

CHAPTER 1

INTRODUCTION

1.1 Introduction

United Nations Economic and Social Council define gender mainstreaming as the process of integrating a gender perspective into designing, implementation, and evaluation of policies and programs thereby realizing gender equality. While gender has increasingly being incorporated in many areas, little progress has been made in its relationship with infrastructure-more specifically transport. Transport networks shape one of the most important elements of a country's infrastructure and are a crucial factor in determining economic development (Crespo-Sancho, 2015). Transportation has generally been assumed to be gender neutral. It is believed that both men and women benefit equally from transport projects and there exist no differences in travel needs and patterns between the sexes. However, scholars and studies over the years have been consistently highlighting the contrary. It has been shown that there exist significant differences in travel needs and behavior of men and women. It is only recently that infrastructure projects have started to include gender awareness as part of their investment decisions owing to women's increasing role in economic growth and prosperity.

Of the various indicators of women empowerment, a crucial factor which significantly influences all others is women's mobility. Mobility refers to the movement of people from one place to another in the course of everyday life (Hanson, 2010). Feminists have long argued that gender and mobility are inseparable influencing each other in profound ways (Hanson, 2010). In the book 'A Wheel within a Wheel' written by Willard in 1895, she describes her ability to ride a bicycle, which she learned at the age of 53, as her symbol of mobility and freedom. Riding a bicycle gave her the perk of long-distance travels alone, a feeling of confidence,

personal growth, and freedom from wearing womanly dresses. Mobility enables access to economic opportunities, helps in challenging restrictions imposed by all-pervading patriarchy and ultimately helps in standing against the various factors which feminize poverty (Mahadevia, 2015).

Both men and women use transportation as an instrument for accessing economic opportunities. In addition to accessing the labor market, women use transportation as a medium to take care of their families and household. Due to the feminization of responsibilities women make more complicated, multimodal, multipurpose trips, i.e., engage in "trip chaining" taking many sub-trips in one main trip. Also, women frequently need to make trips outside rush hours and to destinations different from those of men, for, e.g., to go to shopping, to accompany children to schools and elderly to health centers, etc. (Duchène, 2011). For this purpose, a broader network of safe public transport should be available.

There is a need to integrate gender issues in transport because women's mobility depends a great deal on the public transport system and a survey conducted on women's safety in Delhi by Jagori (2010) reports that 39% of the respondents stated that public transport is the most unsafe public space. In the same study, it was outlined that public transport buses are hubs of harassment. 39% of the women reported that they felt unsafe in a survey conducted in Guwahati in 2012 (North East Network, 2012). Tripathi *et al.* (2017) express the need for Indian policymakers to acknowledge that women's mobility is restricted by their anxiety over victimization in public spaces, buses, and trains.

As an account of the good practices undertaken globally a report on gender and transport by the International Transport Forum highlights that in countries such as Japan, Brazil, Egypt, Mexico, India, Belarus, Philippines, etc. vehicles reserved for "women only" have been introduced to combat sexual harassment (Duchène, 2011). Taxis reserved for women run in

UK, Mexico, Russia, India, Dubai, and Iran. In reaction to a popular movement in France transport operators and equipment manufacturers employed more women to ensure that the expectations of women passengers were properly taken into account. While pink auto rickshaws have emerged in Thane, Ghaziabad, Noida, Mumbai, Ranchi, Bhubaneswar, She-Taxis have been functioning in Kerala.

1.2 Travel Behavior: Trends and Determinants

Travel behavior is that complex exercise undertaken by travelers which comprises the entire set of choices over the various aspects of a trip, such as, the mode of transport that will be used, the frequency with which they travel, the distance to which they travel, the purpose for which they make the trip, the cost that they incur, etc. Analysis of this behavior is critical in framing effective traffic management policies and policies aimed at making economic, secured, socially-inclusive and environment-friendly travel decisions. The study of travel behavior is at the conjunction of two arguments. One, which demands the need to move towards low-carbon emitting transport services in the developing economy and second that calls for equity in transportation services provided with respect to gender.

The reason why people travel owes to the existing structure of built environment (Mahadevia, 2012) and heterogeneity in population (Mahadevia and Advani, 2016) among other factors. Most of the requirement to cover distances is either met by using non-motorized vehicles or by taking public transport.

This travel behavior of a population is influenced by a number of factors such as the type of area, land use pattern of the region, socio-economic and socio-demographic factors like income or consumption expenditure of the household or individual, the individual's age, gender, work status, some geographical factors, etc. Adoption of a mixed economy in India not only led to the development of private sector but also the increasing pace of urbanization. The clustering

of employment opportunities within and nearby prime urban locations has increased home-to-work commuting, in addition to bringing about rapid economic development (Sharma and Chandrasekhar, 2014).

Travel behavior also varies with variation in area type. Certain modes of transport used in rural areas are not much prevalent in urban areas and vice versa (Sudhakara Reddy and Balachandra, 2012). The facility of an efficient system of public transportation lacks within villages in India. Land use pattern in a region affects the distance that the residents of that region travel (Mahadevia, 2012). Not many studies explore the existing differences in travel behavior between urban and rural areas of a developing country city (Jain, Korzhenevych and Hecht, 2018).

1.3 Role of Transportation Sector in Climate Change

One issue which requires immediate undivided attention of economies around the world is climate change. Industry, agriculture, transportation, electricity and heat production are some of the sectors which are attributed to be the major contributors to this global phenomenon. Of this the transport sector's contribution was estimated to be around 24 per cent in 2010 (Wang and Ge, 2019). In India, the transport sector is the third highest contributor of greenhouse gas emissions, of which the majority is contributed by road transport (Singh *et al.*, 2019). Of the ten most polluted cities in the world, six are Indian (Broom, 2020). About 4.2 million lives globally are lost to air pollution (WHO, 2014), of which one million are Indian (Chatterjee, 2019).

Census of India (2011g) data on the share of different modes of transport in total modal use by non-agricultural workers in the country declares that about 23 per cent of the respondents walk, 13 per cent cycle, 13 per cent use private motorized two-wheelers, 3 per cent use four-wheelers, 3 per cent use Intermediate Public Transport (IPT), 11 per cent use bus, 4 per cent use train,

and about 30 per cent of them do not travel to work. According to Wilbur Smith and MoUD (2008), in most Indian cities, the share of public transport in total modal use has declined to less than 50 per cent. In the same study, the modal share in Jaipur was: walking 26 per cent, cycle 13 per cent, motorized two-wheeler 26 per cent, public transport 22 per cent, motorized four-wheeler 4 per cent, and intermediate public transport 4 per cent. A study by Jaipur Metro Rail Corporation Ltd. (2018) finds the following modal distribution in the city, approximately: walking 16 per cent, cycle 6 per cent, bus 18 per cent, car and taxi 19 per cent, two-wheelers 32 per cent, and auto rickshaw 9 per cent.

Brundtland Commission (1987) defines sustainable development as the development which “meets the needs of the present without compromising the ability of future generations to meet their own needs”. “The goal of sustainable transportation is to ensure that environment, social and economic considerations are factored into decisions affecting transportation activity” (Transport Canada, 1999). Litman and Burwell (2006) list the environmental costs created by transportation sector, such as air and water pollution, habitat loss, hydrologic impacts, depletion of non-renewable resources.

In line with the definition of sustainable development by Brundtland Commission (1987), this study defines sustainable mode of transport as that mode of transport which emits the lowest carbon per person, such as walking, cycling or using public transport as compared to the other available modes, such as motorized two-wheelers, motorized four-wheelers or hired taxis, and thereby compromises the least with the needs of the future generations.

Use of non-motorized modes of transport, such as walking and cycling, along with public transport can simplify the intensity of this issue to a large extent. A study by Layton (2002) unfolds how use of private vehicles sheds about twice as much carbon dioxide than public transport per passenger mile commuted. Newman and Kenworthy (1999) also highlight the

role of public transport usage in reduction of fossil fuel consumption. Despite the benefits that this mode of transport offers, its share in overall modal use has shrunk to less than fifty per cent in cities in India (Wilbur Smith and MoUD, 2008). Data released by Census of India (2011g) explores modal share of non-agricultural workers travelling for work purposes in the country. This data finds that it is only about 14 per cent of the workers who make use of public transport. While Wilbur Smith and MoUD (2008) report public transport usage in Jaipur at 22 per cent, Jaipur Metro Rail Corporation Ltd. (2018) find the same as 18 per cent. This study finds approximately 24.59 per cent of the population using the mode.

The declining trend in the usage of public transport in the country can be attributed to multiple factors. Poor infrastructure, which not only causes discomfort but also increased vulnerability to traffic accidents, is an important contributor (Ghate and Sundar, 2008). While public transport has higher ridership of women, their safety is a concern in most of the countries around the world. Studies mention the harassment faced by women while being onboard the public transport (Tripathi *et al.*, 2017) and during the waiting times (Chowdhury and Wee, 2020).

The reason for choosing motorized modes of transport to travel to work has been explained as time-saving in several studies (Horowitz, 1993, Davidov, Schmidand and Bamberg, 2003). However, the results of the current study call attention to the prevailing use of these polluting modes of transport even for non-work/ leisure activities. It is not only the concept of time-saving which calls upon the population to use their private vehicles but also the adaptation of the population to a convenience-loving lifestyle and the inefficiencies in the current transportation system in the city.

1.4 Gender and Travel Behavior: Establishing the Relationship

Gender inequality is the phenomenon by which men and women are treated as unequal. Its presence has been observed in numerous sectors and domains, ranging from inequalities observed in the workplace in the form of pay differences, job stratification or even choice of professional careers and at home in terms of skewed distribution of household chores (Friedman and Marshall, 2004).

World Economic Forum publishes a global gender gap report every year as an indicator of the current situation of this phenomenon worldwide. The calculated index is based on values of economic participation, educational attainment, health and survival and political empowerment. In 2021, while Iceland is reported as the best performer with a score of 0.892, Afghanistan is reported as the worst with 0.444 as its score. India is on the mid-way in this ranking, with a score of 0.625 (World Economic Forum, 2021). Gender Inequality Index, which is another indicator of the same phenomenon, considers reproductive health, empowerment and labour market participation as its three critical dimensions. This index reports Switzerland as the topper on the list with GII value of 0.025 and Yemen as the worst performing country having 0.795 as its score, in 2019. India has a score of 0.488 and a ranking of 123 out of 162 in this global ranking index. Findings of both these indices point out that African, Asian and certain Latin American countries are the worst hit (United Nations Development Programme, 2020).

Because urbanization can widen the whole gamut of economic opportunities for the otherwise not so privileged group, especially women, analysis of commuting behavior segregated by area and gender is a key prerequisite for effective policy-making trying to achieve social equity along with gender equality.

Not only is gender equality a human right but also promotion of this equality checks violence against the oppressed sex while also promoting economic prosperity of household and the nation. Empowerment of women does not simply mean the provision of basic human rights to women but building an environment which secures complete independence in making use of these rights and where there is no discrimination between men and women (Chakrabarti and Biswas, 2012). Therefore, mobility is critical for empowerment of women (Mahadevia, 2015). But absence of convenient and affordable transport option is a major stumbling block in fulfilling this idea. Mobility is also determined by gender. In India, where two-wheelers are an integral part of privately-owned vehicles, there are a small number of women using them (Mahadevia and Advani, 2016). The low demand for transportation services by women is universal (Anand and Tiwari, 2007; Mahadevia and Advani, 2016). Their contribution to environmental footprint is also correspondingly lower than men (Matthies *et al.*, 2002; Xiao and McCright, 2015). Mobility and gender, therefore, share a synergic relationship (Hanson, 2010).

Gender studies on development reveal disproportionate burden of household responsibilities on women. The fact that women need to multitask affects their travel behavior. Literature reveals that women usually travel distances which are shorter than men (Anand and Tiwari, 2007), take modes of transport which are not only cheaper but also safer (Mahadevia and Advani, 2016), travel less frequently, and the purpose for which they travel also differs from that of men. While there exists literature which proves the existing gender differentials in travel behavior in the developed world, there are not many studies in developing countries, especially those in the cities in India which highlight the travel behavior from this perspective.

Existing studies conducted in developed and developing economies conclude that with better socioeconomic conditions, individuals tend to be more dependent on non-motorized modes of travel and are less dependent on public transport or walking and cycling. To the best of our

knowledge, any similar study examining the gender differences in impact of socioeconomic factors on choice of travel mode has not been conducted in Jaipur. Jaipur is not only one of the most populous cities in India (Census of India, 2011e) but also one of those cities which have the highest rates of crimes against women (Narayan, 2020).

There exist gender differences in the damage caused to environment, concern for it, willingness to adapt to changing conditions and vulnerability for it. Studies claim significant differences in level of carbon dioxide emissions from men and women's mode of transport (Carlsson-Kanyama *et al.*, 1999). Women are usually more concerned for the changing environmental conditions and more willing to adapt to them (Momsen, 2000; Yadav and Lal, 2018). This present study displays the difference in preference between men and women for mode of transport used by them in the city and the village to hint at the differences in pollution created and the simultaneous differences in concern for environment.

1.5 Objectives

- To study the gender differentials in travel patterns in urban and rural settings in India.
- To examine how the gender differences in different measures of travel pattern change within and between different socio-economic groups.
- To provide policy suggestions for gender-sensitive transport planning by understanding the gender differences in travel patterns.

1.6 Structure of the Thesis

The remainder of this thesis comprises of four chapters which have been organized as follows:

Chapter 2 provides a review of existing literature on the topic. It reviews literature defining travel behavior, the trends in travel behavior in developed and developing economies of the world, in rural and urban areas, gender differences in impact of different socio-demographic

and socio-economic factors on travel behavior and also reviews the issue of gender-sensitive transport planning.

Chapter 3 works as a sketch of this thesis. It gives details about the research process and research framework of the study. It discusses the research techniques which were employed during the study to fulfil our outlined research objectives.

Chapter 4 of this study is about the analysis of empirical results. It discusses the variables employed in the study, the data sources, the actual research framework and the obtained results of the study.

Chapter 5 summarizes the thesis by giving a description of the findings of the study, recommendations of the study for the policy-makers, novelty of the work done, limitations of the study and the future scope of work.



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