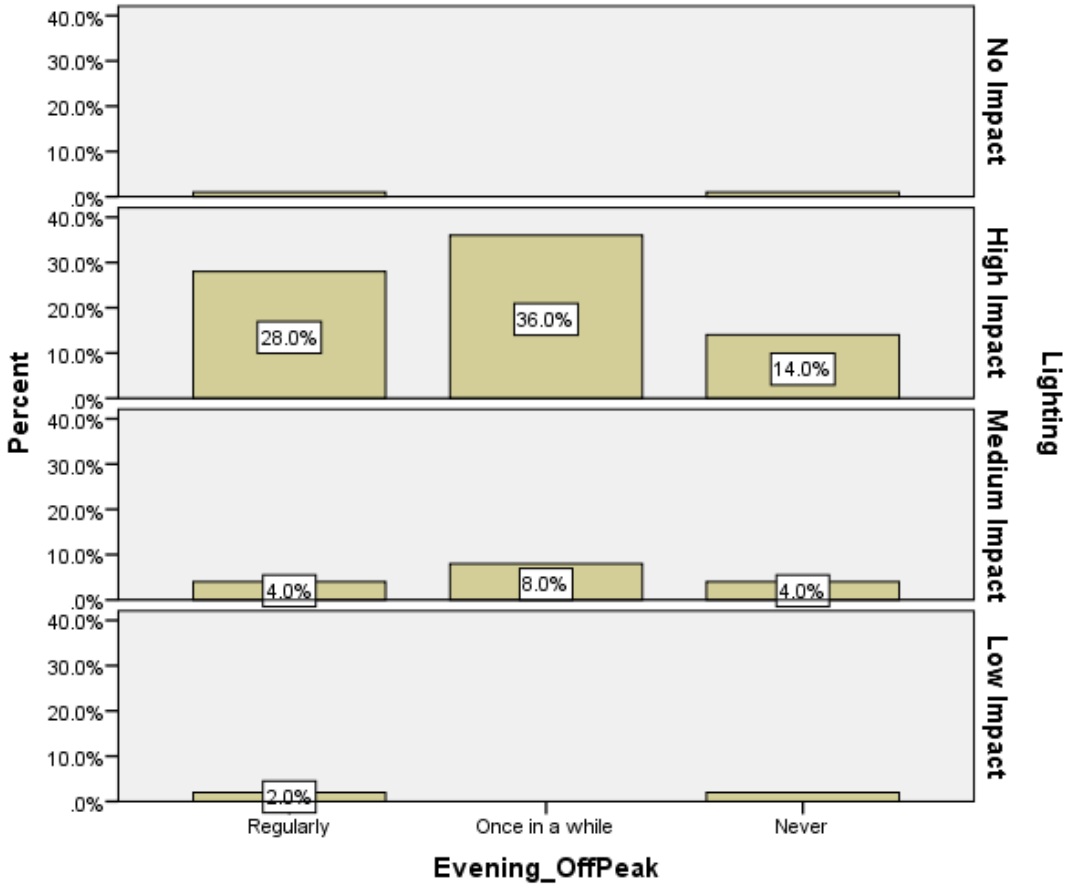


Figure 5.9 shows the cross tabulation of frequency of night time users of PMPML and the impact lighting would have on their travel. The amenities such as the provision of women only buses, reserved seats for women, lighting at the bus stops and on the bus stops, CCTV and safety alarms on buses impact the travel pattern of the women who are the regular commuters on the PMPML. Further, this pattern of the demand in the amenities could be observed among the women who travel across the different time slots discussed earlier.

Figure 5.10 Cross tabulation analysis regular women commuters and amenities impacting *travel*

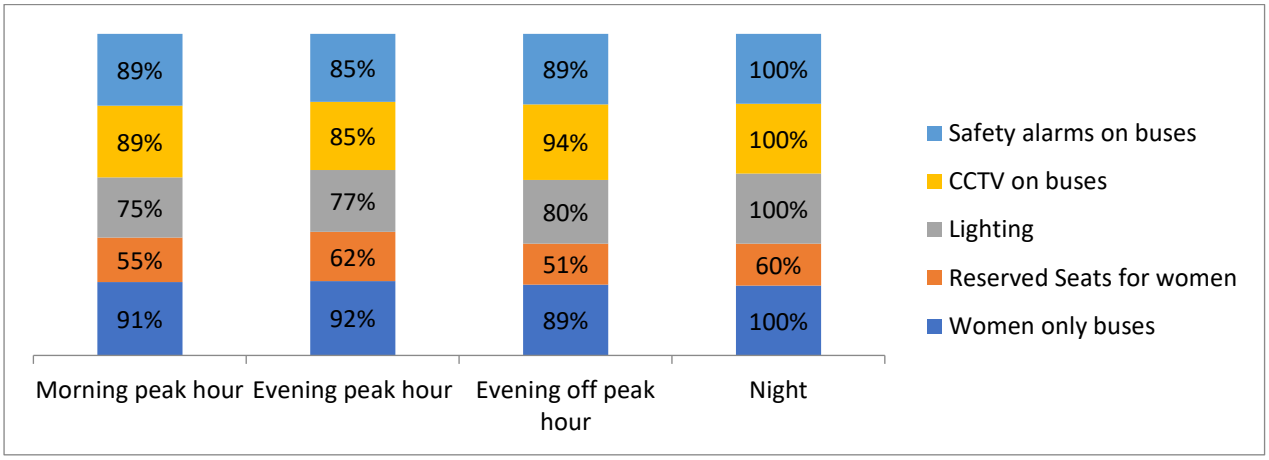


Figure 5.10 shows the impact the amenities such as safety alarms, CCTV on buses, lighting, reserved seats for women and women only buses would have on the travel pattern of women. Of the 56 women who travel regularly in the morning hours, an average of 83 per cent of women responded that with the provision of the amenities listed above the positive impact on their daily travel is high. Similarly, the provision of lighting, CCTV on buses and Safety alarms of buses are likely to highly impact the regular commuter on buses across the different time slots. However, the impact of reserved seats for women is observed only in the peak hour and at night travel. This shows that women tend to assign more value to their safety during the times when the buses are crowded as against the off peak hour travels.

5.3 Summary

The analysis of the primary survey conducted as a part of the study shows visible differences between the travel of men and women on public transport. Although there are no official statistics available with PMPML on the gender breakdown of the daily trips made, an estimation by the depot managers and the drivers and conductor suggest that the ratio of men to women on public transport on major routes are 2:3. The differences in the travel pattern across the genders can be observed in the travel time, duration and distance travelled, and the purpose of travel. The study showed that men in Pune who were surveyed on the 10 different routes make more work trips compared to women. The proportion of women who are homemakers make more trips for the purpose of shopping and religious purposes. The difference in travel pattern was also observed between men and women who are married. Further, differences in travel pattern were evident among the married men and women, who do

travel with dependents. A study conducted in San Francisco (Taylor, Mauch) suggests that women travel more with dependents – old age and kids more than what men do. Out of the 53 per cent of the female respondents who are married with children, 18.9 per cent of them travel with a dependent child/children, whereas of the 55 per cent male respondents who are married and have children, 3.6 per cent of them travel with a dependent child/children. Such minute differences observed in travel patterns affect the overall travel pattern of the genders. Through the analysis it was observed that the priority for men and women in each of the amenities covered as a part of the survey is different and this has been in agreement with majority of the respondents. These differences on public transport make the service and the facility more skewed towards men. Although the PMPML offers women only buses in certain routes, the authorities do not consider these to be viable option to run these services on all the routes.

The differences observed in the travel patterns needs to be addressed through a focused policy initiative which encompasses the specific gender issue in travel to the overall gender parity in the society. In this study it was observed that in Pune women walk more than men, and experience trip changing more than men in their daily travel pattern. While it is established that men and women travel differently on PMPML buses, it is crucial to fill the loopholes with focused policy changes and support the same with infrastructural enhancement. The next chapter of the study deals with policy recommendation in this regard.

6. CONCLUSIONS AND RECOMMENDATIONS

The final chapter of this paper outlines the main findings of the research and then seeks to provide policy recommendations in the aspect of how gendered nature of transport can be addressed. These are drawn from the discussions undertaken in the earlier chapters and also on interviews conducted with practitioners, PMPML staff and the respondents of the survey.

6.1 Conclusions

The current research shows that the main gender differences on public transport in Pune are:

1) The gender differentiated roles in the labour market influences the pattern of travel of men and women. The demand for use of public transport is a derived demand, which implies that the purpose of travel such as travel for work, educational and recreational purposes induces the need for travel. In the study, from the sample collected, it was found that the percentage share of women who make work trips is less compared to that of men. Women who are homemakers make trips on public transport for the purpose of shopping, visit to hospitals and for religious activities.

2) Within the age group, difference in the purpose of travel for men and women was observed in the study. While men who belong to the age group of 55 and above use public transport to travel to work, women in this age group use it for the other purposes such as shopping and religious activities.

3) The gender differences on the travel pattern on public transport can be observed within the income group and between the income groups. Women who belong to the lower income groups travel shorter distance to work as compared to women who fall under the higher income category. Further, men who belong to the lower income groups make longer trips on public transport.

4) The monthly expenditure on travel is proportional to the distance travelled and the purpose for which the trips are being made. Women in Pune who use public transport incur less expenditure per month because they rely on walking as the first and last mile connectivity. Further, in the sample, since the proportion of working women is less, the

trips made by women who are not employed or homemakers are shorter and they incur lesser expenditure on such trips.

5) Women in Pune rely on walking as their first and last mile connectivity. Their reliance on intermediate public transport is low when compared to men. Pune being the city with highest number of two wheeler riders, women use this as one of the modes of transport to access bus stops. The prominence of shared auto services in few of the areas covered as a part of the study replace private autos as the first and last mile connectivity at a lower cost. In order to avoid multiple stops to change buses and also to mainly save time, in the study it was found that men depend on intermediate public transport such as private autos or cabs to reach the closest transit points from where they can get a direct bus. Such transit points identified in Pune for the study are, Swargate, ManPa and Pune Railway Station.

6) The trip changing behaviour in Pune is observed more among the women users of Public transport. Among the women, married women with children experience trip changing on a frequent basis as compared to men who are married. Further, women who are homemakers make exclusive trips on public transport to pick up and drop off kids at school while also running household errand in the same trip. Women in Pune make shorter trips but experience trip changing higher than men in their trip.

7) With regard to the time during the day in which women and men travel, the study's findings establishes that majority of women who travel to work in the peak morning hours are the regular commuters of PMPML. The homemakers often travel in the off peak hours since they do not have a fixed travel hour. Women assign high importance to the their personal safety, and hence their decision to travel in the time slots during the day is guided by the level of personal safety. This pattern is not prominently observed in men. Women often derive the level of safety from the surrounding through physical and social infrastructure. During the survey women preferred not to travel post peak hours because of the lack of infrastructure to access the bus stops or the transit points. Therefore the reliance of women on the intermediate public transport is high during the night hours.

8) There is an inherent relationship between the perception of safety and the decision to travel on public transport. Women in Pune feel unsafe most of the times while using buses. This is guided by the infrastructural defaults at the bus stops and on the buses while making a trip. These, seem to affect women's travel pattern more than men. The women who belong to lower income group and rely on public transport have no choice but to continue travelling on the buses despite feeling unsafe about their travel since they cannot afford the other means of traveling.

9) The differences in the priorities of men and women who use public transport are very well established from the study. There is a clear dearth of infrastructure at the bus stops and at major transit point in Pune. During the survey, it was observed that, the transit points such as Pune Railway Station, Swargate, ManPa, Shivajinagar, which have a high number of commuters passing by every day, has limited shelter and places of waiting. While this is the condition at major transit points, the conditions at individual bus stops are the same or worse. Although there are public toilets located at the proximity of a few bus stops and at transit points where the survey was conducted, the poor maintenance of these toilets make it non usable. The Katraj and the Pune Railway Station transit points in which survey was conducted in the off peak hours and at night, it was observed that the toilets which are located at the proximity do not have any lighting or water supply. The women respondents in the survey were of the opinion that, although they assign high priority to the presence of toilet facility at the bus stops, they end up not using it because of the poor maintenance.

10) The priorities of men and women who use public transport vary with respect to amenities while traveling as well. From the survey it appears that men assign high importance to speed over comfort in their daily travel and this is more or less consistent irrespective of the distances they travel. Further, it was observed during the survey that women prefer to travel more at ease when they are travelling longer distances and often wait for a relatively empty bus. This pattern is very specific to women.

11) The presence of surveillance, either as CCTV or safety alarms is expected to reduce the fear of threat or harassment and instill a feeling of safety among the travelers. The findings from the study show that women assign higher importance to these informal techniques of surveillance. There is awareness among the women users regarding the

reservation of seats for women, but they often do not resist if such seats are occupied by men. This was specifically observed in the off peak hour travelling.

The survey conducted as a part of this study intended to observe the gendered patterns of public transport in Pune. There are visible differences in the travel patterns of men and women which are derived through various interplaying factors. The findings from the study shows that although public transport is promoted as a low cost transport option for the cities, women who belong to the lower income group continue to make walking trips than men. A parallel survey conducted in the Wadarwadi slum area in Pune showed that women who are working as domestic helps or cooks often take up employment in the vicinity of their households since they cannot afford to spend on travelling farther using public transport. Therefore, the average distance travelled by them for work is about 2 kms per day.

However, women who do use public transport for the purpose of work, education or recreation, have different set of experiences compared to men. The data collected from the study helped in highlighting the origin of these differences in Pune. The analysis from the data reveals that women spend lesser proportion of their monthly income on travelling than men and often rely on walking as the first and last mile connectivity. Women are more concerned about the safety aspect while choosing the mode of transport for the purpose of travel and travel during the time slots of the day which instills the perception of safety among them. The findings are in line with the literature reviewed in the earlier sections and also fulfill the alternative hypothesis of this study. Women engage in shorter distance travel and travel to work lesser than men on public transport and have high share in travel for the purpose of recreation. These differences have not been studied in Pune for public transport till date. This understanding of the differences between the travel patterns in the city has now helped to observe the planning and operations of the PMPML buses in the city which may have ignored the gender aspect in catering public transport services. Including differences in travel pattern between men and women on public transport would help to cater to the needs of all the users of the service. During the interaction with the women who were surveyed, significant number of commuters pointed out that the buses do not usually wait for women and elderly to board and alight from the bus. This issue was not only reported in a few bus stops but also in the transit points where there are several bus stops and it gets difficult to keep track of the buses passing by. During the survey it was also observed that at a few bus stops, the buses do not stop at designated points and do not wait long for women to board and exit. And, since the boarding and de-boarding of

men and women happen through the same door, there is crowding at the time of boarding and alighting, often when women feel unsafe in this leg of the journey.

Further, the data has also helped to comment on the priorities stated by the two genders with respect to their travel. The priorities for men are driven by minimum time which would be needed for the purpose of travel on public transport, whereas for women, the perception of safety is the high priority which drives their travel pattern. The survey along with the interviews with the stakeholders has helped to identify the issues which specifically faced by women while taking public transport to reach places. The data which collected information on the perception of safety and priorities at each leg of the journey has been able to identify distinct differences in the way men and women negotiate the service. Although, PMPML believes that it has tried to incorporate gender aspects in terms of route rationalizations and also offering women specific buses, the findings from the field does provide an unanimous agreement to this.

The findings from the study suggest that the reserved seats for women on the bus is not adequate and that women should be given their own space in terms of separate buses for women alone in all major routes. Dr. Kalpana Vishwanath[2], who was interviewed as a part of this study suggested that "the reserved seats and separate buses are only a temporary solution but does not guarantee safety for women travelers in the long run. The focus should be laid on ensuring more regular and accessible services rather than provision of such special services." There are a whole range of issues which contribute to women feeling unsafe and restricting their mobility in the city. Hence, to address the issue, a holistic approach needs to be undertaken. The next section of this chapter recommends a few solutions which could be adopted in order to address the gender differences on public transport in Pune.

6.2 Recommendations

From the primary survey conducted as a part of the study and the interaction with the relevant stakeholders, the recommendations are follows:

1. The bus stops in Pune, including the major transit points need to be re-designed with adequate lighting and passenger information system (PIS) to help commuters during their travel time. Further, the study also recommends that the agencies - PMC and PMPML are coordinated while designing bus stops and also assign designated places for bus stops and maintain the same design across the city

[2] Co-founder and CEO of Safetipin

2. During the study it was observed that there is little or no co-ordination between the agencies which are involved in the operations of the public transport and the infrastructure needed for the efficient functioning. Such agencies identified are - PMPML, PMC, Police and Women and Child Development Department. These agencies need to be well coordinated to be able to respond during the time of emergency. Further, the staff needs to be given a gender sensitivity training to be able to address the issues faced by women in transport.
3. Further, from the primary survey conducted, it was noted that there is a need in the major transit points to have lounges with the facilities of public toilet, feeding rooms and resting area. This is needed to cater to the demands of who make stops at the transit points to board a specific destination bus.

Transport can facilitate mobility and access, and thereby enhance the livelihood of the poor. Public transport needs to be considered as a common property resource, and hence needs to be inclusive. Through this study it has been established that there are visible gender patterns observed on the trips of public transport which are caused due to the infrastructural defaults or the women's perception of safety. Therefore, while planning the transport service in the city, these differences need to be considered.

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APPENDIX I – QUESTIONNAIRE

Assessment of Gender Patterns in Public Transport: A Case Study of Pune City

This survey is a part of the data collection for the study to assess the gender patterns in public transport.

Kindly fill in the details as required and choose the most accurate answer from the options listed.

1. Sex
2. Age

3. Marital status
   (a)Married (with child/ children)
   (b)Not married
   (c)Married (without child/children)
   (d)Others

4. Profession
   (a) Government / Public servant
   (b) Private sector
   (c) Not for Profit sector
   (d) Homemaker
   (e) Self-employed
   (f) Student
   (g) Not employed

5. What is your household monthly income?

6. What is your monthly travel expense?

7. Are you a regular commuter on PMPML buses? (Pune Mahanagar Parivahan Mahamandal Ltd)
(a) Yes (Use it on a daily basis)
(b) Occasionally (Use it once a week)
(c) Use it once in a month
(d) No

8. What is the duration of your daily commute for one trip?
(a)Less than half an hour
(b)30 minutes - 60 minutes
(c)60 minutes - 90 minutes
(d)Greater than 90 minutes

9. What is the average distance traveled on the daily commute?
(a) < 5 km
(b) 5 km - 10 km
(c)10 km - 15 k

(d)15 km - 20 km
(e) > 20 km

10. What is the purpose of your daily commute?
(a) Work
(b) School/College
(c) Others (Please Specify)

11. What are the connectivity options to bus stops available to you?
(a)Walking / Cycling
(b)Auto
(c)Cars
(d)Private cabs
(e) Two wheelers
(f) Others (Please specify)

12. What are the connectivity options from bus stops available to you?
(a)Walking / Cycling
(b)Auto
(c)Cars
(d)Private cabs
(e) Two wheelers
(f) Others (Please specify)

13. How do you usually commute on buses? *
(a) Alone
(b) With a dependent - kids
(c) With a dependent - senior citizens
(d) Others (friends, spouse)

14. Do you experience trip-changing in your daily commute? (Trip changing: A trip involving
multiple stops to complete household works) *
(a)Yes (on a daily basis during one way commuting)
(b)Yes (on a daily basis during both the trips)
(c) Occasionally (once a week or lesser)
(d) No

15. If your trip changing involves completing errands please specify the nature of errands. *
(a) Household (Pay bills, groceries, etc)
(b) Drop or pick up kid (s) from school
(c) Others
(d) NA

16. How many stops do you usually make before reaching your final destination in a trip?
(a) None
(b)1 stop to change the mode of transport only (specify which mode)

(c)2 or more stops to change the mode of transport only (specify which mode)
(d)1 stop to complete household work
(e) 2 stops to complete household work
(f) More than 2 stops to complete household work

17. Please report your frequency of travel in each of these time slots

	Regularly	Once in a while	Never
6:30 - 11:00 am			
11:00 am - 4:00 pm			
4:00 pm - 7:30 pm			
7: 30 pm - 10:00 pm			
10:00 pm onwards			

18. Please state the personal safety level at each of the following steps of a journey according to
you

	Safe	Somewhat Safe	Unsafe
Journey to and from the bus stop			
Boarding and alighting the bus			
Waiting at the stop			
On the bus			

19. Please rank the following in order of your priority

	High Priority	Medium Priority	Low Priority
Shelter at the bus stop			
Benches or chairs at the stops			
Public toilets closer to the stops			
Display of arrival time of the buses at bus stops			

20. Please rank the following in order of your importance during your commute

	High Important	Medium Important	Low Important
Personal safety (CCTV/safety alarms on buses)			
Comfort and hygiene (Air conditioned buses)			

Courteous treatment by transport staff			
Speed (getting to the destination faster)			
Order (schedules, routes, stops)			

21. For women only - Please rate the following by their impact on your travel on public transport.

	High Impact	Medium Impact	Low Impact	No Impact
Women only buses				
Additional reserved seats on buses				
Better enforcement of women-only seats on buses by conductors				
Separate bus entrances for men and women				
Better lighting of bus stops				
Longer stopping times for buses during onboarding				
Safety alarms on buses				
CCTV on buses				

22 . Suggestions to make Public transport women friendly

APPENDIX II – BUS ROUTES FOR PRIMARY SURVEY

Route	No. of Men Sample	No. of Women Sample
Chaturshringi – Swargate - Chaturshringi	10	10
Chaturshringi – N.T Wadi - Chaturshringi	10	10
Chaturshringi – MaNaPa - Kothrud - Chaturshringi	10	10
Chaturshringi – Pune Station - Chaturshringi	10	10
Chaturshringi – Katraj - Chaturshringi	10	10
Chaturshringi – Balewadi – Chaturshringi	10	10
Chaturshringi – Nigadi – Pimpri	10	10
Jagtap Dairy – Bhosari – Chaturshringi	10	10
MaNaPa – Vishrantwadi – MaNaPa – Market Yard – Chaturshringi	10	10
Chaturshringi – MaNaPa – Hadapsar - Chaturshringi	10	10