The University of Witwatersrand

The Impact of Public Transport Policy on Social Exclusion of Hillbrow Residents

A Research Report

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Abstract

This research looked at the public transport experiences and opinions of Hillbrow residents and how that related to the impact of social exclusion they experienced. It involved an investigation into the significance of the relationship between various factors of social exclusion, as influenced by a prior London study, and public transport available to the residents, and the strength of the relationship between the various factors. The target sample was adult Hillbrow residents and frequent public transport users. The study was mixed methods, beginning with a focus group interview. The paper looked at relevant government policy with regard to public transport aims and goals and plans to improve inner city public transport. Survey data collection followed the interview, which was conducted at various public transport hubs within and around Hillbrow, online, and at the Hillbrow Recreation Centre. The study found that most respondents were regular public transport users. Mini-bus taxis were the most frequently used, followed by Metrobus and Rea Vaya. Residents found public transport easy to access, close to home and school, affordable and safe. However, they did not find public transport close to work, found it to be irregular, costs frequently rose, and they did not trust the driving capabilities of the drivers. Public policy and its implementation were shown to have had some negative and positive results based on residents' opinions. These negative aspects were shown to have an impact on social exclusion to varying degrees. While public transport is readily available, affordable and easy to access for Hillbrow residents, there are needed improvements for factors that had significant impact on social exclusion.

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Chapter 1: Introduction

Three prominent issues that can be argued to be a persistent cause of concern in South Africa are inequality, poverty and unemployment. The manner in which a person directly experiences inequality is dictated by the places in which that person lives, works or seeks work, socialises and travels (McLennan, Noble, & Wright, 2016, p. 256). Travel and consequently one's mobility is a focus of this research, especially as it relates to Hillbrow residents. The purpose of this study is to explore existing public transportation options and facilities available to them and how they contribute to or inhibit their mobility. This entailed looking at government transport policy, both proposed and implemented, and exploring how it was experienced by Hillbrow residents. The Hillbrow neighbourhood is a notorious area due to its high crime rate, low income earning residents and rapid dilapidation.

The theoretical lens through which mobility is viewed is that of "social exclusion" (Silver, 1994, pp. 544-545). Social exclusion is also used to evaluate government policy making processes with regard to public transport policies, and how they have tackled social exclusion. This entailed analysing public transport and its ability to adequately link adult Hillbrow residents to places of employment, and its ease of access and effectiveness. Collection of this information can provide insight into whether government policies are adequately meeting the needs of an area that is arguably in need of government

assistance. This chapter will provide a background to the study through the provision of the context and background to Hillbrow, and specifying the problem facing Hillbrow residents. I will also outline the purpose of the study and provide clarity with regard to the study's significance and conceptual framework. Finally, the chapter concludes by discussing the limitations to the study and explaining the terminology used.

1.1. Background of the study

Johannesburg was a racially segregated as early as 1886. The city went on to become South Africa's economic centre (Marais, 2016, p.175). The area of focus here, Hillbrow, is a densely populated neighbourhood in Johannesburg's inner-city. It is a unique location due to its tremendous demographic and physical transformation in the last four decades. This transformation is not only evident in the racial composition of the residents, but also in the structural decline of the buildings and infrastructure of the area (Morris, 1999, p. 509). There have been efforts to revitalise, rebuild and clean up the area. These efforts are hampered by the high incidence of HIV/AIDS, which is caused by the area being deprived, high density and lacking in basic services (Sachs, 2010, p.20).

The neighbourhood's transformation began during Apartheid, a time when it was predominantly populated by white people. This was as a result of the Group Areas Act of 1950 which stated that the area was to be reserved for white people (Morris, 1999, p. 509-512). Hillbrow experienced a surge of coloured and Indian people moving into the area in the late 1970s (Morris,

1999, p. 514). Currently, Hillbrow accommodates a large immigrant population, and is notorious for its high crime rate (Stadler & Delany, 2006, p. 452).

There was an accommodation surplus in the neighbourhood during the 1950s. This, combined with the underdeveloped nature of the areas that were reserved for people of colour, led to numerous coloured and Indian people risking breaking the Apartheid laws to move into the surplus accommodation in the late 1970s (Morris, 1999, p. 514). This movement was accompanied by large rent increases in the area, overcrowding of buildings and deterioration in the maintenance of buildings (Silverman & Zack, 2014, p. 17).

A 2001 paper by the Johannesburg Development Agency (JDA) titled "Inner City Position Paper" describes government's aims to make Johannesburg's inner-city a development zone, which necessitates making it a place for investment opportunities, reducing crime, and managing informal trade, taxis and transport services. The paper also describes improving service delivery with the aim of ensuring economic growth (Marais, 2016, p.176) and JDA (2001).

1.2. Problem statement

A person’s inability to access or participate in ordinary daily activities due to a lack of adequate transport is known as Transport Related Social Exclusion (TRSE) (Rose, Witten, & McCreanor 2009, p. 192). The reasons for transport inadequacy can be related to the price of available transport, ease of access and safety. TRSE can impact one’s ability to get a job, have access to

health and education, and to be socially active (Rose, Witten, & McCreanor 2009, p. 192). Densification within a neighbourhood such as Hillbrow has meant that most goods and services needed by residents are accessible within walking distance. Public transport is thus mainly used to get to places of employment and large shopping malls (Gewer & Rubin, 2015, p. 72).

Public transport can be advantageous in comparison to private transport with regard to energy consumption, the impact it has on the environment, as well as its effect on the economy and social equity. It can also be noted that in developing countries, private vehicle ownership tends to be much lower than that of developed countries, thus necessitating a greater need for public transport (Ojo, 2017, p.1).

Due to the historical separative policies during Apartheid, South African cities are unique. This is because the policies of keeping different racial groups separated has resulted in the geographic location of the different races being more separate than cohesive (Mammon, Ewing, & Patterson, 2008, p.3). This has caused a great deal of spatial inequality.

Household transport costs in South Africa have been rising, with this rise being notable in lower income households. Some of the reasons for this are that these households pay more in transport costs to access higher quality goods and services in areas further away, such as better schools for their children, or have salaries that fail to rise adequately with the rising cost of fuel and transport (Mokonyama, 2008, p.24). A functioning and sustainable public transport system provides benefits such as increased integration; it can also

increase urban development and induce investments, and provide widened access for the public to social, education and environmental opportunities (Mammon, Ewing, & Patterson, 2008, p.20).

In 2003, the Regional Spatial Development Framework (RSDF) developed to create efficient transport systems and urban structures as part of an inner city goal to regenerate Hillbrow (Silverman & Zack, 2017, p.4). This research focused on the level of service delivery and civil engagement, or lack thereof, and how that relates to current public transport facilities. It looked at the daily experiences Hillbrow residents have with public transport, and how they perceive and experience it. It attempted to guage whether government policies and facilities sufficiently met the needs of residents in terms of limiting their Transport Based Social Exclusion.

Social exclusion can be viewed either in the context of public policy and the aims of those policies, or it can be used to analyse changes that are political, social or economic (Hulse & Stone, 2007, p.110). People that are socially excluded tend to be unemployed, have low income and poor skills. The areas in which they reside tend to have high rates of crime and the housing quality in them is low (Hulse & Stone, 2007, p.114). Hillbrow is such an area, and is home to many unemployed people or those with low incomes.

The theoretical framework for this study is that of social exclusion, and in this regard public policy of the City of Johannesburg and how it addresses the issues of its inner city will be analysed in terms of objectives, aims and rationale in dealing with Hillbrow residents' social exclusion.

1.3. Purpose of the study

The purpose of this research is to analyse public transport policies and facilities that are available to Hillbrow residents, and how that may have an impact on social exclusion. In addressing this topic, the concept of social exclusion is used as a theoretical lens with which to view Hillbrow residents in terms of their demographic makeup and history (Silver, 1994, pp. 544-545). Social exclusion was also used to evaluate government policy making processes, especially with regard to public transport. Thus the purpose of this research is to analyse whether or not government public transport policies are effective in reducing inequality and social exclusion, particularly in the low income, densely populated and dilapidated Hillbrow area.

1.4. Research questions

This research asks the following questions:

Primary research question: Do current public transport policies and facilities have an impact on Hillbrow residents' social exclusion?

Secondary research questions: Does government public transport policy directly address issues of mobility and access for inner-city residents? Are Hillbrow residents able to sufficiently access employment, and needed goods and services using public transport facilities available to them? Finally, what opinions and perceptions do they have about these facilities?

1.5. Conceptual framework

The focus of this study is on the manner in which individuals may experience social exclusion, which involves looking at the theory of social

exclusion. Social exclusion is a theory that looks at how some individuals fail to be fully integrated into society. Social exclusion can be experienced because of a break in the social bond between individuals and society, resulting in a lack of social cohesion. It can also be the result of the formation of various groups within society, each with its own rules and traits. It is because of the rules of these groups and the movement of people between them that exclusion may be experienced. Exclusion can also be a result of hierarchies in society resulting in powerful groups having more rights and inclusion, and the less powerful lacking these rights (Silver, 1994, pp.541-543).

This study focuses on the manner in which public transport policy and available facilities may have an impact on social cohesion and exclusion for Hillbrow residents. The focus will be on transport-based social exclusion (Rose, Witten, & McCreanor, 2009). The residents of Hillbrow have been described as being people that are low income earning and living in a densely populated and high crime area in Johannesburg's inner city (Stadler & Delany, 2006), (Morris, 2008) and (Harris, 2001). This study will look at how public transport has an impact on these residents, and whether it is capable of enabling them to access necessary places of employment, goods and services; as well as examining transport's accessibility, safety and effectiveness. Social exclusion can be measured in two ways; by analysing one's access to services, and one's access to social capital (Terbish & Rawsthorne, 2016).

Marginalised people such as Hillbrow residents lack social capital, and one's mobility is an essential part of their being able to access necessary goods

and services (Currie & Stanley, 2008). This study will thus use the concept of "social exclusion" to analyse how public transport impacts mobility.

The study will analyse previous and current government public transport policies that have been implemented to deal with the inner city transport issues. The criteria used to analyse public transport's impact on social exclusion will be heavily influenced by a London Transport Study that set out notable transport factors that limit access to resources, such as the distance of transport facilities, design of the facilities and time and safety concerns (Church, Frost, & Sullivan, 2000, pp. 198-200). This study will focus on these factors as they relate to the South African context.

The focus will be on information regarding Johannesburg inner-city public transport policy and the available facilities, which include mini-bus taxis, the Rea Vaya (Bus Rapid Transit), Metrobus, Metrorail, Gautrain, and metered taxis, Uber and Taxify. This will be compared to Hillbrow residents' opinions about public transport used, such as the cost, design, safety, reliability, ease of use and access (Rose, Witten, & McCreanor, 2009). These factors inform the questions asked in the study, and will influence the focus group and survey topics. Therefore the data collected will be used to see which transport factors have the most impact on social exclusion experienced by the residents.

1.6. Design and procedures

The research involved an initial focus group interview, which took place at the Hillbrow Recreational Centre, and non-probability sampling was

used. This was followed by surveys being distributed to users of public transport at the Gautrain Park Station, Metro Rail Park Station, Ghandi Square Metro Bus stop, Noord Taxi Rank and the Rea Vaya Johannesburg Art Gallery stop, Rea Vaya Park Station, Rea Vaya Old Synagogue West and Old Synagogue East stops, as well as smaller hubs such as various Hillbrow Metro and Rea Vaya bus stops.

Two adult males participated in the first focus group interview, and five adults participated in the second interview. The researcher collected 174 completed surveys. Permission to conduct the study was received from the City of Johannesburg Municipality and the University of Witwatersrand Ethics Committee.

The conceptual framework of this study was used to analyse the quantitative data collected to test if there was a statistically significant relationship between public transport policy and facilities and social exclusion experienced by Hillbrow residents.

1.7. Significance of the study

While there have been many international studies on transport, poverty and social exclusion, South African studies have been focused on evaluating individual transport mode efficacy (e.g. Walters & Heyns, 2012), or the efficacy of transport policy (e.g. Mitchell & Walters, 2011). People without a car in modern, urban environments find themselves at a disadvantage, especially if low income restricts their ability to own a car (Rose, Witten, & McCreanor, 2009, p. 193). A large, urban city like Johannesburg is one in

which mobility is crucial. It has not yet been established for low income areas like Hillbrow how mobility relates to social exclusion (Rose, Witten, & McCreanor, 2009). The densification in Hillbrow may also be the cause of government facilities being strained, and it is commonly agreed that there is facility deterioration and a general lack of public services in the neighbourhood (Gewer & Rubin, 2015, p. 92).

While there have been many international studies on transport, poverty and social exclusion, such as a quantitative study conducted in Britain (Gordon, Levitas, Pantazis, Patsios, Payne, & Townsend, 2000), South African studies have been focused on evaluating individual transport mode efficacy (Walters & Heyns, 2012), or the efficacy of transport policy (Mitchell & Walters, 2011). People without a car in modern, urban environments find themselves at a disadvantage, especially if a low income restricts their ability to own a car (Rose, Witten, & McCreanor, 2009, p. 193). Therefore this study provides information with regard to factors that have an impact on social exclusion experienced by the residents in Hillbrow.

1.8. Limitations of the study

The study may provide information as to whether or not there is a relationship between public transport and social exclusion, but it will not provide answers as to how this relationship is experienced by Hillbrow residents in any explanatory way. The focus group may provide brief insight, but it will not provide detailed, complex and rich information as to the feelings and experiences of the respondents. The small sample size of surveys collected

also means that the margin of error is large. The majority of responses were not from Hillbrow residents, and were instead from commuters travelling through the area. This means the study did not have a significantly large quantity of data to analyse in a way that is generalisable to the target population. The method for collecting data was not random, and the respondents were public transport users. This means the study did not adequately look at the responses of people who walk or cycle, have their own vehicles or share a motor vehicle.

1.9. Delimitations of the study

The following delimitations were imposed by the researcher: the respondents may have certain biases, and responses may not be entirely objective. The manner in which the data is interpreted may also produce limitations. Users of public transport may provide more negative responses depending on the weather and waiting times on the date of data collection.

The researcher assumed that the focus group provided useful input into perceptions of public transport, and influenced the construction of the survey questionnaire meaningfully. The survey questionnaire was an instrument that aimed to accurately gauge Hillbrow public transport users' perceptions and opinions on public transport facilities. Respondents provided answers and input that was assumed to be accurate and honest. Only data collected from adult public transport users that live within or around Hillbrow was used in calculations. Data from transport users in other locations was included to provide a comparison.

The research was a mixed methods study of Hillbrow public transport users' perceptions and opinions about Hillbrow public transport. The research instrument was limited to demographic information about the respondents, and information with regard to their perceptions and opinions about public transport. Responses of commuters travelling through Hillbrow from other areas were also collected. Two research instruments were used, the first being a focus group that influenced the second instrument; the survey questionnaire. The questionnaire was pilot tested to ensure accuracy and clarity of the design of the questions.

The study is concerned with the perceptions and opinions of Hillbrow users of public transport; therefore it is not representative of other residents' opinions of Hillbrow public transport. The variables collected in the study were that of facilities available to Hillbrow residents, the quality, affordability of that transport, as well as safety and ease of access. The study also looked at transport's ability to connect them to goods and services.

The responses from respondents that do not reside in the target area were used as a comparison against the responses of Hillbrow residents.

Chapter 2: Literature Review

This section examines the history of Hillbrow, as well as its status with regard to the people that live there and public transport facilities. This paper looks at the history of Johannesburg's inner-city and the changes it has undergone with regard to its transport facilities. There is a brief analysis of the term "social exclusion" and how it applies within the South African context. Government policy and the impact of civil participation are looked at, along with how it may be related to public transport. Public transport and how it may impact social exclusion is analysed. This entails looking at mobility's impact, the findings of a London study on the concept and how government policy impacts public transport efficacy. Public transport internationally and in South Africa will be viewed, along with how this all ties up with social exclusion. Finally, this paper looks at existing public transport modes in Johannesburg, and government's intended plans to improve inner city public transport and mobility.

2.1. Hillbrow: past and present

Hillbrow was originally predominantly home to white residents as a result of the Apartheid's Group Areas Act of 1950, which separated areas of urban land usage according to racial groups. The Act resulted in the forced removal of thousands of coloured and Indian families into underdeveloped areas. Overcrowding and a severe shortage of accommodation during the 1970s in coloured and Indian areas occurred, leading to those families moving into

the inner-city, into areas like Hillbrow (Morris, 1999, p. 669). At the time, Hillbrow was experiencing a surplus of housing following a construction boom in the 1950s and 1960s. This was followed by an economic downturn in the 1970s (Morris, 1999, p. 672).

The migration of coloured and Indian families was met with a great deal of resistance from the white residents. However, these families refused to move out. Factors such as a relaxing of the provisions of the Group Areas Act and surplus housing led to the movement of Africans into the area in the late 1980s (Morris, 1999, p. 673). Today, Hillbrow is a densely populated area with a large number of African immigrant families (Stadler & Delany, 2006, pp. 451-452). The area is characterised by decline and crumbling buildings, a likely result of apartment blocks being owned by landlords that did not have the managerial skills required to maintain the buildings (Morris, 1999, pp. 514-516). Hillbrow is also characterised by significant levels of xenophobia that some South Africans feel towards African immigrants, such as people from Nigeria, whereby even the police wrongly attribute crime incidents to immigrants even if actual crime statistics say otherwise (Harris, 2001, p. 47).

2.2. Johannesburg transport: A brief history

As early as the 1890s, racial segregation was already displayed in Johannesburg's geographical layout. However, during this time Africans still were placed close to job opportunities and facilities (Chapman, 2015, p.78). The late 1920s was a time when demand for labour grew, and consequently large numbers of African migrant workers came into the city, many residing in

Sophiatown (Chapman, 2015, p.81). There was much white resistance to the existence of neighbourhoods in which African workers lived, and when the Group Areas Act was passed in 1950, black South Africans were removed to the townships, away from areas that were considered to be for whites only. During the 1940s, low density areas for white people were developed, and planning was done in such a way as to focus on the increase of private vehicle ownership. This increase was a factor that made these areas possible, as private transport allowed people to easily travel to the residences further away in the northern suburbs (Chapman, 2015, pp.85-86).

During the late 1890s, the Central Business District (CBD) of Johannesburg was the booming commercial centre of this young city, containing several financial institutions and a great deal of commercial activity. Due to apartheid laws, the only transport services black people were allowed to use were horse-drawn and electrical trams. A light railway and station were introduced in 1890, with Park Station being a place that many passengers would use and pass through (Beavon, 2001, p.4). The population of Johannesburg grew unevenly, with black locations becoming dense (Beavon, 2001, p.8).

Low density in the new, further north suburbs and high density in suburbs such as Hillbrow meant that the flow of traffic transporting workers into the CBD was high. Black people were reliant on the railways, as well as on segragated long distance and local buses (Beavon, 2001, pp.10-12). Over time, businesses moved to the northern suburbs, and city policy emphasised

making provisions for private car use. Private car ownership was higher for white people than it was for black people. The CBD began to decline, and in 1976 the mini-bus taxi industry emerged and grew (Beavon, 2001, pp.12-14).

There have been and currently are government goals to address the public transport issues in the CBD. An Inner City Bus Rapid Transit (BRT) Station Precinct Analysis Market Research that was conducted in 2009 revealed that issues such as crime, the need for upgrades in the area, illegal occupation and land invasion needed to be addressed (Daya & Chiliya, 2014, p.1474). The Johannesburg Inner City Public Transport and Traffic Study laid out objectives such as increasing taxi and long distance bus capacity, as well as improving accessibility and safety of the area. The Johannesburg Development Agency also intended to develop Park Station in Braamfontein (JICTTS, 2010, p.1) through urban renewal to make it a safe place for students and other residents (JICTTS, 2010, p.4).

The City of Johannesburg partnered with the JDA in 2012 to work towards dealing with the spatial restructuring of the city. One of the ways in which this was implemented was by investing in Rea Vaya, a Bus Rapid Transit System, the goal of which was to create public transport routes between Soweto and the inner city, and also from the inner city to Alexandra (Chapman, 2015, p.92).

Public transport can be defined as a transport service that is available to the public, and these services are generally associated with transport services

that are provided for, or under the control of the government (Glover, 2011, p.2). Some modes of public transport are provided by both private and public operators, and even some are provided by informal operators (Glover, 2011, p.3). The precise definition of public transport is not clear-cut, and this is due to the ambiguity in understanding of public transport in how it is defined, and because governments' understanding can evolve after some time (Glover, 2011, p.4).

2.3. Social exclusion: origin and definitions

Of French origin, the term "social inequality" is predominantly attributed to Rene Lenoir (Silver, 1994, p. 532) and (Sen, 2000, p. 1). However, there is some difficulty involved in providing a precise definition of exclusion, and even the French do not quite have a specific definition (1994, p. 535).

The concepts of social exclusion can be explained through three paradigms; solidarity, specialization and monopoly (Silver, 1994, p. 539). The solidarity paradigm originates from French Republican thought, and attributes social exclusion to a break in the social bond between individuals and society. Social exclusion is seen as a threat to social cohesion. The proposed solution is for the excluded to assimilate to the dominant culture, or to have the dominant culture alter itself to better suit the marginalised culture (Silver, 1994, pp. 541-542).

The specialisation paradigm comes from Anglo-American liberalism, and it assumes that individuals differ, and it is in these differences that specialization in the market occurs. Thus in society, there are structures or groups composed of individuals that are competing against or collaborating with each other voluntarily. The alliances between the different groups are reflected by the differing views and interests. Social exclusion refers to these social groups as not having adequate separation, either because the freedom of movement between the spheres is impeded, or the applications of rules within a social sphere are applied incorrectly (Silver, 1994, pp. 542-543).

The monopoly paradigm attributes social exclusion to the formation of a group monopoly. This paradigm argues that there are hierarchies in society, and that the included are those who benefit from their class and status, and tend to have more political power. It also argues that the interests of the included are being served, but the excluded lack access to society's benefits because of boundaries that exist to maintain that inequality (Silver, 1994, p. 543). An example would be that of tertiary education, which is seen as highly important in modern society. Many people feel excluded because of the financial costs involved in attaining such education (Aungamuthu & Vigar-Ellis, 2017, p.178).

Silver warns that the paradigms be viewed as ideal types and that reality is far more complex and nuanced (1994, p.544). The concept of social exclusion is one that is connected to poverty and deprivation. It is further explained that in looking at social exclusion, one is expanding the view beyond that of poverty and instead looking towards impoverished lives (Sen, 2000, p.

3). Being socially excluded limits the capabilities of the excluded, resulting in "capability poverty". This is explained as the limiting of the ability of an individual to live decently (Sen, 2000, p. 4). It is further argued that social exclusion can lead to further deprivations, and results in the limitation of one's opportunities (Sen, 2000, p. 5). For instance, if one earns a low salary, this limits the amount of money a person can save and therefore invest in improving their situation.

Exclusion can be the result of active processes or policies, such as the government laws during Apartheid, or the result of a set of situations that passively result in exclusion (Sen, 2000, p. 15). It is argued that the success of some East Asian economies may have been the result of those societies avoiding certain types of social exclusion through the use of education and social opportunities (Sen, 2000, p. 31). The theoretical concept of social exclusion means focusing on the processes and the relations that result in the deprivation experienced by the excluded (Sen, 2000, p. 26).

2.4. Social exclusion in South Africa

Social exclusion in South Africa can be linked to Apartheid policies, (Adato, Carter, & May, 2006, p. 229), whilst being an immigrant can also lead to social exclusion. Both international and internal immigrants can be seen as outsiders because their status is attached to their place of birth, ethnicity or how long they have been living in their current home (Ngan & Chan, 2013, p. 317). Migrants may also face social exclusion due to having limited access to social services, opportunities to participate socially and protection in the labour

sphere (Ngan & Chan, 2013, p. 331). Hillbrow residents, many of them immigrants, may face social exclusion based on their nationality alone. A 2008 qualitative study conducted to explore the experiences of female African migrants in South Africa revealed that many of the women excluded themselves from participating in society due to a fear of crime or police harassment (Mafukidze & Mbanda, 2008, p. 180). Immigrants in South Africa may face discrimination due to government failing to develop suitable policies, and experience social marginalisation and exclusion (Landau, 2007, p.61).

Strategic plans such as Johannesburg 2030 (Landau, 2007, p.63) also fail to take into account the diverse nature of its residents, which includes foreigners who are not included in development plans or face government discrimination (Landau, 2007, p.63). Some language used with regard to Johannesburg's inner-city regeneration focuses on property improvement in a manner that may exclude current residents by making the area unaffordable (Landau, 2007, p.63).

Social exclusion can ensure that those who are poor will remain in poverty by becoming captive to a “poverty trap”, which is defined as poverty that is not temporary, but rather chronic or persistent. People experience this when they are unable to improve their standard of living due to various mechanisms (Barrett & Carter, 2013, p.977). Those that are able to consistently grow their asssets or experience persistent improvements in their trade may be able to escape from the poverty trap (Carter & Barrett, 2006, p.185). Households that are able to accumulate their assets due to consistent

access to capital, and have those assets protected or insured from shocks, have a safety net and are less susceptible to sinking into the poverty trap (Carter & Barrett, 2006, p.195).

Social networks can be beneficial as they may link poor individuals to those with better resources, technology, information and opportunities. However, if the poor only have networks within poor society, and the rich only interact with other rich people, this can limit the benefits that the poor would otherwise experience if these networks were not separate (Barrett & Carter, 2013, p.978). Households that are poorer tend to have access to lower quality education, whilst richer households have access to better education and experience greater human capital gains from that education. This can further maintain inequality and the low human capital gains experienced by poor households keep them in the poverty trap (Santos, 2011, p.37). Being socially excluded means having limited access to better connections and resources.

2.5. Government policy and the importance of participation

South Africa's radical transformation since the end of Apartheid demands a participative and empowering government as set out in the Constitution (2003, p. 470). It is argued that there is a relationship between government participation and empowerment. Individual empowerment is defined as the increase in the amount of control one possesses. Group or community empowerment is defined as processes that enable people to acquire legal or political powers. This includes having a grassroots level of actions and

a decentralised system in which civil society is in charge of the decisions made about the factors that impact their lives most (Lyons, Smuts, & Stephens, 2001, pp. 1233-1235). Participation can ensure that people trust the government more and can result in more commitment in the implementation of policies (Brody, Godschalk, & Burby, 2003, p. 246).

However, one can argue that participation processes tend to be costly and time consuming, sometimes citizens are too complacent to truly want to engage, and the excluded and marginalised do not get a chance to be heard. There may also be feelings of resentment from those who did participate but feel that they continued to be ignored (Irvin and Stansbury, 2004, pp. 58-60).

It has been argued that it is important for government to understand the public's perceptions and attitudes towards transport, as it can help with policy development. Government should focus on more than costs and other economic considerations, but also look at factors such as comfort, independence and "social obligations" (Goodwin & Lyons, 2010, p.4).

Citizen participation can ensure that government policies are not only well-made and implemented, but also accepted and well received. Government transport policies are seen as having limited success, and affecting members of society unevenly. An example of this would be that of the Gautrain, which is seen as a transport option that caters to the rich instead of the poor (Fombad, 2015, p. 1204). Successful implementation of transport policy needs the

consensus of the government and the public, it must be sustainable and the service must provide value for money (Fombad, 2015).

2.6. Social exclusion and public transport

People's ability to easily and freely move from one place to another means having the ability to participate in society, and subsequently to avoid being excluded (Currie & Stanley, 2008, p. 534). This means looking at mobility as one's ability to fully fit into society socially and economically, and to have greater social capital (Currie & Stanley, 2008, p. 535). Transport can also be looked at in terms of accessibility, which means the "ease of reaching" certain areas (Currie & Stanley, 2008, p. 536). Marginalised groups tend to lack social capital, and public transport should play a role in providing a "safety net" in terms of their mobility (Currie & Stanley, 2008, p. 537).

People's ability to be able to engage in crucial activities and experiences, such as employment, social interactions, sports, recreational activities and have access to health services, is made possible through transport mobility. Thus, transport mobility and social exclusion are likely related and linked (Stanley, Hensher, Stanley, & Vella-Brodrick, 2011, pp. 789-790).

However, mobility alone cannot be seen as the way to reduce social inequalities, but rather how that mobility is being used to connect people to jobs, markets and social institutions (Manderscheid, 2009, pp. 18-19). An individual's social bonds can be beneficial if he or she links to resources or information, especially those of persons of a higher status and thus better quality resources (Myroniuk, 2016, p. 232). Public transport services can link

people to places of employment if the service is affordable and easily accessible (Sanchez, 2002, p. 425). Having a lack of access to services and resources contributes to poverty (Wells, 2012, p. 751).

A London Transport Study that looked into public transport and social exclusion noted several factors that inhibit people from being able to access much needed resources. These factors included physical exclusion, which relate to persons being barred from mobility because of physical or psychological traits, and geographical exclusion, in which mobility is limited because of the location of the individual and the distance to transport facilities (Church, Frost, & Sullivan, 2000, p. 198). Other factors are exclusion from facilities, economic exclusion because of constraints such as joblessness or long commute times, exclusion because of safety fears, and space exclusion due to how certain spaces are designed and secured (Church *et al.*, 2000, pp. 199-200).

The effectiveness of public transport's quality of service can be understood by examining the actors of service quality, service quality itself and functional quality. The actors of service quality refer to actors such as passengers, transport operators and their employees, and regulating bodies. Service quality relates to the difference between a customer's expectation and the received service performance. Functional quality focuses on the "how", which takes into consideration factors such as speedy service and the interaction between staff and customers. Passengers using public transport

want low travel costs, travel times to be as short as possible, and for the transport service to be highly frequent (Ojo, 2017, pp.2-3).

In South Africa, transport authorities have faced numerous challenges in providing public transport that is effective and inexpensive, especially to the majority of low income commuters that are reliant on it (Mitchell & Walters, 2011, p. 241). South African transport policies have had limited success due to an inadequate policy formulation process. Possible reasons are the unsatisfactory analysis of policy problems and strategies for addressing these problems or their consequences, pressure to implement policies as soon as possible after the 1994 regime adjustment, and the cumbersome manner in which transport-related powers were distributed between local, provincial and national government (Mitchell & Walters, 2011, pp. 248-249).

Commuter bus systems have experienced failure in policy implementation due to poor leadership and capacity, unrealistic policy proposals, conflicting viewpoints within the sector and inadequate policy implementation (Mitchell & Walters, 2011, p. 252). The myriad of problems with South African public transport include the cost, with many poor South Africans being unable to afford it, facilities being too far away, safety issues, overcrowding and low frequency of trips (Walters, 2013, pp. 2-4).

2.7. Public transport internationally and in South Africa

Public transport in most developing countries is uneven and riddled with issues such as lack of funds and inefficiencies (Pucher, Korattyswaroopam, & Ittyerah, 2004, pp. 95-96). In developed countries, the

nature of public transport tends to fare much better. For instance, in South Korea, the current public transport system underwent significant changes after a debt crisis in 2004. Seoul, a rapidly growing city, experienced a rise in per-capita income levels and economic growth, along with congestion, pollution and large amounts of strain on transport systems that were available at the time (Pucher, Park, Han Kim, & Song, 2005, p. 42).

The Seoul public transport system underwent dramatic changes and the problematic bus services were improved. Originally, buses were operated by private companies, and a lack of competition between the companies meant that routes did not overlap, and there was no metro integration. In addition to this, the driving was erratic as routes were charged per passenger, therefore bus drivers aimed to pack as many customers on a bus as possible (Pucher *et al.*, 2005, p. 46).

Myung-Bak Lee, the new city manager in Seoul, as a result of the comprehensive studies he had ordered, turned the system around and made it "semi-public". The Seoul Metropolitan Government seized control of routes, fares, bus schedules and the design of the system. The private companies were reimbursed per kilometre driven, which incentivised drivers to not drive recklessly. Buses were colour coded according to type and distance driven, the routes driven were redesigned, there was an expansion in bus lanes, and stored value smart cards could be used on both buses and trains, making payment more convenient for consumers (Pucher, *et al.*, 2005, pp. 48-51).

India has also experienced fast growth, notably in its urban population size, especially in cities such as Mumbai, Kolkata and Delhi. These cities have become more dependent on public transport, and a lack of effective planning has resulted in citizens taking numerous lengthy trips (Pucher, Korattyswaroopam, & Ittyerah, 2004, p. 97). Poverty in India, both for citizens and for the public sector, has meant that there are financial constraints on the public transport industry due to a rapidly growing number of people using public transport and limited government funding (Pucher, *et al*., 2004, p. 96). This, along with the sharply rising demand for public transport, led to overcrowding on buses and trains, as well as dangerous travelling conditions (Pucher, *et al*., 2004, p. 101).

One could look at both the Indian and South Korean systems, see their successes and failures and apply them to South Africa. This will mean determining what success would entail, and what reliable, effective and adequate public transport means in the South African context.

Mobility is not as certain in developing countries, and these countries face numerous challenges with regard to transport. While public transport is a significant contributor to South Africa's GDP, this aspect is often neglected (Vilakazi and Govender, 2014, p. 1). Possible reasons that the South African transport industry has had underwhelming progress may be that transport operators are too focused on ensuring profitability through operational efficiency instead of providing quality service, as well as ignoring the needs of

passengers. Transport is seen as something pleasant to have, instead of it being a necessity (Vilakazi & Govender, 2014, p. 2).

The South African White Paper on National Transport Policy outlined a vision for "safe, reliable, effective, efficient, and fully integrated transportation operations and infrastructure", and it expressed the goals of having services that meet consumer needs, are increasing in quality, and are both sustainable environmentally and economically (DoT, 1996). A quantitative public opinion poll conducted on a thousand South Africans in 2012 (The State of Transport and Opinion Poll South Africa, STOPSA) revealed that South Africans viewed public transport as the most important issue in transport, and the majority of respondents thought transport had either remained unchanged or had worsened (Luke & Heyns, 2013, p. 5-6).

South African public transport was designed to link far away residential areas to formal places of employment, with government providing heavy subsidies for these workers to travel these distances at low cost (Clark & Crous, 2002, p.78). Issues with public transport include the high levels of unemployment along with low wages, and large numbers of poor people depending on public transport for access and mobility (Clark & Crous, 2002, p.80). There is also the issue of inequality between the rich and poor resulting in very different needs and desired choices in the market (Clark & Crous, 2002, p.87).

2.8. Available transport, routes and schedules

2.8.1. Minibus taxis

Minibus taxis are the cheapest and most frequently used mode of public transport, providing transport to approximately over two thirds of the population (City of Johannesburg, 2006) and (Business Tech, 2017). A minibus taxi as a mode of transport is cheap, but taxis tend to be cramped, with some in poor condition. The average distance for taxi routes is 18 kilometres, and while taxis drive routes dedicated to them, they do not operate on a specific schedule (Rietjens, Makoriwa, & De Boer, 2006, p.79).

2.8.2. Rea Vaya

The Rea Vaya BRT is a public transportation system with dedicated routes and enclosed stations. Emphasis is on speed and efficiency. The Rea Vaya at Park Station has three major destinations, which are Soweto, Ellis Park and Eldorado Park Inner City (Rea Vaya, 2017). It was constructed to be a bus service that simulated a light rail system, with the aim of transporting a large number of people at a low price. The Rea Vaya has ramp access, thereby providing access to wheelchair users (Coggin, 2015, pp.309-310).

2.8.3. Metrobus

The Metrobus is a bus service that provides daily commute routes to various major municipal areas around Johannesburg. In total, there are 330 routes, which include 128 routes that are dedicated school routes. Passengers

using Metrobus can pay their fares either in cash, which is more expensive, or by using a loaded smart card (Metrobus, 2016).

2.8.4. Metrorail

The Metrorail is a government subsidized rail network that provides transport in Gauteng, the Eastern and Western Cape, and KwaZulu-Natal, transporting almost two million people a day. There are 478 Metrorail stations, and Metrorail's vision is to facilitate mobility and accessibility by "Getting South Africa to Work" (Metrorail, 2007).

2.8.5. Gautrain

The Gautrain is a rapid rail system, with some of the tracks underground, such as the one at Johannesburg Park Station. The Gautrain was created to be an alternative mode of transport for car users due to Gauteng's congestion problems. It was also used to aid with economic development and provide environmental advantages (Gautrain, 2017). A trip on the train from Johannesburg to Pretoria takes less than forty minutes, and it takes approximately fifteen minutes to go from Sandton to OR Tambo. It is a fairly expensive mode of transport, with a single trip from Park Station to Sandton costing R30, or R55 from Park to Pretoria (Gautrain, 2017).

2.8.6. Meter Taxis, Uber and Taxify

South African meter taxis differ from their international counterparts in that one has to call a taxi company to get a ride, or find the place in which they

are parked. In other countries, in addition to driving to customers when found at a rank or called to an address, the meter taxis tend to drive the streets in search of customers who hail the service when it is needed, thus being more convenient (Travel and Leisure, 2016). Meter taxis are granted licenses by the Provincial Taxi Council, and the taxis are graded according to age and quality of vehicle. They are subject to specific industry regulations (Entrepreneur Magazine, 2009)

Recent competitors to the meter taxi industry are the popular Uber, and emerging Taxify ride-sharing transport system. This competition has resulted in numerous incidents of violence from the meter-taxi operators against Uber drivers and passengers, and causing Uber drivers to avoid several profitable areas. In the aftermath of the violence and the death of one of the drivers, Uber has provided a list of specific no-go areas, which are the CBD, Gautrain stations, certain malls, and Summit Club in Hillbrow (Business Tech, 2017). Despite the violence, Uber has remained in South Africa because of substantial growth as a result of insufficient public transport in the country (Business Tech, 2017).

The Hillbrow area itself does not have railway or Gautrain stations; however, there are relatively close stations to the neighbourhood, such as the Doornfontein Station as seen in Figure 1 below (Metrorail, 2016). In addition to the railway routes, Hillbrow has access to government subsidised and unsubsidised bus routes, which include the Bus Rapid Transit (BRT) system, the Rea Vaya (ReaVaya, 2016), and the Metrobus (Metrobus, 2016). Close to

the Hillbrow boundary is the Park Station Taxi Rank and Noord Taxi Rank, and several other smaller taxi ranks within or around the Hillbrow area (Maps, 2018).

Figure 1. Map of Hillbrow neighbourhood with Hillbrow transport hubs and boundaries highlighted in red (Maps, 2018).

2.9. Social exclusion and transport in South Africa

A person may experience social exclusion but still have quality access to transport. Another person may not have access to transport but still be included in society. There are those that experience both transport and social disadvantage, which leads to transport poverty. Transport poverty, which the poor and marginalised are most likely to experience, occurs when one experiences social exclusion and lack of access to quality transport, thereby rendering one unable to access necessary goods and services (Lucas, 2012, p.106).

Transport-based exclusion can be measured by looking at an area's opportunities and services, analysing the social needs of that community and individuals, and comparing their mobility to society as a whole (Lucas, 2012, p. 108). Transport alone is not a factor in social exclusion and it is only when the price of that transport exceeds what the person can afford, then social exclusion is experienced (Lucas, 2012, p. 109).

Areas in South Africa that have a complete lack of public transport facilities force people to use walking as their primary means of getting to their intended destination. This negatively affects certain groups such as women, who are then limited in their employment options (Lucas, 2011, p. 1321). The majority of poor South Africans either have low access to public transport services or to having their own motor vehicles, or the price of available transport options are prohibitive due to the cost placing a large burden on already small incomes. Due to walking being used extensively by the poor,

they are exposed to traffic risks and crime (Lucas, 2011, p. 1322). Apartheid's lasting impact has meant that rural communities struggled, and many people flocked to cities in the hope of better opportunities, only to experience overcrowding, lack of jobs, pollution and poor sanitation in certain areas of the city (Stull, Bell, & Ncwadi, 2016, p. 10). Public transport in South Africa exists in such a way that it provides for a limited number of people, with bus and train systems not being utilised effectively and being unreliable, doing little to serve those in the informal community (Onatu, 2011, p. 90)

A qualitative study conducted around the Tshwane municipality in order to explore the experiences of those suffering from transport disadvantage revealed that many saw motorised travel as a need in order for them to reach key areas such as places of employment, education, and healthcare. It also revealed opinions that transport costs were perceived as being too high, with available transport options such as mini-bus taxis being deemed necessary but unsafe and in poor condition (Lucas, 2011).

Public transport and its "adequate service" and efficacy can be argued to be measured through the analysis of four attributes. The first attribute is affordability, in which the cost of the transport mode is measured against whether the users or intended users can afford to travel via this particular mode. The second attribute is availability, which refers to the routes provided, the time the services are offered, the length of time spent waiting for service and whether there are delays or issues with reliability. The third attribute is accessibility, which refers to the distance to transport facilities, ease of use

especially for the elderly or disabled, and safety in travelling to the facilities. The fourth attribute is acceptability, which refers to users' perceptions of the standard of service provided (Gomide, Leite, & Rebelo, 2004, pp.6-8).

The research mostly points to the positive impact of citizen participation in ensuring that government policies are formulated in a way that benefits those that it impacts (Brody, Godschalk, & Burby, 2003, p.246). Citizen participation was argued as being a crucial element in ensuring that not only were the government policies well-made and implemented, but also accepted and well received. Government transport policies were seen as having limited success, and affecting members of society unevenly (Fombad, 2015, p. 1204).

Successful implementation of transport policy is seen as needing consensus participation between government and the public, transparency in the process, responsiveness towards the implementation of decisions that are made, and accountability of the state to society. In addition, the service must provide value for money and be effective; there should be risk transference and a proper risk analysis must be conducted. There needs to be strong political will behind projects, government parameters must be well defined with a well-developed corporate structure, and it should be sustainable (Fombad, 2015).

2.10. South African government public transport policy

The National Transport Policy White Paper was compiled and presented to the public in July 1996, after the initial Green Paper was released

to the public in March 1996 in order to be viewed for the purposes of receiving comments from relevant parties. It states under policy goals and objectives that the goal of public transport is to be “smooth and efficient” and to allow society and the economy to operate in an ideal manner. It further states that transport should work to fix “spatial distortions”. The paper states that the current transport system in South Africa is not able to meet basic accessibility needs, especially in rural areas. The paper states that crucial transport issues and decision making should involve public participation and that transport should allow people to “access the transport system in ways that best satisfy their chosen criteria” or needs. This indicates that transport should be able to meet an individual’s need to travel to work, school, for recreational activities, for tourism purposes, or to visit friends and family (The National Transport Policy White Paper, 1996).

The paper states that customers should be able to choose the transport mode that best suits their needs, and that it is affordable. This will require a flexible system and a planning process that is customer needs driven. The paper states that there is a need to improve "safety, security, reliability, quality and speed" of the transport of people and goods. This will involve either reducing transport costs, increasing the quality of transport, or both where possible (The National Transport Policy White Paper, 1996).

In order to do this, the paper states that there needs to be investment in infrastructure or systems in order to meet these criteria. There are specific

transport operations that are at present being subsidised by the government (The National Transport Policy White Paper, 1996). In addition to this, in over two decades since the paper was made public, the government has implemented numerous public transport programs, expanded on the options and modes available, and improved upon existing structures. The paper states that meeting all of these goals will at some point require transport system "integration and intermodalism", with the intention that this will lead to a reduction in ineffective competition and duplication of services, as well as a reduction of costs (The National Transport Policy White Paper, 1996).

The paper outlines Government's awareness of its responsibility to lead in the provision of infrastructure that meets society's needs, and to ensure that services enable accessibility and mobility. However, it is also cognisant of the high costs required and the expectations that tend to be unrealistic, as well as limited funding available, and shows doubt that all needs and demands for transport services will be met. It also states that the provision of services can be provided by the government, by private organisations or persons, or by a combination of both, such as Public Private Partnerships (The National Transport Policy White Paper, 1996). Luke and Heyns argue that mobility and accessibility are stated as being crucial in the Paper, and that this entails having transport operations that are fully integrated (2013, p.2).

This research is focused, in particular, with the paper's policy on Land Passenger Transport. The policy defines this as including "the travel modes

rail, bus, minibus-taxis, metered taxi, light delivery vehicles, private motor cars, motor cycles and bicycles as well as pedestrian movement for purposes such as "commuting or other business related travel, shopping, tourism, recreation and casual travel." The paper describes working towards ensuring that public transport is customer based, which means passenger transport that meets customer needs, the development of better mobility and access, better standards in service, more affordability, an increase in the security and safety of those transport modes, and the improvement of access to information (The National Transport Policy White Paper, 1996).

The paper went into detail with regard to policy and goals for specific modes of transport, such as the minibus-taxi industry needing to be more formalised, competition regulated and minibus-taxis needing permission in order to operate on certain routes or networks, and these permissions would be granted based on the required demand for taxis (The National Transport Policy White Paper, 1996).

Buses need permission to operate, and they need to acquire this from the provincial permit board. Any contracts that are awarded will be done on the guarantee that funds are to be used only for the bus service. The rail passenger transport is government run and owned. It is owned by the national transport authority, and will continue to be owned until taken over by either the provincial or metropolitan authorities. Fare levels are set based on the cost of other modes of transport, and the cost structure of the service. With regard to

other transport operators, the paper states that they are welcome and encouraged to bid for contracts. It also states that smaller operators will be assisted if needed. Competition is to be regulated, and the government aims to ensure that the job security of those working in the public passenger transport industry is protected and stable (The National Transport Policy White Paper, 1996).

The City of Johannesburg (CoJ) Metropolitan Municipality in 2018 presented their overview of Public Transport in Johannesburg. In this presentation, it was stated that the CoJ's role in transport was to integrate transport planning and thereby integrate the city. It also stated its role was to improve public transport quality, expand public transport and maintain its infrastructure (City of Johannesburg Metropolitan Municipality, 2018, p.3). These improvements include improving safety, the support of economic growth, the engagement of the public, and reducing congestion. It is also responsible for the financing of the plan. The modes of transport involved in the plan are the Rea Vaya BRT, Metrobus, provincial subsidised bus services such as PUTCO, and the Gautrain Bus. It also includes minibus taxis, rail services such as PRASA and Gautrain, metered taxis which include Uber, and long distance and cross border buses (City of Johannesburg Metropolitan Municipality, 2018, pp.8-14).

The presentation notes that not all public transport is government owned or operated; therefore the state has limited powers and capacity. It also

stipulates that there are three spheres of government, each with different responsibilities. There is also the complication that the demand for transport did tend to extend beyond municipal lines. The CoJ states that it cannot regulate the price of public transport, although it can set prices for services such as Rea Vaya and Metrobus. These prices are set based on forecasted and current passenger numbers as well as economic indicators. It states as a goal that customers should not spend more than 20% of disposable income on public transport (City of Johannesburg Metropolitan Municipality, 2018, pp.18-19)

The presentation states that Rea Vaya operators are paid a fee per kilometre driven, not per passenger, and that prices increase when wages or fuel prices increase. The Rea Vaya is also cheaper than most other modes of public transport, with Metrorail being one of the exceptions. The Gautrain is the most expensive, and this is due to being targeted at private car users (p.20-21). Subsidies are provided for Metrobus at 70 - 75%, Rea Vaya has a 68% subsidy, and while minibus taxis have no direct subsidy, they do have an indirect subsidy in the form of free access to taxi ranks (p.22) The CoJ states that it is active in BBBEE job creation, capacity building and value chains (City of Johannesburg Metropolitan Municipality, 2018, p.23).

2.11. Current public policy for inner city and Hillbrow transport

2.11.1. The JDA and Inner City Transport Policy

The Johannesburg Development Agency (JDA) is an organisation that has a role in the implementation of the city's Growth and Development strategy, and in supporting the development of the Corridors of Freedom; which are described as being a way to transform the existing spatial inequality. It has a goal of helping to alleviate poverty due to many people living outside of Johannesburg, away from employment and opportunities, and thus spending a large proportion of their salary on transport.

In response to the rapidly growing city population and increase in traffic congestion, along with a forecasted peak morning traffic growing from 400 000 motorised trips to 600 000, the JDA formulated plans to make the inner city "walkable", to maximise and utilise residential density to ensure viability of public transport, and minimize traffic congestion (Johannesburg Development Agency, 2010, pp.6-7). A walkable inner city means one in which the space that exists in an area is utilised to its maximum potential, with many pedestrians given priority over motor vehicles, and public transport being no more than a fifteen minute walk away on foot (Johannesburg Development Agency, 2010, p.6).

However, a compact city has several disadvantages. Shirazi and Falahat argue that the concept of a compact city is a Euro-centic one, and that applying it to a different country and culture is not straightforward. While compact cities tend to mean lower travel times and less private motor car usage, as well as close proximity to urban facilities, people might still prefer to use private cars

for status and convenience. Compact cities may be beneficial for small and local business, but could lead to a rise in land prices and crime (Shirazi & Falahat, 2012, p.247-248). Growing traffic congestion impedes movement, and on street parking is unregulated and almost at capacity. There are also a high number of personal motor vehicles and minibus taxis using the roads (Johannesburg Development Agency, 2010, p7).

2.11.2. Governance and Public Private Partnerships

A Public Private Partnership (PPP) in South Africa is defined as a contract between a private party and government, and it involves the private party performing a function of an institutional nature or the party using state property. The private party bears the financial, operational and technical risk in exchange for payment by the government. PPPs are generally long term in nature and are formed to achieve long term service results (Fombad, 2015, p. 1202).

The Gautrain is an example of a PPP in South Africa. The project began in 1999 with a feasibility study, and the following year was declared as being one of governments spatial development initiatives. The goal of the Gautrain was to improve accessibility and mobility, and decrease traffic congestion in Pretoria and Johannesburg (Fombad, 2015, p.1203).

The building and operating of the Gautrain has resulted in a reduction in traffic congestion, the creation of employment opportunities, and economic growth due to the opportunities provided to local businesses. Despite these

successes, it has been argued that the Gautrain is a mode of transport that benefits the wealthy and has only increased mobility related exclusion. Even though the Gautrain won an award in 2008 for Best Global Project to Sign, as well as the Public Private Finance Award, it is questionable whether the project is an example of effective governance (Fombad, 2015, p.1204).

This is due to the arguement that awards were given for the project's engineering and development successes (Fombad, 2015, p.1204). For instance, the Portfolio Committee on Transport argued against the project due to its exclusionary nature in favouring wealthier commuters, and these objections were not heeded. There are also arguments that the views of all stakeholders were not taken into consideration (Fombad, 2015, p.1205).

Effective PPPs need participation and clear communication from all stakeholders, transparency, and responding and implementing actions in a practical time to decisions that are made. They also require the accountability of political actors with regard to their actions and words, the project being efficient, effective and value for money, and the transfer of risks. The projects need political will backing them, the project should be viable in the long term, sustainable and have good corporate leadership and governance (Fombad, 2015, pp.1204-1202). Lack of skills, information and coordination can lead to poor implementation of PPP projects (Devkar, Mahalingham, & Kalidindi, 2013, p.138).

The JDA's ambitious goal of making the inner city of Johannesburg a compact, mobile city has advantages that may not be realised if the project is not implemented effectively (Hamiduddin, 2017, p.3). Compact cities have been shown by studies to have higher levels of pollutants that people are exposed to and inhale (Schweitzer & Zhou, 2010, p.365). Compact cities have also been argued as improving social ties and interactions, as well as an increase in sense of community. However, this can be affected if it is a mixed-income area, with low-income residents feeling excluded (Talen & Koschinsky, 2014, pp.730-731).

2.12. Conclusion

The concept of social exclusion goes beyond looking at poverty of the individual, but rather, it looks at the quality of life for those in society and how their being excluded from jobs, health services and community participation negatively affects them. Social exclusion is seen as a lens with which to view those excluded in society and the different paradigms offer different solutions. Hillbrow has been looked at, including its colourful history from the time of Apartheid to the present. The origin, definition and explanation of the concept of social exclusion were introduced, and the way in which certain people experience social exclusion due to active or passive circumstances.

Government participation and how it can be beneficial if undertaken correctly, and harmful and inadequate if undertaken incorrectly, was also viewed. The role of government and the JDA in planning to rejuvenate Johannesburg's inner city were introduced, along with their stated goal of

urban renewal and their goal of dealing with existing spatial inequalities. The importance of civil participation was explained, along with the need for government to work together with the public to ensure that policies are formulated and implemented successfully.

The London study which this research used as a base was introduced, along with the factors the study noted as being most significant. Public transport in Seoul and in various cities in India was described, as well as their success and failures. Government goals with regard to public transport as entailed in the White Paper were explained briefly, stating that the aim was to produce efficient and reliable transport that is integrated and meets consumer needs. The modes of public transport in Johannesburg were listed as being mini-bus taxis, Rea Vaya, Metrobus, Metrorail, Gautrain, various other buses and metered taxis.

Criticisms were provided with regard to public transport modes and facilities that currently exist in South Africa. The reasons for the inadequate quality of public transport in South Africa were described as being the result of poor planning and implementation and a lack of facilities. It was also stressed that poor people were largely reliant on public transport as a means of being mobile. The different modes of public transport in Johannesburg were described, as well as the role that Public Private Partnerships play. The government goals in the National White Paper were outlined with regard to public transport, and the development of inner city public transport was also described.

Chapter 3: Methodology

The research used the theory that inadequate public transport has an impact on the social exclusion of Hillbrow residents. Social exclusion was the theoretical lens through which the research is viewed. Through the use of social exclusion as a theoretical framework, it analysed the manner in which Hillbrow residents, as well as commuters travelling through Hillbrow, may fail to adequately access jobs, health and education facilities, social and recreational activites as a result of public transport facilities available to them. The manner in which public policy aims to address social exclusion for Hillbrow residents was also evaluated.

The research looked at which factors have the greatest impact on social exclusion experienced. Public transport efficacy was measured by factors such as availability, accessibility, affordability, safety, comfort, routes and schedules. This paper looked at which of the three social exclusion paradigms most closely resembles the social exclusion faced by commuters and residents in Hillbrow. Based on the criteria set out in the National Transport Policy White Paper, this also meant looking at public transport's ability to limit spatial distortions, meet basic accessibility needs and allow people to use it to satisfy their required needs. Transport efficacy meant looking at whether or not it is customer focused, secure and safe, reliable and of acceptable quality and affordability. Social exclusion was measured by people's ability to access employment, health, education, entertainment and social activities. In doing this, the study focused on public transport customer opinions and views on the

transport modes they used, as well as the infrastructure and information systems associated with those modes.

A mixed methods research approach was used, beginning with a focus group interview. The interview responses were used to build a questionnaire for the quantitative portion of the research. The quantitative portion was used to see if there is a significant connection between public transport efficacy and available modes and social exclusion, with the area of focus being the low income and densely populated neighbourhood of Hillbrow. The data collected was tested to see if there was any significant relationship, thereby providing information that as yet does not exist for the area. Thus this is a baseline study.

Although a mixed methods approach was used, the research is predominantly quantitative in nature. The research theory was tested through observation and measurement. This researcher assumes that the persons to be studied may have biased views or ones heavily informed by their own personal experiences, therefore a post-positivist approach was taken to incorporate the possibility that responses may not be completely objective. In addition, the observations of the researcher may not be entirely accurate, and the researcher is not capable of having in depth knowledge of the environment being observed.

The theory of social exclusion informs the research and how it will be conducted. When testing the data, the focus is on social exclusion as a result of public transport efficacy or lack thereof. Therefore the research aims to see if

there is a relationship between social exclusion and public transport in Hillbrow (Wagner, Kawulich, & Garner, 2012, pp. 52-54).

3.1. Research design

The purpose of the study was to collect data and responses to test if current public transport policy has an impact on social exclusion for people commuting in and around Hillbrow. The investigation was conducted through the use of a mixed methods approach. The study began with focus group interviews. The responses and themes in the responses was collected and used, along with factors from a London public transport study to compile a survey for use in the quantitative portion.

The public transport hubs in which the survey data was collected were locations where there was a strong likelihood that frequent commuters and public transport users would be located, such as taxi ranks, the Gandhi Square Metrobus station, the Gautrain Park Station, and Rea Vaya bus terminals. Data was collected in the morning and evening weekdays during high traffic commute hours, and Saturdays. The use of questionnaires at these high traffic areas helped to ensure the collection of large amounts of data in a relatively short amount of time (Wagner, Kawulich, & Garner, 2012, p. 100).

The researcher was personally present handing out the surveys, therefore the researcher was available to respond to queries, provide clarification, and there was a fair amount of interference due to being present at the site of data collection. The research was conducted in a short time from of several months, and therefore is not a longitudinal study but cross-sectional.

3.2. Research method

The study used a mixed methods approach. The research began with small focus group interviews, the responses of which were used to compile and finalise the quantitative portion of the research. The quantitative part of the research involved the researcher personally handing out surveys at various public transport hubs in and around Hillbrow, and the Hillbrow Community Centres.

The data responses from the focus group interview were analysed by looking at the frequency certain themes were brought up and discussed. The responses from the surveys were analysed by looking at the mean and mode of the responses to the demographic questions. Spearman's Correlation was used to test the strength of the relationship between public transport and social exclusion based on the responses and opinions on public transport usage. These responses were given on a Likert scale. Each response was given a numerical value, which was used in the calculations.

3.3. Data Collection Instruments

The research began with small focus group interviews, in which a total of seven volunteering Hillbrow residents participated. The responses of which were used to compile and finalise the quantitative portion of the research. The surveys were distributed to people at large and small high traffic public transport hubs within and around Hillbrow, as well as the Hillbrow Recreation Centre. The responses were recorded and transcribed. The various themes

discussed were noted, as well as the frequency in which certain themes were discussed. These responses aided in the creation and editing of the questionnaire.

The instrument for data collection was an initial recording of opinions provided in the focus group interviews and the information collected was used to adjust the individual questionnaires as needed. The next instrument was the use of surveys to collect data from a small sample of the population in a relatively short space of time. The survey data was collected by the handing out of questionnaires by the researcher in person, as well as by asking for participation online using social media. The majority of data was collected through individual questionnaires filled in by respondents at specific public transport points within and around the border of Hillbrow, with a smaller percentage of people submitting their survey responses online.

3.4. Data

Primary data was collected through the focus group interviews and the responses to the survey. Secondary data such as government policy, transport schedules and recent relevant newspaper articles were also used in addition to the primary data to provide context and clarity.

The second source of data was that of the responses from the focus groups. The third and final source of data was that of individually distributed questionnaires, and they were the main source of data.

As shown in Table 5 in the appendices, the questions asked of the focus groups were with regard to general opinions about public transport,

opinions about the factors of social exclusion discussed in the London study and how the respondents felt about certain aspects of public transport. The first section aimed to get an understanding of the general perceptions and opinions the participants have of South African public transport. The second section consisted of a brief look at the 2000 London study, what it said about public transport and social exclusion, the factors described in the study, and a discussion of what this meant to the participants. The final section consisted of the participants giving their opinions on the public transport factors they felt to be most important to them in a South African context.

Once the focus group had been conducted, the survey was completed. The questions in the survey were adapted to incorporate input from the focus group. The survey consisted of four sections, as shown in Table 6 in the Appendices. The first section contained questions that asked for input as to the participant's demographics, such as their age, gender, employment status and whether or not they owned a motor vehicle.

The second section asked questions related to the participants general public transport usage, such as how often they used it, and monthly costs involved. The purpose of this section was to provide information as to the participants' mobility and cost of transport, as well to use the data to compare certain group's opinions on the following two sections.

The third section asked questions related to which modes of available transport the participant preferred, and which mode was considered the highest quality. The fourth section asked questions related to their perceptions and

opinions of public transport. For instance, the participants were asked if traffic was a problem on the route taken by the transport mode used. The purpose of these two sections was to gain insight into their public transport views and opinions, as well as their public transport experiences and how those experiences may be related to social exclusion. It also aimed to ascertain whether or not the respondents' preferred mode of transport is easily accessible, affordable, adequate and capable of getting the participant to his or her desired destination. In essence, the questions aimed to see if respondents' available public transport met their transport and accessibility needs.

The questionnaire data collection was conducted using a "choice method", in which participants are given the option of filling in the questionnaire in front of the researcher, having the researcher read the questions and filling in the responses herself, or completing it in their own time and posting it back, or returning it the following day (Bowen, Bradford, Powers, McMorrow, Linde, and Murphy, 2005, p.23). This survey method can be costly and take a lot of effort. In addition, as the research is conducted in a small geographical area, the data may not be generalisable (Bowen, *et al*., 2005, p.31).

3.4.1. Primary data: research instrument

The focus group questions were open-ended and semi-structured in order to facilitate and encourage discussions and the sharing of opinions and viewpoints. The survey questions were closed-ended to ensure that there was consistency in the responses, as well as to enable them to be relatively easy and

quick for respondents to answer. This also ensured that clearer responses were given and that the questionnaire could be replicated in the future (Wagner, Kawulich, & Garner, 2012, pp. 108-109).

A Likert response scale, with options ranging from "Strongly Agree" to "Strongly Disagree" in a linear fashion allowed the respondents to give their views and opinions about the section on public transport and the section about whether or not they are able to reach necessary goods, services and activities. An option for "Not Applicable" (N/A) was there as well in the instance that the question contained a variable that does not apply to the participant (Wagner, Kawulich, & Garner, 2012, pp. 110-111). For instance, the question "My preferred mode of public transport is close to school" was irrelevant for many respondents as most were employed and not students.

3.4.2. Secondary data

Secondary data, such as publicly available maps, bus and train routes, timetables and government policy and Acts were used to supplement the primary data and provide clearer context and background. Information about the policies government had in place for public transport, and the goals and intentions that government had with regard to improving available transport facilities was also used for context. The researcher used the maps to mark the minor and major transport hubs, both formal and informal, as the target site was continuously observed. This provided more detailed and specific information than was readily available.

The paper looked at the goals and aims for government policy on public transport by looking at what was outlined in The National Public Transport White Paper as it was presented in 1996. It also looked at the CoJ Metropolitan Municipality's presentation in 2018 in public transport, and the JDAs role in Johannesburg's Growth and Development strategy for supporting the development of the Corridors of Freedom.

The White Paper outlined that the objective of public transport is that it needs to run smoothly and efficiently so that it enables society and the economy to function in an optimal manner. The White Paper also put forth a goal of having public transport be customer needs focused, and that public transport and its infrastructure should operate in such a way that its users are able to meet their needs for travelling to school, work, or various other places they need to reach.

The survey's focus was on frequent public transport customers and their experiences with transport. It focused on the users of the public transport modes that were set out in the Land Passenger Transport section, with the exception of light delivery vehicles, motor cycles, bicycles and pedestrian walking.

3.5. Research procedure

The data collection began with the focus group interviews. This method was chosen as focus groups are useful in gathering new ideas, something that is not easy to obtain in individual interviews (Breen, 2006, p.466). Focus groups are advantageous in facilitating the formation of opinions in a social

environment, they can allow participants to gain a more in depth understanding of the topic, and they can provide new comprehension for the topic. Focus group interviews are also able to complement and aid in the explanation of statistical information (Breen, 2006, p.467), (Minnis, Holsman, Grice, & Payton, 1997, p.40-41) and (Duarte, Veloso, Marques, & Sebastiao, 2015, p.386). They are useful in the collection of a great deal of interaction in a short space of time, and this interaction is focused on a topic that the researcher introduces, with the topic being introduced before the interview (Duarte, *et al*, 2015, p.384).

The focus groups were used in conjunction with survey collection, as a combination of these methods can assist a researcher in gaining more insight and understanding of the data collected. The focus groups were thus useful as a means to "pilot test" data collection (Minnis, *et al*, 1997, p.41). Focus groups can be useful if the researcher is unfamiliar with the target population, as the researcher was, and thus it provided a better understanding of that population (Minnis, *et al.*, 1997, p.47).

With regard to their disadvantages, focus groups can be more costly and finding participants took a longer time to recruit than the collection of surveys. It was also challenging to arrange a suitable time and place for all participants to meet for the interview. Focus group data can also be affected through the use of a biased sample, and the perceptions and opinions of participants may not be objective or accurate. For instance, all participants to the interview were black males. This meant that the opinions of women were not included. Another

disadvantage that focus groups face is that some participants may be shy and quiet, and during the interview could be drowned out by more confident and louder participants. Data collected from focus groups is "context-specific", and therefore may not be generalisable (Breen, 2006, p.467).

In conducting a focus group, it is important that the participants are homogenous, so that the debate may be more balanced (Breen, 2006, p.467) and (Duarte, *et al*, 2015, p.385). The purpose of a focus group is to gain an understanding of why participants hold the opinions that they do, not for the researcher to merely collect those opinions (Duarte, *et al*, 2015, p.384-385). In this regard, having all be black males as participants may have advantages. However, as the experiences of women were excluded it was not possible to determine their views on safety of walking to and from transport.

A focus group of five participants was the first data gathering procedure, and it was conducted after an initial interview in which only two participants showed up. The focus group interview took place at the Hillbrow Recreation Centre on a Thursday evening. The interview was approximately thirty minutes, and was audio recorded. In both interviews, the participants were all black adult males.

The interview began with an explanation of the purpose of the study, and a brief explanation of the factors of the London study. The researcher then asked the participants about whether or not they owned a motor vehicle, and about their public transport usage. This was followed by asking about their opinions on public transport, and whether or not they viewed South African

public transport favourably. There was also a discussion on which aspects they liked and which they did not.

The third part of the interview was a reiteration of the seven factors from the London study, and the participants were asked if they personally believed that public transport was capable of enabling them to reach necessary places, goods and services. Finally, the participants were asked to rank the factors in terms of importance from highest to lowest. During the interview, open-ended questions were used, as they are useful in encouraging complexity in responses and ensuring that all data is incorporated (Vaughn & Turner, 2016, p.45).

Open ended questions were used to ensure that the sharing of ideas and experiences was encouraged. It also allowed the participants to discuss aspects they agreed and disagreed upon (Breen, 2006, p.468). The researcher was careful during the moderation of the interview to not allow her opinions to influence that of the participants (Breen, 2006, p.472).

The recording of the interview was transcribed. This was analysed, with the researcher coding the data by making note of themes and subthemes within the text. These themes were created based on the research question and the content of the interview. Once the researcher had identified the themes, the frequency of the themes was recorded. This was to note which themes were mentioned most often by the participants, and therefore which themes were of importance to the participants to varying degrees (Vaughn & Turner, 2016, p.47-49). Notable quotes that were made during the interview were recorded.

The data was recorded, transcribed and structured in a way that made the retrieval of information simple (Mainz & Olesen, 1997, p.7).

A pilot testing of the research was conducted among friends and co-workers, and criticisms and feedback were utilized to fine tune the survey. Once it had been finalised, the survey questionnaires were distributed to individuals at taxi-ranks, bus stops and train stations during high traffic hours such as the morning and evening work commute hours, as well as weekend afternoons. Pre-paid envelopes were given to those unable to complete in person, or the researcher arranged to meet again at the same time and place the following day to collect the survey if the participant agreed to complete it on their own time. The survey was also available to be completed online.

The survey enabled the collection of data that combined individual perceptions so as to give insight into the group's opinions as a whole, and this quantitative approach allows one to study human behaviour and attitudes (Groeneveld, Tummers, Bronkhorts, Ashikali, & van Thiel, 2015, p. 64). However, if the researcher's method or technique is incorrect, there is the possibility that the accuracy of the findings will be affected (Groeneveld, et al, 2015, p.65).

The degree of non-response for data collection may be influenced by the sample population, the manner in which the survey and questions are designed as well as the survey methodology, the length of the survey and its subject matter (Moghaddam & Mousavi, 2009, pp. 339-341). The researcher noted that the individuals approached were more likely to participate if they

perceived themselves as having ample time to complete the survey before the arrival of their transport.

As the majority of the surveys collected were handed out to those willing to participate, it was hard to gauge in-person non-response. The advertisement for the online survey was seen by 37 726 people. Of that number, 717 clicked on the link to the survey, and 22 completed it. The degree of non-response was far higher online than in person. The researcher being present for the in-person questionnaires thus appeared to limit non-responses as it allowed participants to ask for clarity about any sections or questions on the questionnaire, thereby giving the researcher a chance to clarify or explain any questions if needed.

The process of handing out surveys was relatively inexpensive, and it allowed respondents to ask for clarity on some questions (Wagner, Kawulich, & Garner, 2012, p. 100-101). In some instances the researcher would read out the questions and mark the answers provided on the survey as given by the participant. This ensured that all questions were answered and there was little misunderstanding. In addition, some participants preferred this method as it involved less effort on their part.

It was challenging finding respondents that were Hillbrow residents. Therefore the researcher used adaptive allocation, which involves refocusing data collection on areas that have been observed to have a higher concentration of the studied phenomenon. In this particular instance, it was found those people using or hanging around the Hillbrow Recreation Centre, as well as

those at small taxi and bus stops, were both residents of Hillbrow and public transport users. Adaptive sampling can involve the researcher dividing a specific geographic location into sections, and after initial data collection, focusing efforts on geographic sections that yield the target participants. This is based on the assumption that "populations tend to cluster geographically" (Martsolf, *et al*., 2006, pp.170-171).

Adaptive sampling is a method that requires the researcher to have some knowledge of the area that is being targeted. The researcher can employ community assessment techniques to understand the targeted community with regards to its needs, issues and resources. This can be done by either looking at relevant existing data about the community, or by conducting a "windshield survey", which entails going through the community and taking note of its characteristics, condition and resources. One can also assess the community through interviews and networking (Martsolf, *et al*., 2006, p.172).

The researcher used all three methods to learn about the studied community. The first method was an analysis of existing data that was compiled during the literature review. The second method was the collection of experiences that were given during the focus group interviews. Finally, when the data collection process had begun and yielded low quantities of the target population, the researcher adapted the focus and collection procedure. The windshield survey procedure began with a drive through Hillbrow during the morning rush-hour and marking on a printed map the areas where lines of

waiting commuters were observed. These were areas that had initially not been identified as they were informal bus or taxi stops, as seen in Figure 1.

This was followed by the researcher walking through the neighbourhood and approaching people that were waiting, and asking for their participation. (Martsolf, *et al*., 2006, p.172). The windshield survey method tends to involve an initial drive and consequential walk-through with deeper analysis of the target community. The researcher also approached people that would use and hang outside of the Hillbrow Recreation Centre, as they tended to be residents of Hillbrow.

3.6. Sampling

The population of the sample was Johannesburg residents, with the sampling frame for the research being adult Hillbrow residents living in or around the area that use public transport. Gender, age and employment status was not used to decide the sample, but these factors are used as a comparison to see if there are significant differences in how certain groups view or experience public transport.

The sampling method used for the focus group was non-probability sampling. The sampling technique for the focus group was critical case sampling, in which public transport users within and around the Hillbrow area were selected. The purpose of this non-probability method was to ensure that those in the group have daily experience with public transport in the area (Wagner, Kawulich, & Garner, 2012, p. 93).

Cluster sampling was initially used for the questionnaires, in which they were distributed equally to users of the following methods of transportation; mini-bus taxis, Metrobus, the Rea Vaya, Gautrain and Metrorail. This technique was used in order to ensure that users for each mode of transport had an equal opportunity to be included in the data (Wagner, Kawulich, & Garner, 2012, p. 91). This method was adapted as the researcher found very low numbers of Hillbrow residents in certain areas, such as Gautrain Park Station. The sampling method was then adapted to critical case sampling, with specific geographic locations being targeted.

3.6.1. Mixed methods: Linking Qualitative and Quantitative data

Quantitative and qualitative methods can be used together in order to try and overcome their individual weaknesses (Kelle, 2006, p.294). The data can be linked using one of three key approaches. The first is the antecedent or sequential approach, which involves the initial use of qualitative data to inform the methods and instruments of the quantitative research. The second is the encapsulated or nested approach, which is when the link between qualitative and quantitative data provides a conceptual framework for which the findings can be verified (Henderson, Ainsworth, Stolarzcyk, Hootman, & Levin, 1999, p.248-249). The third approach is the primary or secondary combinations approach, which includes linking qualitative and quantitative data by having the qualitative data provide comprehensive background to the quantitative data, or by having the primary quantitative data be the basis for further exploration with the qualitative data (Henderson, *et al*., 1999, p.248-249). The researcher

employed the third approach by using the focus group interview to inform the survey and provide background and context.

If the socio-cultural background of researcher and research subject differ a great deal, this can affect hypothesis formulation and the way variables are defined and explained (Kelle, 2006, p.296). Therefore qualitative data can provide better understanding and explain causal processes, and it can even mean the addition of context variables, thereby giving a better and more realistic explanation to the data.

Other issues to consider are that of research subjects misunderstanding a question as it is written in the survey in a way other than the researcher intended it to be understood. This can affect the data's validity and reliability. The respondent may not be entirely honest or omit certain details. In addition to this, misunderstandings, mistakes or deceit can affect the validity of the interview data (Kelle, 2006, pp.300-301). In being present for the survey collection, as well as sometimes administering them herself by filling in the respondent's answers, the researcher was able to answer questions, provide explanations and ensure that misunderstandings were low. The researcher also avoided asking potentially embarrassing or private questions to help ensure that respondents did not experience any discomfort in participating. As a result of wanting to avoid causing discomfort, the researcher did not ask residents their immigrant status.

Quantitative research methods have been seen as being distant and removed from the social world, as well as lacking "first hand involvement"

(Kelle, 2006, p.295). This is especially true if the research takes place outside of the researcher's own cultural environment, and if that particular environment differs drastically from that of the study subject. For instance, if the subject's religion, gender and class differ from that of the researcher's, it can affect the research. The researcher may lack the appropriate knowledge of the subject's specific culture, and this could affect any hypotheses or theories, as well as the interpretation of the data. Measurement of the data could be affected if certain words or actions in that culture differ, and the researcher phrases questions incorrectly, or interprets answers inaccurately (Kelle, 2006, p.296).

Thus it is useful to conduct a qualitative interview before quantitative data is collected so that the researcher has access to the subject's culture, and this data can help to explain variables and provide context and meaning (Kelle, 2006, p.300). Qualitative interviews can provide richer and more detailed responses, and they allow the subject to represent themselves (Kelle, 2006, p.303).

Using a combination of methods can provide ways of dealing with the limitations that each method has when used alone, and together they can help to overcome issues that are specific to each method (Kelle, 2006, p.305). Qualitative data collection used first followed by quantitative data collection can help the researcher to identify any issues, as well as to help better develop any hypotheses and theories (Kelle, 2006, p.307). The collection of questionnaires from a large sample can give the researcher an idea of the views

of the population, and assess what factors are important and which policies are favoured (Goodwin & Lyons, 2010, p.3).

The majority of the research was conducted on site, with the researcher personally handing out and collecting surveys Monday to Saturday. This direct interaction with participants most days of the week ensured that the researcher observed and learned about the environment being studied. The researcher was with the participant as the survey was being completed, in addition to filling out the answers as given by the participant. This meant that the researcher was available to interact with the participant. At times, the participants gave explanations to their responses and why they had chosen that particular response. This gave the researcher some further insight into responses gathered.

The estimated sample size was 150 respondents, and the estimated response rate was high as the researcher was physically present for the distribution of the surveys. The researcher noticed that few people at large, busy taxi ranks were willing to participate, while those at smaller taxi ranks were more willing. It was also observed that there were fewer participants that were Hillbrow residents at large transport hubs. Therefore the researchers came to the assumption that many commuters from other areas in and around Johannesburg use Hillbrow and the Central Business District as a thorough point in their commute.

The researcher is required to know about the cases being sampled, and to know about the population from which the cases are selected (Uprichard,

2013, p.4). Sampling is about finding a strategy that "delimits" certain cases that are selected for a specific purpose (Uprichard, 2013, p.5). There is a danger that exists before conducting the research in which sampling errors may occur that are only discovered when doing the research. Thus, sampling methods must continously be developed throughout the whole research process (Uprichard, 2013, p.7). In this regard, the researcher adapted the areas of focus to better locate the target sample due to the high number of non-residents of Hillbrow responding.

The surveys were distributed on site so as to overcome difficulties that may occur through the use of online or posted surveys. Representativeness can be gauged by seeing if every member of a target population has an equal chance of being chosen in the sample (Bianchi & Biffignandi, 2017, p.128). For this reason, the researcher intended to visit the data collection sites randomly, and each site was to be visited an equal number of times overall.

This approach changed as the researcher became aware that certain sites had more Hillbrow residents. For instance, many Soweto residents use the Rea Vaya, while Hillbrow residents appeared to prefer using Metrobus or mini-bus taxis. Sampling is considered as a more serious topic in mixed-methods research. In sample design and strategy, one considers the sample size, access, the generalisability of the sample and how representative it is. The questions of "what" is being sampled, "where from" the case is sampled and "how" these cases were selected are all issues to be considered (Uprichard, 2013, p.2). The

researcher thus adapted the collection approach so as to focus the areas with a higher concentration of Hillbrow residents.

3.7. Data analysis

The data from the "demographic" section and the "transport" use section of the surveys were analysed using a frequency distribution table, as the data from the responses was nominal. This allowed the formulation of a clearer picture of the makeup of the respondents, with the frequency of factors such as their gender, age, employment status and car ownership being pictured, as well as the modes and methods of public transport used by the participants.

The public transport opinions and the mobility experiences of the respondents as they relate to the social exclusion sections of the survey were analysed by looking at the respondent's preferred mode of transport, and seeing whether or not their responses were positive or negative. The mean and mode of the Likert responses were analysed. This was done by assigning a numerical value to the Likert responses.

The survey had 43 questions in total. Due to there being many questions and items in the survey, Cronbach’s alpha was used in order to adequately test consistency, in addition to the reversal of several questions to test if respondents were consistent in their responses.

Table 1 below shows a brief outline of the questions and statistical tests. The responses between groups were tested to see if the mean and mode differed, depending on the respondents' employment status, mode of transport used, gender and area of residence.

Table 1
Consistency Matrix of data collection method, specific questions and statistical tests.

Research Question	How do existing public transport facilities and government policies impact social exclusion in Hillbrow?		
Hypothesis	There is a relationship between public transport mobility and social exclusion for Hillbrow residents.		
	Source of the data	Specific Question	Statistical Test
	Focus Group	Opinions on Public Transport, previous studies and factors considered important in public transport in SA.	None – record themes
	Survey	Section One: Demographic Information Seven Items	Frequency Distribution
	Section Two	Public Transport Mobility Five Items	Frequency Distribution
	Section Three	Public Transport Mode Usage Three Items	Frequency Distribution
	Section Four	Access to Necessary Goods, Services and Activities Twenty Eight Items	Comparison of mean and mode of responses, Spearman's Correlation

3.8. Validity, reliability and replication

As the research involves the study of people and their experiences, care was taken to ensure the validity and reliability of the research. The survey questions were informed by previous public transport and social exclusion studies criteria, e.g. (Church, Frost, & Sullivan, 2000). It was also informed by opinions gathered from the focus group, therefore helping to ensure that the survey questions were designed to measure the variables they were meant to be measuring. There was a predetermined set of criteria for which factors of public transport mobility were defined, as well as the factors of social

exclusion. Theory on social exclusion and mobility further informed the questions in the survey (Wagner, Kawulich, & Garner, 2012, p. 81). The various stages of the research have been described in detail to ensure that the research can be replicated.

3.8.1. External validity

The sample for the collected survey responses was done through cluster sampling. The researcher approached adult public transport users at various transport hubs as they waited for their transport, or those that were in the vicinity of a transport hub. The survey was also distributed at the Hillbrow Recreation Centre, a place where many residents would come for meetings, functions or to sit around.

The survey was posted online, with the target sample of the population chosen through Facebook's marketing algorithm as being specified as commuters and those with an interest in transport in a seventeen kilometer radius of Hillbrow. The participants at the transport hubs and Recreation Centre were chosen by the researcher randomly approaching people. This method lead to the researcher having respondents be active users of public transport. However, this meant that there was a bias towards people that were available and in public using public transport. This method means that the responses of people that walk, cycle or use public transport outside of the times the researcher collected data were not included in the study.

The online survey was posted inviting participants between the ages of 18 and 65. The Hillbrow resident's sample was small, and therefore the

findings of the research may not be generalisable (Wagner, Kawulich, & Garner, 2012, pp. 80-82). The participants for the survey were recruited from the various public transport venues in and around Hillbrow, the Recreation Centre, and online.

3.8.2. Internal validity

The closed-ended, structured questions on the survey, as well as the reversal of certain items, helped to ensure that there was consistency in responses. The survey questionnaire was divided into four distinct sections, with a description of each section and the aim of that section introduced at the beginning. Each section was designed to gather information about a specific factor or variable. The researcher was present as the survey was being completed, and at times filled in the survey according to responses given by the participants. This also helped to ensure that there was clarity in the understanding of questions and responses.

3.8.3. Ecological validity

The research survey questions were influenced by Hillbrow residents' daily experiences with public transport, and the questions were focused on collecting information with regard to the real, everyday experiences the residents have with public transport and its impact on their everyday functions. The majority of the responses were collected on site during morning and evening commuting hours. This helped to ensure that the responses of those using public transport frequently were recorded.

3.8.4. Reliability

The survey questionnaire was influenced by the focus group information that was collected, and a pilot test survey was administered to the researcher's friends and family. Responses, critiques and changes were all recorded. This was followed by individually administered surveys. Changes to the survey were only permitted during the first day of administering the survey, in case some questions are confusing or phrased in a manner that is unclear. After the initial changes, no more material changes of the survey were permitted. Some immaterial changes did occur, such as printing the survey on one side of paper, as this made completing it easier and quicker to complete.

The questions on the Likert scale were tested using Cronbach's alpha. As seen in Table 2, the Cronbach's alpha is above .7, therefore the items are closely related and show inter-item consistency.

Table 2

Cronbach's alpha

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.889	.891	28

A tool to aid in the analysis of qualitative data is that of Computer Assisted Qualitative Data Analysis Software (CAQDAS). This is software that has made the analysis of large amounts of qualitative data more efficient, as well as making it easier to store and analyse data (Davis & Meyer, 2009,

p.116) and (Davis & Meyer, 2009, p.116). The software can be useful in aiding the arduous process of analysing large amounts of data within a constrained time frame. Such software includes NVivo™ and NUDIST™ (Blismas & Dainty, 2003, p.457).

The program used in this research is that of NVivo™. It has the advantage of having simple coding capacities (Davis & Meyer, 2009, p.117) and it allows the user to store and retrieve data, therefore doing away with the need for the user to keep numerous and burdensome materials and paper (Davis & Meyer, 2009, p.119). The software also enables the user to put the simple codes into categories with more complex themes (Davis & Meyer, 2009, p.120). The software enables the user to link the texts to notes he or she has written, and these can be added during the data collection process, for instance, the making of a note that a new question has been added (Davis & Meyer, 2009, p.121). The researcher first went over the transcribed interview to code the text, before using the software to code it once again.

The survey data was collected on Survey Monkey. Once the collection of data had been completed, it was exported from Survey Monkey onto Microsoft Excel spread sheets. Here the data was analysed and cleaned, with missing values being highlighted. Certain questions were worded negatively; therefore the responses were reversed before being used in the calculations. The data was divided and analysed based on frequencies, means and modes, before being imported into SPSS for further analysis, and to check if calculations were correct.

3.9. Ethical considerations

The residents of Hillbrow are likely to be marginalised due to their socio-economic status, immigrant status, and employment status. Therefore permission to conduct the study was required, as well as an assurance that the residents would not be harmed or exploited in any way. There was also care in ensuring that any benefits provided to the respondents for participating in the study did not exceed the risks and that the distribution of benefits and risks was fair. The researcher avoided asking sensitive and personal questions, including the immigrant status of the respondents (Munford, Sanders, Mirfin Veitch, & Conder, 2008, p. 55). The individually administered surveys were conducted in Hillbrow where the residents reside, and there were translated copies of the survey available to assist in understanding the questions. The copies were translated into isiXhosa, Sesotho and Afrikaans. However, most respondents preferred to use the English copies.

There was also dinner provided for the focus groups, as well as travel money to compensate the respondents that attended. All participants remained anonymous, as they were informed that their names were not needed, and their informed voluntary consent was asked for before any data was collected. Written consent was kept after participation, with respondents keeping a copy. The participants were also informed that they may withdraw from the survey or focus group at any time (Meltzoff, 2005, pp. 314-315). The results of the study and its findings will be shared with respondents that request it. Those that wish for their participation to be removed had such a request granted.

3.10. Summary

The research is a mixed methods study with the aim to analyse the relationship between social exclusion and public transport in Hillbrow. The first stage of the research was the collection of data with regard to transport modes and routes, as well as government policies. This secondary data collection involved the collection of maps and transport schedules and routes. It also included government policy and goals as to inner city and Hillbrow public transport policy. The second stage was that of the focus group interview. The purpose of the interview was to give the researcher some knowledge and understanding of the studied environment and for the provision of personal experiences with regard to public transport in Hillbrow. These first two stages were conducted due to the researcher's lack of in-depth and first-hand knowledge of the area.

The focus group interview was followed by the refining and adjusting of the survey. This was then distributed to friends, family and colleagues for input and criticisms. These further informed the final copy of the survey.

Primary data for the survey involved the responses from the focus group interviews, and the responses from the surveys. It also consisted of observed responses of the research site as observed by the researcher.

The study is mixed methods in nature, with the quantitative portion's aim is to analyse the relationship between social exclusion and public transport. Demographic data will be analysed through the use of frequency distribution.

The responses with regard to the participants' opinions and perceptions of public transport were analysed by looking at the mean and mode of the responses. The significance of the relationship between various factors and social exclusion were also analysed.

Chapter 4: Data analysis and interpretation

Johannesburg is South Africa's most geographically spread out and diverse city and transport is arguably a means of dealing with the spatial inequalities (Coggin, 2015, p.307). The purpose of this study was to investigate these existing modes of transport in order to ascertain whether or not they have any relationship with regard to social exclusion. This meant gathering data about their ability to connect the residents of Hillbrow to essential places, such as areas of employment, and the transport's affordability, ease of use and access, and safety. A focus group interview was conducted with five Hillbrow public transport users. The second part of the data collection process involved the distribution of questionnaires informed by the qualitative data that was collected in the focus group. The quantitative data was collected at various public transport sites and online.

4.1. Focus group interview

4.1.1. Discussion of Themes

There were several themes discussed in the interview, and the transcript of the interview was noted according to frequency of themes mentioned. The themes mentioned most frequently were affordability, safety concerns, driver capability, and mode adequacy and capability.

4.1.1.1. Affordability

The cost of public transport was mentioned numerous times as being too high, and directly influenced by the price of petrol.

Participant 3: *It is expensive to pay… the taxis, they cost too much. Buses are expensive to buy. Too expensive… But the train … maybe they do… they do illegal, illegal transport because of cut the wires. They know to manage the stuff, but the taxis is … in tax- eish… but if you don't have the money, you don't go to work.*

It was also mentioned that those with disabilities were charged more:

Participant 4: *Things for the wheelchair. They charge extra for a wheelchair.*

Participants noted that it was more affordable to travel for those living within Johannesburg, as opposed to those living outside the city in rural areas due to the distance.

4.1.1.2. Safety Concerns

Participants stated that they found public transport to be generally safe:

Participant 3: *It depends if I take a long trip, like a bus. Because it is safe, because they have a limit speed.*

However, they voiced their concern for their safety several times, stating that taxi drivers were prone to violence, either among themselves or competitors:

Participant 3: *But when I use a taxi on a short distance, the drivers are becoming short tempered… The meter taxi, starting*

to go and fight in the road. Sometimes they use firearms, to shoot.

The other themes mentioned were that of taxi illegitimacy, in that some taxis were being used as a trap for unsuspecting passengers:

Participant 3: *Maybe they are using it to or kidnap or do something. Some people they are hijack because of such transport, kidnap.*

4.1.1.3. Driver Capability

Participants spoke about the driving ability of the public transport drivers, and appeared to evaluate the quality of service on how well or badly their driver managed the vehicle. This includes whether or not drivers managed to get to destinations on time:

Participant 7: *Time. Time must managed. By the drivers.*

Participant 3: *Not good, not good. Because of drunk drivers.*

Participant 5: *And they drive bad.*

4.1.1.4. Mode Adequacy and Capability

Participants noted that most modes of public transport were not accessible for all people and were not capable of accommodating those with disabilities, or obese people. It was also mentioned that even those that did have the capabilities, such as Rea Vaya, did not have them on all their vehicles. Instead, only special vehicles were capable of being accessed by those with disabilities.

Participant 3: *Ja, like lifting chairs, they are bit heavy. The only one transport I can see Rea Vaya. They have such a thing but not so much. Look again for a special bus.*

The interview revealed that other areas of concern to the participants that were brought up several times but not frequently were that of traffic concerns, ease of access, mode legitimacy, and violence from drivers. The themes that were not discussed much were problems from fellow passengers, the quality of the transport, ease of payment, convenience and speed.

The participants spoke about access to public transport being a great deal easier for those living in the city, as they did not have long distances to walk to get to the transport, nor were waiting times long. It was noted that participants spoke about those living far away in the location having a much more difficult time accessing transport.

4.1.2. How this data influenced the survey

The most frequently mentioned themes from the interview were used to form the survey questions. This was in addition to the questions that were concerned with the seven factors as influenced by the London Study. An example would be the question related to affordability and the cost of transport going up being added, as it was a theme brought up most frequently during the interview. In addition, the public transport mode of Uber and Taxify were added as an option for respondents to select when participants spoke about how they preferred using the service at night for safety reasons.

4.1.3. Reliability of Data

The first focus group interview failed to record, so there were only notes from the interview. Therefore it was much harder to analyse the data and themes discussed in the interview. The second interview was recorded and transcribed. Notes were made on the transcript with regard to themes discussed, as well as the frequency of the themes mentioned.

The transcript was also analysed to review if the researcher had remained neutral during the interview, and did not influence or prompt certain answers from the participants. It is argued that minimal responses aid in ensuring that the researcher is neutral and without influence during interviews. However, it is noted that the researcher must control the topic discussed (Madill, 2011, p.345). Upon review, the researcher noted that at times in an effort to stimulate conversation or the clarify points, the questions may have prompted the participants to agree or repeat phrases used by the researcher.

4.2. Survey data collection

4.2.1. Demographics

The majority of respondents were between the ages of 20 and 40, as shown below in figure 4 in the Appendices. The majority of respondents were male. The researcher noticed that men were more likely to participate when asked to participate. Even when the researcher approached more women than men to even out the ratio, she found that women were a lot more reluctant to participate. The researcher observed that at the collection sites the male to

female ratio appeared evenly split. The female Hillbrow residents were observed to be especially reluctant. The gender ratios of the respondents according to residential area are below in Figure 4. *Range of ages of respondents.*

For the purposes of this study, the areas known as "Hillbrow Surrounding" include neighbourhoods bordering Hillbrow, such as Berea, Yeoville, Braamfontein, Bertrams, Troyeville, Newtown, Parktown and Doornfontein. "Other" refers to any other area in and outside of Johannesburg, such as Soweto, Sandton, Pretoria and Midrand. The questionnaire gave the respondents the option of filling in their residential location, and based on the responses were clustered in the three groups.

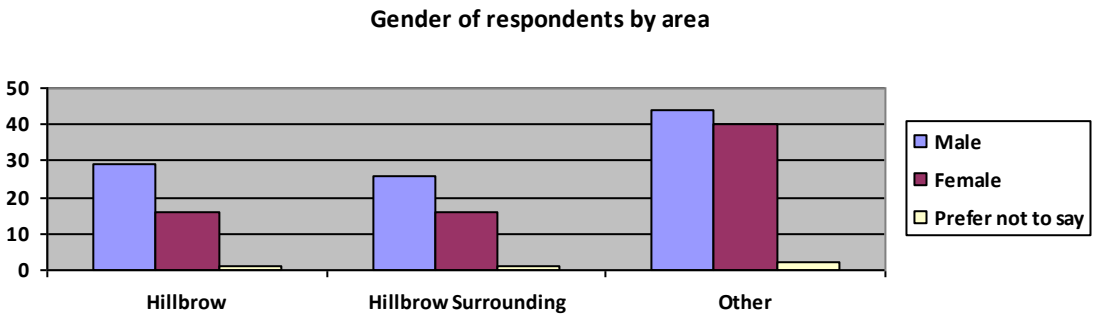

Figure 2. *Gender of respondents by area*

In total, there were 46 Hillbrow residents that responded. In Hillbrow Surrounding areas, the total number of respondents was 42. There were 86 respondents from all other areas, and combined there were a total of 174 respondents.

In terms of car ownership as shown in figure 4 in the Appendices, the data shows that 8 of the 46 (17.39%) of Hillbrow resident respondents own a

car, compared to 30.95% of those in surrounding areas, and 23% of those in other locations. The number of Hillbrow residents living in a household with a car is evenly split, there is a small difference in numbers in surrounding areas, and two thirds of people in other locations live in a household with a car.

The majority of respondents in all areas were employed full time. This is assumed to be due to the researcher collecting the majority of surveys during the weekday morning and evening commuting hours. The researcher thus assumes that the data does not truly reflect the employment percentage of Hillbrow residents, as the collection method meant employed residents were more likely to be targeted for participation. In total, 76% of the 174 respondents were either employed or self-employed, as seen below in Figure 3. In comparison, 87.8% of participants from areas surrounding Hillbrow were employed, while 87% of participants from other areas were employed in some form.

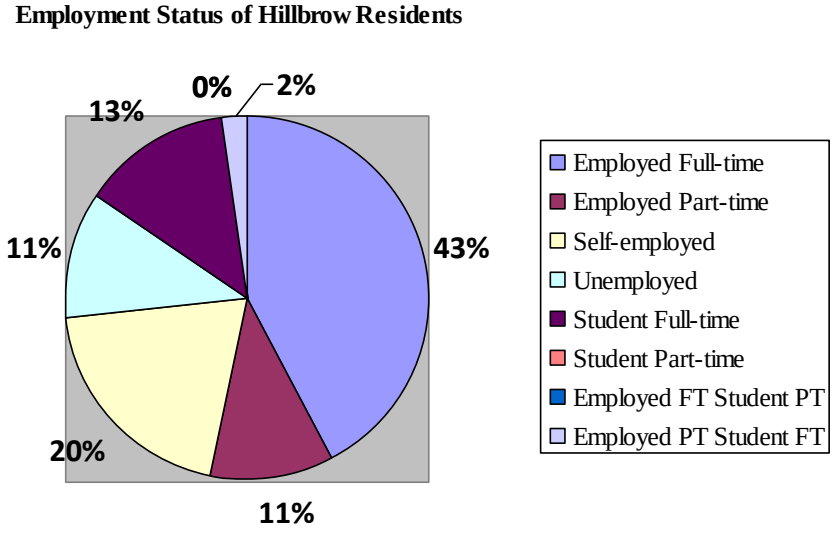

Figure 3. *The Employment status of Hillbrow Residents*

There were only 6.5% of disabled Hillbrow residents, and 4% overall. The low number could be due to disabled public transport users infrequently using public transport due to a lack of facilities for those with disabilities. Government policy does not appear to have yet been able to sufficiently meet the customer needs to less able-bodied passengers; however, there are some modes of transport such as Rea Vaya and Gautrain that can accommodate them.

4.2.2. Public transport modes and preferences

The majority of Hillbrow respondents used public transport every day, as seen in Figure 6 in the Appendices, with 41% using it every day, and another 17% using it three to five times a week. Those participants in areas surrounding Hillbrow and other areas used it daily 64.2% and 65.9% respectively.

The monthly spending of residents was fairly spread out. The majority of Hillbrow respondents spent between R200-R300 on public transport and overall 54.35% spent between R200-R600 on public transport a month. There were a few respondents that spent over R900 a month on public transport; 8.7% spending between R900 and R1000 a month, and 6.5% spending over R1000. Therefore Hillbrow residents tended not to spend more than R600 a month on public transport.

In Hillbrow surrounding areas the number of respondents that spent over R900 a month was low as well, with only 4.76% spending between R900 and R1000. Those respondents in surrounding areas showed the greatest

frequency in spending between R400 and R500, with 21.43% in that range. The next most frequent spent a higher amount, with 16.47% spending between R701 and R8000, and 17.64% spending over R1000. In all areas, 20% spent between R401 and R500, and 34.12% spent over R900 a month, showing that residents in other areas seemed to spend more than Hillbrow residents.

Sixty-five percent of Hillbrow participants preferred using mini-bus taxis, with the next highest frequency being private taxis at 15.2%. Mini-bus taxis were the preferred mode overall, with those in Hillbrow surrounding areas choosing it 42.8% of the time, and participants in other areas choosing it 29.4% of the time. However, this was closely followed by the Rea Vaya at 28.23% preference for other areas. When given the option to choose a mode of transport without cost being a factor, 41.3% of Hillbrow residents choose private taxis, followed by 21.73% choosing Gautrain. People in Hillbrow surrounding areas also choose private taxis as the ideal mode of transport, with 42.85% choosing it. However, when it came to asking participants in other areas, 35.29% chose the Gautrain as the dominant option, followed by 31.76% choosing private taxis.

While two thirds of respondents chose mini-bus taxis as their preferred mode, only 6.5% of Hillbrow residents said they believed them to be the best in quality. The researcher assumes that this is because respondents chose mini-bus taxis out of necessity, affordability and ease of use. However, they found the quality to be low, and would rather use other modes of transport if possible. This is assumed because during data collection, several respondents said that

they chose mini-bus taxis because "there was no other choice". The taxis were described as being most readily available and having the most expansive routes. The long queues in the morning and difficulty in getting to their destination on time was frequently mentioned as a problem.

The majority of the respondents believed that private taxis were the best quality, with 36.95% choosing this option. Several respondents said this was because the cars would drop them off directly at their destination. The Gautrain was considered the next best quality followed by Rea Vaya, at 26% and 21.7% respectively. In Hillbrow surrounding areas private taxis were also the option considered best quality, with a third of respondents choosing this option. Those respondents in other areas thought the Gautrain was the best quality, with 42.5% choosing this mode. The private taxis, Rea Vaya and Metrobus were second, third and fourth choices respectively. Cost and affordability was therefore an important deciding factor in which mode of transport was used, and was more important that quality.

4.3. Research question

The research question was "How do existing public transport facilities and government policies impact social exclusion in Hillbrow?" In looking to answer this question, the focus was thus on the responses from questions 16 - 43 on the Likert Scale, therefore data from responses were ordinal. These questions related to respondents experiences and opinions with regard to public transport.

4.4. Mode

The 27 Hillbrow respondents agreed and 2 strongly agreed that public transport was easy to use for them personally, compared to 12 that disagreed, and 5 responses that were neutral or N/A. However, the majority also responded that it was not easy to use for everyone, with "everyone" including the disabled, the elderly and young children. Public transport received high scores based on ease of access, with 35 respondents agreeing that it was close to home, and 27 saying that it was close to work. The majority said that it was easy to get to the transport they used regularly, with 34 agreeing. In this regard, public transport was seen to be easily accessible.

Responses were not as favourable with regard to the design and cleanliness of facilities, as the majority of Hillbrow respondents had negative views. The majority of respondents said that the price of transport went up, with 39 respondents saying that prices rose, and 20 disagreed that the government subsidized their transport. The majority of respondents felt that there were often queues to get onto their transport, and that traffic was a problem.

The 15 respondents agreed and 17 disagreed that they could rely on the transport to get them to their destination on time. Those that felt that their mode of transport reduced traffic problems were close in value, with 16 agreeing and 17 disagreeing. Most Hillbrow respondents spent less than an hour travelling one way and 15 agreed that the route taken was short to complete. However, thirteen respondents disagreed. Public policy's aim to have

transport that is "smooth and efficient" was therefore not satisfactory according the respondents' experiences and opinions.

The majority of Hillbrow respondents did not believe that the vehicles used were safe and well maintained, and most did not trust the driving capabilities of the drivers, with 21 respondents disagreeing for both questions. Nineteen respondents feared violence on their transport, compared to 13 who did not. The numbers of respondents that did and did not fear getting to and from their transport were close in value. Overall, the majority of respondents believed that their transport was effective in getting them to their destination, and connecting them to work, family, friends, entertainment and healthcare. In this regard, public policy's goal in having public transport meet accessibility needs was met. The majority of Hillbrow respondents were positive in their belief that transport was able to get them where they needed to go.

The responses of those in surrounding areas and other areas tended to be more positive. The respondents in surrounding areas mostly agreed that it was easy to use public transport, and that it was close to home and work. The majority also agreed that the design of facilities were good, that they were cleaned and maintained well, it was easy to get transport information and that public transport was affordable. The majority of respondents felt that their mode of transport reduced traffic and that they spent under an hour in the transport. They also agreed that there was a low risk of crime on the transport, they did not fear violence and trusted the driving capabilities of their drivers. Most respondents also believed that their mode of transport was effective at

getting them to their destination and connecting them with necessary places and services.

The respondents in surrounding areas were ambivalent about feeling safe getting to and from transport, with an equal number choosing “Agree”, “Neutral” and “Disagree”. They also disagreed that there were never any queues, that the cost never went up and that their transport arrived on a set schedule.

The researcher notes that the majority of respondents from other areas were those travelling to and from Soweto. The other respondents came from a diverse number of places such as Auckland Park, Kempton Park and Randburg. These respondents also had fairly positive responses. The majority of these respondents also found public transport easy to use and access, and found it close to home and work. They also found facilities to be designed well, however, an equally close number of respondents agreed, were neutral or disagreed that they were clean and maintained well. The majority of respondents disagreed about the price never going up, and there never being any queues. The majority of respondents either disagreed or strongly disagreed that government subsidised their transport.

The majority of respondents agreed and disagreed in equal measure that the transport arrived regularly according to schedule, and about traffic not being a problem on the route. The majority of these respondents were Rea Vaya and Metrobus users. As Rea Vaya buses have their own dedicated lane; traffic was therefore assumed to be a problem typical for non-Rea Vaya users.

The buses also arrive according to a schedule. However, Metrobus users did complain that the buses did not always stick to that schedule.

The rest of responses were positive with regard to the transport reducing traffic problems, time spent travelling being under one hour, and the transport being well maintained. The respondents also appeared to trust the capabilities of the drivers, felt safe on the transport and getting to their transport, and found it effective at getting them to their destinations. Responses were therefore more positive about Rea Vaya than they were about Metrobus with regard to reliability and traffic issues.

4.5. Mean

The scores from the Likert scale were given a numerical value. Responses such as "Strongly disagree" were given a score of 5, while "Strongly agree" responses were given a score of 1. Therefore, the lower the score, the more positive the average response. The mean was then calculated by adding the numerical values and finding the average.

The majority of respondents tended to respond favourably in response to finding public transport easy to use, being close to work and home, and finding it easy to get to transport. Participants also responded positively to finding it easy to get transport information at the place for public transport, the total time spent travelling being under one hour, and their preferred mode of transport being effective at getting them to their destination and connecting them with work, school, family, friends, entertainment and healthcare effectively.

The respondents were more negative in their responses about finding transport easy to use for everyone, the places where they got transport being well designed, cleaned and well maintained, and the cost going up. They were also much more negative in their responses with regard to queues, being able to rely on the transport getting to the destination on time, the vehicles being safe and well maintained, trusting the driving capabilities of the drivers, feeling safe and not fearing violence.

The highest mean, and therefore the most negative response, was that of the response to the question about cost going up, with a score of 3.87 for Hillbrow respondents, 4.10 for other areas, as most respondents said that the cost did go up. The researcher notes that during data collection, many respondents said that the mini-bus taxi fares went up if petrol prices went up, but they did not go down if the reverse occurred. Prices going up were therefore something about which respondents appeared to feel most strongly. Affordability was therefore a very important factor.

4.6. Monthly cost of transport

The figures given here are based on the modes of transport that respondents chose as their "most used" modes. Hillbrow residents spend as little as under R100 a month on public transport, to as much as R2000. Several respondents stated that they spent over R1000 a month. The average monthly cost of Hillbrow public transport users was R562.75. The average cost for a mini-bus taxi user was R582, which is slightly higher than the total average. Several users frequently used more than one mode of transport, such as mini-

bus taxis and Metrobus, mini-bus taxis and Gautrain, and Gautrain and Uber. The average monthly cost for Gautrain users is highest at R1200; however, this is based on one user's input. The second highest average cost is that of mini-bus taxis and Metrobus, at R620, followed closely by Rea Vaya at R600. The lowest is Metrobus users at R100.

The average cost for users in all areas is R686.79, which is approximately 20% higher than that of Hillbrow users. This could be due to longer distances travelled, and several respondents saying that they used multiple modes or taxis to get to their destination. The average mini-bus taxi user spent R641.67. The average Rea Vaya user spent R536, and the average Metrobus user spent R745.45. Numerous respondents used multiple modes, with the highest cost being that of people using both Rea Vaya and Metrobus users at R866.67, and both Rea Vaya and Gautrain users at a monthly cost of R1050, as well as Metrobus and Gautrain users, and Metrorail and Gautrain users, who both had an average monthly cost of R1000. The lowest average cost was that of Metrorail, and private taxi users at R250 and R262.50 respectively. This showed that there was a higher cost due to those using multiple modes of transport, and therefore a need for more integration and intermodalism in public transport, as stated in the National White Paper, as this was given as a reason for transport to be more efficient and for costs to be reduced.

Several respondents stated that they did not use public transport often, as everything was within walking distance for them. Several of those approached declined to participate for this very reason.

4.6.1. Transport modes: ideal, preferred and quality modes

Respondents were asked to choose their preferred mode of transport, as well as the mode of transport they would prefer to use if money were no object. They were also asked to choose the mode of transport they believed to be the best quality. The mode of transport chosen if money were no object will be referred to as the "Ideal" mode. Hillbrow residents chose private taxis as their ideal mode of transport, with 41% of respondents choosing this option. This was followed by 21.7% choosing the Gautrain. It is noted that several respondents stated that they had never used the Gautrain as it was too expensive for them, but they wished to use it, or at least try it. Metrorail and other bus were not selected at all, and Metrobus was only chosen by 6% of respondents.

The mode of transport that Hillbrow users chose as the best quality was once again the private taxis, with 39% of respondents choosing this mode. The Gautrain was chosen by 26% of respondents, and Rea Vaya was chosen by 21.7%. It is noted that even though a respondent would choose one mode as their ideal, it would not always be chosen as the one considered the best quality. The researcher assumes that this may be due to some participants proclaiming that the routes on some modes not being expansive enough for them to choose to use as a realistic, every day mode of transport. Once again,

Metrorail and other bus were not selected, and mini-bus taxis and Metrobus were only selected by 6.5% of respondents.

In comparison, the majority of all respondents chose private taxis as their ideal mode, followed by the Gautrain, with 37% and 29% choosing the mode respectively. Mini-bus taxis, the most used mode of public transport was chosen by 11.62% of respondents, which is close to the 12.2% that chose Rea Vaya. Once again, only 6% of respondents chose Metrobus, and only 2.9% chose Metrorail. Merely 0.58% of respondents chose other bus, but the researcher assumes this is due to regular users of this mode not being targeted.

The mode of transport that all users chose as the best quality was the Gautrain, chosen by 34.88% of respondents, followed by private taxis by 31.39% of respondents. Only 4% of respondents chose mini-bus taxis, and a mere 1.16% and 0.58% chose other bus and Metrorail respectively. Rea Vaya was chosen by 16.28% of respondents, and 8.72% chose Metrobus.

The researcher notes that respondents liked using private taxis like Uber and Taxify because they picked them up and dropped them off directly at their destination, which was considered convenient and safe. They also found this mode relatively cheap if the distance travelled was not great. Several respondents had also stated that they believed that the Gautrain was the fastest and best quality mode of transport. The researcher also notes that while some respondents liked the wide number of routes the Metrobus travelled, they did not like how the buses were often late, or displayed the incorrect information on their screens. They also stated that many of the stops were not marked. One

Hillbrow resident, a pensioner, stated that she enjoyed using the Metrobus because she paid very little as a result, but believed the Rea Vaya to be the best mode. However, she remarked that it did not offer pensioner discounts and it did not have enough routes.

Many respondents used mini-bus taxis on a regular basis, but few chose that mode as their ideal or best quality mode. The researcher notes that several respondents stated that there were often long queues, so they could not be certain they would reach their destination on time. They also stated that they did not like the manner in which the price went up with rising fuel costs. However, many respondents said that mini-bus taxis were easy to find.

Mini-bus taxis were the mode of transport predominantly used by Hillbrow residents. The researcher notes that several respondents said that this was due to the cost and the fact that the taxi's had routes more expansive than buses and the train. While the CoJ stated that it cannot regulate prices of public transport, responses show that costs and affordability are a concern, and hinder users from using the mode of transport they most prefer, as they are forced to limit their options to what they could afford. Government's aims to formalise the mini-bus taxi industry lead to many improvements. However, there are still issues with safety, long queues, unreliability and constantly increasing fare prices to be tackled.

4.7. Test for significance - Spearman's correlation

The research question asks if there is any significant relationship between the public transport available to Hillbrow residents and social

exclusion. In answering this question, the value for public transport available must first be calculated.

The researcher used the responses from the survey to form an equation that transforms the responses from the Likert scale into a scale that measures the quality of transport available. In other words, the more people that disagreed that public transport quality was low, the more the scale showed public transport quality available to be low.

Due to the responses from the survey being used in the formula, the scale is assumed to be subjective based on public transport users' experiences with transport. The equation combines the values of the respondents' preferred mode of transport, ideal mode, mode viewed to be the best quality, the monthly cost of transport and frequency of use.

The greater the proportion of respondents that chose a particular mode, and the higher the score given based on "Ideal" and "Quality" transport, the higher the score given on the scale. The cost is inversely related to the score, meaning that the higher the cost of the transport mode is to the average cost, the lower the score. If a mode of transport was used more frequently, it had a higher score.

Equation:

$x_{pt} =$ Existing Public Transport (facilities and modes as reported by respondents)

$x_{preferred} =$ Percentage of respondents that chose this mode as their preferred mode

x_{ideal}= Percentage of respondents that chose this mode as their ideal mode

$x_{quality}$= Percentage of respondents that chose this mode as the best quality mode

x_{cost}= Average monthly cost for the particular mode of transport

x_{fre}= Percentage of respondents that chose this mode as their most frequently used mode

$x_{pt}= x_{preferred} + x_{ideal} + x_{quality} + x_{cost} + x_{fre}$

Table 4.

Public Transport Scores based on Survey Responses

Hillbrow transport available	Score
Mini-bus taxi	28.70474851
Rea Vaya	9.168207428
Metrobus	22.58888113
Other bus	20
Metrorail	2.587262804
Gautrain	-10.99691848
Meter taxi / Uber / Taxify	31.30632594

The scores for public transport were calculated by adding five different variables together for a total score out of one hundred. These variables are "Preferred" mode, "Ideal" Mode, "Quality" mode, "Monthly cost" and "Frequency of use. Each variable was calculated as a percentage of 20. For instance, a percentage out of 20 was calculated based on the percentage of users that choose Mini-bus taxis as their "Preferred", "Ideal", and "Quality" mode, as well as the most frequently used mode of transport.

This was added to the percentage figure that was above or below the average cost of the monthly cost of that particular mode of transport chosen.

For instance, 30 of the 45 (66.67%) fully completed surveys for Hillbrow respondents had mini-bus taxis as their chosen Preferred mode of transport. Only 5 (11.11%) of the respondents chose mini-bus taxis as their Ideal mode of transport. A mere 3 (6.67%) respondents chose mini-bus taxis as a Quality mode of transport. A vast majority of respondents chose mini-bus taxis as their most frequently used mode of transport. With 35 (62.5%) respondents choosing this mode, which meant this was by far the most used mode. These four percentage values were calculated as a corresponding percentage value out of twenty, which were 13.33, 2.22, 1.33 and 12.5 respectively.

The calculation for cost of transport used the total average cost of transport for all modes as the base. The total average cost for public transport was R562.75. Mini-bus taxis cost Hillbrow residents on average R582, a number slightly higher than the average. The first step was to take the average of the transport mode, dividing it by the total average and multiplying this by 100. The cost score was then calculated by 100 subtracting the mode average cost as calculated, dividing this by 100 and multiplying that total by 20. This gave mini-bus taxis a score of -0.684. This number is negative as the average cost for mini-bus taxis is higher than the average cost. Gautrain has a score of -22.64 as the cost was much higher than the total average.

The five values out of twenty were added together to get 28.70 out of 100 for mini-bus taxis.

As seen in Table 4 above, mini-bus taxis have the second highest score due to being the most frequently used mode, the preferred mode for most

respondents, and monthly costs being close to the average cost. The Gautrain has a negative score. This is because despite it being chosen as the “Ideal’ and “Quality” mode, its high price means that it was not chosen as a preferred mode by many, and the monthly cost was over twice the average cost. Thus most Hillbrow residents did not seem to use it, or were unable to afford it.

The scores were used to calculate the Spearman’s correlation against the responses for each question. This is due to the responses assumed to not be normally distributed. The scores were tested on a scatter plot, and showed no linear relationship. This was a 2-tailed test, with n = 46 for Hillbrow data, and n = 174 for all areas, tested at 95% confidence interval.

The following Spearman’s correlation will be discussed according to factors. A positive score from 0 to 1 show an increase in the quality and efficacy of public transport, and it would mean respondents rated their public transport highly, thereby stating that the transport was beneficial for social cohesion. A negative score from 0 to -1 shows an inverse relationship in which a greater deal of social exclusion is experienced due to inadequate public transport and facilities.

Due to the small sample size, the accuracy of the tested results has a margin of error of 14.5%, and a confidence level of 95%. The scores for Hillbrow residents will be discussed in detail, and a brief discussion of the total responses will follow briefly for comparison.

4.8. Social exclusion Paradigm and Factor analysis

4.8.1. Social Exclusion Paradigm: Monopoly

The researcher chose the Monopoly paradigm to view social exclusion in the paper. This is due to Silver describing exclusion based on monopoly powers as being one that treats unemployment and exclusion as a result of group monopolies that exploit and create economic inequality (1994, p.651). Due to the high inequality in South Africa, its Apartheid history, and the high unemployment rates in Hillbrow specifically, the researcher chose this paradigm as one that seems to most appropriately resemble the social exclusion experienced by Hillbrow residents.

The Monopoly Paradigm looks at "barriers to free competition" that exists between workers and the organisations for which they work, stating that this leads to segmentation, economic exclusion and social closure. Therefore one can view a lack of access to secure, well paying employment as an issue faced by those excluded (Silver, 1994, p.562). However while Silver (1994, pp.562-564) focused on the demand of labour from firms, this paper looks at the supply of the workforce, and how inefficient or costly access through means of transport can limit one from being or making themselves available for more secure, higher paid employment. In this factor, one looks at the policies, infrastructure and subsidised public transport provided by the government to analyse what has been done to limit the barriers present. The government subsidised BRT service Rea Vaya was given predominantly positive responses

from frequent users, and it was found to be affordable, clean, safe and easy to use. This shows significant positive moves towards government implementing public transport options that allow affordable and efficient public transport in Hillbrow.

However, frequently used modes of transport such as mini-bus taxis were found to be affordable, although cost of use frequently increased, and they were seen as being unsafe and unreliable modes of transport operating without a set schedule or routes. The Gautrain, while considered high quality, reliable and fast, is also considered to be unaffordable for the majority of public transport users.

4.8.2. Factor One: Physical exclusion

The Spearman's coefficient for Question 16 is .226 and for Question 17 is .119. Therefore there is a weak positive correlation between both variables. This means that ease of use has little impact on social exclusion, both personally for the respondents themselves, and for how they perceived ease of use for all users.

4.8.3. Factor Two: Geographical exclusion

The Spearman's coefficient for Question 18 is -.265, showing that there is a small relationship between public transport's closeness to home and geographic exclusion. The relationship is very small with regard to closeness to school, with a coefficient of -.097 for Q20. The relationship is significant for closeness to work, with a coefficient of -.545. Therefore respondents felt that

public transport was not adequately close to work and therefore ineffective at reducing their geographic exclusion. Thus distances to work had a strong impact on their social exclusion.

4.8.4. Factor Three: Exclusion from facilities

The Spearman coefficient for Question 21 is -.151, showing a small negative relationship between finding it easy to get to public transport and social exclusion. This means that residents did not find public transport easy to get to, but this was to a very negligible extent.

The Spearman coefficient for Question 42 is -.270, showing a small negative relationship between public transport getting respondents to their destination effectively and exclusion from facilities. The coefficient for Question 43 is -.729, showing a strong negative relationship between public transport not adequately getting respondents to places such as work, family, friends, entertainment and healthcare, and exclusion from facilities. Thus when asked generally if transport got them to their destination, their opinions were that transport was moderately ineffective. However, when specific destinations were listed, respondents showed that transport's impact was significant and not very good at getting them to their destination. A great deal of social exclusion was experienced due to this.

4.8.5. Factor Four: Economic exclusion

The Spearman coefficient for Question 25 was .696, showing a strong positive relationship between transport affordability and economic cohesion,

showing that respondents felt that public transport was very affordable and thus they did not experience much social exclusion due to cost. The majority of respondents were bus or mini-bus taxi users, and as the monthly costs of these modes were approximately equal to or lower than average cost, the responses show that most Hillbrow users may choose to use modes of transport that are affordable. In addition to this, affordable modes are available to them.

The coefficient for Question 26 is .161, showing a weak positive relationship between the importance of the cost of public transport and economic exclusion. The coefficients for Question 27, Question 28 and Question 29 are -.326, -.249 and .364 respectively. This shows that there is a moderate negative relationship between using less than 25% of one's salary and economic exclusion. It also shows a weak negative relationship between the cost of transport going up, and a weak positive relationship between government subsidising public transport and economic exclusion.

This can be described as participants that spend more than a quarter of their salary on public transport experiencing more social exclusion, as they would have less disposable income. The cost of transport going up had a weak effect on social exclusion. It is assumed that respondents continue to use public transport regardless of the increase in cost, possibly out of necessity.

Government subsidising transport is shown to have a moderate positive effect, meaning more subsiding of transport means less social exclusion. However, most respondents said that they doubted that their transport was subsidized, or did not know if their transport was subsidised.

4.8.6. Factor Five: Time-based exclusion

The Spearman coefficient for Question 30 was -.415, and for Question 33 was -.611. This shows that there is a moderate negative relationship between public transport arriving according to a set schedule and time-based exclusion. There is also a strong negative relationship between transport routes being short to complete and time-based exclusion. Several of the respondents complained about being late for work because of the unreliability of their transport. Thus this had a significant effect on their experiences with social exclusion.

Question 31, Question 32, Question 34, Question 35, and Question 36 had coefficients of .180, .228 .042, -.255 and -.141 respectively. The scores from Question 31, Question 32 and Question 34 show a very weak to weak positive relationship between time-based exclusion and there never being any queues, relying on the transport to get respondents to their destination on time, and traffic not being a problem respectively. Therefore queues, relying on their transport getting to their destination on time, and traffic did not seem to have much effect on social exclusion.

The other scores had a low negative relationship, showing a weak relationship between time-based exclusion and the modes of transport reducing traffic problems, and travel times being under one hour. These factors thus resulted in social exclusion to a small effect.

4.8.7. Factor Six: Fear-based exclusion

The Spearman coefficient for Question 37 was .345, showing a moderate positive relationship between the transport mode being safe and well-maintained, and fear-based exclusion. The coefficient for Question 40 was .456, showing a moderate positive relationship between never fearing violence and social exclusion. Therefore feelings of safety and not fearing violence had a moderate impact on social exclusion, with respondents feeling safe and not fearing violence on their transport.

The score for Question 38 was .181, for Question 39 it was .131, and for Question 41 it was -.255. This showed a weak positive relationship between fear-based exclusion and transport modes being safe and well maintained, trusting the driving capabilities of the drivers, and a weak negative relationship with feeling safe getting to and from transport.

This shows that respondents felt that the vehicles used being safe and well maintained had a small impact on reducing social exclusion. It also showed that trust in the driving capabilities was weak, but positive. Users feared walking to and from their transport, but the impact on social exclusion is small.

4.8.8. Factor Seven: Space exclusion

The Spearman coefficient for Question 22 was -.246, for Question 23 it was -.096, and for Question 24 it was .273. This shows a weak negative relationship between the quality of the design of transport facilities, a very weak negative relationship between the cleanliness of those facilities and a

weak positive relationship between the ease of accessing information and space exclusion. This shows that respondents felt that the design of facilities was not adequate to a small degree and impacted space exclusion, but did not feel strongly that the lack of cleanliness of those facilities had any impact. Respondents seemed to find accessing information mildly easy, and said as much by stating that they could merely ask someone in a queue or one of the taxi marshals if they needed information.

4.8.9. Analysis of All Areas

The Spearman coefficient for all areas is shown in further detail with table 16. In summary, the areas that were viewed positively were that of Question 21 with a score if .707, Question 23 with a score of .511 and Question 24 with a score .727. This showed that respondents in all areas felt that public transport was very easy to get to and adequate at reducing social exclusion, that information was very easy to access and had a strong positive effect, and that facilities were clean and well-maintained and this had a positive effect on social cohesion.

Scores for closeness to work were low, with Question 19 having a score of -.526. In addition to this, Question 35 was -.572, Question 37 was -.684, and Question 41 was -.572. This showed that respondents did not feel that their transport reduced traffic problems, that the risk of crime and lack of feeling safe getting to and from their transport had a significant impact on social exclusion.

Public policy's aims for public transport to be customer focused and capable of meeting customer needs in mobility and accessing places as needed were viewed more positive with regard to transport being close to home, but respondents were more negative when they were aiming to travel to work, school, or other places as needed. The goal of public transport being efficient, operating smoothly and for transport modes to be integrated also appeared to be an issue. The responses to the time-based social exclusion questions showed that reliability was an issue. However, long travel times and queues only had a small negative impact, so although it was an issue, it did not have a great impact on social exclusion. Safety was a small issue, and was shown to have little impact on social exclusion.

Public policy repeatedly outlined goals to fix spatial distortions. The implementation and expansion of travel modes such as Rea Vaya show a positive move, and respondent responses were generally favourable. Modes of transport like the Gautrain were shown to be desirable and high quality, but unaffordable.

4.9. Data collection process

4.9.1. Reliability of Data

The survey was drafted and given to the researcher's friends. Notes and criticisms were taken into account, and the survey was finalized and completed. Changes to the survey questions were not made once the survey

was officially distributed. In total, the survey consisted of 43 questions, divided into four sections.

The first section consisted of seven demographic questions. The second section asked questions with regard to the participants public transport mobility, and consisted of five questions. The third section contained three questions pertaining to the participant's preferences with regard to mode of public transport used and favoured. The fourth and final question consisted of 28 questions. This section had questions dealing with the seven factors of transport related exclusion. In this final section, the participant was to respond using a Likert scale from "Strongly Disagree" to "Strong Agree", with a final option of "Not Applicable", or "N/A", if the question did not apply.

4.9.2. Collection process and challenges

The researcher approached adults waiting for transport at high traffic public transport hubs to ensure the collection of data from regular public transport users. This was done during the morning and evening on weekdays, and the afternoon on weekends. The researcher spent one entire week day collecting data, and found that there were very few users of public transport outside of early mornings and evenings. The researcher found people that were approached at the bus stops and train stations to be generally responsive. People at the taxi rank and pick up points were less responsive.

A challenge faced was that of the arrival of the participants' mode of transport, which would result in some surveys being incomplete. In some instances prepaid envelopes were provided to the participants to complete at

home. In other circumstances participants would agree to return the survey the following day at the same time for collection. Due to the surveys being distributed during weekday morning and evening commuting hours, the frequency of the buses, trains and taxis was higher therefore the completion of surveys was a challenge. Over the weekend there were fewer users at the transport hubs.

The distribution of the survey at major transport hubs lead to the survey being completed by those living far away. The smaller transport stops meant the survey was more likely to be completed by Hillbrow residents, or those living in the areas around Hillbrow. However, these stops were often sparse or empty. In addition to this, users at those stops were less responsive.

The online survey had a few responses. The social media site Facebook allows users to create posts that are advertised to a select market of people as chosen by the user. The researcher selected adults in the Hillbrow area. However, the site only allows the user to concentrate the area of the post's advertised reach to a minimum of 17 km away from the area selected, which is a much larger and wider range than desired. Therefore many responses to the online survey were not from people within the target area.

The validity of a study's results is directly influenced by the researcher's sampling methods and sample demographic (Erba, Terns, Bobkowski, Logan, & Liu, 2018, p.42). Probability sampling has greater validity as the data from the sample is more representative of the target population. However, using a probability method tends to be more costly (Erba, *et al*., 2018, p.46). Due to

the nature of the high traffic transport hubs being frequented by people coming from outside of the area to commute, there was difficulty in finding a high frequency of Hillbrow residents. There were a large number of respondents that came from as far as Soweto, especially those using the Rea Vaya and minibus taxis. This created a challenge in finding residents from in and around Hillbrow.

As a result of being unable to find a large enough number of public transport users that were Hillbrow residents, the reseacher modified the data collection approach and sampling method. Known as adaptive sampling, this meant that participant recruitment methods were altered after data collection had initially begun due to what had been observed with the initial sample (Martsolf, Courey, Chapman, Draucker, & Mims, 2006, p.169).

The number of total participants was 99 males, 72 females, and 4 preferred not to say. For Hillbrow residents, 29 were male and 16 female, with one preferring not to say. The number of male participants exceeded that of the female participants as female Hillbrow residents were reluctant to participate.

4.9.3. Response rate to the survey research

The target number of survey responses was 150. In total, 203 were collected, of this number 174 were completed. In total, 162 surveys were collected on site, and 22 surveys were collected online.

The onsite survey collection took place on weekday mornings between 6:00 a.m. and 7:30 a.m., and in the evening between 5:00 p.m. and 7:00 p.m., and on weekends between 1:00 p.m. and 6:00 p.m. The survey was explained

and distributed to people waiting for their transport. The majority of participants were commuters. The majority of the surveys were completed before transport arrived. However, in the event that the bus, train or taxi arrived before completion, a prepaid envelope was given to the participant so that they could complete it in their own time and post it at a later stage. In total, 24 prepaid envelopes were distributed. The number that were returned was 0.

The online campaign received low numbers of participants, despite Facebook marketing data showing that 34 929 people saw the promotion for the survey. Only 202 clicked the link to the site, and of that number 36 took the survey, with 22 completing it. Therefore the response rate was less than 1%.

4.9.4. Unit and item non-response

Item non-response refers to a respondent accidentally skipping over a question, finding questions too difficult or personal, or not knowing the answer to the question (Bernaards & Sijtsma, 1999, p.277) and (Durrant, 2009, p.295). This means that even though the respondent seemed to have completed the survey, it turned out that one or two items had been left blank. With the surveys being completed on site, as well as participants having to complete them before the arrival of their transport, there were incidents where certain surveys had items left blank.

It should be noted that item nonresponse does not refer to situations where a person refuses to take part in a survey, as that is known as unit nonresponse. Item nonresponse refers to incidents where a respondent answers some or most of a survey's questions, but not all. Therefore the values of

certain variables are missing (Durrant, 2009, p.293). A possible reason in this study's case can be attributed to that of respondents rushing to complete the survey before the arrival of their transport.

If the researcher keeps these responses, which include items missing, this can negatively affect the results in the statistical analysis. In situations where item nonresponse is not random and incomplete surveys are omitted, this could lead to the reduced data matrix ceasing to be representative of the sample population (Bernaards & Sijtsma, 1999, p.278). The researcher noted that by asking the participant questions and filling out the responses herself, item nonresponse was mostly eliminated from those particular surveys.

The researcher noted that respondents would leave the question "Public transport is close to where I go to school" blank. As few of the respondents were students, the researcher assumes that this was done due to respondents not going to school, and therefore the response was assumed to be "Not Applicable". In this instance the researcher would check if the respondent had chosen a form of employment other than student in the answer, and used "N/A" in place of the blank response. Other methods were that of the researcher using the option to ignore the missing variable with the option provided by SPSS to exclude cases "pair wise", rather than "list wise". This allowed the calculations to ignore the missing variable but not the entire case, thereby limiting the number of cases that needed to be deleted (Pallant, 2005, pp.52-53).

4.9.5. Data analysis procedures

The survey data was all entered onto SurveyMonkey, and then exported to Microsoft Excel. Surveys with missing items or those that looked to be entered at random were deleted. If only one irrelevant item was missing, the survey was not deleted. Once the Excel data had been cleaned, it was imported into SPSS. This program was used to analyse the data to see ranges and frequencies of the demographic data.

4.9.6. Instrument reliability analysis

Cronbach's alpha can be used to test for the consistency of a set of items given to respondents; however, it is not a measure of unidimensionality. Construct validity is ensuring that the items do measure what they are meant to measure (Beery, 2013, p.88). A high Cronbach's alpha means that responses were consistent amd that intercorrelation was high (Beery, 2013, p.89). Construct validity can be tested by computing correlation coefficients (Beery, 2013, p.90). The questions on the Likert scale have a Cronbach's alpha above .7, therefore the items are closely related and show inter-item consistency.

There are issues with respondents not understanding questions, not concentrating, not being careful, or being uncooperative. Validity scales are used to weed out careless or malingering responses, such as when a respondent answers "Strongly Agree" to all questions regardless of the nature of the question. The validity of validity scales has been shown in studies to be controversial (Roivainen, Veijola, & Miettunen, 2016, p.115). Indicators of

invalid responses are surveys with a high frequency of positive or negative responses that agree or disgree between items at the beginning and end of the survey (Roivainen, Veijola, & Miettunen, 2016, p.120). In some instances, the researcher noticed that the respondent appeared to rush through the last page and use one response for all questions, such as responding "Agree" or "Disagree" for all questions. These responses were not included.

In this study, the geographical areas and time frames in which the surveys were collected have been described. The researcher has also described how the sampling method changed, and gave reasons for the changes.

Data quality is important because if there is data that is unreliable or inconsistent, it can affect the analysis results. Data cleaning is thus a useful process where these errors in the data are identified and possibly corrected (Hellerstein, 2008, p.1). Reliability of data is when there is shown to be uniformity and consistency in the testing method. Reliability can be tested through various methods, such as testing for internal consistency reliability, the use of Cronbach's alpha or test-retest reliability (Arzoglou, Proios, Tsimaras, Sidiropoulou, Fotiadou, & Pilliandis, 2015, pp.402-403).

Errors in data can arise from some mistake made at some point in the data collection process. The error can be from the respondent or the researcher punching in the wrong value. The other errors are that of distillation, in which data is subjected to summerizing or preprocessing before being entered into the database, or data integration errors, due to data often coming from multiple sources through numerous methods (Hellerstein, 2008, p.2).

Despite the data coming from various sources, the researcher used SurveyMonkey to submit all responses so that they were in one database. This helped to protect against responses being lost or misplaced, and helped ensure that the data was all in one easily accessible place. Once the data had been collected, it was exported to Microsoft Excel to check for missing values and to reverse the values of certain items.

A measurement procedure has high ecological validity if it is able to accurately represent the usual conditions of the subject or phenomena under study as they happen in “the real world”. For instance, if an experiment is undertaken in a lab setting, the conditions need to be recreated as closely as possible to their real world counterpart conditions (Hogenelst, Schoevers, & aan het Rot, 2015, p.220). There are generally four types of validity that are used to assertain the effectiveness of a measurement instrument. They are known as face, construct, content and criterion validity (Kennedy, Homant, & Barnes, 2008, pp.332-333).

Face validity is concerned with the items in the measurement instrument seeming to measure the subject they were supposed to measure. In this study, the items in the survey asked questions related to the respondent’s public transport use, preferences, mobility, ease of access and general opinions with regard to public transport.

Construct validity is when the collected data makes sense theoretically. For instance, participants that live in the location or far away are assumed to reply on the Likert scale with "Disagree" with greater frequency to items

concerned with having close proximity to public transport facilities, as opposed to those living in the city centre. However, the majority of respondents found public transport to be close to work and home. The items in section four were based on the seven factors as described in the London study.

Content validity refers to the items in the measurement instrument representing "the domain of all possible items" and that no item is missing. The final measure is if the instrument is actually measuring what it is supposed to measure (Kennedy, Homant, & Barnes, 2008, p.333). The items on the Likert scale were divided according to the factor they were intended to measure, as seen below in Table 3. For instance, economic exclusion was tested by asking the respondents questions such as whether or not they thought that public transport was affordable, and if they spent more than 25% of their salary on public transport. There were 28 questions that looked at factors of social exclusion, with each factor having at least two questions related to it.

Table 3

Likert scale questions and related factors

Number	Factor	Description	Corresponding questions
1	Physical exclusion	Physical barriers that exist in the environment that limit accessibility.	Q16, Q17
2	Geographical exclusion	The geographic layout of an area that may limit accessibility.	Q18, Q19, Q20

3	Exclusion from facilities	Lack of access to quality facilities needed by residents.	Q21, Q42, Q43
4	Economic exclusion	Income, employment and cost affecting accessibility	Q25, Q26, Q27, Q28, Q29
5	Time-based exclusion	Users' available time and time constraints due to wait and travel times.	Q30, Q31, Q32, Q33, Q34, Q35, Q36
6	Fear-based exclusion	Fear and lack of feeling safe affecting mobility.	Q37, Q38, Q39, Q40, Q41
7	Space exclusion	Design and space management affecting accessibility.	Q22, Q23, Q24

Internal consistency can be tested by measuring for "intercorrelations of items within a scale or the correlations of items to scale". Cronbach's alpha is a method that measures if a group of items has consistency (Arzoglou, *et al.*, 2015, p.403). In this particular study, the items on the Likert scale were tested using Cronbach's alpha and the score was shown to be high.

When first developing the research instrument, it is crucial to identify the "conceptual domain of interest" and understand of what it is composed. With this knowledge, items used in the research instrument are developed and they reflect the conceptual domain. The domain can be identified through extensive literature review, interviews with those knowledgeable about the

subject, or a combination of both (Mastaglia, Toye, & Kristjanson, 2003, p.280). In this study, the domain of interest was transport and how it relates to social exclusion. Therefore information with regard to public transport policy and acts was collected, a literature review, and both interviews and qualitative data were sources were used to develop the survey.

The data that has been collected from the literature review was analysed before developing the questionnaire items. This way the items truly reflect the information gathered. In addition to this, significant phrases from the interview were highlighted, collected and coded with specific themes. The content validity of the items should be checked to ensure that they properly reflect the conceptual domain (Mastaglia, Toye, & Kristjanson, 2003, p.285).

Questions and phrases were reviewed and pretested to ensure that they are clear and easily understandable. Internal consistency can be checked by making sure that items that are grouped or linked are done so appropriately and according to their relevant conceptual domain subset (Mastaglia, Toye, & Kristjanson, 2003, p.286). The survey was divided into four sections, each section dealing with a particular grouping of related questions.

When addressing participants, it is important to give clear and simple instructions catering to their level of comprehension. The questions should be easy to read and understand, and double negatives are to be avoided (Mastaglia, Toye, & Kristjanson, 2003, p.287). The researcher was present for the majority of the time that the surveys were being completed, thus was able to explain and answer any questions. Informed consent was obtained, either in

written form or verbally. In this study, signed consent forms were collected by the researcher, with participants keeping a copy. Participants were told that they may withdraw their consent to participate at any time (Mastaglia, Toye, & Kristjanson, 2003, p.288). Unless mentioned otherwise, the data given below related to completed surveys only.

4.10. Analysis of findings and the conceptual framework

The target population sample is low income earning, therefore cost and affordability is an important factor. Government, through the JDA, aims to deal with special inequalities and rejuvenate the inner-city. It also aims to improve public transport facilities, expand transport networks and provide more formal taxi ranking facilities. This is useful as taxis are the predominantly used mode of transport for Hillbrow residents. Government also aims to make Johannesburg a compact city, and improve walk-ability. As several residents already use walking to get to their destination, this can be beneficial. The benefits of this are related to how effective having a compact city will be, as facilities in the area are already strained, there is a great deal of crime, and the high density population has caused the neighbourhood to be crowded and dirty.

The National White Paper outlined comprehensive plans to ensure that public transport is consumer focused, and capable of meeting consumer needs. It also detailed goals of better regulating public transport, reducing spatial imbalances and integrating public transport modes. While there have been significant improvements in public transport, the different modes are still very disjointed, multiple users were shown to spend a great deal of time and money

using multiple modes of transport to travel daily. Hillbrow residents, possibly due to their proximity to the inner city, were not as negatively impacted as people travelling from further areas such as Soweto.

The research also looked at how transport affects TRSE and mobility by looking at seven factors. In this regard, the responses showed that public transport not being close enough to work, and not being effective at getting respondents to their destination when thinking of specific areas had a significant negative impact on social cohesion. However, respondents felt that public transport's affordability and short routes were significantly beneficial to social cohesion. The constant rising cost of transport was frequently mentioned as a concern.

Respondents seemed to feel that public transport's lack of a consistent schedule and crime risk had a moderately negative impact, and that lack of fear of violence and government subsidising transport had a moderately positive impact on social exclusion.

The responses and Spearman’s coefficient test show that certain factors have a stronger relationship than others. In some instances, factors such as fear of violence were shown to have moderate relationship. Others, such as closeness to work, were shown to have a strong relationship. Thus for certain factors, the theory that there was a relationship between available transport and facilities and social exclusion was correct, and for some factors there was little to no relationship.

In terms of the monopoly paradigm, the costs of transport were shown to be a concern to respondents. Respondents tended to use the public transport most affordable and easily available to them, rather than the mode of transport they ideally would prefer to use. This was even if they responded that they found their current mode unsafe and unreliable. In addition to this, the researcher assumes that the large number of commuters from places such as Soweto show that spatial inequalities are still very present, as residents from other areas travel long distances for employment, education or health care needs, and would use multiple and separate modes of public transport at greater cost to travel. Hillbrow residents were not as negatively affected, and several respondents spoke of being able to walk to places they needed to reach.

Public policy had outlined in the White Paper important and relevant goals as to what public transport needed to be, and what it needed to achieve. Hillbrow respondents provided insight into their everyday experiences with public transport. They found it easy to access and close to home, but had less positive responses when it came to its ability to get them to specific areas they needed to go. Respondents tended to find public transport moderately safe to use, but modes such as mini-bus taxis and Metrobus were not trusted or seen as being reliable. The Rea Vaya BRT was viewed positively by users, and was found to be affordable. However, the Gautrain was seen as being very good but very expensive.

Overall, government through public policy has managed to implement public transport infrastructure, modes of transport or improve certain existing

modes, such as mini-bus taxis. In this regard, there were areas in which it appeared to lessen the impact of social exclusion for residents, such as ease of access to public transport. However, there were still factors, such as lack of ease in reaching work or having transport that was reliable, or transport that adequately dealt with spatial distortions, that still have a negative effect and increase social exclusion. Factors such as cost and affordability were a concern, but respondents appeared to use the option most affordable to them, and would use it regardless of an increase in price.

4.11. Summary

The research began with a focus group interview that was held at the Hillbrow Recreation Centre. The interview was recorded and transcribed, with themes and notable quotes being recorded. This qualitative data was used to edit and inform the survey. The survey was then pre-tested before being distributed at various public transport hubs. Initially, major hubs were targeted as foot traffic in those locations was high. However, this method was adapted as the number of Hillbrow residents that were found there was low. The researcher then focused on smaller bus and taxi stops.

The data from the survey was then analysed by looking at demographic patterns, and the mean and mode of the responses. The responses were used to create a formula to quantify public transport as experienced by the respondents. This formula was used to transform the categorical data into continuous data for testing with the Spearman's coefficient. The results were analysed to see if there were any strengths in the relationship between the seven factors and

social exclusion. The results of the test showed that in some instances, the relationship was significant, in others it was moderate, and in others there was a very weak relationship.

Public policy has goals that can or have lessened the impact of social exclusion. Some have been implemented in a way that respondents had positive responses to those modes or infrastructure implementation, while some were less successful or increased the negative effect of social exclusion.

Chapter 5: Conclusion and recommendations

The aim of this study can be summarized as one that analysed whether existing public transport modes and facilities available to Hillbrow residents had any significant impact on their experiencing social exclusion. The purpose of the study was to collect quantitative data about Hillbrow residents' mobility and public transport usage, and use this data to test whether or not there was a significant relationship between available public transport and social exclusion. The quantitative data instrument was informed by the focus group interview. Once the survey had been drafted, pretested and completed, it was distributed. The responses were then analysed and calculated.

5.1. Summary of purpose

The research's quantitative part's objective was to test for the significance of the relationship between variables. It is a baseline study, as no quantitative data with regard to public transport and social exclusion in Hillbrow exists. The collection of survey data was done in order to collect information with regard to Hillbrow residents' general mobility and ease of access with regard to public transport. Information was also collected that looked at available public transport modes and transport facilities, as well as their affordability, effectiveness, quality of service and facilities, safety of transport and facilities, and driver reliability. The survey also looked at the opinions that the residents have on whether or not public transport is capable and effective at getting them to their intended destination and allowing them to

connect to necessary places. This was done in order to collect relevant data on the daily experiences with public transport as experienced by regular public transport users.

The data collected was then analysed and used to test the relationship as laid out, and to see which factors were the most problematic, and which ones were viewed favourably. The data was also used to see if there were any significant trends, and to see which aspects of public transport were perceived as being effective, and which ones were problematic and needed work. This was done in order to measure public transport adequacy and efficiency. In doing so, four major factors were looked at; affordability, accessibility, availability and acceptability.

The relationship between the variables of public transport modes used as reported by respondents and social exclusion were tested to see if it was significant, with the scores from the survey responses on the Likert scale questions being used in the calculations. The responses were analysed by looking at how they relate to public policy in both stated goal and actual implementation.

5.2. Summary of procedures

The study was conducted in two parts. The first part involved the researcher conducting a focus group interview. The views and experiences

from the focus group interview were used to guide and adapt the survey for the second part of the study.

The focus group interview was conducted at the Hillbrow Recreation Centre. The official interview was attended by five black male participants. The interview was approximately thirty minutes long. The interview was audio recorded and notes were taken. The interview was then transcribed. The transcribed interview was analysed, themes, as well as significant phrases or quotes, were noted and coded. The frequency of themes mentioned were put into a table, and the themes most frequently mentioned were assumed to be those factors considered most important to the participants. The data from the interview informed the survey.

The survey was drafted, with additions being made according to the information provided by the focus group interview. It was then given to the researcher's friends and colleagues to pre-test. Once the survey was finalised, it was handed out at various formal and informal public transport hubs of various sizes, the Hillbrow Recreation Centre and online. Responses were collected either directly on the site SurveyMonkey, or hard copy responses were submitted by the researcher onto SurveyMonkey. In total, 152 completed surveys were collected in person and 22 were collected online. Data from the survey was then used to calculate and test for significance in the relationship between the public transport factors and social exclusion. Spearman's correlation was used analyse the data for trends and patter

5.3. Demographic data and patterns

There were three groups looked at, with the focus being on Hillbrow residents. The other two groups were that of residents in areas surrounding Hillbrow, such as Berea and Yeoville, and resident from other areas, such as Soweto, Pretoria and Randburg.

Most respondents were aged between 20 and 40, and were employed. This is due to data collection occurring during daily commuting hours. Most were employed full-time. A smaller proportion either employed part time, self-employed or students. Only 17.39% of Hillbrow respondents owned a motor vehicle, which is lower than the approximate 30% in surrounding areas, and 23% in other areas. Approximately half of Hillbrow residents and those in surrounding areas did live in households with a car, compared to two thirds in other areas. Public transport thus seemed to be a necessity for mobility. However, there were potential participants that declined to participate due to stating that they did not need to use public transport as places they travelled to were within walking distance.

The majority of respondents were male, with the ratio far higher with Hillbrow respondents. This is due to reluctance of female respondents to participate. However, the researcher observed at the collection sites that the ratio of male to female public transport users seemed evenly split. There were very few disabled respondents, both as participants and in observation. The researcher assumes this is due to a lack of facilities for disabled users. Monthly

spending on public transport varied, however, those using multiple modes of transport or those using more expensive modes such as the Gautrain spent more. People that used mini-bus taxis were spending amounts close to the average costs for their area, which was R562.75. Those using Metrobus or Metrorail were spending less than the average. Monthly costs could be as low as R100 for infrequent users or pensioners, or as high as R2000.

The paper looked at the goals and policies as outlined in the National White Paper on public transport, and what this meant for users of public transport at present and for the future. The JDA is in the process of implementing plans with the aim of rejuvenating the inner-city, dealing with spatial inequalities, implementing urban renewal, as well as making it more safe and walkable. This entails giving pedestrians' priority over vehicles. It also aims to utilise residential density, with the goal of having Johannesburg inner-city become more of a compact city. The JDA goals also involve dealing with traffic congestion, expanding the BRT systems and providing more formal taxi rank facilities. In this way, the JDA does intend to make residents less reliant on public transport, as well as improving the existing transport modes and facilities.

5.4. Research questions

The primary research question asked was whether or not current public transport policies and facilities had an impact on Hillbrow residents' social exclusion. It also asked if Hillbrow residents were able to sufficiently access

necessary places, needed goods and services using public transport facilities available to them. And finally, the research asked about the opinions and perceptions the residents had about these facilities.

The opinions that respondents had towards public transport was varied. Respondents, both Hillbrow residents and those in other areas, found that public transport facilities were close to home and school, but inadequate at being close to work and getting them to specific destinations. Both Hillbrow residents and those in all areas found transport affordable and contributing to social cohesion. The respondents however had issues getting to their destination on time. Hillbrow residents were not concerned with crime's impact on social exclusion, or violence. Both Hillbrow residents and those in all areas rated the distance of routes travelled as having a moderate impact on social exclusion.

5.5. Limitations of the study

The focus of the research was on quantitative data collection, which had followed a focus group interview. Even though the interview resulted in the collection of qualitative data with regard to the experiences and opinions of public transport users, the richness of the data was limited. Due to time constraints and difficulty in locating public transport users that were also Hillbrow residents, the sample was smaller than anticipated. The goal had been to collect 150 surveys from Hillbrow residents. In total, 203 surveys were collected. Of that number, 46 were from Hillbrow residents and 42 from those

living in Hillbrow surrounding areas. This meant accuracy of the tested results had a margin of error of 14.5%, and a confidence level of 95%.

While the researcher had aimed to collect responses at various major and minor public transport hubs equally, difficulty in locating the target sample at certain locations resulted in the researcher having to use adaptive sampling. This entailed redesigning the data collection approach to focus on specific geographical areas as they had been observed by the researcher to have a higher concentration of Hillbrow residents that were public transport users. This could affect the generalisability of the survey data. The researcher also noted that even when Hillbrow transport users were identified, they were reluctant to participate, especially the women. This lead to difficulty in collecting surveys and having the data skewed towards male responses.

The total number of respondents that were Hillbrow residents being low negatively impacts the generalisablity of the study. The questions in the survey were more focused towards opinions and experiences of public transport users with the modes they use and that are available to them, than they were to public transport policy itself.

5.6. Recommendations for further study

This study provided a baseline for understanding how existing public transport modes and facilities are perceived by Hillbrow residents, and how it impacts their levels of social exclusion. However, the sample size was small

and probability sampling was not used. Therefore the results are not generalisable. In addition to this, only one successful small focus interview was held before the collection of the quantitative data.

Further research would benefit from the use of a larger sample, as well as by conducting a focus group interview before, during and after data collection. This additional qualitative data could help provide richer and more meaningful insight into responses. The ratio of male to female respondents was such that the study did not get much in depth insight or enough data on how women perceived public transport, especially as it pertained to their feelings of safety.

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Appendices

Tables

Table 5
Focus Group Questions

Question Type and Number	Question	Talking points and additional notes
1. Semi-structured and open ended	What do you think about public transport in South Africa?	Do you use public transport? How often? What do you like? What do you think needs improving? How much do you spend? What are issues you face?
2. Semi-structured and open ended	(Explain factors of London Study). What do you think about the seven factors?	Do you agree that they are important? What is not important to you?
3. Semi-structured and open ended	How do the seven factors apply in the South African context?	Rate the factors from most important to least important. Explain why? What else would you like to add?

Table 6
Survey

Question Number	Question	Response
	Demographics	
1	How old are you?	Write number
2	Gender	Choose from options
3	Where do you live?	Choose from options
4	Employment status	Choose from options
5	Do you own a car?	Yes / No
6	Do you live in a household where there is a car?	Yes / No
7	Do you have any disabilities?	Yes / No
	Public Transport Mobility	

8	Do you use public transport?	Yes / No
9	How often do you use public transport?	Choose from options
10	What modes of public transport do you use? Check all that apply	Choose from options
11	Which modes of public transport do you use most often? Please choose at most two options.	Choose from options
12	How much do you spend a month on public transport?	Choose from options
	Public Transport Mode Usage	
13	Which mode of public transport do you prefer to use the most?	Choose from options
14	If money was no object, which mode of public transport would you use?	Choose from options
15	Which do you think is the best quality mode of public transport?	Choose from options
	Social Exclusion Factors	
16	Personally, I find public transport is easy to use.	Choose options on Likert Scale
17	Public transport is easy to use for everyone (elderly, young children, people with disabilities, etc.)	Choose options on Likert Scale
18	Public transport is close to where I live.	Choose options on Likert Scale
19	Public transport is close to where I work.	Choose options on Likert Scale
20	Public transport is close to where I go to school.	Choose options on Likert Scale
21	It is easy to get to the public transport I use regularly.	Choose options on Likert Scale
22	The place where I get public transport (Bus stop, taxi rank, train station, etc) is designed well.	Choose options on Likert Scale
23	The place where I get public transport (Bus stop, taxi rank, train station, etc) is clean and maintained well.	Choose options on Likert Scale
24	It is easy to access transport information at the place where I get public transport (Bus stop, taxi rank, train station, etc).	Choose options on Likert Scale
25	Public transport is affordable.	Choose

		options on Likert Scale
26	The cost of public transport is not important to me.	Choose options on Likert Scale
27	I use more than 25% of my salary on public transport.	Choose options on Likert Scale
28	The cost of my preferred mode of public transport never goes up.	Choose options on Likert Scale
29	The government subsidizes the cost of my preferred mode of public transport.	Choose options on Likert Scale
30	My preferred mode of public transport arrives regularly according to a set schedule.	Choose options on Likert Scale
31	There are never any queues to get onto my preferred mode of public transport.	Choose options on Likert Scale
32	I can rely on public transport to get me to my destination on time.	Choose options on Likert Scale
33	The route taken on my preferred mode of public transport is short to complete.	Choose options on Likert Scale
34	Traffic is not a problem on the route taken by my preferred mode of public transport.	Choose options on Likert Scale
35	My preferred mode of public transport reduces traffic problems.	Choose options on Likert Scale
36	The total time spent travelling on my preferred mode of public transport going one way is under one hour.	Choose options on Likert Scale
37	My preferred mode of transport has a low risk of crime.	Choose options on Likert Scale
38	My preferred mode of transport is safe and well maintained.	Choose options on Likert Scale
39	I trust the driving capabilities of the drivers of my preferred mode of transport.	Choose options on Likert Scale
40	I never fear violence on my preferred mode of	Choose

	public transport.	options on Likert Scale
41	I feel safe getting to and from my preferred mode of public transport.	Choose options on Likert Scale
42	My preferred mode of public transport gets me to my destination effectively.	Choose options on Likert Scale
43	My preferred mode of transport enables me to reach work/school/family/friends/healthcare/entertainment effectively.	Choose options on Likert Scale
44	Additional Question (available online only): Please add any notes, comments or additional information here.	Open ended answer

Table 7

Spearman's Correlation Scores – Hillbrow Residents

Question number	Spearman's correlation		Value
SCORE	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	7	
Q16	Pearson Correlation	0.226	
	Sig. (2-tailed)	0.626	
	N	7	
Q17	Pearson Correlation	0.119	
	Sig. (2-tailed)	0.800	
	N	7	
Q18	Pearson Correlation	-0.265	
	Sig. (2-tailed)	0.565	
	N	7	
Q19	Pearson Correlation	-0.545	
	Sig. (2-tailed)	0.206	
	N	7	
Q20	Pearson Correlation	-0.097	
	Sig. (2-tailed)	0.835	
	N	7	
Q21	Pearson Correlation	-0.151	
	Sig. (2-tailed)	0.746	

	N	7
Q22	Pearson Correlation	-0.246
	Sig. (2-tailed)	0.595
	N	7
Q23	Pearson Correlation	-0.096
	Sig. (2-tailed)	0.838
	N	7
Q24	Pearson Correlation	0.273
	Sig. (2-tailed)	0.553
	N	7
Q25	Pearson Correlation	0.696
	Sig. (2-tailed)	0.082
	N	7
Q26	Pearson Correlation	0.161
	Sig. (2-tailed)	0.731
	N	7
Q27	Pearson Correlation	-0.326
	Sig. (2-tailed)	0.476
	N	7
Q28	Pearson Correlation	-0.249
	Sig. (2-tailed)	0.591
	N	7
Q29	Pearson Correlation	0.364
	Sig. (2-tailed)	0.423
	N	7
Q30	Pearson Correlation	-0.415
	Sig. (2-tailed)	0.354
	N	7
Q31	Pearson Correlation	0.180
	Sig. (2-tailed)	0.699
	N	7
Q32	Pearson Correlation	0.228
	Sig. (2-tailed)	0.623
	N	7
Q33	Pearson Correlation	-0.611
	Sig. (2-tailed)	0.145

	N	7
Q34	Pearson Correlation	0.042
	Sig. (2-tailed)	0.929
	N	7
Q35	Pearson Correlation	-0.255
	Sig. (2-tailed)	0.582
	N	7
Q36	Pearson Correlation	-0.141
	Sig. (2-tailed)	0.763
	N	7
Q37	Pearson Correlation	0.345
	Sig. (2-tailed)	0.448
	N	7
Q38	Pearson Correlation	0.181
	Sig. (2-tailed)	0.697
	N	7
Q39	Pearson Correlation	0.131
	Sig. (2-tailed)	0.780
	N	7
Q40	Pearson Correlation	0.456
	Sig. (2-tailed)	0.304
	N	7
Q41	Pearson Correlation	-0.255
	Sig. (2-tailed)	0.582
	N	7
Q42	Pearson Correlation	-0.270
	Sig. (2-tailed)	0.559
	N	7
Q43	Pearson Correlation	-0.729
	Sig. (2-tailed)	0.063
	N	7

Figures

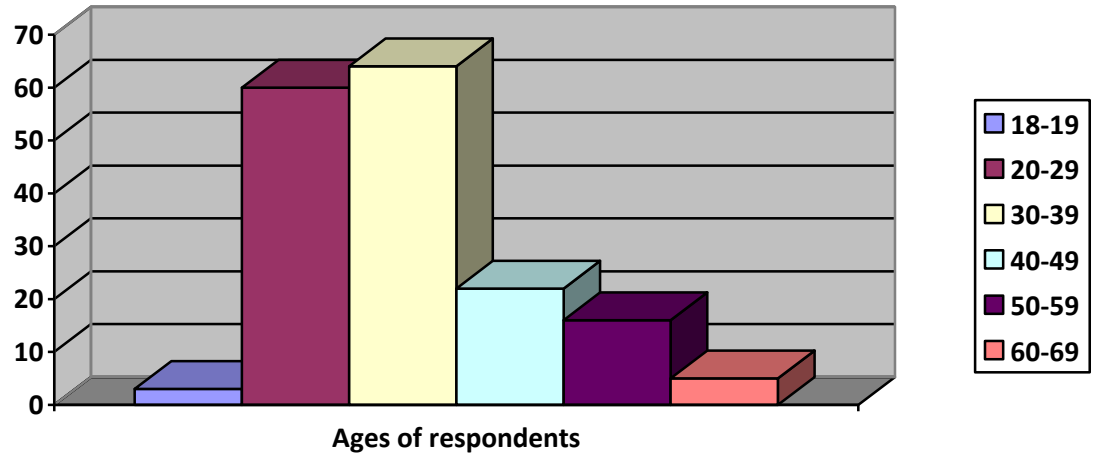

Figure 4. Range of ages of respondents.

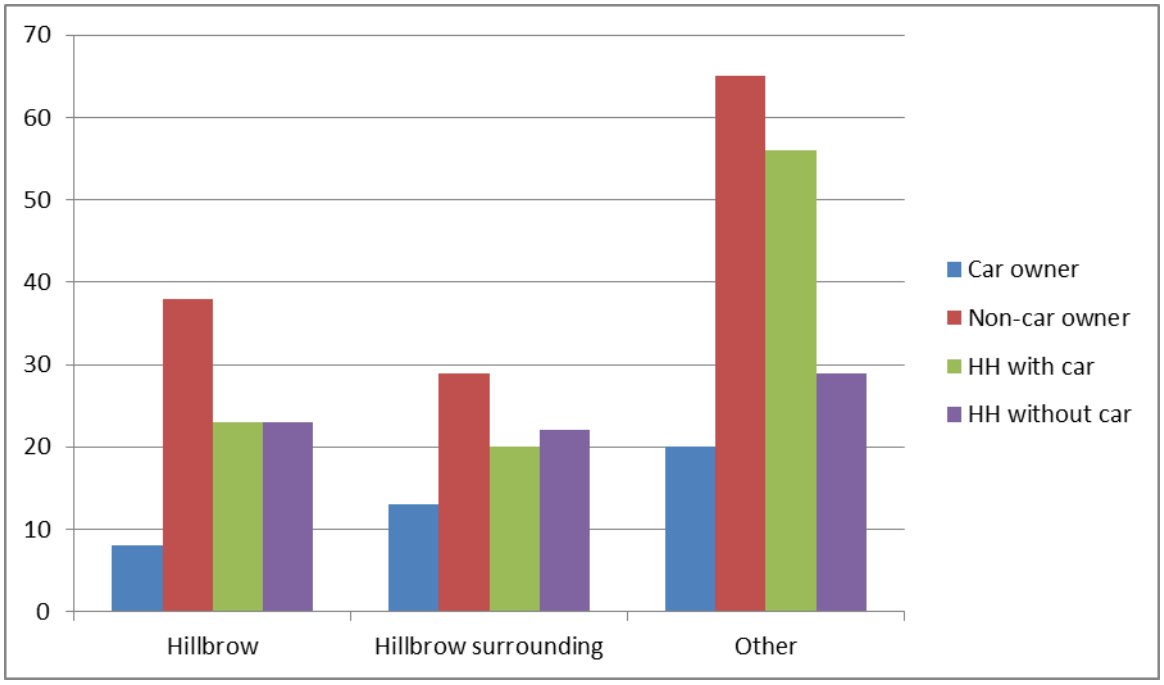

Figure 5. Car owners and non-car owners and HH with cars and HH without car.

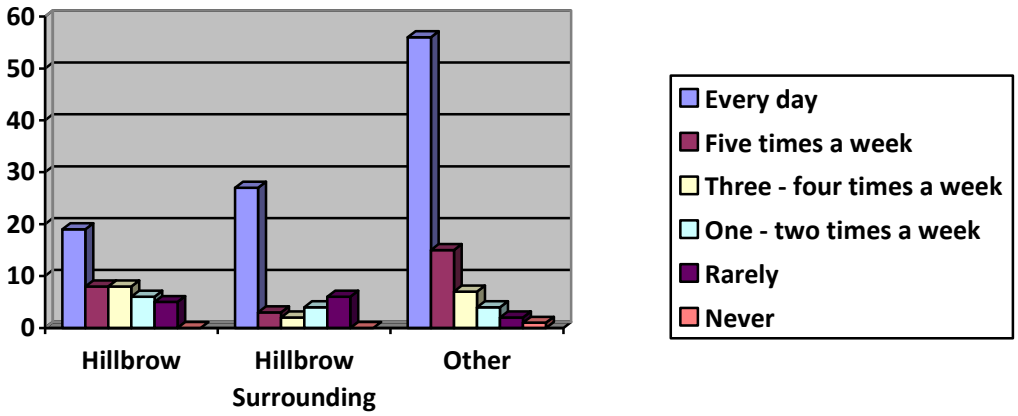

Figure 6. Frequency of public transport use by area

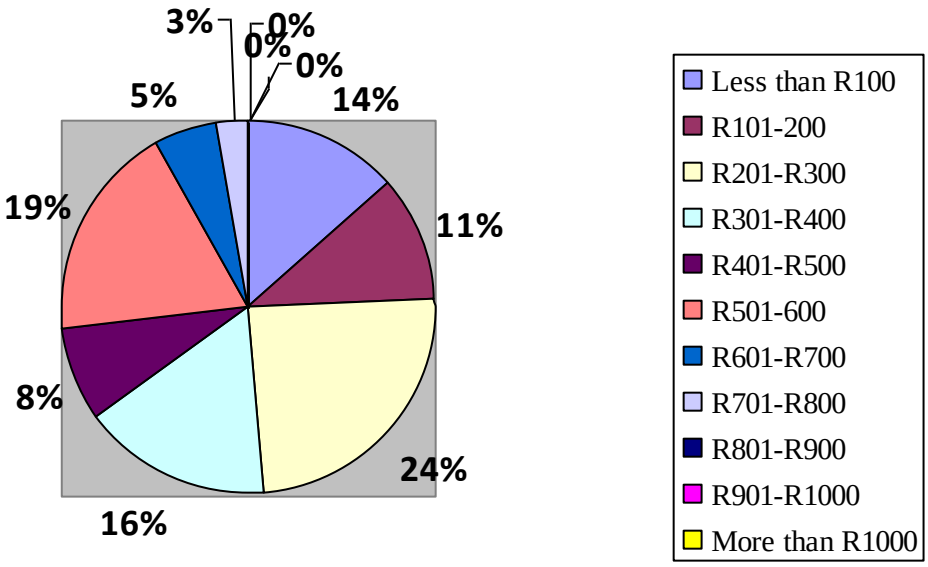

Figure 7. Monthly spending on public transport by Hillbrow residents

Hillbrow transport available	Score	All transport available	Score
Mini-bus taxi	28.70474851	Mini-bus taxi	22.17705382
Rea Vaya	9.168207428	Rea Vaya	18.19255048
Metrobus	22.58888113	Metrobus	5.681445017
Other bus	20	Other bus	-2.532585821
Metrorail	2.587262804	Metrorail	14.10976333
Gautrain	-10.99691848	Gautrain	15.92674853
Meter taxi / Uber / Taxify	31.30632594	Meter taxi / Uber / Taxify	30.91150099

Figure 8. Available transport scores for Hillbrow and all areas.