

# GENDER AND INDIVIDUAL ACCESS TO URBAN OPPORTUNITIES: A STUDY IT WORKERS OF CHENNAI, INDIA

*Vidya Mahambare, Sowmya Dhanaraj<sup>1,2</sup>*

## Abstract

The low rate of female labour force participation in India is striking, and warrants an investigation on women's decision to work and the constraints they face. One of the key supply side constraints, namely the ease of travel mobility – distance, time, mode of transport and cost involved travelling to workplace – has received little attention in the context of India. The Information Technology industry in India is one of the few industries where at the entry level, the ratio of men and women employees is largely equal. Using a primary survey conducted across different locations of Chennai under which detailed information about the commuting pattern of the respondents, we document that one of the reasons for the high proportion of women in IT industry is likely to be the ease of travel to workplace, comparable to men, in the absence of household and childcare responsibilities. In other industries as well as at higher ages even in the IT industry, women are unable to enjoy similar favorable travel mobility to work.

**Keywords:** *Chennai, travel to work, distance, time, mode and cost, gender differences*

## Introduction

There are several reasons which should have led to an increase in the proportion of working women in India in recent years. The key positive factors include India's high per-capita economic growth averaging around 7% since 2000, favourable demography, rising education levels as well as higher age at marriage among women, and falling fertility rates. India however, continues to have one of the lowest female labour force participation (FLFP) rates in the world (International Labour Organization ranked India's FLFP rates at 121 out of 131 countries in 2013), with a near stagnation even in urban areas (Bhalla and Kaur, 2013; Afridi et al., 2016; Andres et al., 2017).

It is important to investigate the circumstances under which this stagnation has taken place, given that gender gaps in the labour force impede economic growth, productivity and other development indicators (Klasen and Lamanna, 2009; Cuberes and Teignier, 2014, among others). Also, the lack of financial independence as well as low exposure to the external social environment also have adverse implications for female bargaining power and in turn, for welfare of women and children (Anderson and Eswaran 2009; Afridi et al., 2012). While several studies have explored the reasons behind the low proportion of working women in India both from demand and supply side factors, the role of one of the key variables from the supply side that influences women's decision to work and the choice of the workplace namely travel mobility has not been analysed in the Indian

---

<sup>1</sup> Vidya Mahambare, Great Lakes Institute of Management - Sowmya Dhanaraj, Madras School of Economics

<sup>2</sup> Acknowledgments: We thank MSE student volunteers especially - Anirudh, and Vasudha who helped administer the primary survey. We are grateful for their support and help. We have to also thank all the respondents who participated in the survey, and took time out to respond to our questions, often in the middle of busy schedules or work and spoke candidly about their experiences, without any foreseeable benefit. I would also like to acknowledge the institutions, organizations and work places that gave us permission to administer our survey in their premises, or to their employees, for offering their support and resources and making it convenient for us to carry out our survey. Without their cooperation this exercise would have been futile

context. Travel mobility refers to the available modes of transport, time taken, distance and direction of travel, and the cost of travelling to work.

Study of how workers commute to work is especially important in case of women who have a high opportunity cost of work in terms of the major bearer of household work. In addition, women face significant trade-off while deciding whether to take up a paid job because in most societies women are in charge of raising children (Dwyer and Bruce, 1988; Blumberg, 1991). Hence, there is no surprise that one of the most important reasons inhibiting women's rise to the top positions in management is the work-life conflict that women professionals experience because of their strong commitment to familial responsibilities (Buddhapriya, 2009). With women required to take care of household responsibilities along with their paid work, better urban transport infrastructure and information aided by technological advancement as well as better modes of transport could provide a much needed fillip to enable women to take up work. It would improve convenience of travel and lead to time savings which can be used for competing tasks (Sorsa, et al., 2015).

Studies have shown that commute time to work significantly affect labour supply for women in a number of countries. For instance, Dobbs (2005) found that women with full access to private transport are more likely to have a job and also, have a better chance at a professional occupation and a higher average weekly income in north east of England. Kawabata & Abe (2018) show that for married women with children, longer commute time is significantly associated with lower labor force participation and regular employment rates in Tokyo. In comparison, commute times were found to be insignificant for married men. This means that for a family living in suburban areas where commute time is longer, it is generally the father who will travel for work whereas mother will stay at home or find some local work. Johnson et al (2017) using UK data find that a reduction in bus travel time leads to higher level of employment.

In the case of India, Census (2011) data on 'Travel to place of work' for 'other workers' i.e. the workers who are not engaged in agricultural activities or household industries show that women workers usually travel fewer distances. Also, a large share of women does not travel and instead works from home. Further, women more often use slower modes of travel to work such as public transport (buses, train etc.) compared to men. For example, according to Census (2011), in urban India 1 in 4 men (22.5%) travel to workplace either by a two-wheeler or a four-wheeler compared to 1 in 10 women (10.3%) who work. This implies a significant gender disparity in vehicle ownership and the lack of access to personal vehicles for women in India, resulting in unequal job opportunities and economic exclusion due to differential patterns of mobility among men and women.

With a majority of research proposing that a dip in the proportion of working women in India despite high economic growth and rising education levels, is due to the absence of suitable jobs; it would be interesting to understand whether the number of 'suitable' jobs could be raised by reducing travel time to work. For example, when an alternative mode of transport to a private vehicle such as the new age ride-hailing cab services such as Uber or Ola (Indian operator) emerges which matches the characteristics of a personal vehicle, in terms of convenience, comfort and time, women should benefit more than men. The development of such alternative transport methods therefore complement rising level of education on one hand and employment opportunities on the other hand, by lowering the travel time and effort over larger city areas. For example, a recent study by IFC and Uber (2018) notes that more than one-third of women passengers in Uber in India say that ride-hailing increases their mobility and 28 % say it help them to reach places not served by public

transport while the majority of Indian women who use Uber say that it helps their mobility, convenience and improves their independence.

In this study, we focus on travel patterns to work among Information Technology (IT) industry employees in Chennai, India which is one of the major hubs of IT/ITES companies in India. IT industry in India has expanded rapidly in the recent decades and employs around 4 million workers of which women account for 34% in 2017-18 which is one of the highest. **Using a sample of 158 workers who filled in a detailed questionnaire between xx and xx 2018**, this study investigates young men and women's travel pattern to work. We demonstrate that when women, young and unmarried, are able to choose their place of residence as well as have access to the modes of transport similar to that of men, there is little difference in terms of distance or time taken to reach the workplace. Post-marriage women largely move to their spouse's place of residence in many cases raising the distance to work and thus, also raising the importance of faster and more convenient modes of transport to work. Thus, we extract insights that indicate possible policy recommendations to augment female labour force participation rates in India. Our primary survey collected information about traveling mobility and other individual/household characteristics from women who are currently working. It therefore, leaves out women who have discontinued working or have never taken up work due to any reasons including constraints related to commuting. Future work plans to cover this section of working-age women.

## Literature Review

### Factors affecting commuting to work in India

Empirical evidence supports that there are numerous factors that affect the travel distance, time, reliability, comfort and travel cost of individuals. Residential accessibility is one of these crucial factors that affect the traveling pattern of workers. Helling (1996) talks about the significance of residential accessibility in reducing travel time. A greater accessibility of residential locations is associated with more but shorter trips, resulting in less travel time. In the context of developing country like India, factors like rapid urbanization, and expansion of manufacturing, construction, wholesale and retail trade sectors lead to a longer commute distance for workers. Chandrashekhar (2011) talks about how these factors are mainly responsible for an ever-increasing number of workers who travel long distances from rural to urban areas or from urban to rural areas every day to go to work. Shrigaokar (2014) explains how as the growing middle class of India are traveling to peripheries to look for jobs, their travel needs are also growing. With their ever-increasing income and because of unavailability of public transport, they are pushed towards owning their own vehicles.

Location of the workplace also plays an important role in determining the commuting pattern. When Shrigaokar (2014) studied the difference in the commuting pattern between those commuting to exurbs versus those commuting to the city for the Greater Mumbai Region, he found that one-way work trips are shorter to exurban work locations. This meant that workers who travel to exurbs for work, on an average, came from close locations. Also because of limited supply, the waiting time for intermediate public transport was found to be high in exurbs which is one of the reasons why workers traveling to exurbs preferred own vehicles.

Income of the household also has a part to play in determining the travel behavior of the workers. Astrop (1996) & Ponnuswamy & Anantharajan (1993) both showed that low-income group of workers depends on non-motorized modes of transport whereas middle-income group and a high-income group of workers own cars and motorized two-wheelers. Astrop (1996) did a primary survey

across Pune where it was interestingly seen that for commuting to the workplace, most common mode of transport among the three-income group is motorized two-wheeler.

### **Gender differences in commuting**

There are numerous findings that have shown that women have shorter commute times and distance compared to men. Women from developed countries such as Japan and America are found to travel for less time compared to men (Lee and McDonald, 2003; Crane, 2007; Kawabata & Abe, 2018). Even in the context of developing country like India, studies like Srinivasan & Rogers (2005) found that women travel less distance compared to men. There can be several reasons behind this. The domestic responsibility of women plays an important role in creating this gender difference in traveling. A number of researchers suggest that, greater household responsibilities lead to shorter travel times for women (Preston et al., 1993). Household responsibilities pose a significant constraint on the participation patterns and job search strategies of women and deter women from commuting long distances to work (Hanson and Pratt, 1988).

Whereas, the study by MacDonald & Peters (1996) found that since women earn less than men on an average, and wages rates for typical female jobs vary less than men's wages, it also makes sense for them to travel a shorter distance. Unlike men, the probability of them earning significantly more at some places is very less, and therefore they might as well save the time and cost of traveling. Madden (1981) says that "If women had the same job tenure and weekly work hours and, most importantly, the same wages as their male counterparts in the household, their work trips would no longer be shorter. In fact, they would be longer!" Another argument behind women's travel time being low is that women's jobs are more evenly distributed across space and therefore requires less traveling. The hypothesis is that women are concentrated in particular type of industries which are more evenly distributed around residential location than male-centric or neutral jobs which might lead to shorter commute distance for women. There have been some arguments in favor of it like in (Hanson & Johnston, 1985; MacDonald, 1999; Benson, 2014) which said that if the women and men residential situation is similar, then shorter work trips for women could reflect that female-dominated occupations may be distributed more evenly over the urban landscape. However, there are some studies like one by Gordon et al., (1989) that has negated the hypothesis by stating that gendered difference in commute distance exists across most income and occupational categories.

### **Study Area: Chennai**

This study was conducted in the context of Chennai Metropolitan area (CMA) (Figure A1 in Appendix). It is the fourth largest metropolis in India and extends to 1189 Sq.km. and comprises the city of Chennai, 8 Municipalities, 11 Town Panchayats and 179 Village Panchayats in 10 Panchayat Unions under the Chennai Metropolitan Development Authority (CMDA). Chennai is also the capital city of state of Tamil Nadu, a southern state in India with a population of more than 70 million. As per the latest Census of India (2011), Chennai city had a population of 4.3 million out of total of 7.4 million in CMA.

Chennai has a radial and ring pattern of road network with a total length of 2780 km (Figure A2 in Appendix). The public transport in CMA majorly includes buses and trains. As per the recent data, Chennai Metropolitan Transport Corporation (MTC) catered to the 26% of the travel demand in the CMA through its fleet of 3300 buses in 2009 and during peak hours, buses carried more than 100 passengers per bus in 2009 indicating substantial overcrowding (CMDA, 2010). Apart from this, commuter rail system in CMA includes the suburban railway network (northern, southern and western

line covering 286 km), Mass Rapid Transport System (MRTS), and the recently built Metro rail which account for around 5% of the trips. Further, intermediate public transports (IPT) include a fleet of taxis, cabs, auto-rickshaws and share-autos. The ambitious plan by CMDA proposed to raise the share of public transport in all trips to 46% by 2026 and reverse the trend of rising trips by private vehicles including two wheelers. However, between 1970 and 2008, there has been a significant decrease in the percentage of all trips by public transport (bus+train). During the same time, there has been manifold increase in the percentage of trips by two-wheeler, from 2% to 25% (Table 1). Among all the trips made by CMA residents, bus, fast two-wheelers and walking are the most preferred modes of transport as seen in the table 1.

**Table 1: Comparison of modes of transport for all trips - CMA**

Mode	Percent of trips by mode			
	1970	1984	1992-95	2008
Bus	42	46	39	26
Train	12	9	4	5
Car/Taxi	3	2	2	6
Fast two-wheelers	2	3	7	25
Auto-rickshaw	0	0	2	4
Bicycle	20	11	14	6
Cycle rickshaw & others	0	2	3	0
Walk	21	27	30	28

**Source:** Chennai Comprehensive Transportation Study, 2010

According to Census on India (2011), Chennai had 1.7 million workers and among them, a large proportion either don't travel to work (20%) or choose to walk to work (16%). Among the workers who do travel, they mostly travel for distance less than 20 km. It can also be seen that a large proportion of female workers (31%) did not travel at all and worked from home (Table 2). In general, female workers travelled shorter distances compared to male workers.

**Table 2: Distance traveled by workers in Chennai**

Distance (in kms)	All	Male	Female
No travel	19.88%	16.52%	30.59%
0-1	13.08%	12.24%	15.75%
2-5	24.79%	25.61%	22.16%
6-10	22.14%	23.45%	17.97%
11-20	10.78%	11.73%	7.74%
21-30	3.81%	4.30%	2.26%
31-50	1.77%	1.98%	1.10%
51+	0.83%	0.94%	0.47%
Distance not stated	2.92%	3.22%	1.95%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Source:** Census of India, 2011

When all the workers are considered (Table 3), it can be seen that Moped/Scooter/Motor Cycle is the most preferred mode of transport followed by public transport (i.e., bus). Specifically, among males, fast two-wheelers are also the most used means of transport whereas, among females, bus is the most popular means of transport. Among workers traveling less than 1 km, walking is the most preferred mode, those traveling up to 20 km mostly use Moped/Scooter/Motor Cycle whereas for longer distances (>20 km), bus is the preferred means of transport.

**Table 3: Mode of transport to commute to work**

	<b>Persons</b>	<b>Male</b>	<b>Female</b>
On foot	15.99%	13.64%	23.50%
Bicycle	9.81%	12.06%	2.64%
Moped/Scooter/Motor Cycle	22.94%	27.36%	8.85%
Car/Jeep/Van	6.15%	6.43%	5.24%
Tempo/Autorickshaw/Taxi	2.16%	2.25%	1.87%
Bus	19.38%	18.04%	23.64%
Train	3.00%	2.95%	3.17%
Water transport	0.21%	0.25%	0.08%
Any other	0.48%	0.50%	0.41%
No travel	19.88%	16.52%	30.59%
All modes	100.00%	100.00%	100.00%
<b>Number</b>	<b>1751824</b>	<b>1333988</b>	<b>417836</b>

Source: Census of India, 2011

In recent years, a significant alternative mode of transport to private vehicles has emerged. While there were several radio taxis operating in Chennai for years apart from the unorganized taxi market, after Ola, the Indian cab aggregator and Uber, the international cab-hailing company started their operations in 2013 and 2014 respectively, it revolutionized the working of the cab industry in the city of Chennai and elsewhere in India. With the use of the modern technology, these companies provide high convenience and low fares to customers (which is competitive alternative to regular public transport). Though the organized taxi market in India only account for 5% of the total taxi market, with the entry of aggregators like OLA and Uber it is expected to grow 20-25% in the coming years<sup>3</sup>. With women having less access to two wheelers as well as private four wheelers, the emergence of convenient and affordable cab services would ease women's travel needs, thereby lowering time table to reach the workplace, allowing more flexibility and more comfort.

### **Data collection – Pilot survey**

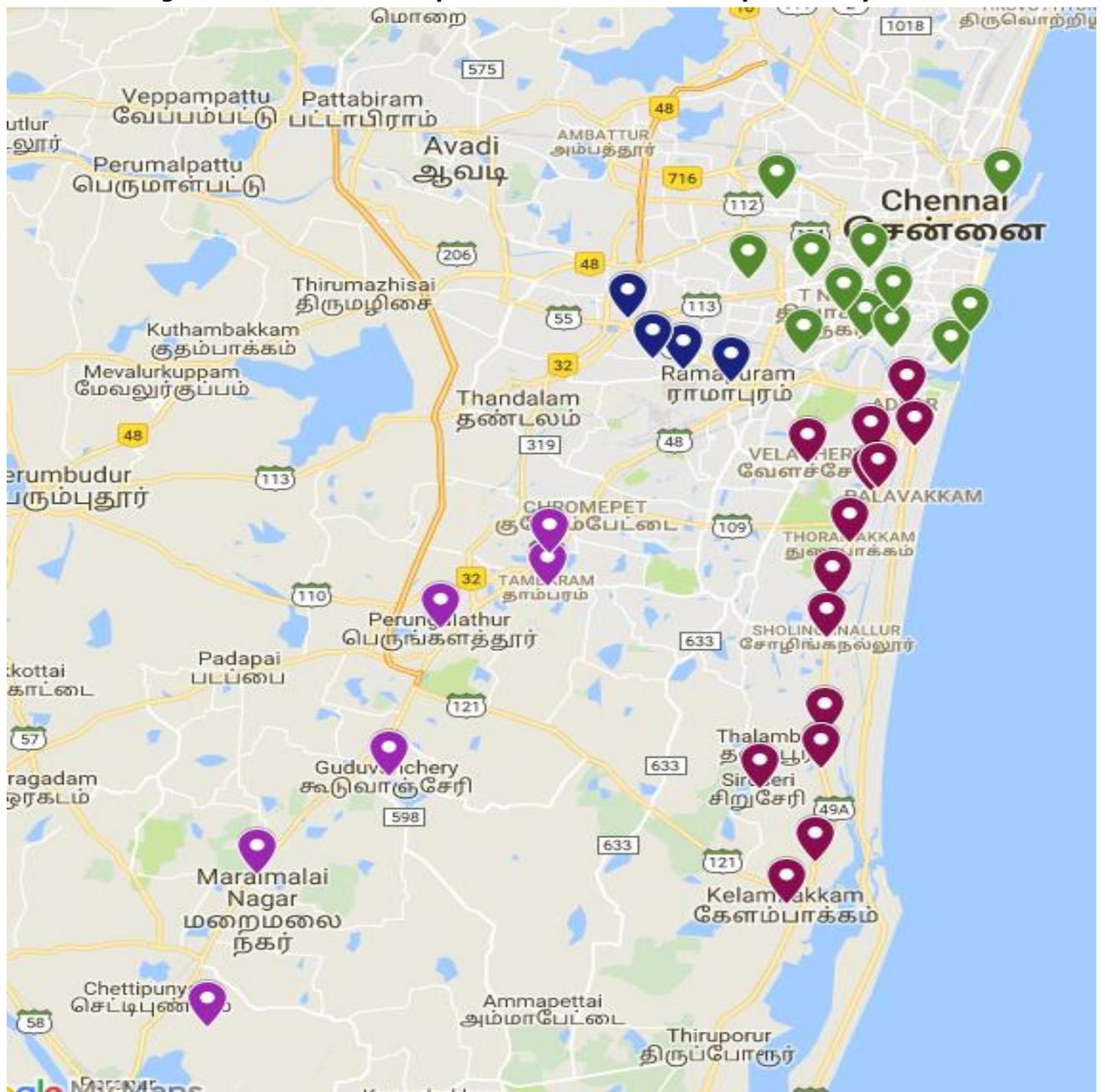
In this study, we focus specifically on Information Technology (IT) workers in Chennai. It is to be noted that a large number of IT/ITES companies are located along the Rajiv Gandhi Salai (or Old Mahabalipuram Road), the area popularly known as IT Corridor that runs almost north-south and parallel to the coast (Figure A2 in Appendix). This area also has large number of IT parks like TIDEL park in Taramani and SIPCOT IT park in Siruseri. These developments have further spilled over to the west along Velachery – Tambaram and Porur belts. Given that the secondary data sources in India are largely deficient in recording all parameters of travel mobility like distance, time, cost, source and destination places etc., it became important to collect primary data in order to extract better insights. We have conducted a pilot survey of men and women IT workers in Chennai and it was conducted in English.

The questionnaire (see table A.1) was primarily designed using relevant metrics identified in the literature and has 6 sections, (1) Background information, which records key variables such as name, age, gender, location of stay, marital status, and income, apart from others; (2) Household Members along with specific details about children and chief wage earner, (4) household details, which included details about household facilities such as household appliances and vehicles owned by the members; (5) Work details, which recorded information about current work, job role and

<sup>3</sup> <https://www.businesstoday.in/magazine/cover-story/india-taxi-market-war-heats-up-ola-cabs-uber-strategy-leaders/story/222542.html> as extracted on July 10, 2018.

designation, job type, shift timing, salary, contract type, etc.; (6) transport details, with questions regarding the primary mode of transport, and alternative modes as well as total cost and time of traveling. For the purpose of the pilot survey, we have used snowballing, and convenient sampling because it is an inexpensive and simple sampling technique. We used the surveymonkey.com from which an online questionnaire was sent to the respondents (either through their email or Whatsapp) for them to fill. The geographic distribution of the sample can be broadly classified into IT corridor (red), Tambaram-Guduvancherry area (pink), and the Porur area (blue) apart from few respondents working within Chennai city (green). Across all locations the sample totals to 158 respondents and average time to complete the survey was 10 minutes.

**Figure 1: Location of workplaces of IT workers in the pilot survey**



Source: Generated by the author on Google maps

The respondents were relatively of young age with more three-fourths in 20-30 age group and rest in the 30-40 age groups while around 30% were females. Around 70% of them are have never married. Similarly almost all of them have a tertiary education (with graduation or post graduation completed). Two-thirds of the respondents stayed in a rented accommodation and around 45% of the respondents chose to live in a particular residential area because it is nearer to their or spouse’s workplace. It is important to note that nearly half of them stayed with friends or colleagues or other non-family members since their immediate family lived outside Chennai. Only 20% of the respondents belonged to single-earner household and all married women reported their spouse as the chief income earner of the household.

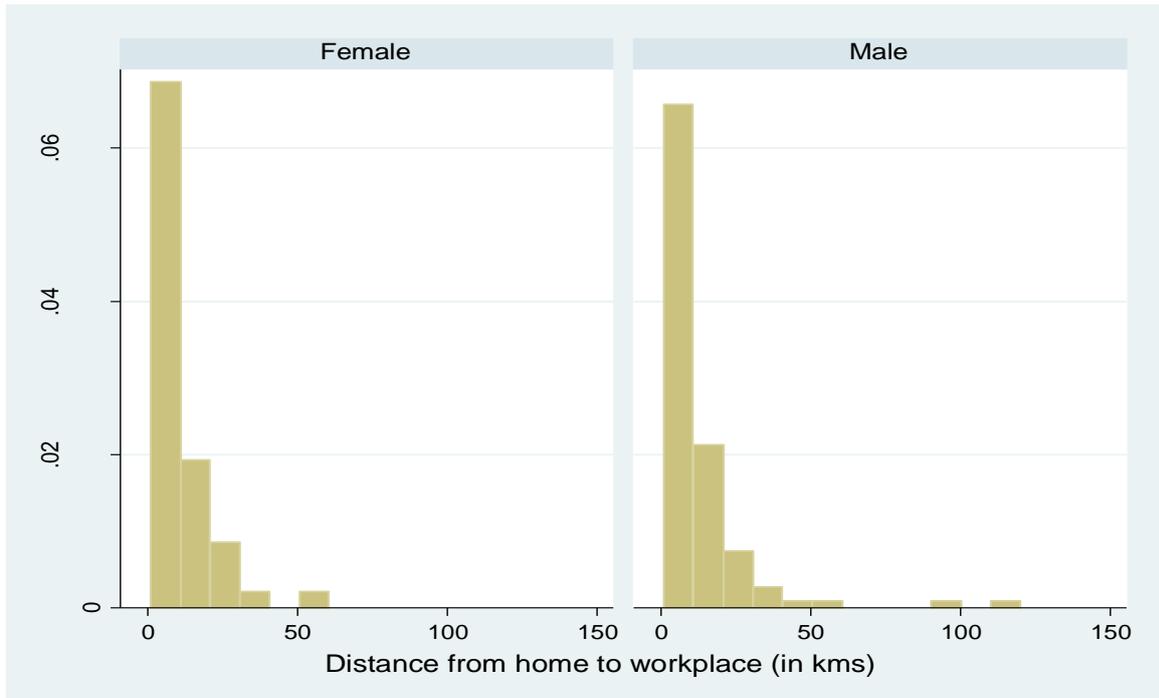
**Table 4: Profile of respondents – IT workers**

Gender	Male	29.75
	Female	70.25
Age group	20-29	74.68
	30-39	25.32
Length of stay in the current locality	0-2 years	53.13
	Above 2 years	46.87
Marital status	Never married	68.98
	Married/Others	31.02
Child	No	84.81
	Yes	15.19
House ownership	Rented	67.72
	Owned/Others	32.28
Currently living with	Alone/ Non-family members	47.46
	Family members	52.54
Immediate family	Chennai	56.34
	Outside Chennai but inside TN	13.92
	Outside TN	29.74
Chief income earner/Next important earner other than self in the immediate family	Respondent is the only earner	19.62
	Father/Mother	50.63
	Spouse	12.02
	Others/Not reported	17.73

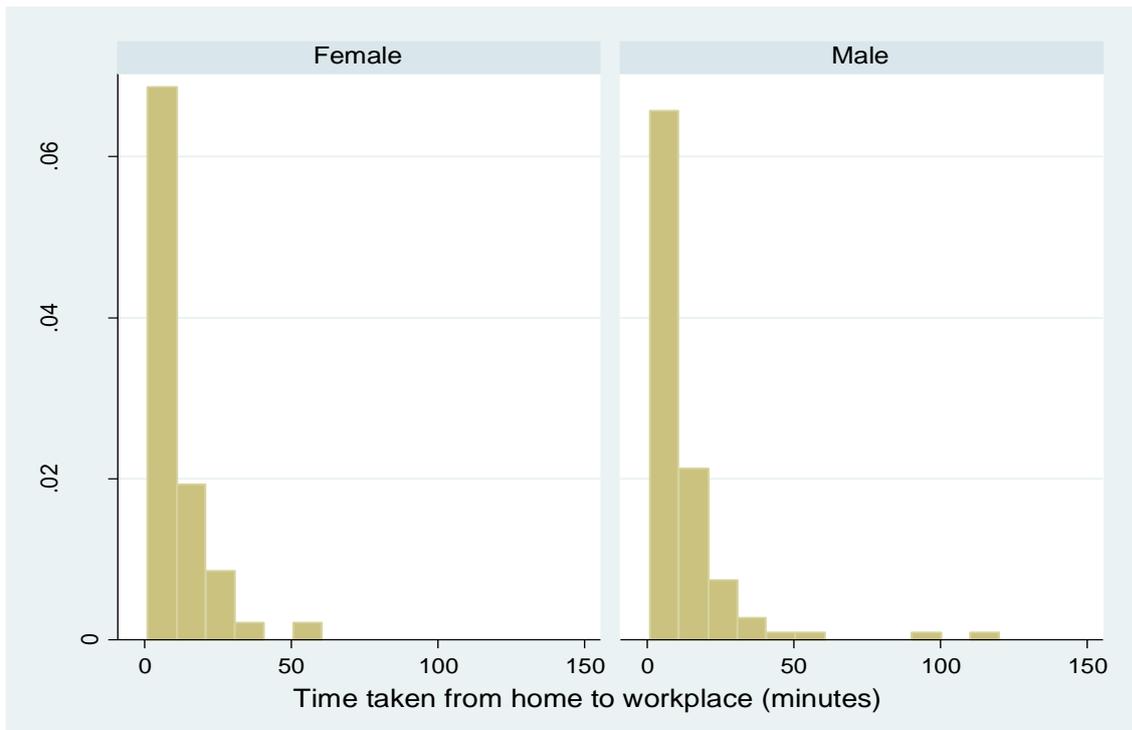
### **Travel to work: Results from the pilot survey**

We do not find significant differences between males and females in commuting distance or time to go to work. This is primarily because of the nature of the sample includes mostly younger people who are also married. We find significant difference in distance and time among those who stay with family members and those who stay alone/with non-family members. Since the latter group’s residential choices, irrespective of the gender, are mostly driven by travel to work, they tend to stay closer to workplace and hence have lower commuting time. However, those who stay with family members have other consideration while deciding residential locations like access to schools for children and ownership of houses. Also, as suggested by the literature homeowners are more likely to commute longer distances and for longer time since housing market rigidities imply that home locations are fixed and they decide to travel longer if their utility from income is very high or because they can afford to pay higher travel costs due to absence of rental costs. In fact, the distance and time taken to travel to work are the highest for those who have stayed in the same locality since birth.

**Figure 2: Distance to work - IT workers**



**Figure 3: Time taken to reach workplace - IT workers**



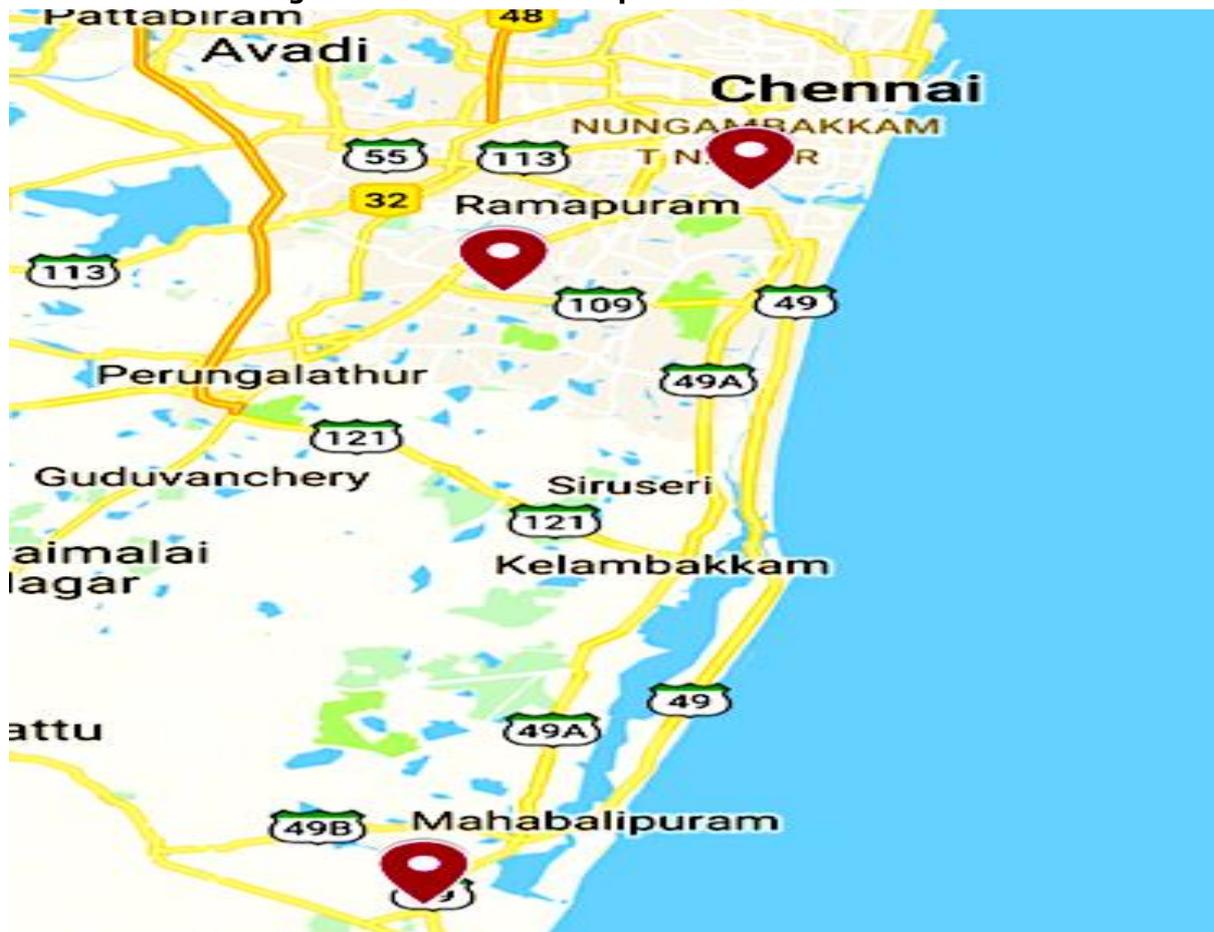
While around 21% of women ride a two-wheeler to the work, over 51% of men do the same. As for a private car, less than 10% of women have an access to one while around 20% men use a car to commute to the workplace. Although relatively less percentage of workers in the sample use public transport, a higher share of women uses buses and trains compared to men. Not surprisingly, all the respondents who have reported being dropped to work by a family member happen to be women. In

contrast, over 50% of the women uses the cab services while only 27% of men use cabs to travel to work. With more women using the cab services, the average cost of transport per km for women is higher than men. High reliance on private modes of transport or intermediate public transports like cabs and autos lead to respondents stating that most important problems faced by them while travelling to work are traffic congestion and pollution.

### Comparison with other service sector

Here we compare travel mobility among IT workers with similar workers from another service sectors, i.e., educational sector. The sample consists of skilled workers who are faculty and administration staff in higher educational institutions. We interviewed workers from three institutions located at Kotturpuram within city of Chennai, Manamai along the OMR road and Pallavaram near the Porur area.

Figure 4: Location of workplaces - Education sector



Source: Generated by the author on Google maps

We find that consistently travel times and distances are shorter for women than men in the case of educational institutions where travel times range between 26 and 63 minutes (see table 5.3), and average travel distances between 6.4 km to 38 km. In the case of educational institutions we find that for the institution situated in the periphery of the Chennai metropolitan area, the travel time and distances are significantly higher, this is indicative of the spatial pattern in Chennai, where a lot of higher education institutions are in the outskirts with either limited residential areas surrounding it, or workers opting to live in the city due to proximity to other resources and facilities thus increasing travel times substantially.

**Table 5: Travel to Work: Education Sector**

<i>Time in minutes, Distance in Km</i>	Total	Female	Male
Mean Travel times for Kotturpuram	28.41	21.77	35.055
Mean Distance travelled for Kotturpuram	6.48	3.664	9.33
Number of respondents	18	9	9
Mean travel Times Manammai	63.24	61.1	66.53
Mean Distance Travelled Manammai	38.76	38.21	39.61
Number of respondents	36	20	16
Mean Travel Time Pallavaram	26.07	26.07	-
Mean Distance Travelled Pallavaram	8.28	8.28	-
Number of respondents	7	7	-

**Source:** Author's own Compilation from Primary Data

When we look at the gender difference in the modes of transport, it can be seen that among the workers in Manamai, both males and females mostly traveled via office provided transport (refer table 6). Also, males were more likely to use personal transport than females. However, in the case of the educational institution in Kotturpuram, while two-thirds of men mostly traveled via two-wheelers, cars, and autos, more female workers reported that they were dropped by their spouse or other members of their family using personal vehicles while most others rely on slower mode of transport like walking, cycling and public transport (please refer table 7). This in turn might restrict their travel distance whereas men faced no such barriers and instead reported to travel via their own private vehicles like two-wheelers and cars. In comparison to IT sector, the use of cabs like OLA and Uber were limited in the case of educational institutions workers.

**Table 6: Mode of transport - Manamai**

Modes of transport	Males	Females
Spouse or other family member drop you by car, bike etc.	0.00%	21.43%
You (or your driver) drive(s) your car	5.26%	3.57%
You drive your two-wheeler	26.32%	3.57%
Bus	21.05%	10.71%
Train	0.00%	0.00%
Auto	0.00%	3.57%
Cab (includes OLA, Uber etc.)	0.00%	3.57%
Share auto	5.26%	3.57%
Cycle	5.26%	0.00%
Walk	0.00%	7.14%
Office provided transport	36.84%	42.86%
Pool with other colleagues at work	0.00%	0.00%
Others	0.00%	0.00%

**Source:** Author's own compilation based on primary data

**Table 7: Modes of transport - Kotturpuram**

Modes of transport	Males	Females
Auto	21.43%	13.33%
Bus	7.14%	0.00%
Cab (includes OLA, Uber etc.)	7.14%	13.33%
Others	7.14%	0.00%
Train	7.14%	6.67%
Walk	7.14%	13.33%
You (or your driver) drive(s) your car	21.43%	6.67%
You drive your two-wheeler	21.43%	13.33%
Cycle	0.00%	6.67%
Share auto	0.00%	6.67%
Spouse or other family member drop you by car, bike etc.	0.00%	20.00%

**Source:** Author's own compilation based on primary data

## Discussions

There is a disparity in choice of mode of transport by gender, with a higher reliance on personal modes by men, which in turn is indicative of access to resources. Identifying women's travel to work patterns in the context of chief mode of transport, and peak hours of travel could be useful for urban planners to extend and or expand services, given that women rely on public and intermediate public transport. We find that younger women in IT sector are able to overcome lack of access to private vehicles by finding access to good residential environments nearer to workplaces and also due to the provision of office-provided transportation and availability of highly convenient ride-hailing cabs. However, married women are constrained in their choices to residential location due to factors like spouse's travel to work and children's schooling which in turn limit their employment choices. Also married women workers are highly reliant on informal childcare support provided by extended family which allow them to work. In the context of changing family dynamics, and residence patterns this source may soon not be available. If women rely on family due to the absence of alternatives, it is important for both employers and the state to provide alternatives.

The paucity of secondary data necessitated a primary survey relating to travel mobility and time-use and its significance for women's work. While the primary survey was designed to collect comprehensive metrics and data, it was largely constrained by the size and nature of the sample. The inability to collect data from a representative sample makes it difficult to assertively characterize travel mobility or time-use patterns of women, and their role in labour market decisions. The next stage of this project intends to add to this sample and extend the analyses through econometric frameworks, based on the data. This could help in identifying the relative role of travel mobility and dual responsibility over other constraints that women face.

## References

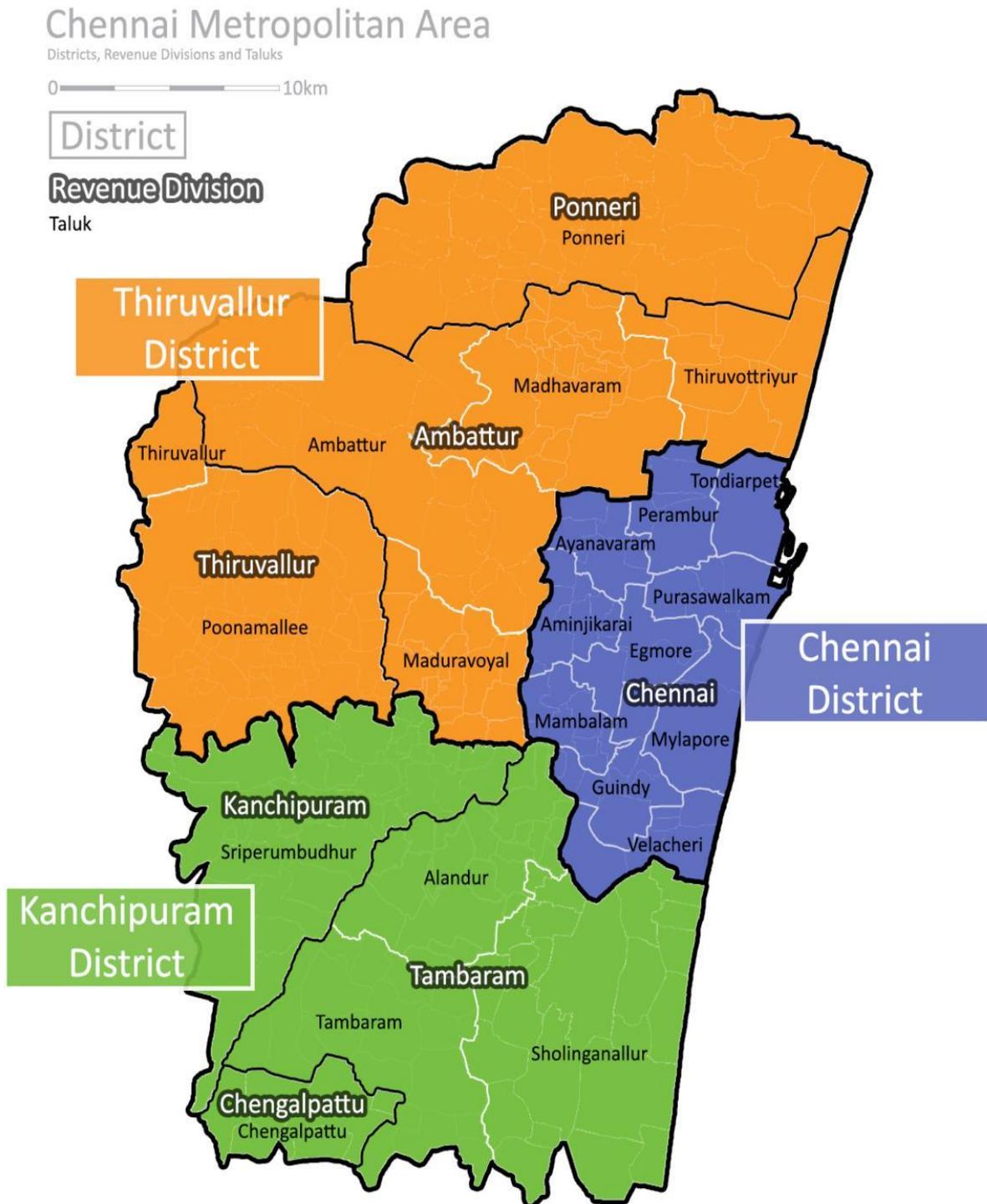
- Afridi, F., A. Mukhopadhyay, and S. Sahoo 2012. "Female Labour Force Participation and Child Education in India: The Effect of the National Rural Employment Guarantee Scheme." . Bonn: Institute for Labor Study (IZA Discussion Papers Series, No. 6593)
- Afridi, F., Dinkelman, T., and Mahajan, K. (2016). Why are fewer married women joining the work force in India? A decomposition analysis over two decades. Bonn: Institute for Labor Study (IZA Discussion Paper No. 9722)
- Anderson, S., and M. Eswaran. 2009. "What Determines Female Autonomy? Evidence from Bangladesh." *Journal of Development Economics* 90 (2): 179–91
- Andres, L.A., Dasgupta, B., Joseph, G., Abraham, V., and Correia, M. (2017). Precarious drop: Reassessing patterns of female labor force participation in India. Washington, D.C.: World Bank (World Bank Policy Research Working Paper 8024)
- Astrop, A. (1996). The Urban Travel Behavior and Constraints of Low Income Households and Females in Pune, India. *Womens Travel Issues: Proceedings from the Second National Conference*.
- Benson, A. (2014) Re-thinking the two-body problem: the segregation of women into geographically-dispersed occupations, 1980–2010. *Demography*, 51, 1619–39.
- Bhalla, S.; Kaur, R. 2013. "Labour force participation of women in India: Some facts, some queries", Working Paper No. 40 (London, Asia Research Centre, London School of Economics and Political Science)

- Buddhapriya, S. (2009). Work-family challenges and their impact on career decisions: A study of Indian women professionals. *Vikalpa*, 34(1), 31-46.
- Census (2011), Primary Census Abstracts, Registrar General of India, Ministry of Home Affairs, and Government of India, Retrieved from <http://www.census2011.co.in/states.php>
- Chandrashekhar, S. (2011). Workers Commuting between the Rural and Urban: Estimates from NSSO Data. *Economic & Political Weekly*, 22-25.
- Crane, R. (2007). Is there a quiet revolution in women's travel? Revisiting the gender gap in commuting. *Journal of the American planning association*, 73(3), 298-316.
- Cuberes, D., & Teignier, M. (2014). Gender inequality and economic growth: A critical review. *Journal of International Development*, 26(2), 260-276.
- Dobbs, L. (2005). Wedded to the car: women, employment and the importance of private transport. *Transport policy*, 12(3), 266-278.
- Dwyer, D. & Bruce, J. (Eds.) (1988). A home divided: Women and income control in the third world: Stanford, CA: Stanford University Press
- Gordon, P., Kumar, A., & Richardson, H. W. (1989). Gender differences in metropolitan travel behaviour. *Regional Studies*, 23(6), 499-510.
- Hanson, S. and G. Pratt. 1988. "Reconceptualizing the Link Between Home and Work in Urban Geography", *Economic Geography*, 4: 299-321
- Hanson, S. and Johnston, I. (1985) Gender differences in work-trip length: explanations and implications. *Urban Geography*, 6, 193-219
- Helling, A. (1996). The Effect of Residential Accessibility to Employment on Mens and Womens Travel. *Womens Travel Issues:Proceedings from the Second National Conference*.
- International Finance Corporation (IFC) and Uber Technologies, Inc. (Uber) (2018). Driving towards equality: Women, Ride-hailing and the sharing economy, Washington DC, USA.
- Johnson, D., Ercolani, M., & Mackie, P. (2017). Econometric analysis of the link between public transport accessibility and employment. *Transport Policy*, 1-9.
- Kawabata, M., & Abe, Y. (2018). Intra-metropolitan spatial patterns of female labor force participation and commute times in Tokyo. *Regional Science and Urban Economics*, 68, 291-303.
- Klasen, S.; Lamanna, F. 2009. "The impact of gender inequality in education and employment on economic growth: New evidence for a panel of countries". *Feminist Economics*. Vol. 15, No. 3, pp. 91-132.
- Lee, B. S., & McDonald, J. F. (2003). Determinants of commuting time and distance for Seoul residents: The impact of family status on the commuting of women. *Urban Studies*, 40(7), 1283-1302.
- MacDonald, H., & Peters, A. H. (1996). Distance and Labor Force Participation: Implications for Urban and Rural Women. *Women's Travel Issues:Proceeding from the Second National Conference*.
- MacDonald, H.I. (1999) Women's employment and commuting: explaining the links. *Journal of Planning Literature*, 13, 267-83
- Madden, J. F. (1981). Why Women Work Closer to Home. *Urban Studies*, 181-194

- Ponnuswamy, S., & Anantharajan, T. (1993). Influence of Travel Attributes on Modal Choice in an Indian City. *Journal of Advanced Transportation*, 293-307.
- Preston, V., McLafferty, S. and Hamilton, E. 1993. "The impact of family status on Black, White and Hispanic women's commuting." *Urban Geography* 14: 228-50.
- Shirgaokar, M. (2014). Employment centers and travel behavior: exploring the work commute of Mumbai's rapidly motorizing middle class. *Journal of Transport Geography*, 249-258.
- Sorsa, P., et al. (2015), "Determinants of the Low Female Labour Force Participation in India", *OECD Economics Department Working Papers*, No. 1207, OECD Publishing, Paris, <https://doi.org/10.1787/5js30tvj21hh-en>.
- Srinivasan, S., & Rogers, P. (2005). Travel behavior of low-income residents: studying two contrasting locations in the city of Chennai, India. *Journal of Transport Geography*, 265-74.

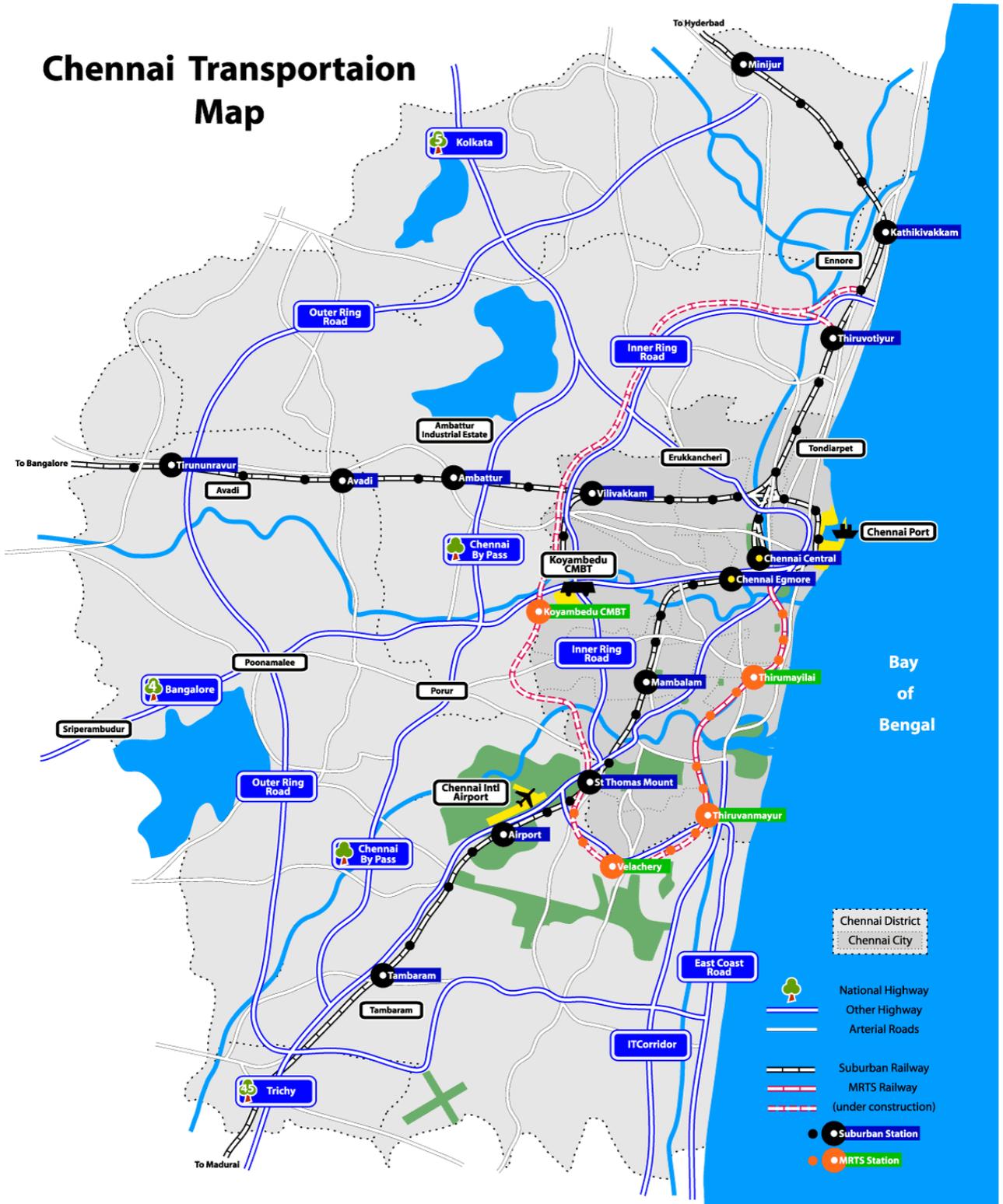
## Appendix

Figure A1: Chennai Metropolitan Area



Source: Chennai Metropolitan Development Authority

# Chennai Transportaion Map



### Questionnaire used for the survey

Questions	Options
1. Age	
2. Gender	a. Male b. Female
3. Where do you currently stay (District)?	a. Chennai b. Kanchipuram c. Thiruvallur d. Others (specify)
4. Please mention area/neighborhood/locality/village?	
5. How long have you been staying in this area or locality or village?	a. Less than a year b. 1-2 years c. 3-5 years d. Above 5 years e. Since birth f. Since marriage
6. What is the most important reason you choose to stay in this locality?	a. Nearer to workplace b. Nearer to spouse's workplace c. Good residential environment d. Nearer to children's school/daycare facilities e. Affordable housing f. Moved here after marriage g. Company provided accommodation h. Lived here since birth i. Nearer to my parents or in law's house j. Others (please specify)
7. Highest level of schooling attained by you	a. Did not attend school b. Primary (class 1-5) c. Secondary (class 6-10) d. Higher secondary (class 11-12) e. Graduation (B.Com., BA, BSc, B.Tech., BL) f. Post-graduation (master's degree and above) g. Diploma h. Others (please specify)
8. What is your marital status?	a. Never married b. Currently married c. Widowed d. Divorced e. Separated f. Others (please specify)
9. Details about children a. Age b. Gender c. Current status	Current status a. Student b. Employed

<p>10. Who takes care of your child or children while you work?</p>	<ul style="list-style-type: none"> <li>a. Other family members</li> <li>b. Take care of themselves</li> <li>c. Friends/Neighbors</li> <li>d. They live separately</li> <li>e. Creche/ Private day care</li> <li>f. I get back to home when they come from school</li> <li>g. Anganwadi (government day care)</li> <li>h. Others (Please specify)</li> </ul>
<p>11. House status</p>	<ul style="list-style-type: none"> <li>a. Own</li> <li>b. Rented</li> <li>c. Leased</li> <li>d. Government allocated</li> <li>e. Company provided accommodation</li> <li>f. Others (please specify)</li> </ul>
<p>12. How much is the monthly rent (please select "not applicable" in the case of own house)?</p>	<ul style="list-style-type: none"> <li>a. Below 5000</li> <li>b. 5000-10000</li> <li>c. 10001-15000</li> <li>d. 15001-25000</li> <li>e. Above</li> </ul>
<p>13. Which of the following facilities do you have in your current house (please check all that is applicable)?</p>	<ul style="list-style-type: none"> <li>a. Regular supply inside house</li> <li>b. Toilet facilities inside house</li> <li>c. Electric fan</li> <li>d. Color television</li> <li>e. Grinder</li> <li>f. Mixer</li> <li>g. Cycle</li> <li>h. Two-wheeler</li> <li>i. Washing machine</li> <li>j. Refrigerator</li> <li>k. Computer/laptop</li> <li>l. Internet connection</li> <li>m. Air conditioner</li> <li>n. Car</li> <li>o. Others (please specify)</li> </ul>
<p>14. Who do you currently live with?</p>	<ul style="list-style-type: none"> <li>a. I reside alone</li> <li>b. Friends/colleagues</li> <li>c. Mother</li> <li>d. Father</li> <li>e. Mother in law</li> <li>f. Father in law</li> <li>g. Husband</li> <li>h. Wife</li> <li>i. Children</li> <li>j. Brother</li> <li>k. Sister</li> <li>l. Brother in law</li> <li>m. Sister in law</li> <li>n. Grandmother</li> <li>o. Grandfather</li> <li>p. Nephew</li> <li>q. Niece</li> <li>r. Uncle</li> </ul>

	<ul style="list-style-type: none"> <li>s. Aunt</li> <li>t. Grandson</li> <li>u. Granddaughter</li> <li>v. Daughter in law</li> <li>w. Son in law</li> <li>x. Other relatives</li> </ul>
<p>15. In case you stay alone or stay with non-family members, please mention where does your immediate family stay?</p>	<ul style="list-style-type: none"> <li>a. Not applicable</li> <li>b. In Chennai</li> <li>c. Outside Chennai but In Tamil Nadu</li> <li>d. Outside Tamil Nadu</li> </ul>
<p>16. Who is the chief income earner in your family? If you are the chief income earner, please select the next important income earner of your family.</p>	<ul style="list-style-type: none"> <li>a. I am the only earner in my family.</li> <li>b. Mother</li> <li>c. Father</li> <li>d. Mother in law</li> <li>e. Father in law</li> <li>f. Husband</li> <li>g. Wife</li> <li>h. Children</li> <li>i. Brother</li> <li>j. Sister</li> <li>k. Brother in law</li> <li>l. Sister in law</li> <li>m. Grandmother</li> <li>n. Grandfather</li> <li>o. Uncle</li> <li>p. Aunt</li> <li>q. Grandson</li> <li>r. Granddaughter</li> <li>s. Daughter in law</li> <li>t. Son in law</li> <li>u. Other relatives</li> </ul>
<p>17. Please select your monthly family income (Include incomes of members of immediate family, rental income, interest income etc.)</p>	<ul style="list-style-type: none"> <li>a. less than 5000</li> <li>b. 5000-10000</li> <li>c. 10001-20000</li> <li>d. 20001-30000</li> <li>e. 30001-40000</li> <li>f. 40001-50000</li> <li>g. 50001-75000</li> <li>h. 75001-100000</li> <li>i. above one lakh below two lakhs</li> <li>j. above two lakhs below five lakhs</li> <li>k. above five lakhs</li> </ul>
<p>18. What is your current job (Please write your job designation/type of occupation)?</p>	
<p>19. Name of the company/firm/organization you work for</p>	

<p>20. What type of company you work for?</p>	<ul style="list-style-type: none"> <li>a. IT/BPO/Analytics/Other allied services</li> <li>b. Banks</li> <li>c. Insurance</li> <li>d. Educational institutions/Colleges/Schools</li> <li>e. Hospitals/Healthcare</li> <li>f. Manufacturing</li> <li>g. Trade (Shops, retail/wholesale, Supermarkets etc.)</li> <li>h. Construction, Utilities (Electricity, water supply, etc.)</li> <li>i. Public administration</li> </ul>
<p>21. Location of your current workplace - District name</p>	<ul style="list-style-type: none"> <li>a. Chennai</li> <li>b. Kanchipuram</li> <li>c. Thiruvallur</li> </ul>
<p>22. Name of area/locality/sub-district/village in which your workplace is located</p>	
<p>23. What would be your position in office on the following scale, according to responsibility and salary?</p>	<ul style="list-style-type: none"> <li>a. Top level</li> <li>b. Middle level</li> <li>c. Bottom level</li> </ul>
<p>24. What are your monthly wages/salary?</p>	<ul style="list-style-type: none"> <li>d. less than 5000</li> <li>e. 5000-10000</li> <li>f. 10001-20000</li> <li>g. 20001-30000</li> <li>h. 30001-40000</li> <li>i. 40001-50000</li> <li>j. 50001-75000</li> <li>k. 75001-100000</li> <li>l. above one lakh below two lakhs</li> <li>m. above two lakhs below five lakhs</li> <li>n. above five lakhs</li> </ul>
<p>25. What are the benefits you are provided with by your employer (please select all the options that apply)?</p>	<ul style="list-style-type: none"> <li>a. Festival/public holidays</li> <li>b. Flexible timings/No fixed work hours</li> <li>c. Maternity/Paternity leave</li> <li>d. Employment provident fund</li> <li>e. Health / Medical Insurance</li> <li>f. Bonus</li> <li>g. Meals</li> <li>h. Accommodation</li> <li>i. Other in-kind benefits</li> <li>j. Work from home</li> <li>k. Childcare/daycare at the office</li> <li>l. Company transportation</li> </ul>

<p>26. How many years have you been working here?</p>	<p>a. less than 1 year b. 1-2 years c. 3-5 years d. 6-10 years e. 11-20 years f. above 20 years</p>
<p>27. Number of leaves you are entitled to in a year (including medical leave, casual leave, earned leave etc.)</p>	
<p>28. Who is your contractor?</p>	<p>a. Employer b. External agency</p>
<p>29. What is the most important reason for working in this company/organization/firm?</p>	<p>a. Proximity to home b. Helps to maintain a balance between work &amp; family responsibilities c. Other work not available d. Financial need e. I enjoy this work f. It suits my qualification g. Safe work environment h. Convenient work timings i. Pays good salary given my education and experience</p>
<p>30. What is your usual office timings? (If you work from home, please give usual timings you work).</p>	
<p>31. Do you work in multiple shifts?</p>	<p>a. Yes b. No</p>
<p>32. Please give your alternate shift timings (Skip if not applicable)</p>	
<p>33. What is the approximate distance from your home to workplace (in kms)?</p>	
<p>34. On a typical day, which of the following forms of transportation do you use for commuting to work from home? (Please select all the options that apply)</p>	<p>a. Spouse or other family member drops you by car, bike etc. b. You (or your driver) drive(s) your car c. You drive your two-wheeler d. Bus e. Train</p>

	<ul style="list-style-type: none"> <li>f. Auto</li> <li>g. Cab (includes OLA, Uber etc.)</li> <li>h. Share auto</li> <li>i. Cycle</li> <li>j. Walk</li> <li>k. Office provided transport</li> <li>l. Pool with other colleagues at work</li> </ul>
35. On an average, the time taken to travel from home to work (one way)? (in minutes)	
36. On an average how much does it cost you per month to travel from home to work?	
37. Please mark all the problems that you face while traveling to work?	<ul style="list-style-type: none"> <li>a. Pollution</li> <li>b. Overcrowding</li> <li>c. Poor frequency/Have to wait long</li> <li>d. Safety concerns</li> <li>e. Road Congestion</li> <li>f. Rude/Cheating staff</li> <li>g. Irregular</li> <li>h. Too expensive</li> <li>i. Poor connectivity (not enough buses or routes)</li> <li>j. Have to switch between different modes (No direct connection)</li> <li>k. Local language not known (Trouble communicating while using public transport)</li> <li>l. No problem</li> </ul>
38. If you are using public transportation, mention which of the following would improve your travel experience?	<ul style="list-style-type: none"> <li>a. Improve frequency</li> <li>b. Improve regularity</li> <li>c. Improve punctuality</li> <li>d. Make it cheaper</li> <li>e. More cordial staff</li> <li>f. Improve connectivity</li> <li>g. Female only transportation</li> <li>h. No suggestions</li> <li>i. Not applicable</li> </ul>
39. Do you use an alternate mode of transport? If yes, please tell us how often you use?	<ul style="list-style-type: none"> <li>a. Every day - while returning from work</li> <li>b. Every alternative day/few times in a week</li> <li>c. Once in a week</li> <li>d. Once in two-three weeks</li> <li>e. When alternate mode of transport is available</li> <li>f. Only if primary mode of transport not available</li> <li>g. In case of an Emergency</li> </ul>

<p>40. In case, you use an alternate mode of transport, mention this mode (check below the options you use)</p>	<ul style="list-style-type: none"> <li>a. Spouse or other family member drops you by car/bike etc.</li> <li>b. You (or your driver) drive(s) to work by your car</li> <li>c. You drive to work by two-wheeler</li> <li>d. Train</li> <li>e. Bus</li> <li>f. Auto</li> <li>g. Cab (includes OLA, UBER etc.)</li> <li>h. Share-auto</li> <li>i. Cycle</li> <li>j. Walk</li> <li>k. Office provided transport</li> <li>l. You pool with your friends or other colleagues</li> </ul>
<p>41. On a typical working day, what time do you leave your home to work</p>	

**Source:** Author's own compilation