

**Moving Millennials:
The Transit Experiences of
Young Adults Living in
High-Rise Suburbs of Toronto**

**by
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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

In light of increasing traffic congestion issues and environmental concerns, initiatives aiming towards the reduction of automobile use have been key in planning for modern communities. Strategies to encourage higher use of public transit are uncommonly applied in suburban contexts and there has been a gap in qualitative research within the transportation literature. Thereby, this study complements this body of works by using a mixed methods approach to understand the transit experiences among inner-suburban young adults living in rental high-rises of Toronto.

Through secondary analysis of the Transportation Tomorrow Survey (TTS) dataset and a series of semi-structured interviews, the study's objectives are to (1) identify elements of the transit system that are working well and those that need improvement, (2) assess whether the current transit network is sufficient in meeting the needs of high-rise suburban residents, and (3) provide recommendations on how to improve transit serving high-rise suburban residents. The study area depicts 2 inner-suburban neighbourhoods, namely Don Valley Village and Crescent Town.

Research findings suggest that the target population is among those most dependent on transit. Although most participants have an overall positive transit experience, they identify elements of the transit system that need improvement reflected upon measures of transit access, service, facility, cost, network, and support. In conjunction with technical enhancements, several policy recommendations are suggested, which include exploring further financing options, ensuring an equitable transit system, and improving transit service and facility. Conclusions from this study can help to inform planners and decision makers on strategies to improve public transit in the suburban context.

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“Educating the mind without educating the heart is no education at all.”

- Aristotle

1. INTRODUCTION

1.1 Research Context

In light of increasing traffic congestion issues and environmental concerns, initiatives aiming towards the reduction of automobile use have been key in planning for modern communities. Post world-war II developments, centered upon urban sprawl and the construction of extensive highway networks, have led to high reliance on cars for mobility purposes. With increased concerns for the environment due to inefficient land use and excessive greenhouse gas emissions, city stakeholders have aimed to promote higher use of public transportation systems.

Although cities have incorporated initiatives to enhance walking, cycling, and transit infrastructures, planners and policy makers have focused their attention on improving urban areas, but fail to facilitate them in suburban contexts. Strategies aiming to increase the livability of communities, such as implementation of complete streets, have been applied within the downtown core but are lacking in the suburbs. Subsequently, the suburban landscape is conducive to high dependence on the car that is a result of continuous development catering towards its convenience.

High car dependence in many suburbs is worsened by the lack of rapid transit infrastructure availability and the overreliance of bus service, which tend to lengthen commute times. A case study showing a lack of rapid transit availability in its old suburbs is the city of Toronto. Martin Prosperity Institute (2011) released a report that outlined Toronto's transit deserts, which are mostly concentrated within the inner suburbs. There is a wide disparity in transit connectivity between the downtown core and suburbs, as the downtown core is 15 times more connected than other parts of the city. This significant gap represents the variation of transit

availability between the two urban realms, which contributes to higher car dependence for suburban residents.

Transit inequity, as described above, is complemented by a widening gap in average income between the two urban realms. The Martin Prosperity Institute (2011) report identifies a positive correlation between income and transit accessibility by making a reference to Hulchanski's (2010) Three Cities report. More specifically, neighbourhoods located in City 1, which experienced the highest increase in average household income between 1970 and 2005, have greater transit connectivity than City 3 neighbourhoods, which experienced the most drastic decrease in average household income. Additionally, the report identifies a large concentration of low-income immigrants living in densely populated, high-rise neighbourhoods within City 3. While car use is the prominent mode of transportation among suburban residents, these recent immigrants largely rely on transit for most if not all of their commute. This observation suggests that inner suburban communities are not only lacking rapid transit infrastructure but they are occupied by a large concentration of low-income residents who are dependent on transit. Aligned with literature on transit equity, it is important to remove structural obstacles related to accessing economic and social opportunities that is caused by the inability to mobilize within the city (Hertel, 2015).

1.2. Purpose and Objective of Research

The purpose of this study is to analyze the transit experiences of suburban residents living in high-rise rental apartments and to understand the conditions of the existing transit service. Analysis includes identifying elements of the transit system that are working well and those that need improvement. Additionally, demographic and travel behaviour data of the target population are examined, such as employment status, primary mode of transportation, and possession of a

driver's license. These among other variables are cross-examined in order to generate an understanding of their transportation needs. More specifically, the research question is the following:

What are the transit experiences of suburban high-rise residents in Toronto?

To be more specific, the study focuses on neighbourhoods that have large concentrations of high-rise rental towers taking part in the Tower Renewal program and in close proximity to a rapid transit station. These criteria are chosen in order to understand whether high reliance of bus service persists despite living in close proximity to a rapid transit station. These assumptions are used to answer the following sub-questions:

- 1. Is the current transit network sufficient in meeting the needs of suburban residents?**
- 2. How can public transit serving high-rise residents in suburban neighbourhoods be improved?**

Participants aged 18 – 35 are taken as consideration for this study. This age group represents the majority of persons in and entering the working age, which collectively tend to have the highest number of trips in a day in terms of total time and frequency of travel. In terms of income, they have the lowest earning in comparison to other working adults. Thus, we may assume that this age group has a higher reliance on transit due to unaffordability of owning a car, as confirmed by previous studies indicating the positive correlation between car ownership and income levels (Nobis, 2007; Simsekoglu et al., 2015).

Moreover, this age group represents the millennial generation, who in majority holds a different perspective towards public transportation in comparison to previous generations. An article identified rising transit ridership in North American cities due to a disproportional increase in ridership among the millennial generation (Goodyear, 2014). Multiple studies

indicate that they take fewer and shorter car trips, and are more likely to use alternative modes of transport such transit, walking and cycling (Polzin et al., 2014; Blumenberg et al., 2012). They are also more likely to combine multiple modes of transportation over the course of a day or a week (Duznik et al., 2014, Kuhnimhof et al., 2012). Among many, these trends may be a result of socioeconomic shifts, lifestyle preferences, technological advancements, and policies that discourage driving (Duznik et al., 2014). Nonetheless, a large body of literature on millennials indicates that they are less car-oriented and are increasingly shifting away from car travel.

The geography of millennials is strongly associated with higher density housing, walkable neighbourhoods, and higher transit connections (Moos, 2014), which closely define inner city neighbourhoods. Their preference to live in urban centres stem from job prospects, lifestyle choices, and entertainment amenities. Nonetheless, it is important to understand the variation among millennials, as a large percentage of them are unable to afford living in urban cores despite their preference. This study aims to enhance an understanding of low-income suburban millennials, who are often overlooked within the literature.

1.3 Study Location

For feasibility purposes, the study area is narrowed down to a few residential locations using two geographic criteria, which are: 1) high concentrations of high-rise rental apartments part of the Tower Renewal Program and 2) close to a rapid transit station. These criteria are chosen in order to analyze whether the current transit service is effectively serving a population who is most dependent on it. Additionally, the chosen locations have the density to service a rapid transit line, which is used to assess whether current rapid transit lines accommodate the travel needs of residents. The following two locations are chosen as study areas:

- Don Valley Village (Don Mills subway station)
- Crescent Town (Victoria Park subway station and Danforth GO station)

1.4 Methodology and Expected Findings

The methodology of this research project follows closely to a study that analyzes the settlement patterns of Sri Lankan Tamil immigrants in Toronto (Ghosh, 2015). The similarity of these two studies stems from the type of information that is acquired. Both assess the experiences of their subjects and identify in-depth reasoning behind their choices. For this reason, the main method that is used in this research is a series of in-depth interviews.

This research uses a mixed-method approach consisting of two sources. The first is through an analysis of tabulated data acquired from the 2011 TTS database. The data examines demographic and travel characteristics of residents based on specific traffic analysis zones. This is to provide a broad overview of the target population, while it is compared to the rest of the city. The second source is through a series of in-depth interviews, which aims to understand residents' experiences of the transit system. The targeted interview participants are young adults aged 18 – 35 who are living in one of the towers within the study area.

The main findings of this research provide an overview of the target population and evaluate the current transit system based on multiple criteria including access, service, facility, cost, network, and support. The goal of this research is to find strategies to enhance public transportation in the inner-suburbs of Toronto by understanding their travel needs and experiences. Its conclusion could be used to assist planners and policy makers to enhance strategies to improve public transportation in the suburbs.

1.5 Overview of Thesis

This thesis is comprised of 6 chapters, which detail the motivation, methodology, findings and implications of the research questions. Chapter 1 outlines the motivation and purpose of research, as well as the specific research questions addressed and the goal of study. Chapter 2 comprises of existing literature supporting the research, including topics on post world war 2 suburbs, Toronto's declining inner-suburbs, transit system, and immigrant community, the shifting travel pattern of millennials, and the evaluation of travel behavior and transit experience. Chapter 3 describes the methodological approach and its justification, including the process of data collection and analysis. It also defines the study areas and explains the ethical considerations, research validity and limitation of methods. The findings of the research are reported and analyzed in chapter 4 and 5. Finally, chapter 6 summarizes the research, provides recommendations, and highlights possible areas for further investigation.

2. LITERATURE REVIEW

2.1 The Suburban Landscape

2.1.1 Defining Suburbs

What are the boundaries of a suburb? According to Forsyth (2012), it could be defined based on its physical dimension. This may relate to their geographic location that are typically situated in peripheral locations within reach of the core city, as well as built environment characteristics of low-density developments that are car-centric. Suburbs could also be defined based on its function, such as activities carried out within the space (ie. how people use and access the space) (Forsyth, 2012). Another definition relates to its social dimension, which is based on how residents interact with each other politically and culturally (Forsyth, 2012). Other distinctions of a suburb include its demographic make-up (ie. age/family status, income, ethnicity), time period, and density (Gober and Behr, 1982; Flint, 2006; Johnson, 2006).

The physical dimension of a suburb has evolved over time. Suburbs in the prewar era (built before 1945) are constructed within walking distance from central cities while “streetcar” suburbs are also built during the later part of this period (Gordon & Janzen, 2013). These suburbs are mainly made up of single detached homes and are diverse, as they are occupied by groups of varied status. By the end of World War II, a push from government agencies for mass housing construction along with increased access to mortgage credits resulted in construction surges of low-density single-family housing developments at the periphery of central cities. These suburbs are primarily built for residential purposes and are segregated from other land uses to accommodate inner city residents in search of new

living quarters away from the deteriorating industrial city. They were built in conjunction with large-scale expressways and “big box” commercial strips, as the car was becoming more prominent. This movement had resulted in widespread design of residential units and neighbourhoods that are catered to the car.

Notions of post-suburbia arose more recently in support of intensification policies, which is known as the new urbanism movement. These suburbs are constructed in consideration of mixed land-use with the inclusion of retail and office spaces (Forsyth, 2012). There is also emphasis on higher density development and pedestrian friendliness, as well as variation in the type of residential dwelling (Hodge & Gordon, 2014). The aim of these strategies is to encourage self-sustaining neighbourhoods with an emphasis on bringing back social values in order to enhance the liveability of communities.

Within these built timeframes, scholars have continuously attempted to classify the variation of suburbs. Walks (2004, 2005) defined the inner city, inner suburban, and outer suburban neighbourhoods based on urban form and the time period they were built in. Others such as Gordon and Janzen (2013) distinguish suburbs through the common mode of transportation, differentiating between auto and transit suburbs. Despite its many definitions, it is important to understand their variation to understand the significant impacts their characters have on transportation behaviour of residents.

2.1.2 Automobile Dependence

In conjunction with the development of post-war suburbs, a trend of decentralization of the metropolis has resulted in increasing dependence on the car (Beauregard, 2006). Post World War II urbanization supports widespread developments of auto-centric infrastructures,

which expanded car-use in low density dispersed urban forms (Mendez et al., 2015). At the same time, the rate of car ownership was on the rise and cars became symbols of “freedom, individuality, and progress” (Gartman, 2004, 180). As a result, these forces facilitated the growing urbanization of North American cities beyond those built around transit lines (Land et al., 2006).

Growing suburbanization is associated with increasing everyday travel for commuters (Kaufmann et al., 2004). Significant portions of residents in North American cities commute longer than one hour each trip, especially in larger metropolitan centers (Mendez et al., 2015). In addition, there is a strong negative correlation between average commute duration and the proportion of car-driving commuters. In other words, those who drive to work have lower average commute times than those who take alternative modes of transportation (ie. public transit) in an auto-centric city (Gordon et al., 1991). Taylor and Ong (1995) coined this concept as “auto-mobile mismatch”.

There are multiple negative implications to designing neighbourhoods catering to high car dependence. First, it is harmful to the environment as car emissions significantly contribute to the rise of greenhouse gas emissions. A report indicates that transport activities are the highest contributor of greenhouse gas emissions, as they are responsible for 23% of the world’s greenhouse gas emissions (FCM, 2013). Second, it delays mobility within the urban realm, as there is a rise in traffic congestion issues in many metropolitan cities in North America and around the world. This has resulted in increasing average commute times for many residents, which additionally contributes to increased levels of greenhouse gas emissions.

Moreover, there are negative health implications to auto dependent neighbourhoods. Suburban developments catering to car dependence provide a lack of opportunity for its residents to engage in active transportation, such as walking and cycling. This contributes to increased health issues amongst suburban dwellers, as studies indicate that residents living in walkable neighbourhoods are less likely to be overweight or obese (Frank et al., 2004; Ricklin & Musiol, 2012). Living in pedestrian friendly neighbourhoods increase the opportunity for residents to take part in physical activities, as residents are more likely to consider walking and cycling as part of their trips.

Although these pieces of evidence suggest the negative implication of highly dependent automobile neighbourhoods on communities, cars are still the dominant mode of transportation and built environments still cater to their use (Filion, 2003). Strategies encouraging active transportation and transit services should be further promoted in suburban contexts in order to limit the negative implications of being car dependent.

2.1.3 Spatial Mismatch of Home and Work

Patterns of spatial mismatch have existed and evolved over time in North American cities. In post-war cities, the working poor and low income were concentrated in inner cities, as they worked in factories located in the city center's industrial areas. However, decentralization of these factories to the suburbs created a "spatial mismatch" between the worker's home and place of work (Mendez et al., 2015). When factories were relocated to the urban fringes where public transit was infrequent or even nonexistent, low-income workers were forced to drive to their workplaces although many were unable to afford cars.

Several employers also preferred to hire local employees living in the suburbs, which exacerbated the issue (Mendez et al., 2015).

These events co-existed with the introduction of a “commuting paradox” – a term coined by Gordon et al. (1991). They find that the decentralization of the workplace and rising popularity of cars contributed to the decline in average commute times. They claim that the dispersal of workplace and growth in housing supply in the suburbs increased the possibility for workers to move to homes closer to their workplace. They believe that households and businesses relocated depending on the locality of the workplace. Through this assumption, workers who lived far from their workplaces were expected to drive to work. However, it does not take into consideration that some workers were unable to afford cars and therefore were unable to access these jobs or were heavily reliant on other modes of transport.

The evolution from a Fordist, or post-war city, to a post-Fordist era has shifted the focus of industrial sectors from manufacturing to services, which subsequently affects the commute patterns of workers. North American cities experience reductions in manufacturing jobs that are replaced by producer services (ie. tied to financial sectors, insurance, and real estate) as well as significant growth in knowledge-based industries. They have become leading sectors and are sources of employment growth concentrated in city centres (Scott, 2008). This has led to the decentralization of manufacturing employment to the suburbs, which increases the proportion of jobs in suburban areas. Although commutes to central cities have persisted over time especially in many Canadian metropolitan regions, “the fastest

growing form of commute is that between one suburb and another” (Mendez et al., 2015:108).

Revitalization of the downtown core, a widespread movement during the post-Fordist era, has led to improved conditions of city centers. As a result, young professionals begin to move to the downtown core causing displacement of inner city residents and rising home prices. Those unable to afford homes in the downtown core look for cheaper housing options located in urban fringes of the city. This leads to deeper polarization of property values between inner cities and older inner suburbs, which became concentrations of housing settlements for the low-income (Skaburskis and Moos, 2008).

As the city experiences deeper geographic polarization of high and low-income jobs, there is increasing inequality persisting between neighbourhoods (Walks 2001; Marcuse and van Kempen, 2000). Unemployed, manufacturing, and low-skilled workers opt to move to the suburbs for cheaper housing options and to be in closer proximity to manufacturing and low-skilled jobs. At the same time, the federal government was accepting influxes of new immigrant families into Canada, and a large proportion of them end up settling in the suburbs for similar reasons.

Growing spatial mismatch of employment is coupled with uneven distribution of transportation networks, which lead to greater polarization of accessibility across the city (Mendez et al., 2015). Those living in urban areas typically enjoy greater access to multiple modes of transportation. Increasingly, young professionals who are employed in high skill jobs have higher preferences to live in urban areas and are more likely to commute using alternative modes of transportation despite having high car accessibility (Danyluk and Ley,

2007). This indicates that living in urban areas does not necessarily mean that there is less car dependence, especially among dual income households (Jarvis, 2005). This is what Kaufmann (2002) and Urry (2007) call “motility capital”, which suggests that those with higher motility capital are characterized as having more options for mobility (ie. owning a car while still living close to transit in cycling and walking-friendly neighbourhoods). Families with higher levels of motility capital typically have greater access to amenities and opportunities, as they have the freedom of choosing between multiple modes of transportation and are able to commute longer distances (if they choose to).

The lack of transit infrastructure connecting suburban communities exacerbates issues in relation to employment access. During the post-war era, the objective of constructing commuter rail lines is to connect the suburbs and inner cities (Mendez et al., 2015), as commute distance is highest amongst high-status employees living far from employment clusters (Shearmur, 2006; Mendez et al., 2015). Notably, this worsens the transportation issues many suburban residents are faced with today, as existing rail lines do not accommodate travel between suburbs. Although many employment opportunities serving low-income residents are located in the suburbs, the homes of workers and their workplace are not necessarily located in the same suburban neighbourhood (Wachs and Taylor, 1998; Ong and Blumenberg, 1998). Thereby, residents are expected to travel between the suburbs by car and those unable to afford a car have two options – 1) decline an employment opportunity and 2) rely on long commutes by bus service.

Ultimately, those who are unable to afford living downtown have to commit to long commutes and are more likely to be dependent on the car, which create wider gaps of spatial

mismatch. This coincides with evidence found in Hulchanski's Three Cities Report (2010), where downtown and suburban communities are increasingly segregated by income. It is argued that spatial mismatch is not only affecting low income or visible minority groups residing in central cities but it is also affecting suburban residents (Houston, 2005; Gotlieb and Lentnek, 2001).

2.2 Toronto's Transit Equity

2.2.1 TTC – Before and Now

The Toronto Transit Commission was established in 1920 to operate municipal transit service across the city. It had amalgamated multiple privately owned companies, which previously operated transit service in Toronto. One of the first modes of transit serving Toronto in the 1980s was a series of horse-drawn streetcar carriages followed by electric streetcars soon after (TTC, 2015). However, increasing street congestion strained road and streetcar networks during World War II. The city came up with a solution, which was to construct a subway line. The purpose of the subway line was to provide mobility for residents living in the downtown core to their workplaces, which were located just east and west of Yonge Street. Preliminary studies and planning of a new subway line started in 1943 and construction began in 1946 (TTC, 2015). The Yonge subway line opened in 1954, and rapid development of the subway system occurred between the 1960s and 80s. This included the expansion of the Bloor-Danforth line, the University line, and the Scarborough RT. The most recent addition occurred in 2002 with the opening of the Sheppard line with a purpose to connect North York residents to the downtown. These expansions were results of urbanization of the city beyond the downtown core boundaries (TTC, 2015).

The current issue with Toronto's transit system is the lack of extensive network of its rapid transit. Between the 70s and 90s, Toronto was praised to have one of the best transit systems in the world, as the city was able to link transit with development effectively (Saxe, 2014). However, since then the city has stopped expanding its network due to changes in political structure, budget cuts, and economic instability that hinder further development of subways (Saxe, 2014; Bow, 2015). Subsequently, the subway system is currently undergoing a lack of maintenance and operating below their potential. For instance, during rush hour, the Yonge-University-Spadina subway line carries 34% passengers below the design capacity (Haider, 2014). The subway system is designed to be able to run more than 30 trains per hour, but it is currently operating less than 23 trains per hour (Haider, 2014). The main reason is due to a lack of track maintenance, which hinders subways to run at their optimal speed. Awareness of this issue has been raised, as one of the main topics during the recent mayoral election in 2014 had to do with the expansion of the transit network. Nonetheless, it is equally important to focus on the maintenance of existing infrastructure as it is to expand the service.

Currently, Toronto has plans to expand its existing rapid transit network. These extensions are designed, managed and operated by Metrolinx, a regional body, and construction is funded by the provincial body as part of their \$8.4 billion commitment to transit expansion in Toronto in addition to the federal government's \$4.8 billion (Metrolinx, 2017; Jones, 2017). One major addition expected in the near future is the Eglinton Crosstown Light Rail Transit (LRT) connecting the eastern and western part of the city, which spans 19 kilometers from Mount Dennis to Kennedy Station. It is currently under construction and

expected to be completed in 2020 (Metrolinx, 2017). Another project currently underway is an eastern expansion of the Sheppard LRT line. This adds an extra 13-kilometer connection from Don Mills Station to Morningside Avenue, primarily designed to serve Scarborough residents. Funding has been approved and construction is to begin in 2021 (Metrolinx, 2017). The third rapid transit expansion is to serve the western end of Toronto's suburb. This 11-kilometer LRT line will run along Finch Avenue West from Keele station to Humber College. It is fully funded and approved, and construction of this line started in 2016 with planned completion by 2021 (Metrolinx, 2017). Moreover, Metrolinx proposes to build a Relief Line, which aims to ease congestion on the Yonge subway line. The details are not clear on this particular project, as planning is still underway (Metrolinx, 2017).

Another transit development includes the integration of the PRESTO card within Toronto's transit system. This new system of payment integrates multiple transit systems and allows commuters to interchangeably take the GO and York Region transit using the same method of payment (Metrolinx, 2016). As well, the Union Pearson Express began operation in 2015 connecting Toronto's International airport and its central station (Metrolinx, 2017). Ultimately, these mega projects suggest that the city is acknowledging the lack of transit expansion in the last few decades, and is currently working to improve its system.

2.2.2 Transit Gap

Geographically, the current rapid transit network in Toronto provides connections from suburbs to the downtown core. With rising employment opportunities in the suburbs, the current rapid transit system fails to consider commute from one suburb to another (Thompson and Matoff, 2003). In place of a rapid transit line, large fleets of buses serve

suburban pockets. However, they are less efficient and contribute to longer commute times for those dependent on this type of transport. This generates questions of equity in accessing transit service.

Toronto's transit desert – areas lacking transit service – is illustrated in the Martin Prosperity Institute report (MPI, 2011). It highlights higher levels of transit connectivity within the downtown core. The gap of transit connectivity between the downtown and the suburbs is represented as 15 to 1, with the downtown core being 15 times more connected than the inner suburbs (MPI, 2011). The method used in this report considered the mode of transit, with subways weighing higher than streetcars followed by buses. Additionally, this report describes a positive correlation between income and transit accessibility, where neighbourhoods with the highest average household income have higher transit connectivity than neighbourhoods with the lowest average household income (MPI, 2011). This finding correlates with Hulchanski's (2010) Three Cities Report, which claimed that City 1 – identified as Census Tracts with the highest percentage increase of average individual income between 1970 and 2005 – has the highest accessibility to transit in comparison to City 2 and City 3 – defined as Census Tracts with lower percentage growth in average individual income, with the latter in negative growth.

Interestingly, there is a contrasting study (Foth et al., 2013) that suggested the nonexistence of transit inequity across Toronto, implying that the most socially disadvantaged residents have better accessibility to transit and have shorter commute times. The authors may have failed to consider geographic shifts in employment opportunities that are growing in the suburbs, where living in close proximity to a station does not necessarily

mean better access to employment (Thompson and Matoff, 2003). An alternative explanation may be that those most socially disadvantaged settle for employment that are in close proximity to their home because they are juggling multiple part-time jobs and household responsibilities. Hence, they are unable to access better employment opportunities that require long commutes due to time constraints.

The high concentration of low-income residents within inner suburban communities contributes to their transportation problems. Most are unable to afford private vehicles, thereby they are highly dependent on public transit service. This results in buses serving these neighbourhoods to operate at high (if not over) capacity and to be prone to run behind schedule (Spurr, 2015). In addition, these residents often hold precarious jobs that do not follow the typical 9 to 5 schedules. Many work at irregular hours and suffer longer commutes as transit service are less frequent during off-peak hours. These are the conditions experienced by many low income residents living in Toronto's inner suburbs, and intervention to these trends are needed to overcome transit equity issues.

2.3 Toronto's Immigrant Population

2.3.1 Suburban Residents – Who Are They?

As Canada opens its doors to immigrants from around the world, Toronto became one of the gateway cities alongside Vancouver and Montreal to accept the largest proportion of newcomers. Within these cities, patterns of immigrant settlement have shifted over the years. Tracing the historic settlement of recent immigrants in North America indicated that the first wave of settlement, which consisted of European immigrants, occurred in urban centres. They eventually moved to the suburbs as they experienced upward mobility (Kataure &

Walton-Roberts, 2015). The settlement pattern of second and third wave of immigrants, which consisted of a greater proportion of visible minorities, was based on voluntary clustering whereby they settled amongst people of their ethnic background (Kataure & Walton-Roberts, 2015). What stood out amongst the third wave of migrants was the large amount of capital that they brought into Canada. In comparison to previous waves of settlement, third wave migrants were able to directly reside in the suburbs (Kataure & Walton-Roberts, 2015). The large amount of visible minority migrants settling amongst people of similar ethnic background contributed to the notion of “ethnoburbs” in which communities within the suburbs were increasingly becoming identified by a single ethnic group (Li, 1997).

With large influxes of immigrants settling in Toronto, the city simply became one of the most ethnically diverse cities in the world. By 2006, approximately half of its residents are foreign born, as Toronto became home to 30% of all recent immigrants and 20% of all immigrants in Canada (City of Toronto, 2017). Moreover, Toronto’s rich diversity is reflected by more than 200 distinct ethnic origins. Today, over 47% of residents categorize themselves as being part of a visible minority group, while the top 5 include South Asian, Chinese, Black, Filipino, and Latin America (City of Toronto, 2017). There are over 140 languages and dialects spoken in the city with over 30% of residents whose mother tongues are not the official languages of Canada (City of Toronto, 2017). Although the city prides itself on its diversity, obstacles to employment as a result of limited English skills and the dismissal of foreign credentials hinder immigrants to completely settle in the city.

The demographic make up of immigrants is that they are highly skilled and well educated, as the largest share of points in Canada's immigration points-based system is allocated to education and knowledge of official languages. To put this into perspective, about 42% of all immigrants entering Canada between 2001 and 2006 hold a university degree in comparison to 16% among the Canadian-born (King, 2009). Nonetheless, despite having higher levels of education, labour force outcomes of these selected immigrants are much lower. They typically have higher unemployment rates and lower income earnings than their Canadian-born counterpart even after a long period of residence. These observations are highly prominent in the three largest immigrant-receiving provinces, with Ontario being one of them (King, 2009). The lack of access to opportunity has led many immigrant families to fall into poverty across Canadian municipalities.

This snapshot of immigrant demography is consistent with the characteristic of immigrants found in Toronto. A study by Metcalf Foundation found that working-age immigrants are over represented among the working poor, which is defined as individuals who are employed and yet still live in poverty even through they work a comparable number of hours to the rest of the working age population (Stapleton et al., 2012). In the Toronto region, approximately 73% of the working poor come from abroad (Stapleton et al., 2012). The study also suggested that the percentage of the working poor increased by 39% between 2000 and 2005. Consistently, the geographic distribution of the working poor reflected the findings in Hulchanski's Three Cities Report, where they are concentrated within the inner suburbs in City 3 neighbourhoods (Stapleton et al., 2012). Furthermore, the report described that a larger percentage of the working poor have occupations in the sales and service

sectors, tend to be younger than the working-age population, and are less likely to own their homes (Stapleton, 2012). These descriptions of the working poor illustrate similar features defined in Hulchanski's Three Cities Report (2010), and match the characteristics of individuals living in transit deserts within inner suburban communities.

2.3.2 High-rise Residents

The construction of high-rise apartments in Toronto escalated between 1945 and 1984, with most developments occurring between 1960 and 1980. There are over 2,000 apartment towers in the Greater Golden Horseshoe (GGH) region as a result of planning policies encouraging the construction of higher density apartment clusters in new suburban communities (Stewart & Thorne, 2010). 60% of high-rises in Toronto are located within inner suburban neighbourhoods (United Way, 2011). Over the years, high-rise apartments became popular places of residence among immigrants, as trends indicated a tendency of affluent immigrants settling in outer suburban communities while less affluent ones in low-cost high-rises in the older inner suburbs (Lo et al., 2011). As the proportion of immigrants increased in the city, these tower clusters also experienced growth in population density. Based on census data, the population density almost doubled between 1981 and 2006 (United Way, 2011). As of 2010, approximately 48% of the city's renters lived in such neighbourhoods (Stewart & Thorne, 2010).

Furthermore, apartment towers have experienced a decline in average household income, as they are increasingly becoming sites of poverty (United Way, 2011). To put it into perspective, approximately 30% of the city's poor households occupy this type of housing in 1981 in comparison to 43% in 2006 (United Way, 2011). Studies have shown that

poverty is becoming highly concentrated in these towers when examining income levels of the neighbourhood. In 2006, 47% of all apartment renters paid more than 30% of their income on rent as a result of declining income and higher rental costs (United Way, 2011). Moreover, Stewart and Thorne (2010) concluded that these tower clusters are closely linked to areas of social need. They showed that 77% of all apartment clusters in the Greater Golden Horseshoe (GGH) region were located in areas of high or very high social need, while only 12% are in low or very low social need designated communities.

Additionally, the location of tower clusters exacerbates social issues and hinders inhabitants from taking part in employment opportunities. First, there is a lack of rapid transit serving tower apartment neighbourhoods and most residents rely on local bus service, as only 17% of them are located in close proximity (within 500 meters) to rapid transit stations (Stewart & Thorne, 2010). Meanwhile, these people have higher dependence on transit as well as walking and cycling to perform their daily activities in comparison to other residents in the GGH region (Stewart & Thorne, 2010; Hess & Farrow, 2011). As a result, residents are unable to optimally partake in employment and other opportunities located far from their homes unless they are willing to commit to long commutes by transit.

Although walking is one of the most common modes of transportation, pedestrian travel was not considered within the design in many of these neighbourhoods. A walkability study of tower neighbourhoods concluded that residents face hostile walking environments within their apartment complex and its surrounding area (Hess & Farrow, 2011). Many of them are located close to strip malls and shopping centers, but pedestrian routes to these centers from individual buildings are “often indirect, rely on paths across private land,

necessitate crossing large roadways, and lack basic infrastructure such as paving and lighting” (Hess & Farrow, 2011, 10). The lack of walking-friendly environments is a result of post-war planning models with the assumption that the car is the primary mode of travel. Often, these apartments abut large arterial roadways, with few crosswalks and traffic lights, initially designed to move vehicles efficiently but are now used by multitudes of pedestrians.

Moreover, the aging of rental apartments and lack of maintenance contribute to the deterioration of infrastructure. Reports of ventilation problem, elevator breakdown, and pest infiltration are common within these rental units (United Way, 2011). However, the greatest issue with their physical structure is the low efficiency of energy use in the buildings, as towers were constructed at a time when energy resources were cheap, (United Way, 2011). Stewart & Thorne (2010) have shown that apartment towers are the highest users of energy among all housing types in the Toronto region, as it approximately requires 25% more energy per square meter compared to single detached homes to make the units functional.

Due to deteriorating physical conditions of buildings and the lack of proper infrastructure serving tower neighbourhoods, the city has launched the Tower Renewal Program as an initiative to improve conditions of these towers and their surrounding areas. Using a complete bottom-up approach, the aim is to enhance environmental, social, and economic conditions of Tower neighbourhoods (Stewart & Thorne, 2010). Upgrades to buildings include the addition of insulation and efficient heating systems to reduce greenhouse gas emissions (City of Toronto, 2011). Other strategies include improving pedestrian environments and enhancing accessibility to amenities and services (City of Toronto, 2011), as well as implementing Ontario’s Poverty Reduction Strategy by expanding

on social programs, such as Parenting and Family Literacy Centres, Ontario Early Years Centre and After School Programs, and the Newcomer Settlement Program (Stewart & Thorne, 2010). Ultimately, the goal of the Tower Renewal Program is to enhance the livability of Tower neighbourhoods that are home to a large proportion of Toronto's immigrant community.

2.4 Travel Behaviour and Mode Choice of Millennials

2.4.1 Millennials vs. Baby Boomers

It is worth noting that the millennial generation has different perspectives towards public transportation than baby boomers. Transit ridership has recently surged in North American cities, which is mainly due to a disproportional increase in ridership amongst the millennial generation (Goodyear, 2014; Polzin et al., 2014). This age group is increasingly using transit and delaying the acquisition of a driver's license despite suburban upbringings (Goodyear, 2014). These pieces of evidence indicate that millennials are slowly turning away from car dependency, which complement their pattern of higher preferences of living in high-density urban neighbourhoods. Given their residential location, young adults tend to travel shorter distances, make fewer trips, and are more likely to use alternative modes of transport, such as walking and cycling (Polzin et al., 2014; Cao et al., 2009; Blumenberg et al., 2012). Interestingly millennial commuters are also more likely to drive alone to work as opposed to carpooling and using transit when compared to similarly aged workers from previous generations (Blumenberg et al., 2012). This may point to higher proportions of older millennials' travel pattern that occupy full time employment positions. Naturally, there

are multiple factors behind mode choice and travel behavior among millennials, and some will be discussed in the next section.

2.4.2 Millennial Travel Behaviour

2.4.2.1 Social Class and Labour Market

It is somewhat self-explanatory that the number of trips a household makes is contingent upon economic factors such as household earnings and employment status of individual members. A global event that showcases this phenomenon is the recession in 2008, in which travel data clearly shows a decrease in the number of trips among US young adults in the 2000s from the 1990s (Blumenberg et al., 2012). Reasonably, individual income and social class are also determinants of travel distance, whereby a higher earning is associated with car availability and allows one to participate in activities, which often requires long distance travels (Polzin et al., 2014). In addition, higher income levels are strongly associated with driving alone to work (Blumenberg et al., 2012). In other words, as an individual's earning increases, the probability of commuting by other mode choice, such as carpooling, transit, biking, and walking, go down. However, the report also suggested that higher income levels are associated with higher levels of carpooling and walking specifically for social trip purposes (Blumenberg et al., 2012).

2.4.2.2 Household Formation

Perhaps it is also rather obvious that the total distance of travel of a household is dependent on the number of its members (Polzin et al., 2014). As expected, travel distance increases as household size increases. Polzin et al. (2014) claim that households with children ages 6 to 15 have the highest number of total travel distance.

Furthermore, the demography of households determines the mode of travel for different trip purposes. Rubin et al. (2014) conducted a study in Netherlands indicating that living with a partner and having a child under the age of 6 is associated with higher levels of automobile use for social trips (Rubin et al., 2014). They (2014) further claimed that distance between point of origin and destination determines the type of mode, whereby families with children tend to walk and cycle for shorter distances and use cars for longer distances. In addition, another study found that millennial parents with children are more likely to own multiple cars and use multiple transportation modes on a daily basis than parents without children (APTA, 2013). They are also more likely to travel by car (Mendez et al., 2015).

Interestingly, variation among family members within a household was also observed according to a study done in a suburb of Tokyo. Kawase (2002) stated that commuting distance tended to be shorter for wives than husbands. He (2002) claimed that it was typical for the men to choose their home based on the location of the workplace, while the women selected their workplace based on where they live. This is based on the traditional residential mobility of families where housing relocation is typically a result of a new employment opportunity for the husband. Women tend to relocate because of their husbands and choose work opportunities that are close to their homes. Additionally, Kawase (2004) noticed variation between male and female children, whereby sons are more likely to commute shorter distances than daughters. This reflects a deep-rooted cultural tradition dictating higher tendencies of daughters to remain living at home until marriage, while sons move out of the home to live closer to their workplace (Kawase, 2004).

2.3.2.3 Education

The level of education also plays a role in determining the travel pattern of millennials. Polzin et al. (2014) claimed those more educated show higher total travel distance. This finding is expected, as workforce participation tends to involve more traveling. They are also more likely to utilize automobiles because of higher earnings (Mendez et al., 2015). In terms of modal choice, studies often found that students display higher shares of alternative modes of transport than other groups (Whalen, Paez & Carrasco, 2013; Rodriguez & Joo, 2004; Jacques et al., 2011). In some settings, walking is the most prevalent mode, but more often transit and cycling are the most common means (Dalmelle & Dalmelle, 2012; Zhao, 2012). There is usually higher use of alternative modes of transport within university settings, which aligns with their promotion of sustainable practice (Whalen, Paez & Carrasco, 2013).

2.5 Travel Behaviour and Transit Experience

2.5.1 Travel Behaviour

A shift in travel behavior towards a less auto dependent one can be achieved by increasing demand for public transit. This is a difficult task, however, because the North American car culture is deeply intertwined within people's livelihoods (Urry, 2007). The car provides flexibility enabling users to cover multiple trips that span long distances. The car culture is also prominent in the design of many North American cities, as much of urban planning principles cater to the convenience of having a car for many years.

According to Forsyth and Krizek (2010), strategies to alter travel behavior in support of alternative modes of transport include hard and soft measures. Hard measures are those used to improve community design and infrastructure to favour a specific transportation mode. They include enhancing the quality and quantity of public transit service in terms of frequency and network. One strategy for a more efficient system is by adapting a service-based network planning approach. It “enables ‘anywhere to anywhere’ travel while keeping occupancy rates high by carrying different kinds of travelers on the same service” (Stone & Mees, 2010, 269). This system follows a transfer-based network that links multiple destinations at an affordable cost. Stone and Mees (2010) further state that it is important to create a high-quality scheme that follows four elements: (1) a simple line structure, (2) a stable line that operates service across the network at all times of the day, (3) provides convenient transfers aligning multiple schedules and have high quality physical facilities, and (4) provides an integrated fare system that allows free transfers. This approach of service planning has seen many successes across North American cities and should be increasingly adopted (Stone & Mees, 2010).

Additionally, the quality of public transit could be enhanced through improvements of community design in areas surrounding the transit station/stop, as commonly seen in transit-oriented development (TOD) projects. Belzer and Autler (2002) stated that TOD projects foster higher efficiency of land use management, whereby development is concentrated in a designated area saving additional service costs, such as for water and sewer infrastructure. They (2002) further proved that TOD projects provide a balanced set of transportation choices in suburban context. Evidence suggests that suburban residents are motivated to

depend less on automobiles in the presence of good alternative modes. As such is the case in the suburbs of New York, Boston, Chicago, and San Francisco, in which reports suggested high levels of transit ridership due to the incorporation of TOD elements within their city planning (Belzer & Autler, 2002). Moreover, a case study in China concluded that living near suburban rail stations minimize the impacts of relocation from city centres to the suburbs in terms of finding job opportunities and in consideration of the length of time spent commuting to work (Cervero & Day, 2008).

Complementing hard measure strategies, soft ones are important to consider as well. Forsyth and Krizek's (2010) notion of soft measure approaches include the implementation of pricing on mobility, as well as programming and education initiatives. Imposing additional costs such as emission, congestion and noise tax has increased the demand for public transit (Taylor, 2006). Not only that, such policies may also carry out other benefits such as improved services and reduced car traffic. The implementation of congestion charges in central London has dramatically decreased car-use within the city centre zone by 25% and increased transit by 18% during the first year the pricing was imposed (Givoni, 2012). It has also generated net revenue of £100 million, which was further invested in the transit system (Givoni, 2012). Moreover, technology has made it possible to track drivers' movements and charge them for external costs accordingly. This type of pricing has been implemented in London, Houston, and Iowa, while the capital collected were allocated to recover costs of environmental clean-up, maintain transit infrastructures, and expand transit service (Taylor, 2006).

Not surprisingly, strategies to reduce car space for automobiles and inconvenience their movement have strong impacts upon travel behavior decisions. Chatham (2006) found that increasing network load density (a measure of traffic congestion) results in the decrease of car use for non-work purposes, which lowers the share of commuting by car. Segregating a segment of the road to prioritize bus-only lanes has proven to work in Paris (Bouf & Hensher, 2007). As well, transforming car parking lots in place of another use can be a strategy to decrease automobile use – one that is implemented in Lyon as city planners eliminate a 1000-space parking lot in place of a recreational space (Bouf & Hensher, 2007). Other soft measures include implementing car share programs and educating society on travel and mobility to encourage higher transit ridership.

Schiefelbusch (2010) coined the term emotional mobility, which describes the essentiality of considering travel experience when designing transit networks. He (2010) stated that the consideration of “soft” approaches such as comfort, ambiance, and sensual stimulation are as important as the provisioning of infrastructure because these elements are linked to the user’s perception of the mode of transportation. He (2010) described that incorporating elements that favour the private car such as flexibility and comfort within the design of transit systems can enhance the experience of using them. Subsequently, it could also alter the negative perception that is often associated with public transportation.

2.5.2 Transit Experience

How can we define transit experience? Many have argued that transit systems should be treated as public spaces (Hood, 1996; Paget-Seekins & Tironi, 2016; Nordahl, 2008). Taking this description into account, perhaps transit experience can be enhanced by adopting

elements of successful public spaces. Through this lens, successful transit systems are ones that are able to attract users and have the ability to heighten their senses, such as sight, sound, and smell (Nordahl, 2008). For instance, the design of cable cars in San Francisco and streetcars in Disneyland, with their open-air concept and modest vehicle speeds, allows passengers to people-watch as well as hear and smell their surroundings. Transit routes that offer scenic views and lively street scenes can make for memorable transit experience, while the fastest routes do not necessarily mean they are the most enjoyable. When considering San Francisco's cable car, one of the routes takes passengers through various sceneries from the historical downtown district and shopping district to vibrant neighbourhoods, such as Nob Hill and Chinatown, as well as tourist attraction sites, such as Lombard street and Fisherman's Wharf (Nordahl, 2008). These elements together enrich the experiences of passengers, hence the popularity of San Francisco's cable car among locals and tourists.

Arguably, another strategy to enrich passenger experience is by providing opportunities for social engagement. This could be done through modifications of the vehicle's interior such as through the provision of reversible backrests allowing passengers to face each other – a feature in New Orleans' streetcar. Enhancing interaction between operators and passengers may also increase social engagement. For instance, this can be adapted by excluding the "stop" button, which forces passengers to make operators aware of their stop (Nordahl, 2008). Ultimately, well-designed settings are key to encourage conversation-friendly atmospheres in transit vehicles, which can boost passenger experience.

Transit experience is also evaluated based on the service of the transit agency. Multiple studies have done so through common criteria such as access, connection and

reliability, capacity, information, comfort, and safety, ranking them according to their importance to passengers (Iseki et al., 2007; FDOT, 2014). A study done in Southern California indicated that safety and service quality factors are most important, while stop and station area amenities are least (Iseki et al., 2007). For Calgary residents, improving connectivity of train service, reducing multimodal transfers, and increasing dedicated right of ways, which enhance transit reliability, are more important than ride comfort (Habib et al., 2011).

Similarly, the Toronto transit agency carries out a TTC Customer Satisfaction Survey every quarter of a year. The criteria that are used include comfort and convenience, customer service and environment, announcement quality, and trip experience (including information, trip duration time and smoothness, and safety). According to recent results released late September 2016, the most influential key drivers of customer satisfaction are trip duration and wait times, while comfort and safety remain low in importance. Thereby, the TTC aimed to improve on communication and announcement (helpfulness, frequency, and clarity of announcements), comfort and convenience (crowding and wait times), and customer interaction with staff within the following year.

Another important aspect of transit experience relates to the “out-of-vehicle” travel, which includes accessing the transit stop/station, waiting for the bus or train, transferring from one vehicle to another, and reaching the destination. Multiple studies have compared in-vehicle and out-of-vehicle perceived travel time differences and concluded that travellers are more sensitive to out-of-vehicle travel time, in particular waiting time (Iseki & Taylor, 2009; Cervero, 1990; Reed, 1995, Hensher and Prioni, 2002). For instance, Reed (1995)

noted that passengers perceive waiting time to be 1.5 to 12 times more burdensome than in-vehicle time. Additionally, the perceived burden of waiting time also varies depending on whether the wait is forced or voluntary. Evans (2004) concluded that transit riders are more sensitive to unpredictable delays than expected waits. To put it in perspective, commuters who adjust their travel time according to a set schedule do not view waits below 8 minutes to be burdensome (Parsons Brinckerhoff & Quade and Douglas Inc., 1993).

Out-of-vehicle travel time related to transfers between transit modes should also be considered. In order to enhance passenger satisfaction of transferring between modes, agencies must consider service frequency, and schedule adherence and information between all modes. These factors relate to actual and perceived wait times. Higher service frequency translates to less wait and transfer times (Iseki & Taylor, 2009). Ensuring that services adhere to the schedule improves travel time certainty for passengers and minimizes unexpected wait time from delayed services. Studies indicated that improved coordination between transit lines, modes, and systems have increased transfer rates (Evans 2004; Tebb, 1977). Other factors such as the provision of clear schedule information and availability of station amenities, such as benches and shades, have shown to reduce the burdens of transfers (Parsons Brinckerhoff, 2002). These out-of-vehicle enhancements have proven to lower burdens of using transit, which could potentially increase its attractiveness.

3. METHODS

3.1 Introduction

This chapter describes the mixed-methods approach to conduct this study and justifies the use of a mainly qualitative framework. Moreover, it provides a description of the study area, data collection methods, which consist of Transportation Tomorrow Survey (TTS) and interview data, as well as the analysis process. The ethics, validity and limitations of research design are also detailed at the end of the chapter.

3.2 Research Question and Objectives

As stated in Chapter 1, this research project answers the following overarching question:

What are the transit experiences of suburban high-rise residents in Toronto?

Using two study areas, the objective of the research is to:

- (1) Identify elements of the transit system that are working well and those that need improvement
- (2) Assess whether the current transit network is sufficient in meeting the needs of high-rise suburban residents
- (3) Provide recommendations on how to improve transit serving high-rise suburban residents

3.3 Methodological Approach

Despite many studies that focused on improving the quality of public transport systems, there is a gap in transportation research evaluating the travel experience of users through a qualitative approach (Litman, 2008; Carreira et al., 2013; Fink & Taylor, 2011). Much of transportation research aiming to improve public transit systems analyze quantitative factors,

such as speed and operating costs, and lack to evaluate qualitative aspects, such as convenience and comfort (Litman, 2008). Bodies of quantitative literature focus on *who*, *what*, *when*, and *why* aspects of travel such as demographics of users and mode choice, while little research has been done on *how* – in particular the experiential aspects of travel (Fink & Taylor, 2011). This understudied phenomenon is important in understanding the barriers and facilitators of a travel mode in order to fully evaluate it.

This study aims at an in-depth understanding of resident perception and response to address their travel experience; for this reason, a qualitative approach is mainly used. An important feature of qualitative research is “their facility to describe and display phenomena as experienced by the study population, in fine-tuned detail and in the study participants’ own terms” (Ritchie, 2003, 27). It is descriptive and exploratory in nature (Marshall and Rossman, 1999; Robson, 2002). In other words, its purpose is “to explore and describe participants’ understanding and interpretations of social phenomena that captures their inherent nature” (Ritchie, 2003, 27). Therefore, for an in-depth examination of transit experience as described by residents, this method is applied.

The study design follows previous transportation research that have used qualitative approaches aiming to examine travel behaviour (Simons et al, 2013), as well as travel experience of subjects (Carreira et al., 2013; Fink & Taylor, 2011; Dell’Olio, 2010). These studies use various qualitative methods, including visual ethnography, focus group, and interview. Their emphasis is on studying values, perceptions, and behaviours of participants using public transport, which correspond to the goal of this research project.

The research question is addressed through a mixed methods approach using both quantitative and qualitative data. Although there is debate surrounding the “incompatibility” of

combining quantitative and qualitative data, many argue that the combination can add value to the research (Ritchie, 2003; Creswell, 2009; Robson and McCartan, 2016). The use of mixed methods yields different types of information, which brings multiple insights into the study and provides a more comprehensive analysis of the research problem (Ritchie, 2003). For instance, a combination of statistical and interview data provides a comprehensive overview of the population as well as a detailed understanding of the research problem (Creswell, 2009). Moreover, in recognition that all methods have limitations and biases, using a mixed methods approach could potentially neutralize the biases of other methods (Creswell, 2009; Robson and McCartan, 2016). Its use is especially valuable in real world settings due to its complex nature and the need of multiple perspectives to understand reality (Robson & McCartan, 2016).

The quantitative aspect of this study involves secondary data analysis, which is defined as “any reanalysis of data collected by another researcher or organization” (Hakim, 2000, 24). An advantage of this method is that it allows the researcher more time for analysis and saves costs on data collection (Robson & McCartan, 2016). An exploratory study of existing data could produce new findings through the examination of relationships between two variables that have never been considered (Bryman et al., 2012), as well as act as a starting point to develop further questions (Robson & McCartan, 2016). Acquiring data from a large database, such as Statistics Canada and TTS, allows the researcher to obtain a comprehensive picture of the population in question (Bryman et al., 2012), which is the intention behind the use of this method in answering the research problem.

In this research, Transportation Tomorrow Survey (TTS) data is used as background information to provide an overview of the demographic and travel behaviour of the sample population. The purpose is to provide a comprehensive illustration of the variation among young

adults, such as in terms of occupation, student status, common mode of transportation, and possession of a driver's license. An analysis of tabulated data is used to cross-examine the characteristics of young adults living within the study area as well as in comparison to others in the City of Toronto. Furthermore, cross tabulations of demographic and travel behaviour variables are examined. Through this analysis, a better understanding of the travel behaviour of young adults is acquired, which may outline distinct typologies of young adults that produce certain types of travel patterns.

The second method of this study follows a qualitative approach using a series of semi-structured, open-ended interviews. The purpose is to gain an in-depth understanding of the transit experience of young adults living in high-rise apartments in the suburbs. More specifically, this study provides an assessment of access, service, facility, cost, network and support within the transit system through the participants' lived experiences. Through this approach, we can identify elements of the transit system that are working well as well as those that can be improved on in order to better serve the needs of residents. In conjunction, the transit network of Toronto's rapid transit system is assessed to understand whether there is still high reliance on bus service for residents living in close proximity to a rapid transit station. With a qualitative approach, we can understand why certain travel behaviours persist. Through dialogue with participants, an in-depth perspective of their travel needs are acquired in order to identify strategies to improve the existing transit system for those who are most dependent on transit.

3.4 Study Areas

This section describes the two neighbourhoods that are chosen as the study area based on two criteria. The first is geographic location that is inner-suburban and in close proximity to a subway station. The second is the presence of a cluster of high-rise apartments that have high

potential to take part in the Tower Renewal Program. See Figure 1 for the map of rental clusters in Toronto. These conditions are chosen in order to analyze whether the current transit system is adequate in serving a population who are most dependent on it. As well, the chosen locations have the density to service a rapid transit line, which as a measure is used to assess whether current rapid transit lines accommodate the travel needs of a significant proportion of the population. When these two criteria are applied, three neighbourhoods are singled out – namely Weston, Don Valley Village and Crescent Town. Out of the three, two communities (Don Valley Village and Crescent Town) are further selected based on the similarity of the two neighbourhood demographics in terms of the high share of individuals born outside of Canada who speak non-official languages as their mother tongue. Furthermore, assuming that residents most dependent on transit is reliant on TTC services, it is appropriate to evaluate persons living in close proximity to a TTC station rather than a station of other transit agencies. Thereby, the selection of Don Valley Village and Crescent Town is justified because at the centre of these communities is a TTC transit station, whereas Weston is in close proximity to a GO station.

According to Hulchanski's Three Cities Report (2010), Don Valley Village and Crescent Town fall under City 3 category, which is defined as neighbourhoods whose incomes have fallen 20% or more below the Toronto CMA average since 1970. The report further indicates that these neighbourhoods are generally low-income areas of Toronto, with relatively poor access to transit and services. Furthermore, these neighbourhoods are gradually becoming popular residences among recent immigrants and visible minorities, as the proportion of immigrants have increased from 31% of the population in 1970 to 61% in 2006. There is a large concentration of rental clusters within these neighbourhoods, which became home to newly arrived immigrants. The following sections describe the two study areas in more depth.

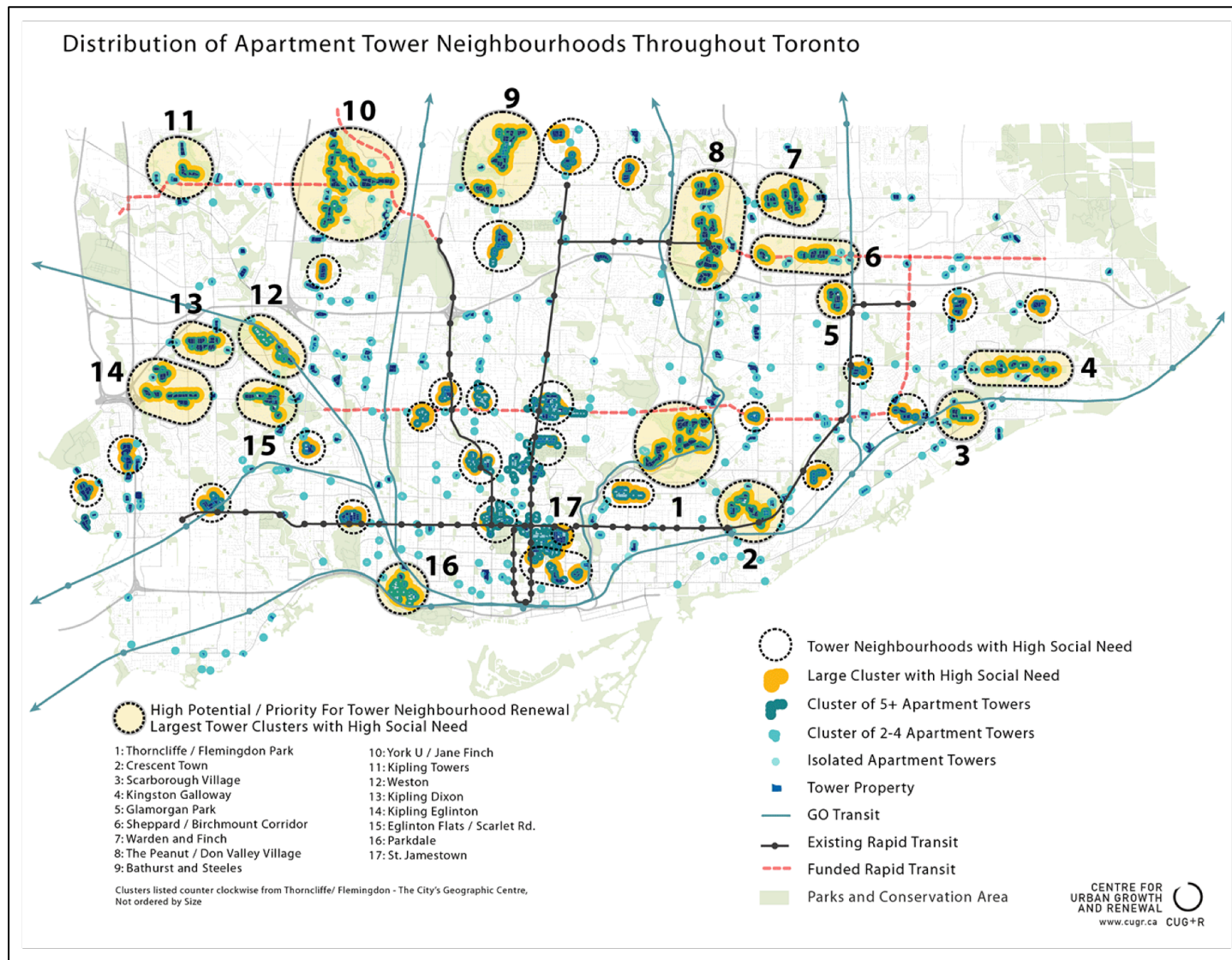


Figure 1 - Distribution of Tower Neighbourhoods Throughout Toronto (CUGR, 2010)

3.4.1 Don Valley Village

Don Valley Village is a suburban neighbourhood located in the former municipality of North York. It is bounded by Finch Avenue to the north, Sheppard Avenue to the south, highway 404 to the east and Leslie Street to the west. See Figure 2 for the map of the neighbourhood. It has pockets of green space, including multiple small parks and bike trails. Various amenities and institutions could also be found within the neighbourhood, including medical offices, ethnic grocery stores, secondary schools, a post-secondary school, a mall, and a hospital. An accessible transit station, Don Mills, serves the area, which is a stop on the Sheppard subway line. It can be accessed through the mall, as well as outdoor entry points. There is a concentration of high-rise rental residences encroaching the “Peanut” plaza. Similar to Crescent Town, these towers were built between the 1950s and 1970s in response to an exponential increase in housing demand.

As of 2011, there are 26,739 residents living in Don Valley Village with a population density of 6,366 people per square kilometer, and a population growth of 0.4% between 2006 and 2011. The working-age population (25-54) represents 45% of the population, and the young working-age (15-34) makes up 27% of the population, which are comparable to the city’s average of 46% and 29%, respectively.

The proportion of residents living in high-rise apartments is approximately 53%, while 23% of residents report living in a single-detached house. Furthermore, the majority of residents (85%) state living with families. The neighbourhood also has a large proportion of immigrants (69%) with the top three birth countries being China, Iran, and Philippines. Approximately 67% of the population speak non-official languages, with Mandarin, Chinese, and Persian to be the most common.

These residents are also highly educated with 77% of them declaring to hold a minimum post-secondary certificate, diploma or degree. However, the employment rate is 55%, and the unemployment rate is 11%, which is higher than the city's average of 9%. Poverty is also more prevalent as 41% of households report that they spend 30% or more of their total income on shelter costs in comparison to the city's average of 35%. Although, the average household income is higher than Crescent Town, it remains lower than the city's average.

These figures are taken from the 2011 Census and National Household Survey data, and summarized in Table 1. A quick demographic snapshot of the neighbourhood indicates that Don Valley Village is an immigrant concentrated neighbourhood. These residents are highly educated but are finding it difficult to find employment, which may be due to their foreign credentials that are widely unaccepted. This is an issue in itself when considering the presence of a large working-age population.

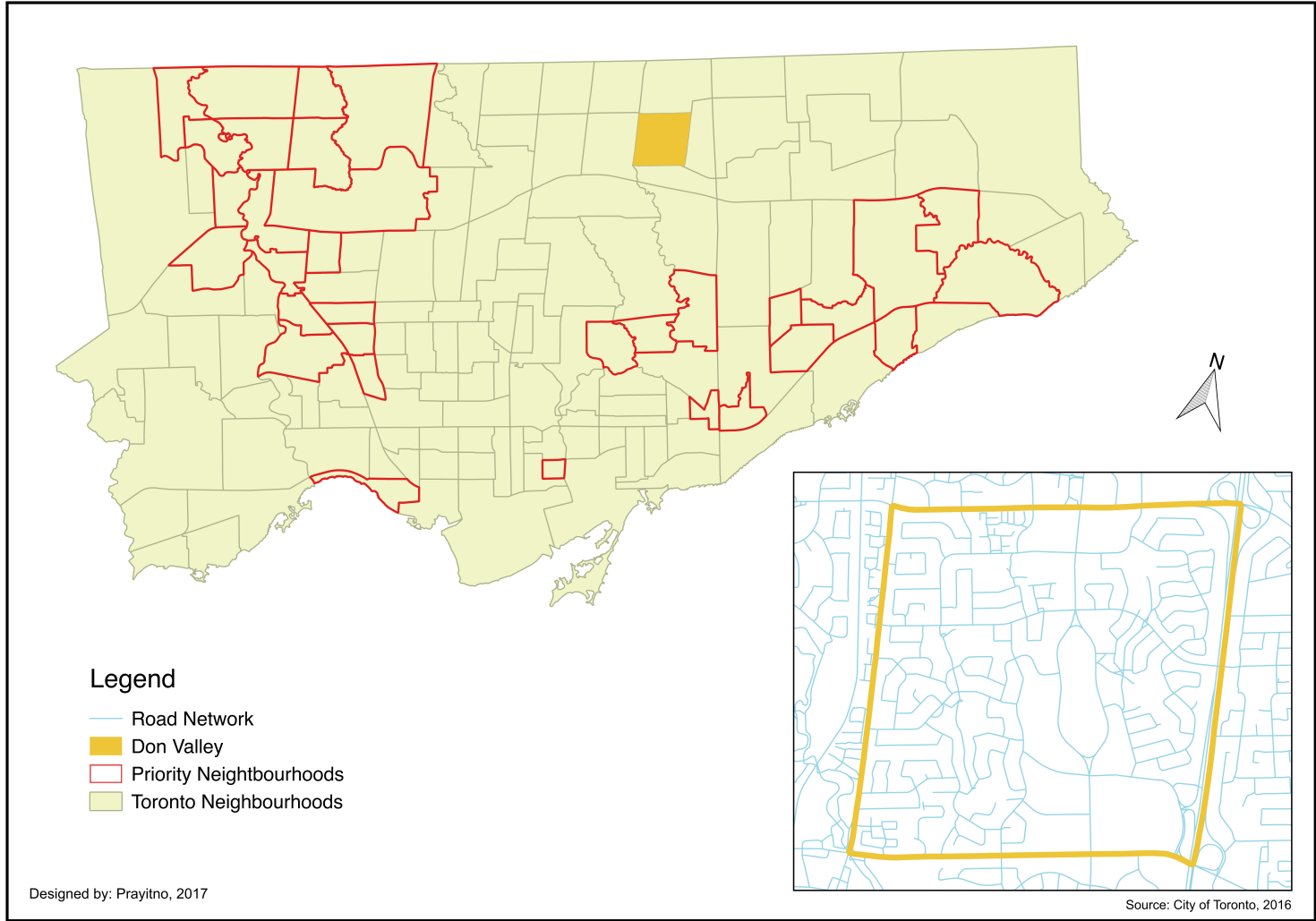


Figure 2 - Study Area Map of Don Valley Village

3.4.2 Crescent Town

Crescent Town is a densely populated suburban neighbourhood in Toronto located near the intersection of Victoria Park and Danforth Avenue. See Figure 3 for the map of the neighbourhood. Prior to amalgamation, it lies in the former municipality of East York. The neighbourhood is within walking distance of Victoria Park station, which is a stop on the Bloor-Danforth subway line and is accessible via an overhead walkway. The neighbourhood is surrounded by green space, including Dentonia Park and Taylor Creek Trail, and enclosed by the Massey Park Ravine just on the north side. It is considered as a self-sustaining neighbourhood with availability of local amenities such as a restaurant, grocery store, and medical offices.

In 2004, the neighbourhood is identified as one of the 31 Priority Neighbourhood Areas. These communities are classified as falling below the Equity Score, which measures the weight of unjust differences that residents face on the basis of economic opportunity, social development, healthy livelihood, participation in decision-making process, and physical environment (City of Toronto, 2014a). For a long period of time, the area has suffered a lack of investment and maintenance. The city has incorporated the Tower cluster to become part of the Tower Renewal Program. The neighbourhood contains a mix of condominiums, townhouses, and rental apartments, with a large concentration of the latter.

This neighbourhood is home to approximately 15,594 people as of 2011. The population density is approximately 15,440 people per square kilometer with a growth rate of 2.5% between 2006 and 2011. It has a large fraction of the working age population (49%), consisting of people aged 25 to 54, which is slightly more significant than the city's average of 46%. The young working age population (15-34) makes up 28% of the population.

Similar to Don Valley Village, the majority of the population (78%) live in high-rises that are taller than five storeys, and 79% of the population live with their families. The neighbourhood has a large immigrant population (61%) with the top three birth countries being Bangladesh, Pakistan, and India. Approximately 56% of the population speak a non-official language as their mother tongue, and the five most common languages are Bengali, Urdu, Tagalog, Romanian, and Tamil, in respective orders.

Overall, Crescent Town residents are highly educated with 67% of them holding a postsecondary certificate, diploma or degree. The employment rate (54%) is comparable to the city's 58%, but the unemployment rate is significantly higher (16%) than the city's 9%. Poverty rates are higher with 44% of the population reporting to have spent 30% or more of household total income on shelter costs, as compared to the city's percentage of 35%. The average household income is also significantly lower (\$45,283) in comparison to the city (\$70,945).

Through these observations, it can be concluded that Crescent Town is concentrated with a large immigrant population. Unemployment rate in this neighbourhood is greater than the city's average, and higher education is reported to be lower. Nonetheless, large shares of the working-age population live in this neighbourhood, indicating high productivity and potential for economic improvement.

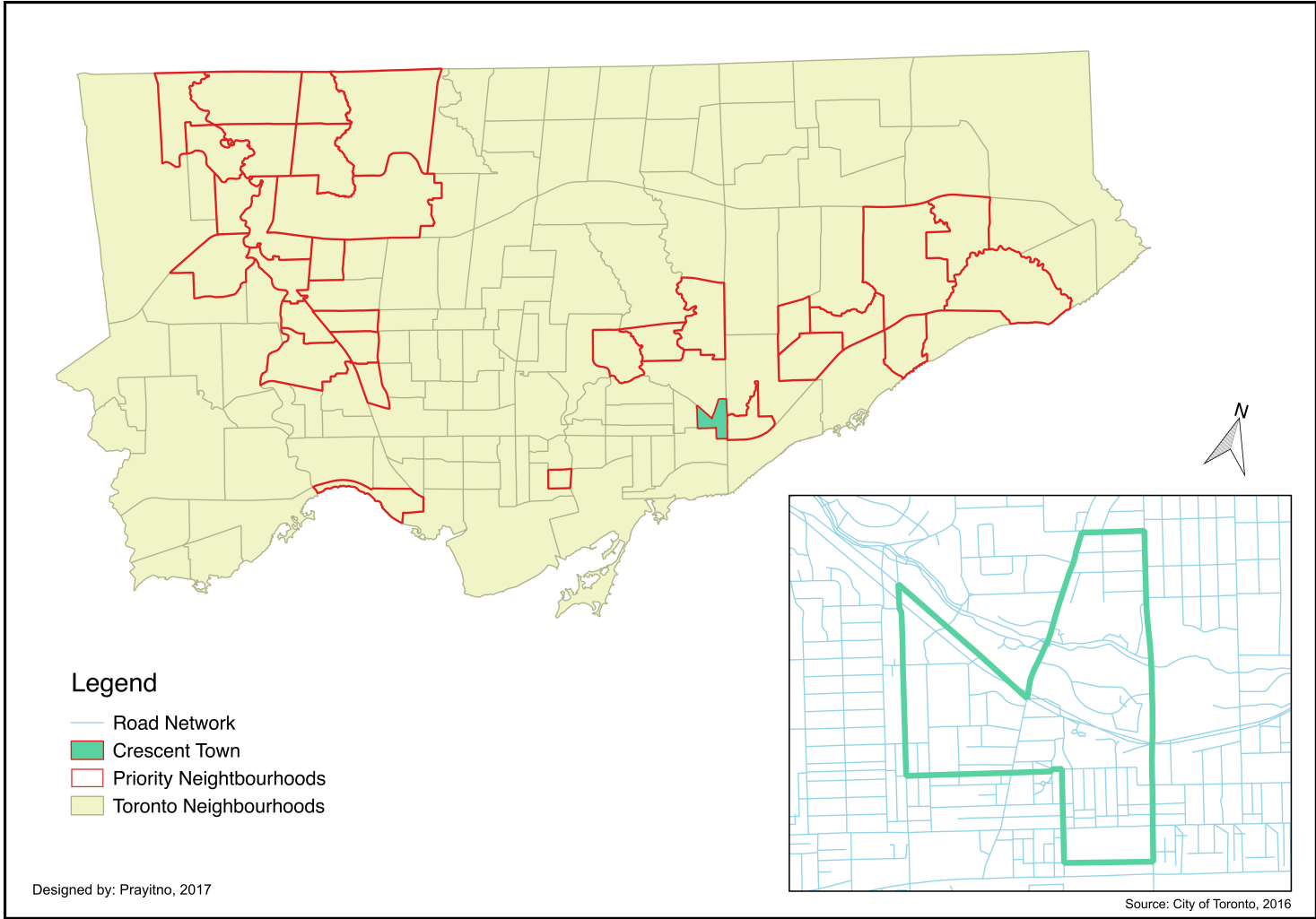


Figure 3 - Study Area Map of Crescent Town

Table 1 - Demography comparison between Crescent Town and Don Valley Village

	Crescent Town	Don Valley Village	City of Toronto
Population			
Total Population	15,594	26,739	2,615,060
Population Density (per square km)	15,440	6,366	4,150
2006 to 2011 Population Change (%)	+2.5	+0.4	+4.5
Working-age Population % (25-54)	49	45	46
Young Working-age Population % (15-34)	27.7	26.6	28.5
Living Arrangements			
Living in high-rise apartments (%)	78	53	41
Living with family (%)	79	85	79
Immigration			
Percentage of immigrants (%)	61	69	51
Top three birth country	Bangladesh; Pakistan; India	China; Iran; Philippines	India; China; Philippines
Language			
Non-official mother tongue language (%)	56	67	46
Top three non-official mother tongue language	Bengali; Urdu; Tagalog	Mandarin; Chinese; Persian	Chinese; Cantonese; Italian
Education			
No Certificate (%)	12	5	11
High-School (%)	20	17	21
Post-secondary certificate, diploma or degree (%)	67	77	69
Employment			
Employment Rate (%)	54	55	58
Unemployment Rate (%)	16	11	9
Income			
Spend 30% or more of the household income on shelter costs (%)	44	41	35
Average household income (\$)	45,283	62,567	70,945
Data taken from 2011 Census and National Household Survey; Data on population, living arrangements are taken from 2011 Census; Data on immigration, education, employment and income from 2011 National Household Survey. Source: City of Toronto, 2014b, 2014c			

3.5 Data Collection

This section describes the process of data collection. The data in this study is collected from two sources: (1) Transportation Tomorrow Survey database, and (2) a series of semi-structured interviews.

3.5.1 Transportation Tomorrow Survey (TTS) Database

The TTS database collects information on urban travel of southern Ontario residents living in the Greater Toronto and the Greater Golden Horseshoe area in a five-year cycle (TTS, 2017). The survey is voluntary and eligibility is based on a random sample of participants with a minimum age of 11 years old. Its purpose is to help local and regional governments, and transit agencies make decisions on transportation planning (TTS, 2017).

I received access to the database in late June 2016 through the Data Management Group of the University of Toronto. I used the 2011 dataset, which was collected in the fall of 2011 and 2012, and contains approximately 160,000 completed surveys (DMG, 2017). The database is divided into four categories – household, person, trip, and transit data, and is geographically separated by traffic analysis zones. In addition to travel data such as mode of transportation and length of trip, demographic data, such as occupation and status of employment, can also be acquired of a specified geographic area. It should be noted that the data collected had been expanded to represent the total population in each survey area. The number of dwelling count in each FSA zone obtained from Census Canada, and age specific adjustment factors are used as control total for calculating the expansion factor. An in-depth description of the expansion factor can be found in the “2011 TTS Data Guide”.

In order to acquire background information on young adults living in high-rise apartments in the two study areas, certain filters are applied. The first filter limits the data to the

specified geographic areas where the high-rise apartments are located. Namely, the traffic zone IDs obtained were 467, 481 and 483 to identify Don Valley Village high-rises, and 249 to classify Crescent Town ones. See Figure 4 for the map of TTS zone boundaries of the study area. The second filter limits the data to only include persons aged 18 to 35. In acquiring household data, the “age” filter is not applied, however. While not used at all times, the third filter relates to the type of dwelling to highlight differences of persons living in various housing options.



Figure 4 - TTS Boundaries of Study Area

The application of filters and queries “Frequency Distribution” and “Record Count” allowed for the acquisition of background information of the target population. The variables used in this study are listed in Table 2. Cross tabulations of demographic and travel variables are

applied to identify differences in household and individual characteristics as a factor of certain travel behaviours. More specifically, the following comparisons are made:

- Type of dwelling unit & Number of vehicles available in the household;
- Type of dwelling unit & Number of drivers in the household;
- Primary mode of trip & Employment Status
- Primary mode of trip & Student status
- Possession of transit pass & Employment status
- Possession of transit pass & Student status
- Purpose of trip & Primary mode of trip

Table 2 - List of TTS Variables

	Attribute	Description
Household Data	gta06_hhld	2006 Traffic zone of the household
	dwel_type	Type of dwelling unit
	n_person	Number of persons in the household
	n_vehicle	Number of vehicles available for personal use in the household
	n_license	Number of persons possessing a driver's license in the household
Person Data	age	Age of person in years
	driver_lic	Possession of a driver's licence
	tran_pass	Possession of a transit pass
	emp_stat	Employment status of the person
	occupation	Person's occupation type
	stu_stat	Student status of person
Trip Data	mode_prime	Primary mode of the trip
	trip_purp	Purpose of the trip
Transit Data (Trips by transit only)	n_route	Number of transit routes or links used for the trip
	n_subway	Number of links on TTC subway or RT
	n_ttc_bus	Number of links on TTC bus or streetcar

3.4.2 Interviews

The second method, semi-structured interview, is one of the most common qualitative methods aiming to acquire detailed, rich responses from participants (Bryman et al., 2012). Typically, this method is conducted with a small number of participants and is less structured

allowing for more open-ended questions. It allows for the exploration of “why”, not solely “what, where, when, and how” (Bryman et al., 2012), while the focus is to achieve depth of exploration and explanation (Yeo et al., 2014). Moreover, this method allows participants the freedom to express their views in their own words, which may produce a more truthful assessment of their experiences (Robson and McCartan, 2016). As a result, there is less likelihood of misunderstanding and missing data, as researchers are also able to ask for clarifications or use probes to encourage participants to clarify their answers and provide more detail (Robson and McCartan, 2016). The purpose of this method is to gain in-depth perspectives of participants in regards to their experiences, perceptions, behaviours, and attitudes towards transit.

Sampling Frame

The sampling frame consists of young adults between the age of 18 and 35, who are living in the study area. The sampling frame is restricted to transit riders among the millennial population who, as a group, have shown to have higher dependence on transit than previous generations (Blumenberg et al., 2012). The age range diversifies the dataset as participant characteristics vary, such as in terms of household composition, occupation, student status, and income levels. As well, this group of people is among the most mobile as they typically are in and entering the working age. Reports indicate that the millennial generation has overtaken baby boomers as America’s largest generation. In Canada and the US, they represent the highest proportion of the workforce in the labour market (Fry, 2016; Scott, 2015). Along with their higher tendencies to be transit dependent, they are currently the most prominent group and will continue to be in the near future, making it appropriate to assess the existing transit system to meet their travel needs.

Recruitment Strategy

The recruitment process began upon approval of an ethics application in the beginning of January. This process included various strategies including advertising through posters, contacting community members and personal connections, and using the snowballing method. The poster (see Appendix A) provided a brief description about the interview, including the topic of discussion and time commitment, as well as the researcher's contact information. Posters were placed in central locations of the respective study area, including community centres, billboards, and libraries. This recruitment strategy was ineffective, as there was no response through this approach.

Next, I contacted staff members of community centres to seek their assistance in recruiting participants. Following unresponsive email responses, I visited both community centres. The community centre in Don Valley Village was undergoing construction and therefore was not in operation at the time of data collection. I had more success visiting the community centre in Crescent Town, as I was able to speak with a senior staff member. Through this approach, I was invited to attend community events and workshops, whereby I was able to recruit two potential participants that met the sampling criteria. Additionally, in an attempt to broaden my community contacts, I approached the offices of ward councillors from each community but the Councillors were unable to commit time to schedule a meeting.

The most effective method of recruitment was through personal connections and snowballing. I contacted acquaintances living in the study area and others who are acquainted with residents living in those communities. Through this approach, enough interest accumulated, which was further expanded through a purposeful sampling technique – snowballing method. As a result, I was able to make contact with 15 potential participants – 12 from Don Valley Village

and 3 from Crescent Town. Of the 15, 6 were acquaintances and 9 were a result of snowballing. I had more success in recruiting participants living in Don Valley Village because of my broader social network in the neighbourhood.

Participant Sample

The interviews were conducted between January and April 2017. I was initially in contact with 17 potential participants, however, 2 participants were unresponsive after initial contact and 3 more did not meet the sampling frame criteria, and thereby were excluded. As a result, 12 interviews in total are used for analysis – 9 participants from Don Valley Village and 3 from Crescent Town. Out of the 12 interviews, 11 were done in person, and 1 was carried out through a face-to-face interaction using an online platform. The collection of interview data concluded when similar themes emerged from preceding interviews, or “when the ability to attain new information has been attained” – termed as data saturation (Fusch & Ness, 2015, 1408). See Table 3 below for a description of each interviewee.

Table 3 - Demographic and Travel Behaviour Data of Participants

Participant Pseudonym	Study Area	Age	Personal Annual Income	#persons in hhld	#vehicles in hhd	Possess driver's license	#mo. possess Metropass
Brea	Don Valley	33	Less than 20,000	4	2	YES	0
Brooks	Crescent Town	35	N/A	4	1	NO	0
Clara	Don Valley	33	Less than 20,000	7	1	NO	0
Emma	Don Valley	23	20,000 – 39,999	4	2	YES	11
Harper	Don Valley	20	Less than 20,000	7	1	NO	10
Jacob	Don Valley	21	Less than 20,000	6	1	YES	12
Keenan	Don Valley	23	20,000 – 39,999	3	0	YES	4 (just started)
Layla	Don Valley	23	Less than 20,000	2	2	YES	0
Liam	Crescent Town	18	40,000 – 59,999	3	1	YES	0
Medina	Don Valley	24	Less than 20,000	6	1	YES	8-11
Michael	Crescent Town	24	Less than 20,000	3	1	YES	0
Stella	Don Valley	23	20,000 – 39,999	3	1	YES	4

The Interview Process

Following the first contact of an interested participant, electronic copies of the information letter and consent form were provided to explain a more detailed description of the topic questions and what participation would entail. The forms were signed prior to the interview session and collected either through email or in-person (see Appendix B). In terms of the setting, I had suggested a few public sites close to their home and workplace, but participants ultimately chose the location. The length of interviews ranged between 20 minutes and 1 hour.

The interview follows a semi-structure approach, whereby the interviewer has prepared a checklist of topics, or an interview guide, but ultimately there is some flexibility in terms of the sequence of questions, wording, and amount of time dedicated to each theme (Robson & McCartan, 2016). To some extent, the wording and order of the interview are guided by the response of interviewees, and unplanned questions are used to follow up on certain topics in greater depth (Robson & McCartan, 2016).

In creating the interview guide, Arthur and Nazroo (2003) claimed that the ordering of questions is important in order to provide a non-threatening environment. They (2003) suggested that the interview should proceed from general to more specific questions. The opening topic should involve asking background questions to ease participants into the study subject. These also help in providing context for the latter stages of the interview. Following these sets of questions, the researcher can move on to the core part of the interview, while asking more in-depth, explanatory questions (Arthur & Nazroo, 2003). Towards the end, they (2003) suggest to wind down the interview to end on a positive note, such as by asking for their recommendations on the topic. It is also helpful to include questions to seek an overall summary of the participants' attitudes and experiences, which gives an indication of the emphasis placed on certain topics that matter most to participants (Arthur & Nazroo, 2003). See the interview guide in Appendix C.

Following the suggestions by Arthur and Nazroo (2003), the interview is divided into 3 parts. It begins with a description of their transit trip either to school, work, a combination of the two or other trips that they take regularly. This includes details about the length, mode of transportation, and start time of their trips. Here, participants describe their route, transfer points, and destination. In the next phase of the interview, participants describe their experience using the transit system. More specifically, participants identify elements of their commute that they

are satisfied with and/or ones that they find challenging. This includes comments on access, service, facility, cost, network, and support. In the last section of the interview, participants are asked to describe their overall commute experience, top priority problems, and additional comments on the rapid transit network. Lastly, they are asked to provide recommendations on strategies to improve their transit experience.

Upon completion of the interview, participants are asked to fill out a demography questionnaire in order to better understand their personal characteristics and travel behaviour. This includes information about their age, gender, income level, car access and more. See Appendix D for a sample of the questionnaire. Once completed, participants are given a study feedback letter that restates the purpose of study, confidentiality and security of data, as well as the researcher's contact information. See Appendix E for the appreciation letter.

3.6 Data Analysis

Following the completion of data collection through interviews, the researcher assigned pseudonyms to each participant to maintain anonymity for analysis purposes. The analysis phase was broken down into two parts. The first stage is transcription, which was simultaneously completed as the interviews were on going. The second stage is coding, which involved reading through the transcription and identifying common themes that have emerged. This is what is commonly referred to as open coding, which is referred to as “the process of breaking down, examining, comparing, conceptualizing, and categorizing data” (Strauss and Corbin, 1990, 61). At this stage, a single statement may produce multiple themes, and unanticipated topics may emerge, as this phase involves generating as many themes as possible (Robson and McCartan, 2016). The themes were developed based on the data collected rather than having pre-determined themes and fitting data into them. This follows a grounded theory approach, which is the most

common framework used in analyzing qualitative data (Bryman et al., 2012). The latter stage of open coding involves grouping together similar themes to form larger categories. Following this step, axial coding is applied, which involves making connections between categories and further contextualizing them (Robson & McCartan, 2016).

3.7 Ethical Considerations

Since the research involves human participants, I submitted an ethics application to the Office of Research Ethics prior to data collection and I received approval at the end of December 2016. Throughout all stages of the research project, I ensured that confidentiality of research participants is maintained and that any personal information is stored securely. This included ensuring that responses are unidentifiable, and the focus of findings remained on the content of discussion (Webster et al., 2014). Upon dealing with participants, an information letter and consent form are sent prior to the interview, which explain the purpose, duration, and content of research project to enable them to make a choice of participating. These documents also indicate the right of participants to withdraw from the study at any given time. They contain contact information of the researcher, the research supervisor (Dr. Markus Moos) and the Office of Research Ethics for further inquiries about the research project and their voluntary participation.

3.8 Quality of Research

The quality of research is assessed using four criteria, which are credibility, transferability, dependability, and confirmability (Lincoln and Guba, 1985). The following paragraphs describe how each are applied in this study.

Credibility refers to confirming that the interpretations accurately present the perspectives of participants, known as internal validity in quantitative research (Lewis & Ritchie, 2003). In

ensuring credibility, I certify that any bias is minimized throughout all stages of the research process, including the questioning phase during interviews, the early and latter stages of coding and data interpretation, and the presentation of findings. Additionally, the strategy used to warrant credibility is triangulation, which is the use of multiple sources to improve the clarity of findings (Ritchie, 2003). There is debate about the extent of verification that triangulation offers, however, many cite that it is one of the central ways to enhance the validity of qualitative research (Ritchie, 2003; Robson & McCartan, 2003). It has the capability of adding depth and breadth to analysis (Fielding & Fielding, 1986), “giving a fuller picture of the phenomena” (Ritchie, 2003, 44).

Transferability is the degree of generalizing findings to other groups and different contexts, also known as external validity in quantitative research (Lewis & Ritchie, 2003). Thick descriptions – or “rich, detailed accounts of peoples’ experiences” (Bryman et al., 2012, 139) are documented through the use of an audio recorder and by taking notes during the interview process. This is to provide other researchers with a database to assess whether findings are transferable to other contexts (Bryman et al., 2012).

Dependability refers to the replicability of findings if the study were to be repeated by another researcher using the same or similar methods, also known as reliability in quantitative research (Lewis & Ritchie, 2003). In ensuring replicability, detailed documentation of the research process is accessible for audit, including transcripts, field notes during interview, and data analysis notes. This is to allow other researchers to be able to trace back the research process or repeat the study (Bryman et al., 2012).

Lastly, confirmability is the level of objectivity of the study (Bryman et al., 2012). Although objectivity is difficult to achieve in qualitative research, rigour and integrity of findings

and interpretation are kept throughout all stages of the research project. The careful design of interview questions and the use of open coding ensured that findings are not directed to a preconceived hypothesis formulated prior to the start of the research project.

3.9 Limitations

The limitation of this research relates to the small sample size of 12, which prevents findings to be generalized to all suburban young adults living in high-rise apartments in the suburbs of Toronto. However, by obtaining the demographics and travel behaviour of the target population (suburban young adults living in apartments in Don Valley Village and Crescent Town) and others living in high-rise apartments across the city, I was able to provide a general description of the target population's travel behaviour. This allows the reader to situate the experiences of the participant sample in larger contexts.

Additionally, the limitation of using TTS data include the lack of authority over the type of data collected, which may raise issues in regards to the lack of familiarity with the data and absence of key variables (Bryman et al., 2012). For instance, the lack of income variable available in the database prevents a fuller assessment of population demographics. As well, the quality of data has to be assessed prior to use in order to ensure validity (Robson & McCartan, 2016), which meant that time had to be allocated to read through data guides and verification/validation documents.

The expansion factor that is applied towards the TTS dataset may also contribute to slight inaccuracies to subsets of the data. For this analysis, there are approximately 160,000 responses expanded to the Greater Golden Horseshoe region covering a total of 4,566 traffic analysis zones. Thus, a single traffic analysis zone would account for approximately 35 responses, which

becomes the representation of each zone. For this reason, there may be a slight error in data representation of individual traffic analysis zones.

3.10 Summary

This chapter provides a description and justification of the research design, which uses mixed methods of quantitative and qualitative approaches. The data used in this research is acquired from the Transportation Tomorrow Survey database and through a series of semi-structured interviews. The data sources are utilized to obtain an overview of the target population's demographic profile and travel characteristics, as well as an in-depth description of their transit experience.

In addition, this chapter described the two data collection methods. I identified the TTS variables, as well as the filters and queries that are used to navigate through the database. The interview process is also broken down to define the sampling frame, recruitment strategy, and participant sample. Moreover, this chapter presents descriptions of the two study areas, Don Valley Village and Crescent Town, as well as the two-stage process of data analysis that consists of transcribing, and open and axial coding. Lastly, ethical considerations, quality of research, and limitations are included to conclude the chapter.

4. TRANSIT NUMERIC

4.1 Introduction

This chapter provides background information on the target population – young adults living in high-rise apartments within the two study areas. Transportation and demographic data is acquired from the TTS database and compared to characteristics of (1) other young adults (18-35) living in the city of Toronto, (2) older working adults (36-65) living in Don Valley Village and Crescent Town, and (3) older working adults (36-65) across the city. The findings are divided into four categories, which comprise of household, individual, trip, and transit characteristics.

4.2 Household Data

In this section, demographic variables of households in Don Valley and Crescent Town are presented and used to compare households across the city of Toronto. They include the type of dwelling, the number of persons and the number of cars in the household. Furthermore, dwelling type is cross-examined with availability of cars and the number of drivers to identify transportation characteristics of households living in high-rise apartments.

There are various dwelling types found in the study area. Figure 5 illustrates that more households live in high-rises in Don Valley (68%) and Crescent Town (71%) in comparison to the City of Toronto (44%) – an indication that these neighbourhoods have large clusters of apartment buildings. The next dominant dwelling type is the single-family house, which makes up 28% and 15% respectively, while 49% of households across the city live in this type of dwelling. There is a slight difference between the two study locations in terms of dwelling units,

as there are less households living in an apartment and more in a single-family house in Don Valley in comparison to Crescent Town.

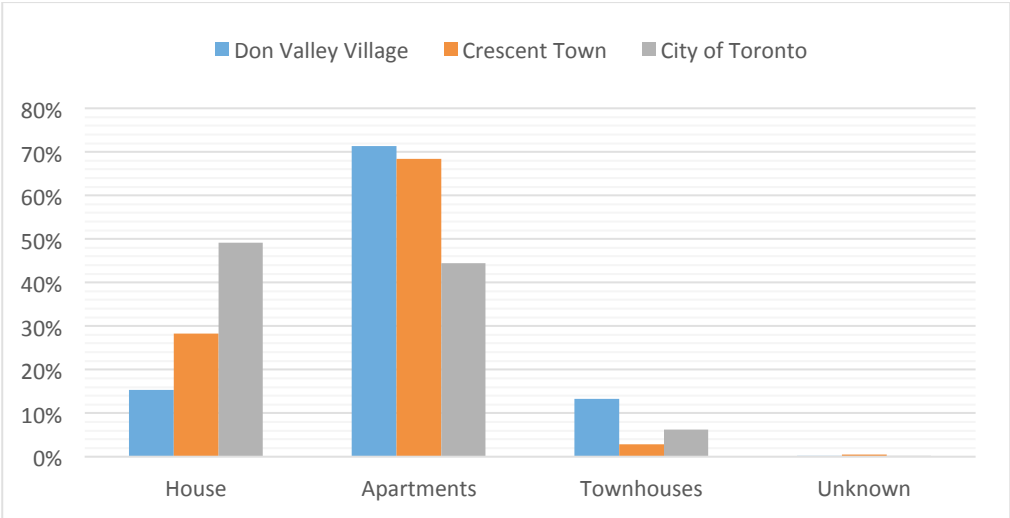


Figure 5 - Household dwelling types in the study area and Toronto

Additionally, household sizes in these neighbourhoods appear to be different than the rest of the city. As shown in Figure 6, families living in Crescent Town and Don Valley are larger, with more than 4 people per unit, than the rest of Toronto. There are 25% of households in Don Valley and 20% of households in Crescent Town that are made up of 4 persons, whereas the city of Toronto only has 17% 4-person households. To note, Crescent Town generally has larger household sizes, as there are more 5 and 6-person member households than in Don Valley.

Despite the large household sizes, more households in Don Valley and Crescent Town have limited access to a car. As shown in Figure 7, large fractions of households (57% in Don Valley and 51% in Crescent Town) have access to one car for personal use, while a significant amount (20% and 34%, respectively) have no access to a car. These figures indicate that these households are highly dependent on alternative modes of transport.

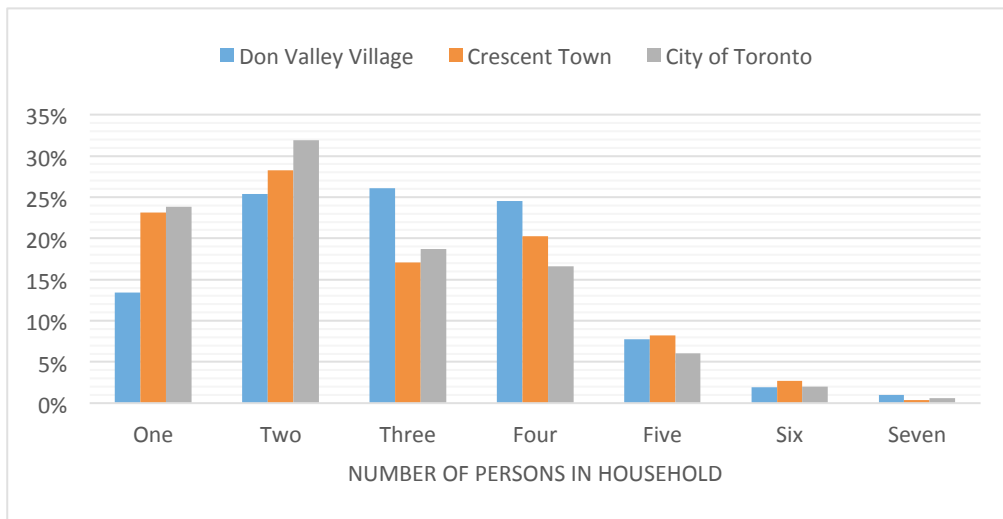


Figure 3 - Household sizes in the study area and Toronto

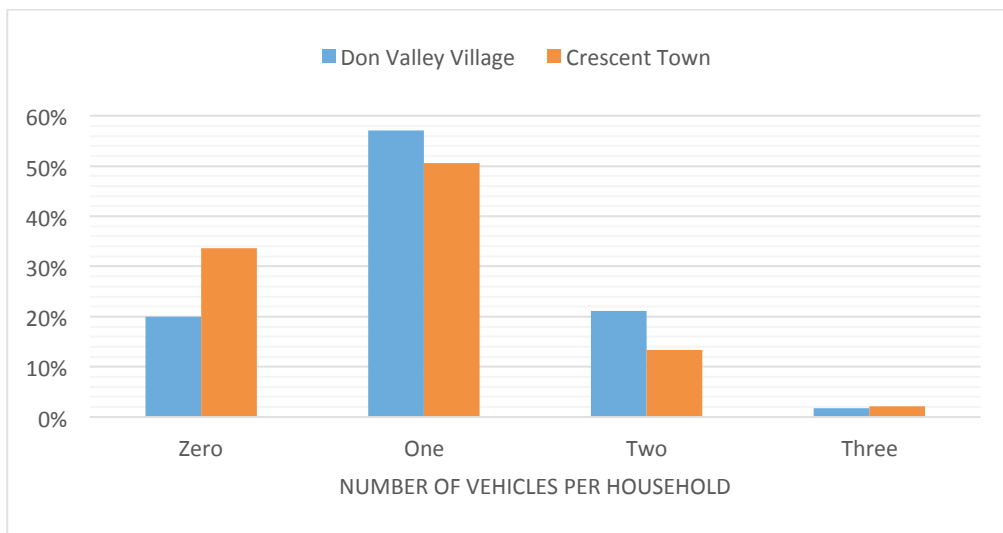


Figure 7 - Household car availability in the study area and Toronto

To further investigate households that are most reliant on alternative modes, the number of vehicles per household is compared to the dwelling type. A striking difference is identified between households living in a single-family house and an apartment. Shown in Table 4, large shares of households living in a house have access to at least one car (95% in Don Valley and

94% in Crescent Town) while quite a significant amount (49% and 44%, respectively) have access to two or more cars. Meanwhile only approximately half of apartment dwellers have access to one car (58% and 50%, respectively) and even less have access to two or more cars (18% and 6%, respectively). Note that there are larger percentages of households in Crescent Town that have no access to a car in comparison to households in Don Valley. These figures illustrate that the gap in car access is exacerbated when dwelling type is taken into account, indicating that a large proportion of households living in an apartment have no or limited access to a car for personal use, and are therefore most dependent on alternative modes of transport.

Table 4 - Percentage of dwelling type by the number of vehicles in the household

Neighbourhood	Number of vehicles	Dwelling Type			
		House	Apartment	Townhouse	Unknown
Don Valley Village	Zero (%)	5.0	24.0	15.8	0
	One (%)	46.0	58.2	63.5	100
	Two (%)	42.4	17.5	16.4	0
	Three (%)	6.6	0.3	4.3	0
	Total (n)	1313	6119	1137	15
Crescent Town	Zero (%)	5.8	45.0	31.7	48.6
	One (%)	50.6	50.0	68.3	51.4
	Two (%)	35.8	4.7	0	0
	Three (%)	7.8	0	0	0
	Four (%)	0	0.4	0	0
	Total (n)	2023	4908	205	35

Although many households living in an apartment have limited car access, a large part of them have at least one driver. As shown in table 5, only 9% of household in Don Valley and 24% in Crescent Town have no drivers and the share of households having two or more drivers are high (55% and 31%, respectively). Similar to previous trends, driver's license possession is high among households living in a single-family house. Only 3% and 4%, respectively, of households

living in a house have no drivers, while most have two drivers (57% and 49%, respectively). These figures indicate that although households living in an apartment do not have access to a car, there is still a trend towards acquiring a driver's license. It may be due to their living environment in a suburban community, where cars are more popular, or the usage of a driver's license as a piece of ID in Ontario.

Table 5 - Percentage of dwelling type by the number of drivers in the household

Neighbourhood	Number of drivers	Dwelling Type			
		House	Apartment	Townhouse	Unknown
Don Valley Village	Zero (%)	3.1	8.9	9.0	0
	One (%)	20.0	36.5	33.7	100
	Two (%)	56.7	43.7	45.3	0
	Three (%)	12.4	9.3	7.6	0
	Four (%)	7.9	1.7	4.5	0
	Total (n)	1312	6119	1138	15
Crescent Town	Zero (%)	4.1	24.2	12.7	48.6
	One (%)	23.5	45.5	56.6	51.4
	Two (%)	48.6	23.1	21.0	0
	Three (%)	18.2	5.6	9.8	0
	Four (%)	4.3	1.1	0	0
	Five (%)	1.4	0.6	0	0
	Total (n)	2022	4910	205	35

4.3 Individual Data

In this section, demographics of individual young adults are presented, including the target population – which is defined as young adults living in high-rise apartments in Don Valley and Crescent Town. The description contains a comparison between the target population, older working adult population (36 – 65), and all young adults, which are separated according to their geography – Don Valley, Crescent Town and the city of Toronto. The variables examined

include possession of a driver’s license, possession of a transit pass, employment status, student status, and occupation. The share of young adults living in Don Valley and Crescent Town is comparable to the city, as the proportion in Don Valley is 25%, Crescent Town 24%, while the city’s share is 26%.

Table 6 shows that young adults living in apartments represent the lowest proportion of those possessing a driver’s license. Lower shares of the target population, 65% in Don Valley and 52% in Crescent Town, possess a driver’s license in comparison to all young adults living in the two neighbourhoods. When compared to all young adults in Toronto, the gap is wider, and the difference is largest in comparison to older working adults.

These pieces of evidence point to two things. One, the acquiring of a driver’s license is becoming unpopular among young adults, which may be linked to a preexisting trend of millennials’ shift towards alternative modes of transport (Polzin et al., 2014; Blumenberg et al., 2012). The second explanation may be due to the delay in acquiring a driver’s license, which is another phenomenon commonly observed among this young generation (Goodyear, 2014). Nonetheless, it is seen that young adults living in apartments, especially those in Don Valley and Crescent Town, are the least likely to acquire a driver’s license among all young adults and older working adults.

Table 6 - Percentage of driver's license possession among older working adults, all young adults, and high-rise young adults

Driver’s license	Age 36-65			Age 18-35			Age 18-35 (Apartment)		
	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto
Yes (%)	79.1	72.3	81.6	67.6	56.5	72.2	65.1	51.9	68.4
No (%)	20.9	27.7	18.4	32.4	43.5	27.7	35.0	48.1	31.7
Unknown (%)	0	0	0	0	0	0	0	0	0
Total (n)	10654	7969	1098157	6502	4773	674914	4879	3265	276349

The next studied variable is the possession of a transit pass. Collectively, young adults are more likely to hold any type of transit pass than older working adults. As shown in Table 7, older working adults are less inclined to hold a pass – 81% in Don Valley, 74% in Crescent Town, and 84% in the city of Toronto. It is worth noting that the target population in Don Valley (41%) is more likely to hold a transit pass in comparison to all young adults living in the neighbourhood (38%), while the target population in Crescent Town (35%) is less likely to in comparison to all young adult residents in the community (38%). This may suggest that the target population in Crescent Town have lower spending power than in Don Valley, but may also be a result of less frequent transit trips.

Table 7 - Percentage of transit pass possession among older working adults, all young adults, and high-rise young adults

Transit Pass	Age 36-65			Age 18-35			Age 18-35 (Apartment)		
	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto
Dual Pass (%)	1.0	0.3	0.3	0.5	1.6	0.6	0	2.3	0.6
GO Transit Pass (%)	0.1	0	0.6	0	0.8	0.8	0	0	0.4
Metro Pass (%)	17.2	25.1	14.4	36.5	36.1	29.6	38.2	31.6	31.5
None (%)	81.0	73.6	84.0	61.0	59.2	68.0	59.1	62.7	66.4
Other Agency Pass (%)	0.7	1.0	0.7	2.0	2.4	0.9	2.7	3.4	1.0
Unknown (%)	0	0	0	0	0	0.2	0	0	0.1
Total (n)	10653	7970	1098157	6502	4773	674914	4879	3265	276349

The next three tables (8-10) represent demographic information of individuals living in Don Valley and Crescent Town. In summary, the target population signifies the lowest proportion of those occupying full time positions, while they are most likely to be unemployed, as shown in Table 8. An exception exists among Don Valley high-rise young adults, as they have a lower rate of unemployment in comparison to all young adults in the neighbourhood, but a

higher share of part time workers constitute the difference. Moreover, the target population represents the lowest percentage of individuals holding professional, managerial, and technical positions, and highest to occupy jobs in retail and services, as shown in Table 9. These are indications that the target population has less stability in terms of employment as compared to all young adults. Additionally, there is a higher fraction of full-time and part-time students in Don Valley and Crescent Town in comparison to the city, while the target population represents the highest proportion of students. The predominant number of students living in the two study areas may indicate that there is a higher reliance on transit, as indicated by previous studies showing higher percentage of transit use among students (Dalmelle & Dalmelle, 2012; Zhao, 2012).

Table 8 - Employment status among older working adults, all young adults, and high-rise young adults, in percent value

Employment Status	Age 36-65			Age 18-35			Age 18-35 (Apartment)		
	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto
Full time (%)	56.8	51.9	57.8	37.7	27.0	41.1	31.5	25.6	41.2
Part Time (%)	7.9	11.8	8.3	17.7	24.2	18.6	20.3	21.1	17.4
Home/Full-Time (%)	4.2	3.7	5.8	0.4	0.8	2.6	0.6	0	2.3
Home/Part-Time (%)	1.0	0	1.8	0	0.8	1.0	0	1.1	1.1
Not Employed (%)	30.1	31.9	26.3	44.1	47.2	36.7	35.7	52.2	38.1
Unknown (%)	0	0.2	0	0	0	0	0	0	0
Total (n)	10654	7970	1098156	6503	4773	674913	4879	3265	276349

Table 9 - Occupation type among older working adults, all young adults, and high-rise young adults, in percent value

Occupation	Age 36-65			Age 18-35			Age 18-35 (Apartment)		
	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto
General Office/ Clerical (%)	12.6	12.8	12.4	7.9	4.9	10.5	7.2	4.8	10.1
Manufacturing/Construction/Trades (%)	8.7	7.6	9.2	5.9	6.6	5.3	5.5	25	4.7
Professional/Management/ Technical (%)	27.3	18.4	28.4	18.9	9.6	19.0	15.4	8.0	19.1
Retail Sales and Services (%)	21.1	29.2	23.4	23.2	31.7	28.2	25.2	32.5	28.0
Not Employed (%)	30.1	32.1	26.4	44.1	47.2	36.8	47.6	52.1	38.1
Unknown (%)	0	0	0.2	0	0	0.2	0	0	0
Total (n)	10653	7969	1098157	6501	4773	674913	4878	3266	276349

Table 10 - Student status among older working adults, all young adults, and high-rise young adults

Student Status	Age 36-65			Age 18-35			Age 18-35 (Apartment)		
	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto
Full-Time (%)	2.6	5.5	1.2	29.4	39.2	28.7	29.8	36.8	26.9
Part-Time (%)	4.6	2.1	2.1	7.8	7.0	6.4	9.1	8.0	6.7
Not a Student (%)	92.9	92.5	96.6	62.8	53.8	64.9	61.2	55.2	66.3
Unknown (%)	0	0	0.1	0	0	0	0	0	0.1
Total (n)	10654	7969	1098157	6502	4773	674913	4878	3265	276349

4.4 Trip Data

This section provides information on trips taken by the target population. The data includes each trip taken on the trip day by each person 11 years or older in the household. Similar to the previous section, a few variables are used to compare all young and older working adults in the city. The variables include mode of transportation and purpose of trip, which are cross-examined with few demographic variables, such as employment status, student status and possession of a transit pass.

Table 11 provides the breakdown of mode of transportation by various age groups. It shows that the target population takes the most trips on transit and the least as an auto driver. The majority in Don Valley and Crescent Town use higher levels of transit in comparison to all young adults across the city, while the target population living in Crescent Town shows the largest difference between transit-goers and auto drivers. The figures identify that the target subjects are most dependent on transit based on age (in comparison to older working adults), dwelling type (in relation to those living in a single-family house), and geography (as compared to other residents across the city).

In addition, the target population in Don Valley shows the highest proportion of auto passengers, which may indicate the prevalence of car-pooling among individuals living in an apartment in comparison to those residing in other dwelling types. This may be a factor of lower rates of car availability among households living in an apartment in the study area.

A cross examination of transportation mode and trip purpose is illustrated in Table 12 to provide further context into mode choice of the target population. The following tables (Table 12 – 16) provide data limited to the target population – that is young adults living in high-rises in Don Valley and Crescent Town. Table 12 indicates that the most car usage by the study subject is for discretionary purposes (ie. shopping, leisure trips) and non-home based trips (where neither end is a home), although they are dependent on transit for work and school commutes. This may be a consequence of carpooling and needing to be more flexible to trip chain for discretionary trips, pointing to a previous study that observed higher car use for shopping, visiting private contacts and medical care (Carse et al., 2013). As well, it is worth noting that the difference in mode of transportation is more significant in Crescent Town, where discretionary trips are still mostly taken by transit. This highlights a slight difference between the two neighbourhoods.

Table 11 - Mode of transportation among older working adults, all young adults, and high-rise young adults, in percent value

Mode of Transport	Age 36-65			Age 18-35			Age 18-35 (Apartment)		
	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto	Don Valley	Cres. Town	City of Toronto
Transit excl. GO rail (%)	24.8	30.6	18.7	46.8	63.4	38.7	47.5	73.6	42.9
Cycle (%)	0	0.7	2.0	0	1.2	2.4	0	2.0	2.3
Auto Driver (%)	59.8	55.0	64.4	36.0	20.3	37.7	33.7	11.6	31.8
GO rail only (%)	0.4	0.4	0.5	0	0	0.4	0	0	0.2
Joint GO rail and local transit (%)	0	0	0.1	0	0	0.2	0	0	0.2
Motorcycle (%)	0	0	0.1	0	0	0.1	0	0	0.1
Other (%)	0.1	0.2	0.1	0	0	0.1	0	0	0.1
Auto Passenger (%)	11.8	10.0	9.6	13.7	10.7	12.5	16.1	6.7	10.8
School bus (%)	0	0	0	0	0	0.2	0	0	0.1
Taxi passenger (%)	0.2	0.3	0.7	0	0.2	0.4	0	0.7	1.2
Walk (%)	3.0	3.0	3.8	3.5	1.9	3.6	2.7	5.4	10.4
Unknown (%)	0	0	0	0	0	0	0	0	0
Total (n)	22467	19164	2687452	13137	9003	1404519	9788	5533	566532

Table 12 - Trip purpose by mode of transport among the target population, in percent value

Neighbourhood	Mode of Transport	Trip Purpose			
		Home based work	Home based school	Home based discretionary	Non Home based
Don Valley Village	Transit (%)	49.9	82.7	24.5	14.6
	Auto Driver (%)	36.7	13.2	43.5	45.8
	Auto Pass. (%)	9.9	2.7	28.5	39.6
	Walk (%)	3.5	1.4	3.5	0
	Total (n)	3702	2394	2803	891
Crescent Town	Transit (%)	66.5	92.8	56.5	57.0
	Cycle (%)	5.9	0	0	0
	Auto Driver (%)	10.2	1.8	23.5	34.4
	Auto Pass. (%)	9.7	1.8	13.4	0
	Taxi Pass (%)	0	0	3.3	0
	Walk (%)	7.8	3.6	3.3	8.6
	Total (n)	1915	2073	1112	433

Cross examinations of demographic and travel data are shown in the following tables (Table 13 and 14) to further identify the types of young adults choosing a particular mode. Table 13 shows a comparison between employment status and mode choice. The data illustrate that there is a higher fraction of unemployed and part-time workers taking transit, with significantly more in Crescent Town. In contrast, most auto drivers are found among full-time workers. Moreover, Table 14 indicates that a greater share of full time students use transit in comparison to part time and non-students. As well, higher shares of part-time students are auto drivers in comparison to full time students. These pieces of evidence may suggest that income plays a role in determining mode of transportation, similar to several studies, which had suggested more car use among individuals with higher income earnings (Blumenberg et al., 2013; Mendez et al., 2015).

Table 13 - Employment status by mode of transport among the target population, in percent value

Neighbourhood	Mode of Transport	Employment Status		
		Full-Time	Part-Time	Not Employed
Don Valley Village	Transit (%)	34.5	50.9	59.3
	Auto Driver (%)	53.3	25.6	16.7
	Auto Pass. (%)	11.3	17.2	21.3
	Walk (%)	0.8	6.4	2.7
	Total (n)	4086	2029	3617
Crescent Town	Transit (%)	57.1	81.3	80.3
	Cycle (%)	4.5	2.7	0
	Auto Driver (%)	25.0	0	9.1
	Auto Pass. (%)	8.9	5.4	6.1
	Taxi Pass. (%)	0	0	1.5
	Walk (%)	4.5	10.7	3.1
	Total (n)	1675	1396	2463

Table 14 - Student status by mode of transport among the target population, in percent value

Neighbourhood	Mode of Transport	Student Status		
		Full-Time	Part Time	Not a Student
Don Valley Village	Transit (%)	78.0	52.0	32.5
	Auto Driver (%)	13.0	39.8	42.7
	Auto Passenger (%)	6.8	8.2	21.6
	Walk (%)	2.3	0	3.2
	Total (n)	2873	794	6122
Crescent Town	Transit (%)	92.7	35.3	62.9
	Cycle (%)	0	0	4.8
	Auto Driver (%)	0	47.0	14.7
	Auto Passenger (%)	4.4	5.8	9.6
	Taxi Passenger (%)	0	0	1.6
	Walk (%)	2.9	11.8	6.4
	Total (n)	2566	634	2334

Lastly, transit pass is cross-examined with employment and student status. As shown in Table 15, part-time workers and unemployed young adults are more likely to own a TTC monthly pass than full time employees. This may be due to the flexibility that a monthly pass provides, which is an essential criterion for part-time workers who are more likely to be traveling between multiple destinations. It may also be an effect of full-time employees disregarding transit pass as a need and preferring to drive to work. Additionally, higher percentages of Crescent Town residents hold other agency passes and a combination/dual pass, which may be the outcome of living close to a GO transit station.

As can be seen in Table 16, more full-time students spend money on a transit pass than part-time and non-students. Part-time students may have higher tendencies of car use because of their need for flexibility. Another plausible explanation can be their age and income differences, as they are generally older and tend to have higher earnings, and thereby have the greater ability to afford a car.

Table 15 - Employment status by transit pass among the target population, in percent value

Neighbourhood	Transit Pass	Employment Status		
		Full-Time	Part-Time	Not Employed
Don Valley Village	Metro Pass (%)	35.6	49.8	39.2
	None (%)	61.2	50.3	55.5
	Other Agency Pass (%)	3.2	0	5.4
	Total (n)	4086	2030	3617
Crescent Town	Combination/Dual Pass (%)	0	5.4	3.1
	Metro Pass (%)	32.7	48.6	39.1
	None (%)	62.8	40.7	54.8
	Other Agency Pass (%)	4.5	5.4	3.1
	Total (n)	1674	1397	2463

Table 16 - Student status by transit pass among the target population, in percent value

Neighbourhood	Transit Pass	Student Status		
		Full Time	Part Time	Not a Student
Don Valley Village	Metro Pass (%)	55.3	28.6	33.8
	None (%)	42.4	63.2	63.1
	Other Agency Pass (%)	2.3	8.2	3.2
	Total	2873	793	6121
Crescent Town	Combination/Dual Pass (%)	5.8	0	0
	Metro Pass (%)	62.2	29.4	17.4
	None (%)	26.2	70.6	79.4
	Other Agency Pass (%)	5.8	0	3.2
	Total	2566	633	2334

4.5 Transit Data

This section pertains to individuals who use public transit. The dataset singles out this particular mode from trip dataset described in section 4.4. A filter is used to limit observations on the target population, which is compared to all young adults across the city. The variables used are with respect to the number of transfers made by different transit vehicles.

Figure 8 shows the distribution of the number of transfer routes or links by public transit among the target population in comparison to all young adults in Toronto. Although most young adults use two transit routes, a greater fraction of the target population has to use multiple links (at least 2). The trend continues as the number of transit links increase, with the exception of Crescent Town residents who are less likely to transfer more than 3 times in comparison to all young adults. This may be an effect of living close to both TTC and GO station.

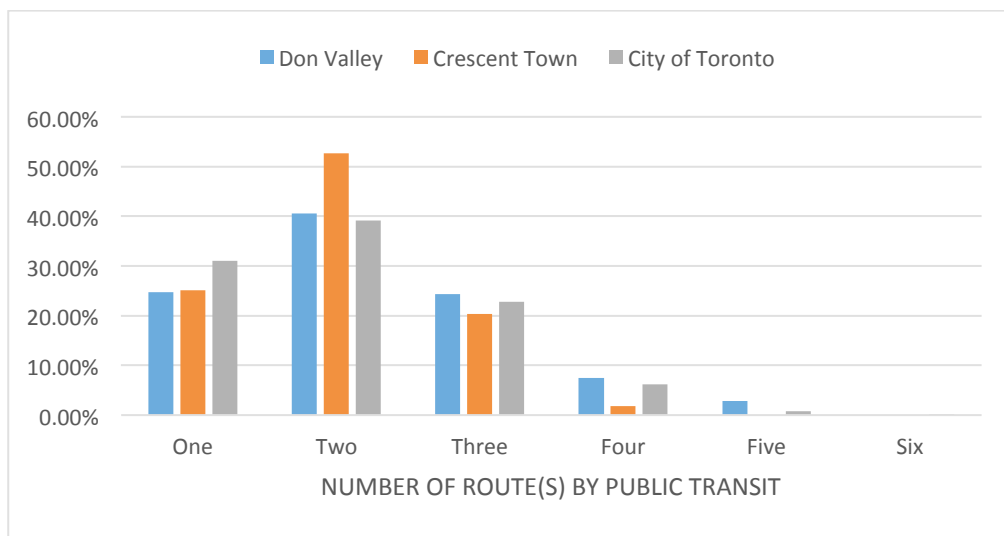


Figure 8 - The number of transit route(s) among the target population and all young adults in Toronto

The next figure compares the number of bus and RT transfer links between the target population and all young adults. Interestingly, the target population living in Don Valley is shown to have higher tendencies of making multiple bus or streetcar transfers than those in Crescent Town and all young adults in Toronto. As shown in Figure 9, the share of Don Valley residents is highest amongst those who make one or two transfers. As well, it is worth noting that

there is a significant difference between Don Valley and Crescent Town residents, whereby a much larger portion of Crescent Town young adults make zero transfers.

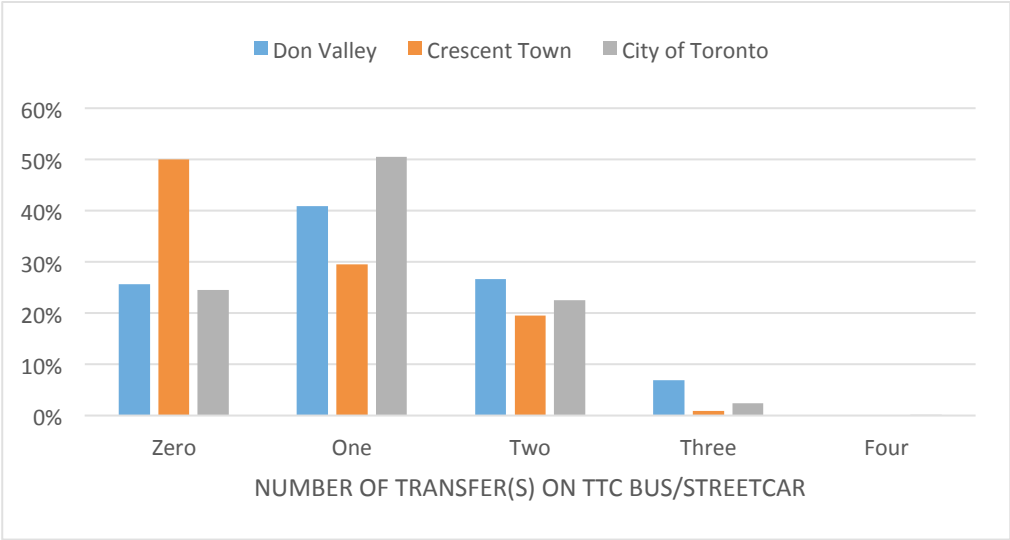


Figure 9 - The number of transfer(s) on TTC bus or streetcar among the target population and all young adults in Toronto

Lastly, the target population is compared to all young adults based on the number of transfers made on the subway and RT. The data shows a higher likelihood of the target population making multiple transfers on the subway and RT. Figure 10 illustrates a larger proportion of the target population making two or more transfers in comparison to all young adults. Similar to the previous graph, there is a significant difference between the target population in Don Valley and Crescent Town, as most Don Valley young adults make zero transfers and many Crescent Town young adults make one.

Ultimately, the target population is more likely to make more transfers than all young adults in any given transit mode, as shown in Figures 8 to 10. These graphs illustrate the lack of transit connectivity serving the two study areas even though they are in close proximity to a

subway station. The frequent transfers may add inconvenience to an already lengthy commute, which suggests that there is a need to reevaluate connectivity within the transit network, especially the sections serving suburban neighbourhoods.

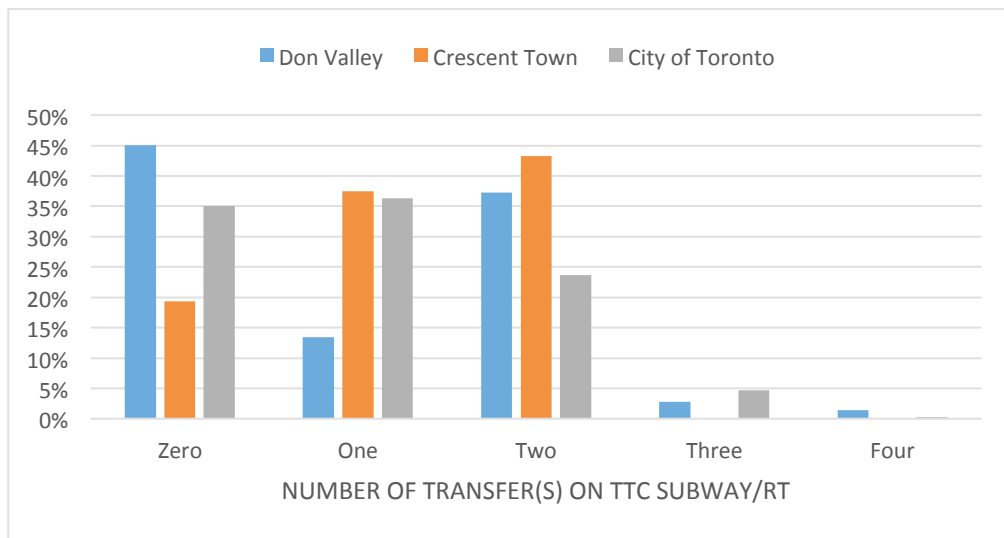


Figure 10 - The number of transfer(s) on TTC subway or RT among the target population and all young adults in Toronto

4.6 Summary

This chapter provides an overview of the target population based on demographic and travel data contained in the TTS database. The data is divided into four categories - household, individual, trip and transit characteristics. A compilation of household data concludes that the majority of households in Don Valley and Crescent Town live in high-rise apartments, and they comprise of larger household sizes in comparison to the rest of the city. They also typically have limited access to a car but have at least one household member possessing a driver’s license.

Through an examination of individual characteristics, the target population is the least likely to possess a driver’s license and has the highest share of students. These study subjects

have the least stability in terms of employment, as they have the highest unemployment rate and proportion of part-time workers. As well, they tend to acquire lower income earnings, as they more likely to occupy jobs in retail and services and least likely to hold professional, managerial, and technical positions than other residents across the city.

Moreover, the target population has high transit dependence, as they represent the largest portion of those who take transit to school and/or work among all young adults. Full-time students and unemployed and part-time workers have the highest tendencies. The car is used frequently for discretionary purposes, such as leisure trips, but a large percentage of these trips are still taken by transit among the target population living in Crescent Town. Although the target population is highly dependent on transit, they are more likely to make multiple transfers (two or more) during a trip regardless of the transit mode in comparison to all young adults in the city.

In summary, these pieces of evidence suggest that the target population is among those who are most dependent on transit but live in neighbourhoods lacking transit connectivity. Therefore, it is important to understand their transit experiences in order to improve transit serving these communities, which is the topic of discussion in the following chapter.

5. TRANSIT EXPERIENCE

5.1 Introduction

This chapter presents the findings of a series of in-depth interviews conducted with participants between January and April 2017. It aims to respond to the main objective of the research question, which is to generate an understanding of participants' experiences using transit. The section is divided into seven sections, which were the main themes of discussion during the interview. The first theme relates to access, in particular the importance of proximity, convenience, and safety. The second theme discusses transit service, which is based on frequency (subway delay and bus wait-time) and capacity. The third theme is transit facility, which details station accessibility and amenity, signage, as well as comfort and cleanliness. The fourth theme describes transit (monetary) costs, which includes discussions on the fare system, discount options, and multiple types of transit pass. The fifth theme is transit network and it includes a discussion on network coverage and expansion, and transferring between transit vehicles. The sixth theme deals with support – or lack of – that passengers receive on transit, in particular their personal interactions with TTC staff and other riders, as well as factors affecting their personal safety. The last theme describes the overall experience of participants, which are mainly positive despite some challenges. During the interview, top priority problems and recommendations to improve transit experience are discussed, which are embedded within the themes. See Figure 11 for an illustration of the themes.

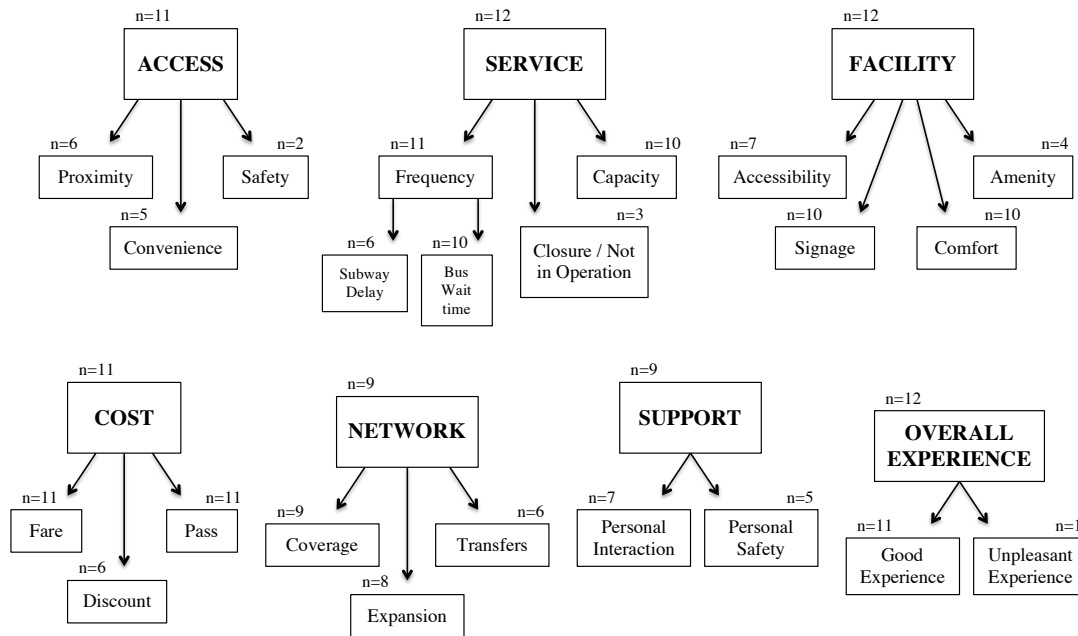


Figure 11 - Summary of themes from interview discussions on transit experience

5.2 Access – Proximity, Safety & Convenience

When participants are asked about their experience accessing transit, there are three main areas of discussion. The first is in regards to proximity to the subway station. All participants who relate accessibility in terms of proximity state that it is not an issue, with some stating that living close to a transit station is one of the benefits of residing in the neighbourhood. Stella states that the advantage she has with her route is due to the living close to a main station (Don Mills) that is part of her commute, adding “access is not a problem at all because if I check my phone and see that the bus isn’t coming in another 10-15 minutes, which is rare ... then I would just walk to the subway because it is quicker”. Medina, who lives in Don Valley, further mentions that close proximity to a transit station “is one of the reasons why [she and her family]

would not want to move”. Liam, who lives in Crescent Town, also expresses the same view, stating that he “literally lives right beside the subway, so everything is really accessible.”

Other areas of discussion in regards to transit access relate to safety and convenience. Notably, Layla and Emma state that accessing the station (Don Mills) can feel unsafe, especially during early mornings, late at night, and during severe weather conditions. They explain that this is due to the location of the subway entrance, which forces them to walk through a parking lot of a mall, which can become very busy during the day and dark at night. Layla clarifies that when she is leaving Don Mills station, she “would just walk through the parking lot and [she] does not like to do that after 9:30 [pm] because everyone is gone from the mall and it is pretty dark and scary”. Emma expresses similar concerns, stating “there is not a clear path to [accessing the subway station], so I would have to walk through the parking lot ... it’s very dark and there are not any lights. In a way, it feels unsafe for me.” In addition, Emma mentions that walking through the parking lot can be an inconvenience during the day with statements such as “the streets are jam-packed and [the cars] are always making noise” and that she would rather walk through the mall to go home. The inconvenience of access at Don Mills station is a top priority problem for Emma.

These concerns stem from the lack of direct subway exit to the street. Emma states, “it would’ve been better to come home if there was an open or a public open space connection to my place rather than having to go through the mall”, and further adds “[access] is a concern especially during hours where the mall is not open or is a little bit too dark [because of] the weather”. Furthermore, she makes a comparison between the Don Mills and St. Clair subway exit. The latter is located in mid-town Toronto, which has more of an “urban” setting than the former. Emma prefers the St. Clair subway exit because of the multiple access points and the

integrated transition between the station and its surrounding environment. She further states the following about the St. Clair subway exit:

“If I leave late, there are still people and there are commercial spaces underneath it. If I go grocery shopping I can access the subway station right from that building and there are good access points versus here [Don Mills subway exit] where [access] is dependent on the weather, dependent on the timing of the mall, so it’s very dependent...” – Emma

Furthermore, Keenan describes the inconvenience of access of an egress point. He experiences inconvenience when he goes to the gym – located in another suburban location. He describes that there is a lack of walkable pathway between the bus stop and gym entrance. He explains his experience as having to walk through a field and parking lot to reach the gym entrance, whereby the pathway is occasionally covered by mud and rain puddles.

Additionally, other statements about access include the absence of a TTC representative by the subway entrance at Don Mills station. Participants explain that one of the popular entrances used by many riders only accepts metro passes and tokens as fare payment, while a TTC representative has to be present to accept other types of payment. Keenan, Harper, and Stella state that the absence of a TTC representative, which occurs often, forces them to walk a long way to access the station. Harper adds that “a lot of the times, the token machines don’t work”, hence the need to make the extra journey frequently. These challenges and inconveniences of access pose as concerns for many participants.

5.3 Service – Frequency & Capacity

In this section, the experiences of participants in relation to transit service are highlighted. Transit service refers to discussions about the frequency of service (delays and wait-times) and the capacity of vehicles. The discussion is divided by transit vehicle - subways and buses.

5.3.1 Subway Service

In terms of subway service, all participants do not have an issue with wait-time. However, all participants who are frequent subway users (minimum 3 return trips a week) state that there are issues with subway delays, which are caused by emergency alarms and service disruptions. They indicate that there is a high occurrence rate, which results in the lack of predictability of arrival time. Keenan, an infrequent subway rider, identifies subway delays to be a priority problem as they occur each time he uses the subway. Emma recommends that the TTC should do more research on the problem to be able to recover from a subway delay at a faster rate.

Emma, Michael, and Medina state that the subway service is highly dependent on external events, such as emergency alarms, which disrupt the whole system. Harper claims that she has “been stuck in so many delays that range from 15 minutes to an hour and a half on the same train without moving, and sometimes multiple times a week.” Medina, who believes that delays and subway closures are top priority problems, claiming “every day, [subway delays] add about 30 minutes to my commute”, while Michael and Harper conclude that subway delays prevent them from being on time to appointments. Michael and Harper further state that occurrence rate of delays is higher during the winter season. Michael’s experience is described in the following:

“It happens almost every time of the month especially during the winter, I don’t know why. In the winter, it happens a lot. And it’s crazy, they like... [Operate] the shuttle buses and then you have to go upstairs out of the subway and wait for the buses out in the winter. It’s ridiculous. It happens almost every week during the winter.” – Michael

In addition, a few participants indicate that frequent subway closures on weekends also pose an issue. In the occurrence of a subway closure, there are shuttle buses replacing the subway service, but they are much less convenient to passengers. Often, Harper has to take

shuttle buses and claims that they are always “so slow” and “filled to the brim”, adding at least an hour to her commute. She expresses that they come in clusters, which lengthens wait time. Liam and Jacob are less frequent subway riders and they express the same concerns about weekend subway closures and shuttle buses. Liam describes the frequency of subway closures, stating “there’s usually a subway closure every weekend on different routes; So, it’s frequent.”

In terms of subway capacity, almost all participants who are regular and semi-regular users indicate that the subway is often operating at full capacity. Emma, Layla, Brooks, and Michael claim they rarely get a seat and frequently have to wait for multiple trains before they are able to board. Michael adds that when the subway is operating at full capacity, it adds a bit of an inconvenience to his commute as the situation prevents him from working, using a laptop, and reading a book on the train. Emma expresses capacity issues have improved since the operation of the newer trains, as they are able to carry passengers at higher capacities.

A few participants claim that subway delays have improved and occur much less frequently in recent times. However, these claims are a result of a change in travel pattern, which may explain the difference in transit experience. For instance, Emma states that the subway service has “recently been good”, but adds that she leaves later in the day outside of rush hour. She also notices that there are more of the new subway trains in operation across different lines. Layla experiences similar positive changes, while adding that delays may be a factor of high capacity. She may experience fewer delays because she leaves earlier or goes home later in the day, hence missing peak rush hours.

5.3.2 Bus Service

The main concern regarding bus service is the long wait time. All participants except 2 express this concern, while Brea, Stella, and Jacob mention this as a top priority problem. Brea,

Michael, and Jacob specifically express that long wait time is a result of bad weather conditions. Brea adds that she would occasionally have to wait 30 – 35 minutes for the bus. Jacob elaborates that inconvenience stems from not knowing when buses arrive during bad weather conditions due to the lack of information. Other participants, including Emma, Layla, and Clara express concern of delay due to the lack of busses operating in certain routes that they frequently use. Clara, a student attending an adult school, mentions that “not only [she] is suffering, [but] many students are ... because the [number] 20 bus is always late and [there is] only one bus on this route”. The long wait time of buses is considered a top priority problem for a few participants, including Keenan, Brea, Stella, Medina, and Jacob.

Furthermore, Medina and Jacob express concerns of lengthy wait times due to the clustering of buses, as Jacob clarifies that 3 or 4 buses would come at the same time leaving a half hour gap until another bus arrives. Medina further expresses “often times, when two buses come and we have waited long, one of the buses just goes out of service”. This situation is an inconvenience because it would mean that some passengers would have to wait longer for the next bus. Keenan and Medina express that the clustering of buses is a top priority problem. Stella recommends that buses should be spread apart by 5 minutes to avoid clustering, while Medina recommends that the gap between buses should be more balanced, not necessarily with equal interval between them but one that does not leave passengers waiting for long.

Stella, Michael, and Jacob are current or previous York University students, and they specifically express concerns over the wait time of buses to and from the university. The long wait time is a top priority problem for Stella and Jacob. Michael states “it is so hectic and so disappointing during the winter ... you have to make a line outside the station even when it is minus 10, minus 20, or minus 30 outside.” Jacob further claims “the transit time [to school] is

about an hour, but [he] always gives [himself] extra time because the buses are always late ... and too packed”, while Stella expresses similar concerns stating “from home getting to York was [her] least favourite commute ever...the 196B was never on time. It was packed.”

This leads to the next topic of discussion, which is in regards to bus capacity. Eight out of twelve participants claim that buses are often operating at full capacity and they would not be able to find a seat. Keenan, Layla, Medina, Stella, and Jacob describe this to be a priority problem as they describe it as “major inconvenience”. Stella specifically mentions the bus travelling to York University as a priority problem in terms of capacity. Keenan states that buses are especially at full capacity during peak rush hours. Brea and Medina add that buses often do not stop when they are already at full capacity, hence lengthening wait time for passengers waiting at the bus stop.

On a positive note, Stella and Liam notice improvements regarding bus service modifications. Stella claims that bus route changes have improved certain lines in terms of bus frequency, such as the 25-bus route. Recently, TTC had broken up the previous lengthy route into multiple shorter ones to minimize bus delays. Additionally, Liam notices that bus service has improved recently in comparison to 5 years ago, as buses are more frequent and on time. The following is his statement about the improvement:

“They [TTC] have gotten better because now the buses run way more frequently especially now they know there are certain times where a lot of people are coming home or kids are coming home from school, so they have busses that run way more frequently than before. When I was in high school, it was hard because the buses don’t run that frequently but now since they’ve done their research so now they know at certain time it gets really busy and it’s rush hour time. So now they send the buses more frequently.”

5.3.3 Choosing between Subway and Bus

Multiple participants have expressed preferences of using one transit vehicle over another. Notably, the majority of participants, seven out of twelve, indicate that they much prefer

to travel by subway than by bus due to two main reasons – length of commute time and convenience. Brooks, Stella, Michael, Medina, and Jacob reveal that there is less wait time for the subway, hence shorter commute time. Medina suggests that the reason is due to higher frequency, while Michael and Brooks claim it is predictability of schedule. Jacob and Stella add that the subway allows for higher capacities, and therefore are more efficient in transporting individuals.

Moreover, Brea and Medina indicate that the subway is much more convenient than the bus. Clara states that the subway is more direct, which means it requires fewer transfers, and it protects her from the cold weather in the winter. Brooks adds that the subway is more convenient because of the availability of stop announcements, which allows her to navigate the subway route better. Among participants, there is a general consensus of higher preferences of riding subways over buses, as the former provides a better transit experience.

5.3.4 Switching to Cars

The switch to drive a car is inevitable in light of worsening transit service according to some participants. They claim that mode-switch is an option when their transit experience reaches a certain negative threshold. A few participants have made the switch to drive a car due to long commute and wait-times. In particular, Stella and Michael recently switched to driving for their main commute. Stella's reasoning of the switch is time constraint; as she compares her one-hour transit commute to her 10-minute drive. Michael, who now drives frequently, provides similar rationale in addition to his lengthy wait at the bus stop of his university. Emma states that she would use a car in the evenings to go to her community center due to long wait-times of buses and "feeling unsafe" to walk through residential areas. She further mentions that she is acquainted with several individuals who take the car to and from Scarborough because of the

lack of subway connection. She is teaching her sister, who must commute to Scarborough on a daily basis, to drive because of the long wait-time and frequent bus transfers. Brooks also commented on the convenience of the car stating, “When you have a car, life is easy.” As a substitute to driving, some participants use Uber as an alternative in the event of unpredictable bus schedules and disrupted service.

These statements indicate that efficiency in service is an important consideration in order to retain and increase transit demand. Similarly, a study concluded that timeliness and comfort are essential transit attributes in order to encourage individuals to make the switch from being car dependent (Wang et al., 2013). These are functions of “emotional mobility” that is coined by Schiefelbusch as described in chapter 2. Ultimately, several researchers, such as Belzer and Autler (2002), believe that suburban residents depend less on cars in the presence of good public transport alternatives.

5.4 Facility – Accessibility, Signage, Comfort & Amenity

In this section, transit facility is evaluated, including bus stops, subway stations, and transit vehicles. There are four overarching themes, which include station accessibility, signage, comfort (ie. cleanliness) and amenities. This section is divided into two separate discussions of individual transit vehicles - subways and buses.

5.4.1 Subway Facility

Several participants have concerns over accessibility at subway stations. Six out of twelve participants claim that there is a lack of escalators and elevators in several subway stations. Emma, Layla, and Liam discuss the difficulty of navigating through the station at times of injury. Layla describes, “I was experiencing challenges last week because I had a back injury...the escalator wasn’t working and so I had to take the stairs up.” Liam states that he also

had to take the stairs while on crutches in the absence of an escalator. Emma's concern is her difficulty of finding elevators, and she finds that escalators are not speed-friendly as everybody "is in a rush and treat it as if it's stairs".

The lack of functioning escalators and elevators hinder wheelchair accessibility according to some participants. Brea states that the lack of elevator is a top priority problem for those who are in wheelchairs or have health injuries such as knee problems. Michael experiences the issue first hand when he travels with his father who is on wheelchairs. He has to check whether certain stations are wheelchair accessible prior to the trip when accompanying his father. This is not only a problem for individuals in wheelchairs, but also for mothers who travel with their babies. Brooks claims that she has difficulty bringing strollers on her commute, as escalators are often unavailable for use. She describes that she would have to take the stairs while carrying her baby and stroller at the same time.

Furthermore, there are accessibility issues with the new subway train, as it is not levelled with the subway platform. Medina claims that the door of the new train is 1 inch higher than the level of the platform and she sees this as a tripping hazard. She has witnessed passengers tripping over the doorway on multiple occasions. She also sees this as a concern for people in wheelchairs whose wheels often get stuck in between the platform and subway door. Layla also expresses a tripping concern over the dividers between train compartments of the new train, as she has witnessed this incidence occur multiple times.

The next discussion is in regards to the signage system in the subway station. Five participants indicate that signage is an issue, particularly when in search of a washroom. Medina finds it hard to navigate through the station especially when there are multiple exits. Emma claims that she does not know where things are located because of the lack of clear signage.

Brooks, an immigrant from Bangladesh, recommends that stations in neighbourhoods with a large ethnic cluster should also provide signage systems in the dominant language catering to the common ethnicity of the area. Her suggestion is based on her observation that many older adults living in the neighbourhood lack English skills. On a positive note, Jacob indicates that the signage system in the new subway train is effective, as stops are clearly announced and shown clearly on the interactive subway map.

Lastly, a few participants indicate that additional amenities have the potential towards increasing positive experience. Emma describes live music in subway stations as “really cool” and “fun”. As well, the availability of a phone signal and Wi-Fi on the subway level provoke positive attitudes. Liam and Michael describe that having access to these amenities will make the trip more enjoyable. Emma adds that it allows one to be in contact with their workplace in case of a delay. Harper acknowledges that Wi-Fi is installed on the subway platform but recommends that it should also be available on the train. Other additional amenities that a participant endorses are additional seating on the subway platform and the availability of washrooms at all stations.

5.4.2 Bus Facility

In regards to bus facility, the most common issue among participants is related to comfort. Several participants have issues with bus shelters. The main argument is the lack of protection that they provide from external weather events. Harper claims that she has witnessed the shattering of the protective glass in cold temperatures. Medina explains the ineffectiveness of shelter protection stem from their design. She notes that many bus stops have been altered from two-sided to one-sided glass coverings, which does not protect passengers from the weather elements such as rain and snow. Moreover, Keenan states that some shelters are located too far from the bus stop. He expresses a concern of missing the bus when standing under the shelter, as

he is not visible to the bus operator. During severe weather conditions, he opts to wait outside the shelter by the bus stop to ensure that he is within visibility of the bus driver.

Additionally, participants depict the lack of bus shelter at some stops. Layla states that she is left unprotected at the bus stop despite its location at a major intersection. Brea, a 33-year old lady, states, “there is no shelter on my bus [stop] ... [there is] only one bench but you know in the winter when there is snow, it’s covered with the snow or black ice, it’s slippery.” The lack of shelter in the winter can be dreadful for commuters like Brea, as she continues “... because it was extreme cold weather, the bus [is] delayed 35 minutes and I have to wait at the stop, and I was waiting and I don’t know when the next bus will come.” Michael, a York University student, describes similar experiences when waiting for the bus in the winter. He describes it as his worst transit experience.

Another common issue encountered by participants is in relation to signage or the information system indicating the arrival time of buses. Harper, Layla, and Liam state that the countdown timing of bus arrivals shown on bus platforms and shelters are often inaccurate. Layla considers this as a top priority problem. Stella indicates that there is no information on the arrival time of the next bus at the stop she uses regularly and she would estimate its arrival by counting the number of people waiting. Brooks repeats this sentiment recommending that all bus stops should have a countdown timer. A few participants mention that they use a phone application, such as Google Maps, to acquire this information. However, this is not possible for those who do not own a mobile device, such as Brooks who would just wait at the bus stop. Jacob mentions that paper postings of bus schedules are often inaccurate and out of date. He adds that there is a lack of information about route hours and night buses. In addition to bus schedules,

Medina recommends introducing an interactive map showing the position of the bus stop in relation to the route, which is to be posted at all functioning bus stops.

On the topic of bus facility, a few participants describe their definition of a comfortable transit. Keenan compares TTC and GO buses by their comfort level, describing GO buses as having better amenities such as the availability of an air vent, reading light, leg rest, and adjustable seating. He finds that he is able to complete tasks when he rides the GO bus, such as reading and working. Additionally, punctuality is also regarded as important, as he describes GO buses to be “90-95% almost always on time”. The punctuality sentiment is repeated by Medina, as she indicates well-functioning bus shelters and accurate scheduling are important to improve her transit experience. Keenan assured, however, that it is inappropriate to compare GO and TTC buses, as they have different functions.

The next most common issue is in relation to cleanliness. Six participants out of twelve, indicate that bus cleanliness could be improved. Layla describes the lack of cleanliness as a safety concern because of the wet and slippery surface. Brea believes that school-aged children are the ones responsible. All six participants agree that the lack of cleanliness is the fault of the TTC but transit riders. Nonetheless, there are good Samaritans on transit as well, such as Medina, a 23-year old lady, who claims that she would pick up after other passenger’s trash because clean space matters to her.

5.5 Cost – Fare, Discount & Pass

Transit cost refers to the amount of monetary value spent on transit, excluding time resources. Regarding this topic, the interview covered three main areas of discussion including fare price, discounted options and types of passes. The following paragraphs are divided into these three categories.

The opinions of participants about transit fares are acquired and all participants indicate that the fare is too expensive with varying explanations, except for one respondent who refused to comment. Five participants are concerned about the constant fare increase, as indicated by statements such as “I remember when the fare is \$2 and now it’s \$3.25” (Keenan). Harper, Layla, Clara and Stella express similar concerns, as Stella states, “Oh gosh, the fare...it increases every year. The fare kind of hurts the bank.”

Other participants conclude that there is no justification for the fare increase, especially due to the “slow service” and lack of improvement. Stella states “I feel like if there was a guarantee that [the fare] wasn’t going to be raised, it would be ok ... I don’t really see the improvement in order to garner a price increase.” Layla and Medina express similar statements. Emma, who uses the Yonge-University subway line for her commute to work, a fare increase is reasonable as long as she sees improvement. However, she empathizes with people who have worse transit commutes than herself stating, “if I were my sister and I take transit to Scarborough, then I would hate it and I would not even pay my fare because of the lack of service.”

Another factor of false justification relates to TTC’s large profit margin according to participants. Stella claims that the TTC already makes a big profit, stating “[TTC] makes a whole lot in a day. I just don’t see why it’s necessary to be paying so much”. Other participants, including Michael and Medina, express similar sentiments such as “the bus is profiting if it travels more frequently and has more capacity” (Medina). These statements indicate there is a general sentiment among Toronto residents believing that the TTC operates similarly to a private company looking to profit from its services. This is a wide misconception since TTC is a public service that has been underfunded for a long period of time (Hume, 2016; Palisoc, 2014).

Additionally, Michael suggests that the transit fare is expensive by comparing it to other transit systems. He states “transit is kind of expensive. If you compare [it] to Montreal’s subway service, Toronto subway is way way expensive ... Two years ago, I visited Paris, so I compared the price and I think Toronto fare is kind of expensive.” Keenan also makes a comparison between purchasing a transit pass and a car. He claims, “for [a] regular metro pass, I would say it is expensive. If you compare it to getting a car, you would be paying around \$200 on insurance but for comfort. I guess this is just putting it into perspective.”

The next topic of discussion is in regards to the effectiveness of several discounted options for paying the transit fare. Harper and Medina, two students of the University of Toronto who use monthly passes for transit, are unsatisfied with the discounted metro pass. They express that the price is constantly increasing and yet there is no relief even though students are earning minimal income from their part-time jobs. Medina claims the following:

“for students [the fare] is really expensive. The [student] monthly pass is only \$3 cheaper than the adult monthly pass ... Students shouldn’t be burdened that much. I think the biggest population who commute are students, so [the fare] should be a bit more accessible or give [students] more benefits.” – Medina

Clara, who goes to an adult school and opts to pay using discounted tokens, is unsatisfied that she cannot take advantage of the discounted option for student single tickets. She claims, “I think I am a student so maybe for me [buying student tickets] is [less expensive], but my principal said no, no it’s not for you. It’s only for kids [children under a certain age].” However, Emma, someone who recently entered the working force, is satisfied with the student discount on the monthly pass and compares it to the fare amount that she has to pay currently. She states “because I have been a student for a while and the fare has been subsidized, I am okay with it. But now that I am working and I made the transition into buying an adult metro pass, I feel like it is increasing a lot.”

A few participants provide recommendations on other types of fare discounts. Several of them believe the TTC should introduce a low-income metro pass. This will be beneficial for recent graduates entering the working force, according to Emma, as well as students and underprivileged families, according to Medina and Jacob. Moreover, Stella recommends that transit should be free for seniors above a certain age. She adds that this may be successfully implemented, as there is a precedent of free transit fare for children under 12 years old currently under effect.

The next area of discussion is in regards to different types of transit passes. The most commonly used one is the monthly pass, commonly known as the Metropass. Six out of twelve participants claim that they are currently using this type of pass. Emma, Stella, and Jacob claim they use the Metropass due to convenience. They claim that individual tickets, such as tokens, are harder to keep track of and they often do not work at automated subway entrances. Stella and Jacob further claim that the TTC monthly pass gives them the flexibility to re-route and trip chain, which is especially convenient for running errands. Other participants, in particular Harper and Medina, use the pass because they ride transit frequently or on a daily basis, while Layla and Brooks opt to disregard it because of their infrequent transit trips.

Although a metro pass gives flexibility and convenience, Medina claims that she would have to get the student ID card, which is not convenient. She claims, “[getting the student ID] is all the way at Sherbourne [and they open] after 3 to 7 only, and I can’t get there in time.” The consequence of not having a student ID is severe according to her. She states, “I got fined for not having a student ID. It was 450\$. But then since I gave proof that I was in university, they reduced it to 200\$. And it’s still a lot.” To solve this issue, Harper and Medina recommend embedding the transit pass within school ID cards, as part of a student’s tuition payment. Harper

states that Toronto is a student city with many post-secondary institutions. She concludes that it would be convenient for students if monthly passes were included in student cards and this would alleviate problems related to students paying the improper fare.

The next most common type of pass is the individual one-way pass, known as tokens. Layla, Brea, and Clara use tokens because it is cheaper, while Brea uses tokens because she only uses transit once a day. Harper and Medina occasionally opt to pay using tokens instead of purchasing a metro pass for the months they are not travelling to school on a regular basis. Layla pays the fare using tokens and suggests that pricing should depend on travel distance. Her statement is explained in the following:

“Let’s say one person is going for an hour trip and one person is taking a 10-minute trip, and they’re both paying the same amount of money. It gets annoying. It feels more worth it when I’m going downtown because it’s a longer trip than versus when I’m taking a one bus trip somewhere.” – Layla

Another method of payment that is less common among participants is the PRESTO card. Although only one participant pays the fare using this method, he describes it as being the most convenient method as opposed to tokens. He is surprised that many of the buses do not accept PRESTO cards currently. He describes the convenience of using a PRESTO card in the following:

“It’s so old using tokens and keep counting tokens and buying every time, it’s so old. That’s why I got the PRESTO. I don’t have to carry it around my wallet. I just have the card and [I put it behind] my phone, so whenever I am by the TTC entrance, I just tap it, so it’s fast. And I don’t have to buy it every week when it ends and it auto updates ... every time my balance goes below the \$5 [limit], it will top up automatically.” – Michael

The PRESTO card, however, is still unpopular among most participants, and there is a widespread misunderstanding around it. Stella claims that she had previously used the PRESTO card for her commute but it was inconvenient in the past in comparison to now. She claims, “I think when I got PRESTO, it wasn’t as convenient as now where they actually have it on the

buses and you can reload in most stations, so I never really gotten into it.” Layla and Medina claim that they have heard of it but do not use it. Medina, however, believes that the PRESTO is a step in the right direction of integrating various transit systems across GTA. Furthermore, Emma claims that there is a lack of information and transit riders should be more informed about PRESTO.

Lastly, another fare payment option is the day pass, which is an unlimited pass for a single day. The day pass can be used by one person on weekdays or as a group on weekends and holidays. Reflections of this fare option vary between two participants. Keenan believes that it is an effective discount option for groups, as it becomes much more affordable per person. Harper claims that the day pass is inconvenient because they are not accepted at automated entrances.

5.6 Network – Coverage, Expansion & Transfer

Transit network refers to the area coverage of transit service. This discussion responds to one of the sub questions of the study, which is to understand whether the current transit network is sufficient in meeting the needs of high-rise suburban residents. Participants comment on particular missing links within their travel, and their responses are categorized into subway, bus, and overall network.

5.6.1 Subway Network

Numerous participants identify the uneven distribution of the subway network across the city. Nine out of twelve participants conclude that the rapid transit line should be more extensive in order to cover their travel needs. Medina claims “I think ... getting into downtown and the sort of adjacent areas – is the only place we can get to via subway easily. Other places are not at all convenient ... there are significant chunks of the city which aren’t as accessible.” Layla claims that there are no subway lines serving her current gym and the commute is especially

inconvenient from her school, as she is dependent on bus service. She claims, “by car [the trip] will be 15 minutes but with transit, it’s an hour and 15 minutes on the bus ... you would have to take that bus across and it’s so slow. It’s really ineffective. I feel like there should be another option.” Similar to Layla’s journey to her gym, Brooks and Clara often rely on bus service to reach their destination. Brooks explains the need to transfer between the subway and bus for social trips. She describes her negative experience travelling to Markham in the following:

Brooks: Markham is very horrible. 2 years [ago] I went to my husband’s friend’s house in McCowan. I took [the] train, then I [went] to Kennedy and then [took] the RT to Scarborough Town Centre. After that I took a bus. [I took] 2 trains and 1 bus, and [I had to walk for] 22 minutes.

Interviewer: How long did the whole journey take?

Brooks: One and a half hours. It was my last visit.

The lack of extensive subway network has prompted several participants to recommend subway expansions across the city and support existing network expansion plans. Brea believes that there should be a subway connection from Don Mills station to Scarborough Town Centre and/or Markham. She states, “It’s not enough. Toronto is really big ... [expand] until at least Markham.” Emma also recommends the eastern continuation of the Sheppard line to Scarborough Town Centre, as she notices that many commuters travel between those two destinations. She further states that the lack of subway connection forces residents to use the car to travel to Scarborough, and she believes there is sufficient subway demand. She describes her negative experience of travelling by bus while accompanying her sister to a school located in Scarborough in the following:

“So she would have to take the bus. The 190 Rocket, and from there she would have to take another bus, and it would take her a really long time. But looking at the map itself if there was a subway, I feel like it would be a lot shorter. When I was there in the morning, with her ... I noticed how packed it is and how there are so many people using it but there isn’t a subway. - Emma

Emma continues on to describe her journey to her sister's school by describing her experience using transit in Scarborough, which includes using the "outdated" RT (blue) line connecting Kennedy and McCowan station. She states the following:

"I was looking at the line from Scarborough to [McCowan] station to [reach] the blue [RT] line. My sister could take that line because it's shorter for her if she stops in one of those RT Scarborough, but the quality of it, that was my first time being on it and I felt like I'm in the third world country or something ... I did not know there [is] such old subway system that still exists. Personally, I was shocked. And my sister has to make this trip every day Monday to Friday because that is when her school is." - Emma

Stella does not express the same concern about the RT line but expresses the need to expand it, and claims that the east end of Toronto should have better access to the subway network. She states, "I find that a lot of the times I'm on the east end and there isn't a lot of access on the east end in terms of subways. Like there's an RT, but I think if they worked on branching that out, it would be so much better off."

Moreover, other participants support subway expansions in other areas of the city. Harper believes that building the downtown relief line is a top priority. She believes that subway infrastructure investment should be concentrated within the city, specifically the downtown area, instead of expanding to other regions and municipalities. She recommends that building the downtown relief line should be a top priority in order to relieve pressure off the overcrowded Yonge line and thereby lessen subway delays. Similarly, Medina states that building more subway lines could decrease delays, although she was less specific as to which areas need the expansion. She states, "currently, there's too much burden on existing subway lines evident through constant repairs and delays," as there is stagnant growth in transit network while neighbourhoods are developing rapidly. She believes that the solution to decreasing the frequency of delays is to have more interconnections between stations in order to provide alternative routes, which would also shorten commute times. She expects that the transit network

would expand further over the years. Lastly, Emma recommends that network expansion projects should be equally distributed to all neighbourhoods including transit desert areas, such as Scarborough.

5.6.2 Bus Network

A gap within the bus network is reported among several participants, as some bus routes have infrequent service. Emma claims there is a missing bus connection to her community center, as the headway between buses is 30 minutes. Layla also describes a missing link in bus network serving her old gym in the following statement:

“Where my old gym used to be, it was at Lesmill and it’s like the exit on Leslie from the 401. There is no bus that runs on Lesmill (the continuation of the Leslie exit from the 401). There is one that goes from York Mills and goes up Lesmill (route 122) but it runs every 45 minutes. If you want to make the bus, you have to time it and run out at the right time and the bus stops coming after a certain time.”

In solving the bus network issue, participants recommend increasing its service to busy destinations, such as community centres and universities. Medina specifically recommends allocating more direct (express) buses to these destinations. Emma and Jacob recommend increasing bus service based on the population growth of the area, and operating shuttle buses to serve especially busy destinations. Emma explains the need to increase the frequency of buses servicing her community centre in the following passage:

“It is a community centre that is serving new immigrants because in our community centre one of the programs that we have is to help people transition into Canadian society from our perspective; because we speak the language and we help them transition into the Canadian Society. And those people don’t have access to cars, right? And so if they look at these kinds of things or look at the area where these kinds of people are using [transit], maybe they would recognize that it needs transit.”

Additionally, some participants are unsatisfied with the many bus transfers on their commute. Clara, who has to travel to Scarborough on a daily basis, considers frequent bus

transfer to be a top priority problem, as she believes the bus network do not accommodate her travel efficiently. Emma also claims that her sister has to take three different buses to get to her school in Scarborough. As well, Brooks mentions that she has to transfer multiple times to reach her destination in Markham, while Stella describes her past trip to school in the following:

“So from home getting to York [University] was my least favourite commute ever. And I think part of me hating the campus so much was because of the inconvenience ... I think more than anything, it’s the transferring that kills.”

These experiences represent the concerns of a transit system that relies heavily on bus service connection between suburbs, thereby creating a need to re-evaluate route design in order to allocate service in accordance to the population growth of the neighbourhood. As well, these issues present a necessity to identify popular destinations among residents in order to serve those areas more efficiently. However, these remain temporary solutions since the real need is to provide more interconnections of rapid transit between suburban communities.

5.6.3 Overall Transit Network

Interestingly, all male participants (Keenan, Michael, and Jacob) are satisfied with the transit network and believe that it is sufficiently expansive. Keenan states, “[network] is pretty good. The transit network is pretty much a grid so you can get from point A to point B pretty quickly. I think it is pretty good ... there is pretty much a bus on every minor intersection.” Michael, Jacob, and Liam express similar sentiments. Michael specifically comments on the subway network claiming, “Toronto is not that big so I think it covers the whole Toronto area except Mississauga. And it covers part of Scarborough so I think they are ... they are good. They are still building new lines in Eglinton actually.” Jacob makes a remark on the overall transit network, claiming, “you know everywhere you go, there’s always the TTC at every intersection and every road has a TTC line.” However, he would like to see the transit service expand beyond

Toronto into neighbouring municipalities, such as Markham and Vaughan, as he states, “I think it’s not that far, you know you cover the whole Toronto, and you might as well cover that little bit too. I feel like that wouldn’t hurt.”

Furthermore, in response to one of the sub questions of the study, participants are asked specifically whether the current transit network is meeting their travel need. Their responses vary between the two main transit vehicles – subway train and bus. Most explain that the subway alone does not meet their travel need even though these individuals live close to a subway station. Although rapid transit (subway) is what they prefer, they are reliant on bus service for much of their travel, which lengthens commute time in most cases. The problem is due to the layout of the current rapid transit network that provides links between downtown and suburban communities, failing to facilitate suburb-to-suburb connections. Through interview discussions, it is evident that the majority of participants – eight out of twelve – commute to another suburb where there is no rapid transit service. Therefore, it is imminent that rapid transit expansions should consider connecting suburban neighbourhoods. As Emma mentions previously, expansion should occur equally across the city as long as there is demand.

5.6.4 Transit Dependence

A recurring finding that arose out of the interview process is the dependency on transit among participants. There is a common sentiment about car unaffordability, and relying on transit for all commutes. Brooks states, “everybody has no own car; everybody uses TTC,” while Jacob adds, “even if the fare is expensive, people would still pay it.” Harper, a commuter student of the University of Toronto, expresses that she has “no choice but to use the subway” despite constant delays. She expresses that her university experience is dependent on transit, as she is unable to come home late because of unpredictable transit schedules. In addition, employment

choices are dependent on the availability of transit for a few participants. Medina indicates that accepting a work placement relies upon the location's transit accessibility. Similarly, Brea previously refused a job offer because of the (time and monetary) expenses associated with commuting to the job. She describes, "I said no to that job because of [the] \$7 I'm going to pay in the morning, \$7 in the afternoon, and plus I have to wait for [the] bus [for] 40 minutes."

These characteristics similarly reflect that of the study population outlined in chapter 4 of this study. In summary, as indicated previously, the target population is shown to have one of the highest transit dependencies among all young adults in the city based on several demographic variables including student and employment status, and occupation type.

5.7 Support – Interaction & Safety

This section engages a discussion on the level of support passengers receive on transit. More specifically, participants comment on whether support is obtained through personal interactions with TTC staff and other passengers. It also discusses whether the transit system supports a safe environment. This topic is not inclusive of the interview guide but rather discussed spontaneously when participants express the need for a more supportive transit setting.

5.7.1. Personal Interactions

Personal interactions refer to the various contacts and exchanges participants experience on transit. Their remarks are divided into two sections: (1) interaction with TTC staff, including operators and booth collectors, and (2) interaction with other commuters.

A few participants indicate they have had negative experiences interacting with TTC staff. Jacob considers this as a top priority problem, as he believes TTC employees are often "not courteous" to passengers. Layla indicates her negative experience is not based on transit service or facility, but interactions with TTC staff. She especially has issues with TTC personnel

working at the collector booths stating, “the collector people are often yelling so I find that annoying.” She has less of a problem with bus operators, but at times she finds they are abrasive when asked questions. Additionally, Medina explains that some bus operators do not regard the stop request policy for females after 9:30. She describes, “The TTC has a policy that after 9:30, if it’s only a female passenger travelling, they can [request] a special bus stop request and they just don’t regard that ... some drivers, they just say no. That happens.”

Multiple participants have been told to alight the bus because of miscommunication issues with TTC operators. Brooks reports that she was asked to alight the bus because she had asked too many questions after boarding a wrong bus. Clara also describes her negative experience with a bus operator due to misinformation about a route change and the payment system. She explains her experience in the following:

“So one time I was on the bus and the lady told me: “you get off!” So I said why? And she says I have no time to explain to you, you get off; she said she won’t drive unless I get off...she was very rude.” - Clara

On a positive note, Stella has had pleasant experiences interacting with TTC staff. She believes that they are friendly and encouraging, especially in the morning. She sympathizes with them and believes that they receive ill treatment on a regular basis. In particular, there is one particular bus operator that she is fond of on her regular route to work. She describes her daily experience coming into contact with the bus operator in the following:

“There’s this one lady on the 190, and she’s so great. You get on and she’ll start off with giving you a weather update and letting you know the 190 you’re on. She has just ... you know when you’re getting on a plane and the pilot gives you an update or gives you an overview of your commute? It’s like that. And she has the perfect voice for it too. Yeah, so I’ll get on the 190 and she’ll do it every time, and you think, “I’m ready to start my day”. You know, it’s one of those things... it’s refreshing.” – Stella

In addition, a few participants mention that they have issues with other commuters and less with TTC staff. Brea avoids going on a bus full of middle and high-school children. She

does not feel comfortable being around them because of their use of offensive language, and so she prefers to wait for another bus that is less crowded. Jacob also does not appreciate some commuters because of their rude behavior. He describes rude behavior as, “people [who do not] give up their seats for seniors or disabled people,” which frustrates him. He also believes the lack of cleanliness is the fault of other commuters, stating “they have no courtesy for other people; they just leave their newspapers and bottles.”

These experiences show that many participants perceive a lack of support on transit, especially when interacting with TTC staff and other passengers. To overcome these challenges, a few participants prefer to keep busy in order to avoid any confrontation. Emma states that she prefers to read a book on transit to alienate herself from her surroundings. Stella and Jacob also like to keep to themselves, as Jacob’s primary purpose is to get to his destination. He states, “I need this [transit] to get to somewhere and I just zone out. I would just read or listen to music ... I don’t really look at people or talk to people, so people don’t bother me.”

Additionally, the lack of support on transit shows itself in more blatant forms. According to Harper, she has often encountered seniors “getting lost” (unable to reach their destination) because of a lack of assistance from the operator and other commuters. She has also encountered people on transit who were mentally ill, claiming, “I have legitimately had this suicidal person and I just sat beside them and she just started talking,” and she adds, “there’s no support [on transit] ... no protection for individuals, especially for a female travelling alone.” She frustratingly continues stating that other commuters have asked her not to pull the emergency alarm despite another individual needing medical assistance. She concludes, “so that’s the type of unfortunate atmosphere that we’ve created in the subway.”

5.7.2 Personal Safety

Personal safety relates to perceptions of safety within the transit environment. A few participants express concerns about their safety. Emma, a 23-year-old lady wearing a headscarf, states that recent events have evoked feelings of insecurity because of her identity. She feels unsafe standing on the subway platform and in the train, as strangers would constantly stare. Brooks, a mother of one, has experienced harassment on transit, stating “sometimes I feel scared...I feel very bad when people use bad language...sometimes some old man or old lady would tell me to sit on the other side and they [would] use bad language.”

Other statements of insecurity are results of being below ground. Stella states “you’re kind of stuck underground; you can’t really do a whole lot in terms of getting out. Whereas the bus, if something were to happen, you can get off at the next stop and take the next.” Layla adds that her safety concerns are elevated because she is unable to reach out to anyone while underground. She also expresses being uncomfortable at empty subway stations during the early and late hours of the day, suggesting that there should be more of a security presence on the platform and that security emergency buttons should become more visible to passengers. Nonetheless, Emma claims that the new subway trains increase perceptions of personal safety because of the open concept.

Furthermore, a few participants have negative safety perceptions when waiting at certain bus stops. Medina expresses that she re-routes her trip in order to avoid a bus stop she perceives to be dangerous although it is the more convenient route when coming home in the evening. She claims that this particular bus stop located at a major intersection is not well lit. She explains, “I do avoid it entirely because of that stop and [bus number] 25 does take a while to come and it’s scary.” Moreover, Stella also takes a detour of her trip to avoid alighting at a dark bus stop and

walking through an “unsafe path” at night. She mentions that her trip gets delayed by 20-30 minutes as a result of it.

As these pieces of evidence suggest, perceptions of danger on personal safety are often left unsupported according to several female participants. The reasons behind these perceptions include the lack of security presence, information, and sufficient lighting at some stations and bus stops. Nonetheless, it is interesting to note that male participants in the study do not have any safety concerns when the topic surfaced.

5.8 Overall Transit Experience

Towards the end of the interview, participants are asked about their overall experience of the transit system. It is meant to generate a reflection of the topics they have mentioned during the interview.

Most participants, eleven out of twelve, indicate that their overall experience is good although eight participants have suggested some improvements, while three (Keenan, Liam, and Brea) are completely satisfied with the current transit system. Brea claims that her pleasant experience stems from the positive impact of living and working close to a subway station. She does not need to transfer between transit vehicles multiple times.

In describing overall transit experience, a few participants respond by stating their satisfaction with transit because of the advantage of their commute that mainly relies on trains instead of buses. Brooks and Michael state that they much prefer to take the subway instead of the bus. Brooks, however, adds that the subway system should be more developed as there are many commuters relying on it. Emma, a frequent subway rider, also has had good overall experience but states that there could be improvements particularly in terms of delay.

Others describe their overall transit experience by reflecting on their interaction (or lack of) with TTC staff and other commuters. Clara states that her experience with transit has been good but she opts to have no interaction with other commuters because of her motion sickness problem. Jacob's statement is similar to Clara's although he has his own reasoning. He explains, "[my] overall transit experience is not really bad because I don't care. A lot of people fight on transit, complaining, arguing with each other ... I just try to do my own thing and not talk to anybody so I can get to where I need to go as fast as possible." Moreover, Layla claims that her overall transit experience is affected more by interactions that occur around her rather than the service itself. She describes it in the following:

"I feel like ... I don't like taking the transit but it's not so much because of the equipment, it's more because of the staff and the other people that are on the trains and buses. Like a lot of the times, the staff is really rude ... I mean, I think they should train the employees to be more polite, but I think beyond that the service is pretty good." – Layla

In addition, other participants claim that their overall transit experience in Toronto is good by comparing it to other cities and transit systems. Medina states that despite the need for improvement, she is grateful that there is a system that works. She confesses that Toronto has a much better system available to commuters as opposed to Mississauga. Stella expresses similar sentiments, as she rates her overall experience at 7 out of 10. She claims that the TTC could use some improvements, however, she compares it with the GO system in which experience is better but at a much higher cost.

Only one participant claims to have had a negative transit experience, describing it as "frustrating". Harper believes that many residents rely on the TTC, however, there are many barriers that prevent one from getting to places on time. She describes it as very decapitating.

Although the majority of participants express they have an overall positive transit experience, many of them claim to have gotten accustomed to the negative aspects of transit. For

instance, Keenan reveals, “TTC is a learning experience for people, once you get used to it, it is pretty good, but to new people it might not be as reliable [and] comfortable.” Similarly, Liam speaks about the length of his commute, “I’ve done it so many times like when I first started doing it, it was kind of annoying and frustrating. But now like I’ve done it so many times, it’s like I’m used to it.” Moreover, Clara and Jacob have had to get used to the unpredictability of bus schedules by adjusting the time they leave their homes and giving extra time for their commute. These statements indicate participants have to undergo a steep learning curve to become familiar with the system. While they claim to have had good transit experiences, there are adjustments that need to be made to reach a degree of full satisfaction.

6. CONCLUSION

The city of Toronto is the most populated city in Canada, as it grew at an unprecedented rate of 4.5% between 2011 and 2016 (City of Toronto, 2016). The steady increase in population has proven to overwhelm Toronto's existing transit infrastructure, as reports of overcrowding and constant delays are becoming common. The rapid transit network is unevenly distributed across the city, which exacerbates social disparity issues between neighbourhoods. Transit deserts, defined as areas underserved by transit, are concentrated within the inner suburbs of the city. Despite the many transit improvement projects across the city these areas are often overlooked.

Inner suburban neighbourhoods are concentrated with clusters of rental towers that have become affordable settlements for newcomer immigrants. These residents are typically characterized as having large families whose members are relatively young in age. They typically have a wide variety of mobility needs, as a previous study indicated a positive correlation between family size and the number of trips (Polzin et al., 2014). Unfortunately, the lack of transit connectivity in the suburbs is impeding their mobility need, as they are heavily reliant on transit service. An objective of this study is to examine the transit needs of suburban residents in order to serve these communities better. More specifically, it aims to get an understanding of the transit experience of these residents to enhance the system.

The boundary of this study is based on two criteria – location and age restriction. As a result, two neighbourhoods are chosen as the study area – Don Valley Village and Crescent Town – because they are located close to a subway station and have high concentrations of rental towers. The study also limits participation to individuals between ages 18 and 35 – categorized

as the millennial generation. Studies indicated that they have distinct travel patterns than previous generations, as they are reported to use higher levels of transit. These individuals are also of working age, which means that they typically have a high level of mobility need.

To provide a brief background of the study area and population, quantitative data is extracted from the TTS database and interpreted in chapter 4. Based on an assessment of demographic and travel data, the target population is shown to be dependent on transit, evidenced by a large share of households with limited car access. Individual travel data indicate a large proportion of riders use transit to go to school and work. Demographic data also points to high transit dependence, as there is a large percentage of students and unemployed workers who are more likely to commute by transit than drive a car. Despite the need for transit, Don Valley and Crescent Town have low rapid transit connectivity, as young adult residents living in these neighbourhoods are more likely to make multiple transfers (at least one) to get to their destination in comparison to all young adults in Toronto.

The second method follows a series of semi-structured interviews, which aims to understand the transit experience of residents and to acquire recommendations on how transit can be improved. Using multiple recruitment strategies outlined in chapter 3, 12 participants are interviewed. The recordings are transcribed and coded for analysis. This process produced seven themes, which are based on the interview guide questions as well as spontaneous topics that surfaced during the interview. See Figure 11 for an illustration of the themes.

The first theme in regards to access has three main areas of discussion. These are proximity, safety, and convenience. All participants agree that access in terms of living in close proximity to the station is not an issue, as it is one of the advantages of living in Don Valley and Crescent Town. However, a few participants describe safety concerns accessing Don Mills

station because of the lack of “direct path”, while others identify inconveniences of access to some stations.

The second and third themes discuss transit service and facility, and comments are made separately about the two main transit vehicles – subway and bus. The main service issues relating to the subway are frequent delays and interrupted service. Greater shares of participants express concern over bus service because of the lengthy wait-time and capacity issues. In regards to transit facility, there are accessibility issues in some subway stations especially for individuals in wheelchairs. Participants also recommend improving the signage and information system as well as add amenities, such as WI-FI, to enhance experience. In terms of bus facility, the main issues are the ineffectiveness of bus shelters, the lack of schedule accuracy, and cleanliness. If participants had a choice, they would prefer to travel by subway than bus for convenience purposes and to shorten commute time. Ultimately, worsening transit experience has led a few participants to switch to travel by car for their main commute, while there are sentiments about the possibility in the near future among other participants.

The fourth theme deals with transit cost, which is divided into three sub categories including fare pricing, discounts, and types of passes. All participants, except one, indicate that the fare is too expensive for different reasons. They compare it to the fare price of previous years, indicating the lack of justification for price increase despite the “slow service” and TTC “already making a big profit”. Participants comment on the effectiveness of discount offers and recommend more relief for certain groups of people. The most popular transit pass is the monthly one, followed by the one-way pass (known as tokens), while the day pass and PRESTO are the least popular.

The fifth theme, transit network, has three main areas of discussion – area coverage, network expansion, and transfers. Most participants have issues with the limited area coverage of the subway network, as they are heavily dependent on bus service. They recommend several subway expansions across the city including the addition of a downtown relief line, and added connections to Scarborough and neighbouring municipalities. According to most participants, the area coverage of the bus network is satisfactory, however, a few describe missing links in the network because of infrequent service on some routes. Several participants also describe having issues with the number of bus transfers on their commute. This theme relates to a sub-question of the study, which aims to answer whether the current transit network is meeting the needs of high-rise residents. Ultimately, participants would like to see an expansion of the subway network, as the current one does not meet their need. Although they live close to a subway station, many participants still rely on bus service. This is due to the lack of rapid transit connection to other suburban neighbourhoods, which are popular destinations among participants.

The sixth theme is transit support, which provides a description of participants' personal interactions and personal safety. Several participants have had unpleasant interactions with TTC staff and other passengers, and a few prefer to have no interaction on transit. They comment on the lack of support that passengers receive in several circumstances. A few female participants perceive feelings of insecurity especially when travelling alone in the evening.

Finally, the last theme is a compilation of their overall transit experience. All except one participant are satisfied, although most provide recommendations on multiple aspects of the system that can be improved on. Participants are pleased with TTC despite its issues when comparing it to neighbouring transit systems. Others prefer to have zero interaction with staff or

other passengers in order to maintain a positive experience. A few participants also report that they have become accustomed to “bad” transit experience after an initial phase of adjustments.

6.1 Recommendations

The interview process identifies areas that need improvement within the current transit system. An objective of this study is to acquire strategies to improve these areas, which are highlighted in this section. Table 17 summarizes the negative experience of participants as well as technical recommendations for improvement.

Table 17 - Technical recommendations based on transit experience

Themes	Experiences	Improvement (Participant Recommendation)	Improvement (Researcher Recommendation)
Access	Lack of Safety at Station Access Points	<ul style="list-style-type: none"> - Multiple entries - Direct subway exit to the street - Integrated transition space between station and surrounding area 	<ul style="list-style-type: none"> - Increase lighting at station access points - Increase commercial spaces around access points that stays open late
	Lack of Convenience	<ul style="list-style-type: none"> - Higher presence of TTC personnel at station entrances 	<ul style="list-style-type: none"> - Standardize station entrances to accept all types of payment - Replace revolving doors at station entrances
Subway Service	Frequent Subway Delays	<ul style="list-style-type: none"> - More research to increase rate of recovery time from delays - Build more interconnection between stations to reduce impact of delays 	<ul style="list-style-type: none"> - Continue to invest in infrastructure improvement - Maintain existing infrastructures (ie. rail tracks, signal system)
Bus Service	Long Wait Time & Bus Clustering	<ul style="list-style-type: none"> - Maintain “balanced” headway (between buses) - Avoid leaving a big gap along one side of the run 	<ul style="list-style-type: none"> - Prioritize headways rather than schedules - Break long routes into shorter ones² - Provide dedicated bus lanes on busy routes²
	Overcrowding	N/A	<ul style="list-style-type: none"> - Increase the number of buses at peak rush hours - Introduce new bus designs for easy boarding - Impose rules to enter from the front and exit from the back to create better flow of passengers
Subway Facility	Lack of Accessibility	<ul style="list-style-type: none"> - Install elevators at every station 	<ul style="list-style-type: none"> - Track the progress of the Multi-Year Accessibility Plan - Ensure that vehicle doors are levelled with the platform
	Lack of Signage and Information	<ul style="list-style-type: none"> - Provide signage system in multiple language 	<ul style="list-style-type: none"> - Provide clear signs indicating location of exit points, especially at stations with multiple exits

	Lack of Amenities for Passenger Comfort	- Install phone signal and WI-FI in subway trains and stations	- Provide more seating in stations - Have live music performances at major/busy stations - Install painted zones and signs for queues to direct traffic in the station (ie. New York) ¹
Bus Facility	Lack of Comfort (bus shelters)	- Construct proper shelters protecting passengers from the weather	- Install bus shelters at stops located at major intersections
	Lack of Signage and Information	- Show the location of each bus stop on the TTC map posted at all stops and stations	- Provide information of the bus route in respective of the city map ² - Install real time bus schedules at all stops and stations - Improve the accuracy of signs indicating bus arrival times
Cost	Lack of Discounts; Misunderstanding of fare system	- Increase student discount; embed transit monthly pass in student ID - Introduce low-income monthly pass - Introduce free fare for seniors - Introduce fare price based on distance of travel - Install PRESTO machine at all stations and vehicles; provide more information on PRESTO to the public	- Research alternative sources of funding before increasing fare price - Eliminate cash payments; introduce reloadable transit card (ie. like in Singapore & Paris) - Provide transit discount options for passengers attending adult schools
Subway Network	Lack of Extensive Network (do not meet participant need)	- Provide a subway connection to Scarborough and neighbouring municipalities (ie. Markham) - Build the downtown relief line - Distribute expansion projects equally across the city	- Explore the integration of multiple trains on one track; including regional ones (ie. Karlsruhe, Tokyo) - Prioritize subway expansion to areas most in need
Bus Network	Gap in Bus Network	- Increase the frequency of bus service to busy destinations (ie. community centres, universities) - Provide more direct routes to busy destinations (ie. shuttle service or express bus)	- Research the effectiveness of bus stops on each route based on boarding data; add or eliminate them if necessary ² - Reassess the current bus network to lessen the number of transfers
Support	Unpleasant Experience with TTC Staff and Other Passengers	- Provide better customer service training for TTC employees - Provide more frequent cleaning service	- Provide clear information on routes & payment system at all stops and stations - In the case of a route change or disruption, inform passengers clearly (use repetition); inform other bus operators whose routes may also be affected - Implement policies for respecting public space
	Lack of Support & Personal Safety	- Increase security presence at subway stations; ie. by installing 'help' buttons	- Offer support by providing a telephone line that is connected to a support team (at all stations) - Enhance policy to increase safety for passengers - Install more lighting at bus stops

¹ Fitzsimmons, E. (2017). Frustrated by Subway Delays? How the M.T.A. Plans to Improve Commutes.

² Philipsen, K. (2017). Ten Ways to Improve Bus Transit Use and Experience.

The table summary provides an outline of the major issues within the current transit system and strategies to amend its technical aspect. However, broader policies need to be implemented to fully upgrade the system. These include exploring further financing options for an under-funded transit system, ensuring an equitable transit system to satisfy all residents including suburban high-rise residents, and improving services and facilities.

6.1.1 Financing Options

Reports indicate TTC is under-funded when one compares its per rider subsidy to other transit systems across North America, including Los Angeles, New York City and Montreal (Spurr, 2017a). Although the federal government has secured a sum of \$5 billion for transit investment in Toronto and the provincial government is matching one-third of that amount (Riety, 2017), the city is still short of approximately \$7 billion (Spurr, 2017b). To overcome the deficiency in funding, several strategies include:

- 1) **Allocating more “public money” for transit improvement:** This is not a new concept, as several ideas have been introduced including the reinstatement of vehicle registration tax, imposing road tolls, and reconsidering higher gas and emissions tax. These amendments also provide incentives for drivers to take transit more frequently.
- 2) **Exploring the possibility of PPP for transit expansion projects:** There are multiple successful transit projects constructed and operated under a public private partnership, such as Vancouver’s Canada Line Rapid Transit and Ottawa’s Confederation Line. Several benefits from this type of partnership include the sharing of costs, risks, and tasks associated with the project, being able to acquire expertise knowledge from private sectors, and increasing efficiency by providing competition between private companies

(Lammam et al., 2013). This partnership has a proven record towards successful implementation of long-term plans in many cities.

6.1.2 Equitable Transit System

Findings from this study indicate Toronto's suburbs are lacking rapid transit connectivity. The city has been working to expand its transit network outlined within the "Transit Network Plan to 2031". The document contains multiple expansion projects such as SmartTrack, Downtown Relief Line, Scarborough Subway, and Eglinton West LRT. The implementation of these projects should ensure an equal distribution of transit service across the city. Several approaches include:

- 1) **Complementing a bottom-up and top-down approach** – There is a need to extend Toronto's transit network more equitably. In order to ensure this, the travel pattern of all residents has to be acquired including the mobility need of those living in transit deserts. This is to understand the evolving commute pattern of residents. The combination of "local knowledge" along with technical expertise allows for the successful implementation of long-term projects.
- 2) **Allocating equitable fare pricing in accordance to income** – The city has developed a Transit Fare Equity Policy Framework in 2015, which outlines strategies to ensure more equitable fare options for all residents. Further steps should be taken to assess various discount models to establish a fare system based on income. This includes discounts for a broader range of students, low-income families, and seniors.

6.1.3 Service and Facility Improvement

Based on inputs from several participants, service and facility improvements are top priority issues. In addition to maintaining the existing transit infrastructure, participants would like to see improvements in transit service and facility. A few suggested schemes include:

- 1) **Incorporating sustainable design and operation** – This involves limiting greenhouse gas emissions by introducing a sustainable design standard for all new vehicles. Others comprise of enhancing control standards to lower pollutant emission, such as by adopting stricter emission testing and upgrading to new clean technology.
- 2) **Improving access for suburban communities** – Several station access points in the suburbs are unfriendly to pedestrians and cyclists. A way to improve access is to enhance the urban environment around transit stations to encourage more walking and cycling. This includes improving wheelchair accessibility at all stations and raising security measures. The integration of the built environment within station areas is important to encourage higher use of alternative modes of transport.

6.2 Future Research and Concluding Thoughts

This study aims to understand the transit experience of high-rise suburban residents living in close proximity to a rapid transit station. It specifically examines residents living in two neighbourhoods of Toronto – Don Valley and Crescent Town. The study uses qualitative data supported by quantitative data to gain an in-depth understanding of the issue at hand. Future research should be based on a quantitative analysis of a larger sample in order to assess the generalizability potential of the results in this study. Furthermore, future studies should include other neighbourhoods, such as ones that are less accessible to a transit station, in order to see if

similar transit experiences persist. Interviewing key informants responsible for managing transit expansions in the suburbs could also potentially further an understanding of strategies to integrate the urban environment around station areas and find solutions to provide transit in suburban communities.

Additionally, this study is placed within a wider body of literature that is transit equity. Currently, the transit network is distributed unevenly across Toronto, as many suburban communities lack access to rapid transit. Most of Toronto's priority neighbourhoods are located within the inner-suburbs where transit connectivity is lowest. This places its residents at a greater disadvantage, as they are heavily dependent on transit for mobility purposes. Moreover, the current rapid transit network is centralized around the downtown area, lacking to service suburb-to-suburb connections. With increasing job opportunities outside of the inner core, many residents are travelling between suburbs and have to rely on bus service. Future studies should explore strategies to enhance transit connections for suburban residents. This includes the exploration of optimal transit routes by assessing commute patterns across the city.

Lastly, further investigation of this study should examine ways to warrant equal transit access for all residents including those who are most disadvantaged. This may consist of the re-examination of the transit's fare system, service, station amenities, and access points to accommodate all passengers. On a positive note, there has been much political interest from all levels of government to improve the system. Therefore, the task of transportation planners is to engage all stakeholders in this discussion to ensure an equitable transit system serves Toronto residents.

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APPENDIX A – RECRUITMENT POSTER

**School of Planning
University of Waterloo**

**PARTICIPANTS NEEDED FOR
RESEARCH IN *TRANSPORTATION PLANNING***

We are looking for volunteers to take part in a study of
PUBLIC TRANSIT COMMUTE EXPERIENCE.

ARE YOU BETWEEN THE AGES OF 18 AND 35?
DO YOU MAINLY COMMUTE USING PUBLIC TRANSIT?
DO YOU HOPE TO SEE IMPROVEMENT IN YOUR TRANSIT
EXPERIENCE?

IF YOU ANSWERED YES, THIS IS THE RIGHT STUDY FOR YOU!

As a participant in this study, you would be asked to:

Sit down in a **30 MINUTE INTERVIEW** & fill out **A SIMPLE
QUESTIONNAIRE**

For more information about this study, or to participate in this study,
please contact:

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University of Waterloo

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This study has been reviewed by, and received ethics clearance
through a University of Waterloo Research Ethics Committee.



APPENDIX B – PARTICIPANT INFORMATION LETTER AND CONSENT FORM

University of Waterloo

Date

Dear *(insert participant's name)*:

This letter is an invitation to consider participating in a study I am conducting as part of my Master's degree in the School of Planning at the University of Waterloo under the supervision of Dr. Markus Moos. I would like to provide you with more information about this project and what your involvement would entail if you decide to take part.

The aim of this study is to investigate transit experiences of young adults (between ages 18 and 34) living in rental towers in two neighbourhoods located within the inner-suburbs of Toronto. This is done by analyzing the current condition of the existing transit service, facility, and network serving these communities. Areas that are working well or need improvement will be identified. The study is done to get a better understanding of the transportation needs of suburban residents and provide recommendations to city planners and politicians on how transit could serve community members better.

Your participation will consist of two parts. The first is an interview that will take place for approximately 30 minutes. The second part is a brief survey on demographic information.

During the interview, participants are asked to describe their commute using public transit. Among others, this includes the destination, duration and time of day of their trips. The interviewer will also assess the participants' satisfaction with the current transit service, facility, network, and fare system.

Participation in this study is voluntary. You may decline to answer any of the interview or survey questions if you so wish. Further, you may decide to withdraw from this study at any time without any negative consequences by advising the researcher. With your permission, the interview will be audio recorded to facilitate collection of information, and later transcribed for analysis. All information you provide is considered completely confidential. Your name will not appear in any thesis or report resulting from this study, however, with your permission anonymous quotations may be used. Data collected during this study will be retained for an approximate period of one and a half year or until successful completion of the study in a locked office that the researcher will only have access to. There are no known or anticipated risks to you as a participant in this study.

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE#21896). If you have questions for the

Committee contact the Chief Ethics Officer, Office of Research Ethics, at (519) 888-4567 ext. 36005 or ore-ceo@uwaterloo.ca.

If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me by email at kprayitno@uwaterloo.ca. You can also contact my supervisor, Dr. Markus Moos at 519-888-4567 ext. 31113 or email at markusmoos@uwaterloo.ca.

I hope that the results of my study will be of benefit to those organizations directly involved in the study, other voluntary recreation organizations not directly involved in the study, as well as to the broader research community.

I very much look forward to speaking with you and thank you in advance for your assistance in this project.

Yours Sincerely,

Khairunnabila Prayitno
M.A. Candidate
School of Planning, University of Waterloo

CONSENT FORM

By signing this consent form, you are not waiving your legal rights or releasing the investigator(s) or involved institution(s) from their legal and professional responsibilities.

I have read the information presented in the information letter about a study being conducted by Khairunnabila Prayitno of the School of Planning at the University of Waterloo. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted.

I am aware that I have the option of allowing my interview to be audio recorded to ensure an accurate recording of my responses.

I am also aware that excerpts from the interview may be included in the thesis and/or publications to come from this research, with the understanding that the quotations will be anonymous.

I was informed that I may withdraw my consent at any time without penalty by advising the researcher.

This project has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee. I was informed that if I have any comments or concerns resulting from my participation in this study, I may contact the Chief Ethics Officer, Office of Research Ethics, at 1-519-888-4567 ext. 36005 or ore-ceo@uwaterloo.ca.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

YES NO

I agree to have my interview audio recorded.

YES NO

I agree to the use of anonymous quotations in any thesis or publication that comes of this research.

YES NO

Participant Name: _____ (Please print)

Participant Signature: _____

Witness Name: _____ (Please print)

Witness Signature: _____

Date: _____

APPENDIX C – INTERVIEW GUIDE

Section 1 – Description & Experience of Using Transit

What is your most common purpose of travel using transit? Work? School? Or Other?

1.1 Work Trip

Imagine the trip you took this past week.

Describe your commute to work. (what, where, when, how)

- Do you take the TTC, GO, YRT, or other transit systems?
- Where do you go to work? (closest intersection & municipality if possible)
- How much time does it take to go to work?
- What time of day do you go to work? Does it vary between days?
- Do you make multiple stops in one trip to go to work? If so, where and how many stops?
- Do you take the bus, subway or a combination of both?
- Which bus or subway lines do you use?
- Where do you get on and off?
- How many times do you have to transfer to get to your workplace?

Describe your experience.

- Accessing transit stop or station
 - Walking pathway
 - Cycling pathway – Bicycle parking?
 - Parking for car
- Transit Facilities (Bus stop or shelter, transfer area, bus, subway/RT/GO train)
 - Comfort
 - Safety (ie. lighting sufficiency)
 - Accessibility (ie. wheelchair accessible, other impairments)
 - Signage
 - Cleanliness
- Transit Service (Bus, subway train, RT train, GO train)
 - Frequency of service (ie. wait times)
 - Capacity of vehicles
- Transit Network
 - Missing links in the transit network
 - Transferring between different transit systems. Do you have trouble transferring between them? Are there missing links between them?
- Transit Fare
 - What do you think about the transit fare?
 - What do you think about the transit hikes? Are they fair?
 - Are the discounted options effective? (ie. tokens, monthly pass)

- Do you use presto? Is Presto accessible to use? Is the Presto machine installed in every TTC bus/subway that you? Are there issues with using Presto?

1.2 School Trip

Imagine the trip you took this past week.

Describe your trip to go to school.

- Do you take the TTC, GO, YRT, or other transit systems?
- Where do you go to school? (closest intersection & municipality if possible)
- How much time does it take to go to school?
- What time of day do you go to school?
- Do you make multiple stops in one trip to go to school? If so, where and how many stops?
- Do you take the bus, subway or a combination of both?
- Which bus or subway lines do you use?
- Where do you get on and off?
- How many times do you have to transfer to get to school?

Describe your experience.

- Walk me through the route you take from your front door to your destination.
- Do you experience challenges when/with...
 - Accessing transit stop or station
 - Walking pathway
 - Cycling pathway – Bicycle parking?
 - Parking for car
 - Transit Facilities (Bus stop or shelter, transfer area, bus, subway/RT/GO train)
 - Comfort
 - Safety (ie. lighting sufficiency)
 - Accessibility (ie. wheelchair accessible, other impairments)
 - Signage
 - Transit Service (Bus, subway train, RT train, GO train)
 - Frequency of service (ie. wait times)
 - Capacity of vehicles
 - Transit Network
 - Missing links in the transit network
 - Transferring between different transit systems. If you are using more than one transit systems, do you have trouble transferring between them? Are there missing links between them?
 - Transit Fare
 - What do you think about the transit hikes? Are they fair?
 - Are the discounted options effective? (ie. tokens, monthly pass)

- Do you use presto? Is Presto accessible to use? Is the Presto machine installed in every TTC bus/subway that you? Are there issues with using Presto?

1.3 Other most frequent trip

Imagine the trip you took this past week.

Describe your most frequent trip.

- What is the purpose of the trip?
- Do you take the TTC, GO, YRT, or other transit systems?
- Where is the destination of your trip? (closest intersection & municipality if possible)
- How much time does it take to reach the destination?
- What time of day is your trip? Does it vary between days?
- Do you make multiple stops in one trip to go to work? If so, where and how many stops?
- Do you take the bus, subway or a combination of both?
- Which bus or subway lines do you use?
- Where do you get on and off?
- How many times do you have to transfer to get to your destination?

Describe your experience.

- Walk me through the route you take from your front door to your destination.
- Do you experience challenges in your commute?
 - Accessing transit stop or station
 - Walking pathway
 - Cycling pathway – Bicycle parking?
 - Parking for car
 - Transit Facilities (Bus stop or shelter, transfer area, bus, subway/RT/GO train)
 - Comfort
 - Safety (ie. lighting sufficiency)
 - Accessibility (ie. wheelchair accessible, other impairments)
 - Signage
 - Transit Service (Bus, subway train, RT train, GO train)
 - Frequency of service (ie. wait times)
 - Capacity of vehicles
 - Transit Network
 - Missing links in the transit network
 - Transferring between different transit systems. If you are using more than one transit systems, do you have trouble transferring between them? Are there missing links between them?
 - Transit Fare
 - What do you think about the transit hikes? Are they fair?
 - Are the discounted options effective? (ie. tokens, monthly pass)

- Do you use presto? Is Presto accessible to use? Is the Presto machine installed in every TTC bus/subway that you? Are there issues with using Presto?

1.4 What other less frequent trips do you take transit for?

Describe one of these trips

- Do you take the TTC, GO, YRT, or other transit systems?
- Where is the destination of your trip?
- How much time does it take to reach your destination?
- What time of day does your trip take place?
- Do you take the bus, subway or a combination of both?
- Which bus or subway lines do you use?
- Where do you get on and off?
- How many times do you have to transfer to get to your destination?

Describe your experience.

- Walk me through the route you take from your front door to your destination.
- Do you experience challenges in your trip?
 - Accessing transit stop or station
 - Walking pathway
 - Cycling pathway – Bicycle parking?
 - Parking for car
 - Transit Facilities (Bus stop or shelter, transfer area, bus, subway/RT/GO train)
 - Comfort
 - Safety (ie. lighting sufficiency)
 - Accessibility (ie. wheelchair accessible, other impairments)
 - Signage
 - Transit Service (Bus, subway train, RT train, GO train)
 - Frequency of service (ie. wait times)
 - Capacity of vehicles
 - Transit Network
 - Missing links in the transit network
 - Transferring between different transit systems. If you are using more than one transit systems, do you have trouble transferring between them? Are there missing links between them?

Section 2 – Improvement of Transit Experience

- Describe your overall transit experience.
- What are the top priority problem(s) with your commute experience?
- What do you think about the current subway line?
 - o Is it effective in connecting you to your destination or not?

What recommendations do you suggest to improve your commute experience?

- Accessing transit stop or station
- Transit Facilities
- Transit Service
- Transit Network
- Transit Fare

APPENDIX D – PARTICIPANT QUESTIONNAIRE

Section 3 – Demography Questionnaire

1. What is your current age?
2. What is your gender?
3. How long have you been in Canada?
 - a. If immigrant, what is your country of origin?
4. Are you a student?
5. What is your highest level of education?
6. What is your current work/employment status?
 - a. Full time
 - b. Work at home full time
 - c. Work at home part time
 - d. Not employed
 - e. Part time
7. What is your type of occupation?
 - a. General Office / Clerical
 - b. Manufacturing / Construction / Trades
 - c. Professional / Management / Technical
 - d. Retail Sales and Service
 - e. Not Employed
 - f. Unknown
8. What is your annual personal income range?
 - a. Less than 20,000
 - b. 20,000 – 39,999
 - c. 40,000 – 59,999
 - d. 60,000 – 79,999
 - e. 80,000 – 99,999
 - f. Over 100,000
9. What is your current living arrangement?
 - a. Living alone
 - b. Living with parents
 - c. Sharing with roommates
 - d. Living with partner
 - e. College dormitory
 - f. Parents living with you
 - g. Other
10. How many people live in your household?
11. Do you have access to a (personal or household) vehicle?
12. If yes, how many vehicles are there in the household?
13. Do you currently possess a driver's licence?
14. In a year, how many months do you possess a transit pass?

APPENDIX E – PARTICIPANT APPRECIATION LETTER

University of Waterloo

Date

Dear *(Insert Name of Participant)*,

I would like to thank you for your participation in this study entitled “Moving Millennials: the transit experiences of young adults in suburban Toronto”. As a reminder, the purpose of this study is to analyze the transit experiences of young adults living in the inner-suburbs of Toronto, which generates a stronger understanding of the transportation needs of suburban residents and how well transit is currently serving them.

The data collected during interviews will contribute to a better understanding of the condition of the existing transit service, facility, and network serving inner suburban neighbourhoods.

This project has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE#21896). Should you have any comments or concerns resulting from your participation in this study, please contact the Chief Ethics Officer, Office of Research Ethics, at (519) 888-4567 ext. 36005 or ore-ceo@uwaterloo.ca.

Please remember that any data pertaining to you as an individual participant will be kept confidential. Once all the data are collected and analyzed for this project, I plan on sharing this information with the research community through seminars, conferences, presentations, and journal articles. If you are interested in receiving more information regarding the results of this study, or would like a summary of the results, please provide your email address, and when the study is completed, anticipated by August 2016, I will send you the information. In the meantime, if you have any questions about the study, please do not hesitate to contact me by email or telephone as noted below.

Should you have further questions or concerns about the study, please feel free to contact me by email at kprayitno@uwaterloo.ca or my supervisor, Dr. Markus Moos, at (519) 888-4567 ext. 31113 or email at markusmoos@uwaterloo.ca.

Yours Sincerely,

Khairunnabila Prayitno
M.A. Candidate
School of Planning, University of Waterloo