Evaluating the Significance of Travel Plans in Shaping Commuting Practices Within the University Sector in Greater Manchester

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List of Abbreviations

BEIS – Department for Business Energy and Industrial Strategy

DETR – Department of the Environment, Transport and the Region

DfT – Department for Transport

EEBPP – Energy Efficiency Best Practice Programme

FG#P# - Focus Group Number Participant Number

GHG – Greenhouse Gas

GMPTE – Greater Manchester Passenger Transport Authority

HEFCE – Higher Education Funding Council for England

HESA – Higher Education Statistics Agency

IPCC – Intergovernmental Panel on Climate Change

SEU – Social Exclusion Unit

LTP – Greater Manchester Local Travel Plan

MCC – Manchester City Centre

GMU – Greater Manchester Universities

MMU – The Manchester Metropolitan University

PM – Particulate Matter

RNCM – Royal Northern College of Music

SLR – Systematic Literature Review

SOC – Single Occupancy Car

StaIP# - Staff Interview Participant Number

StuIP# - Student Interview Participant Number

TA – Thematic Analysis

TDM – Transport Demand Management

TfGM – Transport for Greater Manchester

TP – Travel Plan

UoM – The University of Manchester

UoMSCO – University of Manchester Sustainable Campus Officer

UoS – The University of Salford

UoSESO – University of Salford Environmental Sustainability Officer

UoSTTO – University of Salford Travel and Transport Officer

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Declaration of Originality

This thesis is presented as an original contribution for the Qualification of Master of Science by Research at the University of Salford, Salford, UK. This work has not been previously submitted to any institution of higher education under my name or any other name. To my knowledge the material featured in this thesis does not contain any materials previously published or written by another where the author has not been referenced and acknowledged.

Abstract

The commute is often thought of as a mundane activity, an activity done so regularly that it fades into insignificance. Lost in the hustle and bustle of the modern city is a practice done almost daily that has the potential to significantly reduce greenhouse gas emissions and improve public health. The aim of this study is to evaluate the effectiveness of travel plans in promoting and encouraging sustainable travel behaviours in Greater Manchester's university sector. To achieve the aim this study will use practice theory to explore the effects of university travel plans on the commuting habits of students and staff of the University of Manchester, University of Salford and Manchester Metropolitan University. The three Greater Manchester Universities were chosen for this research due to their close proximity to Manchester City Centre and their large student and staff populations. Using focus groups as the primary method for collecting qualitative data, the study examined the factors that generate commuting habits and whether the university travel plans are able to create a shift towards more sustainable transportation systems. This thesis will also draw to attention the challenges and barriers to sustainable and active transport in order to produce a set of recommendations for future iterations of travel plans that might "nudge" commuters onto more sustainable forms of transport. The thesis has found no two universities or workplaces are exactly the same, therefore each travel plan has to be unique and a "one plan fits all" approach is improbable. But universities share the trait of having the power to influence and promote policies which are more adept at meeting the needs of the site users and promoting sustainable commuting practices.

1. Introduction

In the UK passenger transport is dominated by fossil fuel using cars. As of 2017 vehicle ownership in the UK was at 37.7 million, which was a 1.3% increase from the previous year, 83% of the vehicle owned in the UK are cars, this is worrying because current transport initiatives are unable to accommodate for the current growth trends (Parry, 2018). Transport planning has always been focused on providing infrastructure to accommodate the ever-increasing demand of private cars, only recently are planners beginning to realise that there are various problems with this approach, this implies environmental policies are pressurising urban planners and councils to become more sustainable (Mahmood et al., 2009). Car favouring policies have caused congestion, increased emissions, depletion of fuel reserves and large areas of land dedicated to roads and car parks, resulting in damage to the environment and all who inhabit it (Banister, 2000; Mahmood et al., 2009; Schiller et al., 2010).

In order to create a more sustainable future sustainable transport initiatives aim to undo the car-favouring trend, one such initiative is the workplace travel plan (Schiller et al., 2010). A workplace Travel plan (TP) is a collection of tools to promote sustainable transport and dissuade travelling via single occupancy car (SOC), these TPs can cover a wide range of travel objectives from commuting to business travel. The aim of this thesis is to use practice theory as an analytical framework to examine whether TPs at three Greater Manchester Universities (GMU) have affected the commuting habits of the students and staff at Manchester Metropolitan University (MMU), the University of Manchester (UoM) and the University of Salford (UoS). To achieve the aim current TP implementation knowledge will have to be consolidated, this knowledge will be used to analyse the three GMU TP's. Through the lens of practice theory the three GMU's students and staff commuting behaviours will be explored through the lens of practice theory.

Many social and environmental challenges have arisen as a result of the rise of the car (Mattioli, 2013). From an environmental stand point, the increase in frequency, travel distance and car ownership has resulted in transport being a major contributor to the amount of greenhouse gases (GHG) being emitted (Schäfer, 2009). In both developed and developing countries' industries, transportation is the sector with the fastest growth of GHG emissions, without control the damage to the environment will be irreversible (Berrittella et al., 2008; Mattioli, 2013).

In contemporary urban environments the car has redefined urban life (García-Palomares, 2010; Reimers, 2013). The power of the car to define where people can and cannot travel has exacerbated social inequality, where those who do not have access to a car are bound by public transport provisions and how far they are able to walk or cycle (Knowles, 2006). In some communities it is perceived that being a pedestrian or cyclist infers a lower social status than those that drive, therefore people have a mind-set where they aspire to drive because they think driving is related to wealth and power (Mokhtarian & Salomon, 2001).

Even though people know that travelling by car is very harmful to society and the environment there is a reluctance to switch to more sustainable methods of transport, making travel policies even more important (Cass & Faulconbridge, 2016; Whitmarsh & Köhler, 2010). The main reasons why commuting by car is favoured in the UK is that journeys made by car over longer distances are perceived to be more time efficient and driving offers greater flexibility (Cervero & Duncan, 2003; Kim & Ulfaesson, 2008). There is also the perception that car commuting and its upkeep is cheaper than using public transport to commute (Rodriguez et al., 2008; van Vugt et al., 1996). Another reason is people feel safer inside a car, as they are in their own private environment shielded away from the outside (Handy et al., 2010; McMillan et al., 2006; Saelens et al., 2003). On the other hand people tend to shy away from commuting by cycling or walking because of the topography, bad

weather or lack of facilities (Cervero & Duncan, 2003; Dill & Carr, 2003; Handy et al., 2010; Kim & Ulfaesson, 2008; Mackett, 2003). Many of the reasons for choosing to commute using a car are based on perceptions and or past experiences, a travel plan (TP) offers employers the ability to address the perceptions that mobility can only be gained through driving a car and encourage the use of sustainable transport.

Finding solutions to reduce GHG emissions and demand within transport is often portrayed as being very challenging and expensive (Kopp & Pizer, 2007). Policy makers struggle to create effective plans and policies because even the experts cannot agree on the complexities of the transport policies (Berrittella et al., 2008). Currently policies of reducing GHG emissions aim to provide incentives, particularly economic mechanisms that alter the price of carbon and energy or provide motivations to develop and deploy low carbon mobilities (Mandell, 2009; Santos et al., 2010). Under the Climate Change Act 2008 the UK established a long term framework to reduce GHG emission by at least 34% compared to 1990 baseline levels and 80% by 2050, in 2016 the total domestic GHG emissions from all sources was estimated to be 467.9 million tonnes, with domestic transport becoming the largest emitter with 26%, with more than half of these emissions being released by cars and taxis (ONS, 2018a). At 25% energy production is the second largest emitter of GHG, followed by business, housing, agriculture and waste management (DfT, 2016; ONS, 2018a).

In order to better understand the travel behaviours of the general population travel surveys have been implemented, but these methods can lead to certain populations, such as university students being underrepresented even though they can form a large proportion of the area's population (Khattak et al., 2011; Whalen et al., 2013). University students not being well represented can be attributed to difficulties in obtaining travel data due to their temporary term time living arrangements. As a result of underrepresentation of the student

population there are very few studies on their travel behaviours, leading them not being very well understood (Khattak et al., 2011).

The main topic to be researched is the commuting practices of university staff and students of in relation to TPs, this is because universities are facing the challenge of sustainable auditing and reducing land dedicated to car parking. Car ownership and the number of SOC commutes are increasing within the students and staff population, as a result environmental and social impacts are being exacerbated in the areas surrounding universities (Khan, Mohammadzadeh, & Syam, 2014). The environmental and social impacts are amplified further due to three GMUs being located near Manchester City Centre (Khan et al., 2014). This study will focus on the students and members of staff at the three Universities because they contribute to a large proportion of the total population in the surrounding areas, as a result large amounts of traffic are generated by commuters travelling to and from university (Balsas, 2003; Shannon et al., 2006). University student and staff travel data will be analysed because it can be used to uncover valuable information regarding the relationships between the built environment and the travelling habits of different populations (Khattak et al., 2011). Another reason for choosing to examine the commuting habits of university students and staff is because a higher variety of modal choices can be seen compared to that of the general population (Whalen et al., 2013).

The practice of commuting was chosen as the focus of the study because a large majority of journeys made by students and members of staff are done for the purpose of commuting. Universities are often places where new ideas are tested and often take a leading role in changing societal behaviours. (Balsas, 2003; Khan et al., 2014; Toor & Havlick, 2004). If the commuting habits of university students and members of staff can be changed through the implementation of TPs other organisations may be encouraged to follow suit (Khan et al., 2014).

Studying or working at a university offers many opportunities and life changes, because it can be a time where people learn life lessons and encounter changes to their surroundings. Often experiences from university endure long after students have left, therefore being able to create practices of sustainability travel now is very important for the future (Balsas, 2003). Every year there is a large turnover of students and members of staff who are able bring the travelling practices they have learnt while studying at a university to the wider community. On average undergraduates study for three years and postgraduates anywhere from one to seven years, therefore there is a very quick turnover of students and offers a unique opportunity to influence many people's travelling practices.

In order to reduce the GHG emissions from student and staff commutes TPs have been introduced by three GMU.

TPs are a targeted marketing technique involving the provision of travel advice to individuals (Jones & Sloman, 2003), which:

> "Encourages people to make more sustainable travel choices. It seeks to overcome the habitual use of the car, enabling more journeys to be made on foot, bike, bus, train or in shared cars. This is achieved through the provision of information, incentives and motivation directly to individuals to help them voluntarily make more informed travel choices (DfT, 2008, p. 5) ".

TPs are beginning to be used as tools to deliver transport demand management (TDM) measures by larger organisations as a way to change their workers commuting habits, towards more sustainable methods and to promote active transportation (Enoch & Zhang, 2008). Also known as individualised travel marketing, TPs have been implemented worldwide since the 1980s through residential, workplace and school-based projects (Bartle & Avineri, 2014). In 1998 there was a major shift in policy towards TPs in the UK due to the release of the Governmental white paper *A New Deal for Transport, Better for Everyone*. With the introduction of *Planning Policy Guidance 13*: *Transport* all applications for planning permission that involved significant transport implications were required to have

created a TP (DETR, 2001). Guidance notes to help authorities and businesses create TPs was introduced by *Smarter Choices – Changing the way we travel* in 2004, which helped to standardise TPs.

Within university TPs buses feature heavily as they are the most flexible in terms of the number of routes and destinations available (Khan et al., 2014). Buses make efficient use of the existing road infrastructure, they are less polluting compared to cars and force people to walk at either end of their commute (Rissel et al., 2013). Modes such as cycling or walking are known as active modes and they have no negative environmental impacts (Brown et al., 2003), these methods have benefits to people's health as they involve physical activity (Enoch & Zhang, 2008).

Practice theory will be used as an analytical framework to explore the aspects of the commuting practice. By analysing commuting practices through the lens of practice theory the elements of the practice that might be most meaningfully or expediently targeted by policy makers (or employers through TPs) can be identified and targeted by TDM measures. Through the targeted implementation of TDM measures people may be nudged into performing sustainable commuting practices.

The following aims and objectives will be fulfilled by this thesis:

Aim:

- To evaluate the effectiveness of TPs in promoting and encouraging sustainable travel behaviours in Greater Manchester's university sector.

Objective:

- To consolidate current knowledge on the implementation of TPs
- To analyse the TPs of three GMU

- Through a practice theory lens evaluate the commuting behaviours of students and staff at MMU, UoM and UoS.
- To identify challenges and barriers to sustainable commuting.

The next six chapters of this thesis begin by exploring workplace TPs and the TPs of three GMU, they end by using elements of practice theory as a framework the gauge the effectiveness of the three GMU TPs and discuss how future transport policies can be used to create a modal shift. In detail, the chapters are organised as follows. Chapter two, 'Literature review', introduces concepts of why people travel by car and the health and social problems associated with large scale car usage. The chapter continues by exploring the evolution of transport planning policies and the introduction of TPs into Governmental policies. To conclude the chapter describes practice theory and the combinations of elements which practices are made.

Chapter three, 'Methodology' describes and explains the methods which were used within this study to achieve the aims and objectives that are outlined above. Chapter four, 'Review of travel plan', is an empirical chapter which consists of two sections, the first section is a systematic literature review (SLR) of large workplaces which have used TPs in order to explore why they have implemented their TP. The second section uses the findings from the SLR to analyse the TP's of the three GMU. Chapter five, 'Qualitative data analysis', uses practice theory to delve into the commuting practices that the TPs in the previous chapter are trying to influence. This chapter analyses the focus group and interview data collected from students and staff of the three GMU in order to explore whether the TP has been embedded into the site users.

Chapter six, 'Discussions' reviews the key features of the argument built through Chapters one to five and discusses the implications for the future of travel plans at universities and large workplaces. The last chapter, Chapter seven, 'Conclusion', explains the limitations

encountered during this study and recommends how future research on this topic can be conducted.

2. Literature Review

2.1. Introduction

The largest proportion of final consumption of energy in the UK is from transport, which represents 40%; transport has dominated energy consumption within the UK since 1988 due to a shift away from heavy, energy intensive industries and increasing rates of car ownership (BEIS, 2017). Fossil fuels such as coal, oil and gas are the primary sources of energy (Leung, Caramanna, & Maroto-Valer, 2014).

The problem with burning fossil fuels is primarily the release of particulate matter (PM), carbon monoxide (CO), carbon dioxide (CO_2) and other anthropogenic GHG into the atmosphere. Globally the atmospheric concentration of CO_2 has risen by over 45%, from 280 ppm before the industrial revolution, as a result average global surface temperature has risen by 0.8˚C (IPCC, 2014; NOAA, 2018). The Intergovernmental Panel on Climate Change (IPPC) (2014) estimate without climate change mitigation policies global levels of GHG emissions by 2030 will be 25-90% greater than that of 2000, with concentrations of CO_2 in the atmosphere growing to as much as 600-1550ppm.

The IPCC 5th Assessment Report (AR5) confirmed the 4th Assessment Report's assertion that global warming of our climate system is unequivocal and is associated with the observed increase in anthropogenic GHG concentrations (IPCC, 2007, 2014). The same IPCC report (AR5) indicates in order to avoid the worst scenarios of climate change occurring, it is necessary to keep global surface temperature rise less than 2 °C relative to preindustrial levels and CO_2 emissions have to be reduced globally by 41–72% by 2050 and by 78–118% by 2100 with regards to 2010 levels (Leung et al., 2014).

The purpose of this chapter is to provide a review of current literature on the growth of the private car culture, why people choose to drive and the health concerns that have arisen

(section one), what are TPs and how they can promote active transport (section two) and practice theory and why the commute is a practice (section three). This literature review will provide context for TPs and why they are needed in addition to explaining how practice theory will be used to analyse the commuting habits of students and members of staff.

2.2 Evolution of the Driving Culture

This section of the literature review will explore literature surrounding why people have gravitated towards using the car as the main form of transportation and the effect this has had on the health of the urban population. The car has grown for many into the primary mode of transportation within an urban environment and for many it is more than a mode of transport. As the car has embedded itself into the daily lives of many of the UKs population, the infrastructure to support driving has also grown. Not only is the growth in car detrimental to the environment, there have also been serious health effect on people living in urban locations. Only by targeting the reasoning behind car usage can policies create a modal shift towards sustainable transport and begin to repair the health and environmental damage caused by the car.

2.2.01 Growth of private motor vehicles

For over a century the car has been mass produced and a main stay of urban society, often driving and the cars infrastructure are overlooked as normality (Brandon, 2002; Thrift, 1990; Thrift, 2004). The normality has stemmed from the car being the primary form of transportation; such normality has led to cars being viewed as a neutral technology that permits social patterns of life or as an implement of destroying earlier urban lifestyles (DfT, 2016; Sheller & Urry, 2000).

Department for Transport (DfT) (2016) data shows 64% of all trips and 78% of total distance in England during 2015 was done by car or van. Korsu and Nechet (2017) found in studies

by Nielsen and Hovgesen (2008), Lee et al. (2009) and Frändberg and Vilhelmson (2011) that people are regularly travelling greater distances since the 1970s for work and leisure due to improvements in transportation technologies. The dependence on the car has caused congestion, depletion of fuel reserves, large areas of land dedicated to roads and car parks and social problems (Banister, 2000; Korsu & Le Néchet, 2017; Mahmood et al., 2009; Newman & Kenworthy, 1999; Schiller et al., 2010).

Sheller and Urry (2000) express the modern city and urban architecture has become a function of movement, cities are built around a simple mechanical entity. Opposed to the classic urban architecture described by Sennett (1990) as built for the pedestrian. The car has been embedded into society and changed people's lifestyles, at the end of 2016 30.9 million cars were licensed for use in Great Britain compared to around 25 million in 1995 (DfT, 2017). Urry (2000, p. 59) explains the significance of the rising number of cars and how it shapes society, 'the car's significance is that it reconfigures civil society involving distinct ways of dwelling, travelling and socialising in and through an auto mobilised time-space'. Sheller and Urry (2000) says the simple car has led to the creation of systems of production, consumption, circulation and sociality. The car and its infrastructure are deeply rooted in and define many modern global cities but the effects on social life are vastly outnumbered by studies conducted on the environmental effects of the car on the city (Jacobs, 1994).

For many the second major item of personal consumption after housing is the car (Sheller & Urry, 2000). The car is an instrument to a socio- technical system that not only determines how and where people travel to, but also 'the formation of gendered subjectivities, familial and social networks, spatially segregated neighbourhoods, national images and aspirations to modernity and global relations ranging from transnational migration to terrorism and oil wars' (Sheller & Urry, 2006, p 209). Beckmann (2001) says the success of the car as the primary form of transportation is embedded within the social, technical and economic

changes of modernity. Promotions of the car by infrastructure planners, public administrators and private organisations have elevated the car to such a dominant position within the transport sector. Kuhm (1997) writes the actors have nurtured the car by creating "hard" infrastructure, such as roads, tunnels and bridges to facilitate "softer" services. Modernity and mobility are interwoven and depend equally on each other (Beckmann, 2001; Urry, 2000) within the nexus of modernity and mobility Thrift refers to the car as the "avatar of mobility" in his book *spatial formations*, the car provides the motor for spatial, cultural and economic development, it acts as the engine to modernity (Thrift, 1996, p. 272).

2.2.02 Choosing to Drive

In the UK even though the adverse effects of car travel are well known, travelling by car is still favoured for the vast majority of trips. Cervero and Duncan (2003) and Kim and Ulfarsson (2008) suggest time efficiency over longer distances, convenience and improved accessibility as reasons for choosing to drive. A car is instantly available to travel door to door, has the flexibility to go anywhere on a complex road system and in most situations results in a reduction in travel time (Kim & Ulfaesson, 2008). Psychologically driving a car provides mastery and self-esteem and promotes feelings of prestige, autonomy and safety, that public transport cannot provide (Ellaway et al., 2003). Mokhtarian and Solomon (2001) suggest driving is not just about getting from A to B but also about the pleasure and enjoyment gleaned from being behind the wheel. The emotions that a driver gains from driving a car, such as the feeling of speed, movement, control and enjoying the scenery affects the final transport mode choice.

The car allows and facilitates automobility, permitting numerous socialities, from family orientated, community, leisure to enjoyment of moving to be intertwined within an intricate mixture of time and space (Sheller & Urry, 2000). Automobility is possible because the car offers immense flexibility and is dominant, to the point where many urban lifestyles have

been structured around it. Automobility through the car creates a sense of freedom, to drive wherever there is a road, the flexibility offers allows the driver to travel at speed, whenever, wherever along the arteries that link together the houses, workplaces and leisure sites.

The car is not bound by rails or specified routes and has the freedom to extend where people can go, thus expanding what they are humanly able to do (Sheller & Urry, 2000). Sheller and Urry (2000) argue much of what people believed to be the "social life" would be impossible without the flexibility and 24 hour a day nature of the car. Leaving late by car is possible; there is no need to adhere to the strict timetable of public transport. Cars create a freedom for travellers to find pleasure in travelling on their own agendas, being in control of what routes they choose, and being able to find surprising new locations (Gardner & Abraham, 2007). Shove (2003) terms the car as a "convenience device" of modern society, a device which makes complex, often stressful patterns of social life just about possible, at least for those who have access to a car.

Throughout the literature which has explored why people choose to drive (e.g. Gatersleben & Uzell, 2007; Lois & Mercedes, 2009 Mann & Abraham, 2006; Steg et al., 2001) reducing financial costs and believing car travel is cheaper was often cited, but Gardner and Abraham (2007) explains driving may not actually be cheaper than using public transport. The study found participants would often quote the cost of a single journey in terms of fuel and or parking costs, without including maintenance costs, such as road tax or insurance. Due to financial costs of travelling by car being underestimated, prices of public transport were perceived as relatively expensive since it involved an explicit cost, generally encountered on a per journey basis.

Steg et al., (2001) explored the importance of symbolic-affected as opposed to instrumental-reasoned motives for using cars and found people are attracted to driving not only because of the physical benefits but also the mental, such as the enjoyment or the feeling of power and

status. Many empirical studies have focused on the utilitarian and practical aspects of driving without incorporating symbolic- affected motives due to their methodology (Bergstad et al., 2011; Steg et al., 2001). Steg et al. (2001) notes how participants in personal interviews tended to give socially desirable answers, and not many participants would be able to easily admit that they drove because they felt powerful. Instead participants would rather say that they drove because it was cheaper, or it saved time.

> "No doubt, any kind of vehicle fulfils an instrumental function – transporting people from one place to another – but the private vehicle satisfies other, symbolic needs, which may become particularly important as an expression of the self" (Lois & Lopez-Saez, 2009, p. 791)

Dittmar (1992) who studied psychosocially what is meant by possession of objects, with the car being one of them, first explores an object's instrumental and functional use, then the emotional dimensions and its relationship to pleasure and relaxation, and how the object is a symbol of identity. Symbolically an object displays a person's position or social status and as an expression of personal identity and values. Similar to Dittmar (1992), Allen (2002) distinguishes the meanings associated with owning a product, but instead of three divisions he uses only two: utilitarian and symbolic. Utilitarian functions of a product include the physical context and gaining practical benefits, while the symbolic functions as vessel for self-expressed motivations and to achieve a desired self-image or ideal self (Steg et al., 2001). The dual purpose of the car has been shown by Ennis and Zanna (2000), who found cars stimulate feelings and beliefs related to needs of a symbolic and instrumental nature. Symbolic needs have been explored through social expressions functions and expressions of values, social expression functions relate to social interaction and acceptance, while expressions of value are related to self-value. Mann and Abraham (2006) have shown the car can become a symbol of identity, a projection of someone's status related values. For example some people value having and driving a big expensive car to show their status or

identity, while others prefer a smaller car as they are ashamed because they want to be identified by the opposing values.

Choosing to drive is not as simple as just because it is cheaper or it is more convenient, rather delving deeper into the subject reveals driving to be the result of a complex balance of both utilitarian and symbolic reasons. Only by creating policies that address and understand both the utilitarian and symbolic reasons behind using the car can the driving culture be changed.

2.2.03 Health Concerns (Physical and Mental)

In an urban environment, motor vehicles are the leading source of air pollution (Johansson et al., 2017). Even though motor engines have become cleaner and more efficient, the sheer number of vehicles on the road and the amount of distance has driven results in large quantities of CO, CO_2, PM, Nitrogen oxides (NO_x) and hydrocarbons into the air. In the presence of sunlight NO_x and hydrocarbons react to create ozone (O_3) (Frumkin, 2002). Hänninen et al. (2004) and Dons et al. (2012) found travelling along a densely trafficked area during rush hour could contribute a large proportion of daily exposure to air pollution. Exposure to pollutants occurs from both within and outside of the vehicle due to the close proximity of air intakes to exhaust emissions from nearby vehicles, cyclists and people walking nearby are also badly affected (Dons et al., 2012). Air pollution does not only affect those that are in close proximity but entire regions due to the wind (Frumkin, 2002)

The effects of air pollution, in particular airborne PM, on the human body and the environment have been well documented by Brook et al. (2010), Mills et al. (2007), Nawrot et al. (2011) and Peters et al. (2004) have found prolonged exposure to air pollutants from road vehicles can trigger many cardiovascular diseases. While Lin et al. (2011); McCreanor et al. (2007), Patel et al. (2010) have explored how traffic related pollutants can cause respiratory problems and Bos et al (2011), Power et al. (2011), Suglia et al. (2008), have

looked at the effects of pollution to the brain. Air pollution is of great concern because even at low concentrations they can be very harmful; globally there is an estimated two million deaths per year due to respiratory system damage from air pollution (Kim et al., 2015; Shah et al., 2013).

Dependence on car travel is seen as a major cause of physical inactivity, by discouraging walking and cycling (Cervero & Duncan, 2003; Cooper et al., 2003; Mindell, 2001). Potentially walking or cycling parts of the commute can be a great way to increase daily physical activity, by using a car this potential is lost (Kim & Ulfaesson,2008; Rosenkilde et al., 2017). Walking trip rates in the England have decreased by 19% between 2005 and 2015, from around 4.7 trips per week to 3.8 trips per week, cycling have seen a decrease of 16% from 2006 to 2016. Wen et al. (2006) add the overall number of trips done through active transport have decreased. Oja et al. (1998) explains how such sedentary behaviour increases the risk of obesity and chronic disease.

Frank et al. (2004) found there was a negative relationship between walking and the likelihood of obesity, and a positive relationship between the time spend driving and the likelihood of obesity. Wen et al. (2006) found that commuting to work via driving was significantly associated with being overweight or obese, however they did not study the effects of gender or if different modes of transport other than driving produced the same results. Wen and Rissel (2008) concluded men who cycle commuted were the least likely to become overweight or obese, however they believed that they did not have a big enough sample of women who cycled to create a definitive answer for female cyclists.

Oja et al. (1998) suggests cycling has greater effect on obesity because the intensity of effort is much higher. A heart study which assessed men and women aged between 20 and 93 by Andersen et al. (2000) found people who cycle commuted were 39% less likely to die from heart disease. Banister (2008) and Rabl and Nazelle (2012) suggests active travel alternatives,

such as cycling and walking offer many more health benefits such as increases in life expectancy.

Studies by Flint et al., (2014), Petrunoff et al. (2013) and Rissel et al. (2012) all found that commuting via public transportation to work produced a sizable contribution to people's daily physical activity. Public Health England (2016) recommends adults aged between 19 and 64 should do a minimum of 150 minutes of physical activity per week, a commute to and from the workplaces of 15 minutes per day using active forms of transport is enough to fulfil the minimum amount of weekly activity.

Active travel does not only include walking or cycling, public transport can be included if the distance travelled from the nearest source of public transport to the destination contributes significantly to daily physical activity guidelines (Petrunoff et al., 2016). Studies conducted by Flint et al., (2014), Petrunoff et al. (2013) and Rissel et al. (2012) all found that commuting via public transportation to work produced a sizable contribution to people's daily physical activity. Therefore active travel has the ability to reduce the amount of airborne pollutants released through domestic transportation and the potential to increase levels of physical activity. .

2.2.04 Fragmented Social Practices

The car and the "structure of autospace" forces people to conduct their varied and complex socialities over very large distances (Freund & Martin, 1993). Sheller and Urry (2000) argues social practices that occurred within the city have been fragmented by the car. Sheller and Urry (2000) state cars have divided workplaces from homes, resulting in lengthy commutes across and into the city; homes and business districts have been separated, discouraging the use of cycling or walking to local retail outlets, thus eroding town centre, places where cars can't access and public spaces. Homes and leisure activities are now often only available to those who have access to private or public transport. A city designed for the

car has turned zones on the urban fringes into wastelands, where only those who have access to transport can escape the concrete and pollution filled urban prison. Family members are being forced to live further apart, and often require complex journeys to infrequently meet up. Kunstler (1994) explains for those who do not drive the car centric urban environment makes everyday habitats dangerous and inaccessible.

As the city becomes more fragmented social exclusion becomes a pressing concern, especially for those who do not have adequate access to private or public transport. The 2002-2003 *Social Exclusion Unit* (SEU) report on transport and social exclusion is credited with bringing the inter-relationships between transport disadvantage and social policy concern to the forefront of policy makers and researchers (Lucas, 2012). The governmental study found links between poor access to transport and unemployment, poor health and education. Since the report there has been a rise in academic interest from around the world (Lucas, 2013). As early as 1973 physical mobility in the US was identified as a major contributor to social and economic equity by Wachs and Kumagai (1973). Banister and Hall (1981) claimed transport or the lack of transport has a significant role in defining social outcomes within the UK. More recently researchers have suggested there is a direct link between transport and social exclusion (Cass et al., 2005; Lucas, 2012; Schwanen et al., 2015; Stanley & Vella-Brodrick, 2009).There are a number of different definitions of transport poverty that highlight different aspects of transport and poverty, but it is widely agreed that social exclusion goes beyond a description of poverty to provide a multifaceted, multidimensional and dynamic concept of deprivation. Social exclusion is defined as:

> '…the lack or denial of resources, rights, goods and services, and the inability to participate in the normal relationships and activities, available to the majority of people in a society, whether in economic, social, cultural or political arenas. It affects both the quality of life of individuals and the equity and cohesion of society as a whole.' (Levitas et al., 2007, p. 9)

As a note Currie and Belbosc (2010) say transport disadvantages and transport-related social exclusion are not always synonymous, for example it is possible to be socially excluded

while having good access to transport networks or to be highly socially included but be transport disadvantaged. Rather transport poverty is an indirect or direct conjunction of transport disadvantage and social disadvantage. Those who are in transport poverty often do not have access to essential goods and services, as well as being frozen out of planning and decision-making processes.

2.2.05 Summary

Through urbanisation the car has become the dominant mode of transport for many, as a result the environment has heavily been influenced by it. Infrastructure for cars and the willingness to facilitate driving has resulted in driving being much more convenient and flexible than any other form of transport in the UK. The number of cars on the road is rapidly increasing along with the number of journeys conducted by SOC.

As well as the utilitarian reasons for driving there are many social reasons for why people choose to drive, such as using the car to project identity and values. In the UK the creation of an over reliance on the car for mobility has caused massive problems for the health of the environment and the people that live in it, this is because of the high levels of pollutants released through burning petrol and diesel. Many of these pollutants, such as PM, CO and CO_2 have been reported to increase the risk of respiratory diseases. While driving instead of using active forms of travel have reduced the amount of weekly physical activity, increasing the likelihood of obesity and cardiovascular diseases.

On top of the physical health concerns there are social implications from the car. At the moment a private motor vehicle provides an unrivalled level of mobility, which in the UK no other mode of transport can match. For those without access to a private motor vehicle there is a high chance of being socially excluded and falling into transport poverty.

2.3 Travel Plans and Their Effects

This section of the literature review will explore how and why transport policies are moving away from facilitating the use of the car to promoting the use of sustainable transport. One of the policy initiatives gaining traction in the UK is the workplace TP. A workplace TP acts as a means of delivering TDM initiatives and measures to its employees, in order to promote sustainable and active transport while reducing SOC commutes.

2.3.01 Changing Policies

In the past transport planning has always focused on providing transportation facilities to compliment the ever-increasing demand (Mahmood et al., 2009). Korsu and Nechet (2017) and Banister (2008) says some of the solutions that urban planners have employed include creating more efficient cars and alternative vehicles, designing roads to reduce speed and capacity, higher taxation and planning housing to be in places that are well serviced by public transport links. Banister and Marshall (2000) and Schiller et al. (2010) say city planning has been approached unsustainably to accommodate the car because it is the dominant form of transportation. Being the dominant form of transportation urban planning in the past has prioritised car access, while neglecting other modes of transportation, as a result many lifestyles are built around the car and its mobility (Macmillan et al., 2013).

Mahmood et al. (2009) writes that transport planners are beginning to realise that there are various problems with continuing to focus on the car and supplying more facilities. Transport facilities are inept at quickly responding to changing travel needs coupled with the growth of passenger and freight transport, creating more facilities to match the demand is unsustainable (Mahmood et al., 2009). Hickman and Banister (2007) note targeting transport infrastructure is important, but investing in infrastructure alone is unlikely to create a modal shift towards low carbon transportation. Cass and Faulconbridge (2016) propose a shift

towards psychological approaches that use “soft” interventions to “nudge” or influence choices will be more effective at changing transport habits. Policies that use “soft” initiatives that do not change the alternatives available or their costs, but raise awareness and promote existing sustainable travel options seek to voluntarily change behaviours (Cairns et al., 2008). Voluntary behaviour change policies are becoming more popular because they fit neo-liberal agendas of choice (Jones, 2012; Marsden et al., 2014; Pykett, 2012)

When forming policies short vehicle trips are often ignored as their impact on the environment is often seen as minimal (Kim & Ulfaesson, 2008). Short trips are defined by ONS (2018b) as trips less than one mile. European studies by Black et al. (2001), Loukopoulos and Gärling (2005) and Mackett (2003) argue the importance of targeting short trips in reducing the need and desire to travel using a private motor vehicle. Although short trips represent a small proportion of the total mileage, they are important because of their greater impact on the environment. Reducing short trips in an urban environment is important because short trips often result in driving with a cold engine in urban traffic conditions, resulting in increased amounts of GHG emissions, during the first three kilometres of the trip emissions are 50 times greater (Black et al., 2001; Loukopoulos et al., 2005). Kim and Ulfarsson (2008) say convenience and the instantaneous nature of driving make reducing the number of trips in rural or suburban areas difficult, as locations are far apart and there are few transportation alternatives. But on short trips of less than 5 miles, walking and cycling can be realistic alternatives to driving(DfT, 2018).

In order to address the environmental and social health effects resulting from the dependence on the car, changes to transport policies are needed (Macmillan et al., 2013). Urban planning policies have been used to make low carbon transportation more feasible, such policies aim to reduced travel distance and time (Handy, 1996; Næss, 2012). Policies of making travel by car more expensive and difficult have been explored by Fujii et al. (2001)

and Thogersen (2009). Woodcock et al. (2009) found policies of promoting active transport and discouraging the use of private motor vehicles provided greater health benefits than policies which solely focused on lowering emissions from motor vehicles. Analysis by Woodcock et al. (2009) suggests that policies which increase the amount of active travel in an urban environment are potentially the best option for reaching health and climate goals. Short every day commutes to school or work are particularly accommodating to more active forms of transportation (Macmillan et al., 2013).

Changing travel behaviours away from cars to more sustainable forms of transportation can be very difficult, as a result there has been a large volume of research on how significant change can be achieved through policies (Whitmarsh & Köhler, 2010). Particularly interest in policies that encourage the shaping of an individual's choice rather than direct policy interventions have gained traction in the UK and other European countries (Barr & Prillwitz, 2014). Transport policies which have become of particular interest are TP.

2.3.02 What are Travel Plans and TDM measures

TPs are starting to be implemented by larger organisations in the UK as a way to change their workers travelling habits, towards more sustainable methods (Enoch & Zhang, 2008), these can be adopted both voluntarily or be compulsory. The need for implementing TPs has arisen from increasing rates of urbanisation and rising numbers of trips being done by SOCs (Dargay et al., 2007). In different countries TPs are known as transport demand management (TDM) plans , mobility management plans and green transport plans (Enoch & Rye, 2006).

TPs are defined by EEBPP (2001) as being an overarching term for a package of measures that are tailored specifically to meet the needs of individual sites, the aim of the measures is to encourage the use of sustainable transport and discourage travel through SOCs. The packages consist of a variety of policies, initiatives and goals that work in partnership to reduce the impact travel has on the environment and bring benefits to the organisation and its

staff. Bradshaw (2011) further explains a TP is therefore a series of TDM measures collected into one package with the aim of reducing a particular site's travel impacts. The act of travel planning can be derived from the definition of TPs, it is the act of creating a series of mechanisms, initiatives and targets all aimed at influencing the travel behaviour of site users in order to reduce congestion and promote alternate mobility options. Some of the initiates employed in travel planning involve changing the cost, mode, time or routes of transport (Meyer, 1999; EEBPP, 2001).

TPs generally follow a similar structure that include specific elements highlighted by local governments (ACT Canada & Noxon Associate Limited, 2010; City and County of San Francisco, 2016; DfT, 2009; Department for Infrastructure, 2008; NZ Transport Agency, 2011; Transport for London, 2011). The components of a TP include context, the transport conditions that are already present, the objectives of the transport plan, the targets and indicators, measures and actions to be implemented by the TP, how to manage the TP and how the TP is to be monitored and reviewed.

Table 1 provides a breakdown of the component part of a TP. Within the context for the TP there is normally a statement to highlight the motivations behind creating the TP (Khandokar, Price, & Ryley, 2017; Roby, 2010). A baseline travel survey of the people affected by the TP is usually undertaken to gain information about the existing transport (Brockman & Fox, 2011). Normally the objectives of the TP are created by using a bottom up approach and using the opinions of the site users (Howlett & Watson, 2010). The targets and indicators for TPs are often aligned to the goals and priorities of the organisation (Roby, 2010). For new developments, it is feasible to incorporate infrastructure-based actions or measures such as changing facilities or bicycle parking or even contribute towards public transport services, whereas places where infrastructure is already in place and available land space is limited may focus on changing the travel behaviour of the commuters (De Gruyter et al., 2014) .

Management of the TP usually involves the existing employees and is part of the internal budget used to fund it (Roby, 2010). Monitoring and reviewing the TP is normally done through yearly surveys and progress reviews of reductions (De Gruyter et al., 2015).

Table 1. Components of a travel plan (Cairns et al., 2002; De Gruyter et al., 2015; Gammie & Vandersar, 2003; Howlett & Watson, 2010; Roby, 2010; Rye et al., 2011; Yeates & Enoch, 2013).

Element	Description	Explanation
Context	Characteristics of the organisation, their motivations and policies.	Normally the amount and type of people effected by the travel plan are already known to the organisation, there may already be existing transport policies.
Existing transport conditions	Transport network and services in the surrounding area, travel patterns that already exist.	A baseline travel survey is usually conducted to aid the development of the travel plan.
Objectives	Statement about the goal of the travel plan.	The people who will be affected by the travel plan are often involved in the shaping of the plan.
Targets and indicators	The measures of whether the travel plan is meeting the objectives.	Also covers the awareness and uptake of the initiative.
Actions/ Measures	Initiatives used to achieve the objectives of the travel plan.	Responds to the baseline survey findings, generally soft measures are employed.
Management	Who is responsible for the implementation and continuation of the travel plan.	Normally involves the people who are already involved with the organisation, they are in charge of the how to manage the travel plan.
Monitoring and review	The method of measuring the results and ensuring that the plan is relevant throughout its life span.	Yearly surveys and reviews to analyse the direction of the travel plan, ensuring that it maintains its relevance.

The power of a TP comes from being able to deliver a package of several policy instruments, as a result a mixture of measures can be customised to the site's needs. By tailoring to the needs of the site a TP is able to offer strategies that are balanced, ensuring the use of the car is sufficiently controlled and incentives target the correct site users. Unlike Governmental policies, TPs are implemented by organisations and not by the local authorities; as a consequence TPs are effectively developed to satisfy the needs of the local user (Enoch, 2012). EEBPP (2001) says, in theory a TP which is done correctly can offer many benefits, which include organisations having happier and healthier staff, local businesses gaining opportunities, reduced congestion and improvements to air quality.

Macmillan et al (2013) further extends the benefits of a TP by arguing they could offer a means of delivering TDM strategies that can reverse the private motor vehicle domintation and create a shift towards more sustaianble forms of transportation, such as buses, trains, cycling or walking. In addition Petrunoff et al., (2016) explains the increased dependency on active forms of travel would be beneficial to alleviating the lack of physical activity that many people face.

The implementation of TPs has been studied across different land uses including offices (Cairns et al., 2010), schools (Smith, 2010), universities (Curtis & Holling, 2004), hospitals (Khandokar et al., 2017), housing (De Gruyter et al., 2015), railway stations (ATOC, 2013), airports (Ison et al., 2014) and tourist attractions (Guiver & Stanford, 2014). Different TPs have used a wide range of strategies, such as places to store bicycles, discounts for public transport, restrictions for private motor vehicle parking and carpooling opportunities (Cairns et al., 2004; De Gruyter et al., 2014; De Gruyter et al., 2017).

2.3.03 Governmental Publications Regarding Travel Plans in the UK

Interest in TPs within the UK has arisen from workplace TP initiatives in the United States and continental Europe (Cairns et al., 2010; Meyer, 1999). In the UK the Association for Commuter Transport was established in 1997 and the Minister for Transport created national guidance for workplace TPs (Newson, 1997). In 1998 the White Paper – *A New Deal for Transport: Better for Everyone* (DETR, 1998) was released and was seen as a major shift in policy and created a standard for local authorities to follow. Coupled with the legitimisation of TPs by the *Planning Policy Guidance Notes 13: Transport* (DoE & DoT, 1994). Local offices and planners now could apply more progressive transport policies without feeling they were not being credible as they had the security that the whole nation was doing it. *Planning Policy Guidance 13: Transport* was revised in 2001, making transport plans a requirement for all planning applications with significant transport implications (DETR,

2001). Subsequently Government departments, agencies and health organisations were all required to introduce TPs at their sites.

A number of notable changes were made in 1999 budget; these included changes to the tax systems to try to entice employers to create measures that would encourage employees to adopt more sustainable practices. Further benefits were added in the 2002 budget as a result of work by the Open University, WS Atkins and Napier University on behalf of the DETR (Potter et al., 2001). Potter et al. (2001) adds The Government funded the development of a TP evaluation tool in 2001, this was done to enable those who were developing TPs had a means of assessing whether their plan included the necessary elements to be successful. By having guidance more establishments were able to create more successful TPs and further enhancing their relevance as a way to create a modal shift.

Reinforcing the notion of TPs being an effective form of reducing commuter traffic Cairns et al. (2004) produced the *Smarter Choices'* report for the UK DfT. This paper was written in conjunction with the white paper – *The future of Transport* (DfT, 2004), the white paper was re-issued in December 2004 to include greater emphasis on workplace travel planning. The UK DfT launched the National Business Travel Network in February 2007 to encourage more workplace owners to adopt TPs, they also have published an update version of the national guidance on workplace TPs, which is titled *The Essential Guide to Travel Planning* (Taylor & Newson, 2008) . The release of *Smarter Choices – Changing the Way we Travel* by Cairns et al. (2004) is seen as critical in the development of TPs as it provided a series of guidance notes for any planner who was creating a TP, it also was one of the first pieces of published work to collate and show the effects of soft measures such as TPs on large workplaces. The value of TPs shown by Cairns et al. (2004) really reiterates that TPs are a viable means of creating a modal shift.

Some of the first major companies to adopt TPs in the UK were pharmaceutical companies Boots and Pfizer and communications company Orange (Kingham et al., 2001). The exposure and success these organisations gave catapulted TPs from experimental to a measure which had the potential to significantly reduce the number of SOC journeys.

When Ken Livingstone was appointed Mayor of London in 2004 he became a key influencer of transport strategies in the UK, as he promoted the ideas of transport demand management and sustainable travel planning. London became a beacon for transport policy development after the Transport Demand Management department was created, with funding and resources being directed into sustainable travel planning (Enoch & Ison, 2008).

2.3.04 Summary

During the early 1990's the UK Government started to realise the problems related to the car could not be sustainably resolved by the continued facilitation of driving. Current policies of reducing GHG emissions from travel were expensive and inefficient. Stemming from the release of *A New Deal for Transport: Better for Everyone* and *Planning Policy Guidance Notes 13: Transport* different planning policies started to appear, policies which focused on psychological approaches instead of physical approaches, such as TPs,

Overseas TPs have been used in many situations to successful reduce GHG emissions from travel. A TP is a tailored package of TDM measures and polices aimed at encouraging the use of sustainable travel options and discourage the use of SOC journeys. Due to being individually tailored to individual workplaces, TPs are able to deliver multiple policies that target specific site issues, resulting in the initiatives having a greater uptake by employees. TPs are not only beneficial to the workplace in terms of being a cost effective method of reducing congestion and GHG emissions, they are able to promote healthier lifestyles and increase employees overall happiness.

2.4 Theories of Practice and the Commute

Theories of practice have changed over time, Reckwitz (2002b) and Schatzki (1996) list Bourdieu and Giddens as two of the first key exponents to practice theory. When practitioners do a practice, they are simultaneously reproducing the practice in which they are engaged and the elements which the practice is made. Reckwitz (2002b, p. 249) describes the elements as interdependencies between forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge. Shove et al. (2012) further simplifies the elements of a practice into three key ideas: materials, meanings and competences.

2.4.01 Evolution of Practice Theory

Archer (1982, p. 455) proposed "the fundamental problem … stalk[ing] through the history of social theory" were the dualism of structure and agency. To resolve the problems of structure and agency Giddens (1984) and Bourdieu (1977) began developing their own theories for social practice.

In Bourdieu's works *Outline of a Theory of Practice* (1977) and *The Logic of Practice* (1990) there is an understanding that social life cannot be understood as simply the aggregate of individual behaviours nor can practice be solely expressed as the decisions made by individuals or determined by structures. As a result he developed his theories of social "dispositions", habitus and field (Bourdieu, 1990, p. 53),

Webb et al. (2002) say Bourdieu developed his theory of habitus and cultural field to bridge the gap between subjectivism and objectivism that have split previous theories of human practice. In *The Logic of Practice* Bourdieu writes "of all the oppositions that artificially divide social science, the most fundamental, and the most ruinous, is the one that is set up

between subjectivism and objectivism" (Bourdieu, 1990, p. 25). Habitus is described by Bourdieu in *The Logic of Practice* (1990) as a system of social dispositions gained from cultural history, which are responsible for directing an agent's actions and behaviours, in time these actions and behaviours become routinized and are conducted without the individual consciously knowing what they are doing (Bourdieu, 1977).

Bourdieu believed practices are heavily influenced by the habitus an agent has gained throughout their life. Webb et al. (2002) explains consciously agents do things and think in strategic ways by practicing what is advantageous to themselves, but at the same time they are influenced or driven unconsciously by the values and expectations coming from their habitus. Agents may know consciously that they are manipulating the game, but they do not know that their motives, goals and aspirations are not spontaneous or natural, but are a result of their habitus.

On the other hand Giddens (1984) uses "structuration" to bypass the dualistic thinking of "structure" and "agency", and to acknowledge that all actions done by humans are a result of predetermined behaviours related to the social structures in which we live. Structures of rules and meanings enable and shape human actions, the structures themselves are at the same time reproduced in the flow of human actions (Shove et al., 2012). Giddens emphasises actions for the greater part are not consciously conducted. The capability to continue a largely routinized social life depends on the acquired practical knowledge and is dictated by the structural features of the social systems that shape daily life.

Schatzki (2002, p. 73) suggests that practice theory promotes the idea that people continuously repeat behavioural norms with their own "teleoaffective" logic. Once an individual has been enveloped into a practice, the practice carries them effortlessly along without them realising (Shove & Pantzar 2007). In a way "wants and emotions" do not belong to the individual anymore but rather are a part of the practice (Schatzki, 2002, p. 254).

Leading to most people being unaware that they are "carriers" of a practice (Reckwitz, 2002a, p. 252). However these are theories that are not set in stone and there is still scope for human will (Reckwitz, 2002b). Shove and Pantzar (2007) state people do not always rigidly follow a particular practice as shown by studies that have proved that people are able to use improvisation to amend the practice.

Bourdieu's theories of practice have been developed to include a post-humanist stance by Reckwitz, Schatzki, Shove and many others; practice now recognises the agency of materials, technologies and objects in the construction of the daily lifestyle (Reckwitz, 2002a; Shove & Pantzar., 2007; Shove et al., 2012; Strengers & Maller, 2012). The inclusion of these normally external factors as co-practices that have an active role as materials, objects and infrastructure, are a result of the increasingly technologically dependent social world where electronics have a huge effect on the health and wellbeing of people (Maller, 2015).

2.4.02 What is a Practice

Reckwitz (2002b, p. 249) defines a practice simply as "a routinized type of behaviour which consists of several elements, interconnected to one another". Shove et al. (2012) writes that Reckwitz's definition can be slightly misleading because habits are also just a routinized behaviours performed by individuals, interpreting the definition in such a way would overlook the recursive nature of practices. To explain the difference between practice and habits Reckwitz (2002b) says practice exists as a block or a pattern of which the inside is filled with a number of single and often unique actions. Similarly Schatzki (1996, p. 89) describes practice as "a temporally and spatially dispersed nexus of doings and sayings."

Taking the idea of the block or pattern further Reckwitz suggests practices consist of interdependencies of diverse elements such as forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge" (Reckwitz, 2002b, p. 249). To

illustrate the definitions of practice by Schatzki and Reckwitz, Shove et al. (2012) uses the analogy of the practice of skateboarding to describe how competences, meanings and materials can be translated into reality. The practice of skateboarding requires a complex combination of skateboards, spaces and skills in order to ride the board and perform tricks; within the practice there are rules and norms which define skateboarding as a practice; there are meanings found within the skateboarding community and meanings from outsiders. The recognisable conjunction of elements turns skateboarding into an entity which can be talked about and repeated (Shove et al., 2012).

Social practices are those that have clear entities which have their own unique histories and trajectories, they have obvious signs that they are being practiced (Shove & Pantzar, 2005; Shove et al., 2012; Warde, 2005) by the carriers (Reckwitz, 2002b). Through the association of various combinations of elements and repetition over time, theorisation about the evolution of the practice over time can be conducted (Shove and Pantzar, 2007; Shove et al., 2012; Warde, 2005). Practice entities are not the behaviours of individuals but rather units of analysis and change (Maller, 2015).

As a way to simplify the elements of practice described by Reckwitz (2002b), Shove et al. (2012) uses a scheme based on only the elements of materials, competences and meanings. In the theories of Bourdieu (1984) and Giddens (1984) "things" do not feature prominently because there is a heavy focus on the social aspects of practice. However objects and things are important to both Reckwitz and Schatzki who have explored how practices are fundamentally related to and interwoven with objects (Shove et al., 2012). Røpke (2009) proposes things should always be treated as elements of practice. The theory of practice by Shove et al. (2007) incorporates things under the theme materials, within this theme includes elements of objects, infrastructure, tools, hardware and the body itself.

Know-how, background knowledge and understanding are crucial in Giddens' (1984) theory of practice, all of which are put together into the theme competences by Shove et al. (2007) to form the second of the three elements of practice. The last element of practice used by Shove et al. (2007) is a combination of what Reckwitz describes as mental activities, emotional and motivational knowledge. This broad element is known as meaning and is used to represent the social and symbolic significance of participation. Shove et al. (2012) use the idea of practices as being defined by the relationships between the three elements.

The three elements of practice (competences, meanings and materials) proposed by Shove et al. (2012) can be used to describe patterns of routinized behaviours with unique entities, such as skateboarding, driving, cycling or walking. The unique combination or pattern of elements found within a social practice results in each practice having its own identity and it is clear when they are being performed.

2.4.03 Summary

Over time theories of practice have changed and evolved to accommodate for an ever-changing world. Bourdieu (1977) and Giddens (1984) are two of the pioneers of theories of practice. Although both Bourdieu and Giddens are trying to explain why agents perform and repeat practices, there are major differences between their theories. Bourdieu tries to explain practice through habitus and social dispositions, while Giddens focuses on structuration.

The theories of practice from Bourdieu (1984) and Giddens (1984) explore practices in nearly an entirely social context through exploration of the competences and meanings of practice. Reckwitz (2002b), Schatzki (1996) and Shove (2012) incorporate materials or "things" into their theories of practice in able to explore the various ways in which practices are intrinsically linked with objects (Schatzki, 2002). The myriad of interconnected elements forms the basis of the theories of practice from Reckwitz, Schatzki and Shove. A practice is a block or pattern of routinised behaviours created by the interactions between elements.

Shove et al., (2007) categorises the elements of practice into three categories known as competences, materials and meanings. Competences are elements which relate to skills, know-how and techniques, materials are “things”, physical objects and technologies, while meanings encompass the ideas, aspirations and symbolic meanings that an agent may encounter.

3. Methodology

3.1 Introduction

The project will focus on the practice of the commute for students and staff at three Greater Manchester (GM) Universities (MMU, UoM and UoS). AS of 2017 the three biggest Universities within GM in terms of students and administrative staff numbers are UoM, MMU and UoS, combined there are nearly 75,000 students and 15,000 members of staff who have to commute in order to access the three universities.

Tables 2 and 3 show the largest university in terms of members of staff and student population is MMU with just over 30,000 and the smallest university is UoS with a combined total of 17,310 students and members of staff (HESA, 2017). In addition to having large numbers of staff members and students, the three universities have implemented TPs to reduce commutes that are private car orientated. The main MMU and UoM campuses are located within Manchester City Centre (MCC) as shown Figures 1 and 2, while UoS is located in Salford half an hour's walk away from MCC shown by Figure 3.

Table 2 The distribution of undergraduates and post graduates within MMU, UoM and UoS (HESA, 2017).

University	Undergraduate	Postgraduate	Total number of students
The Manchester Metropolitan University	25270	4920	30190
The University of Manchester	20670	6115	26785
The University of Salford	14225	3085	17310

Table 3. The distribution of staff with MMU, UoM and UoS (HESA, 2017).

University	Academic Staff	Non- academic staff	Total staff
The Manchester Metropolitan University	2435	1880	4315
The University of Manchester	4945	5315	10260
The University of Salford	1335	1135	2470

Figure 1 Location of the MMU campus in relation to MCC (MMU, 2018)

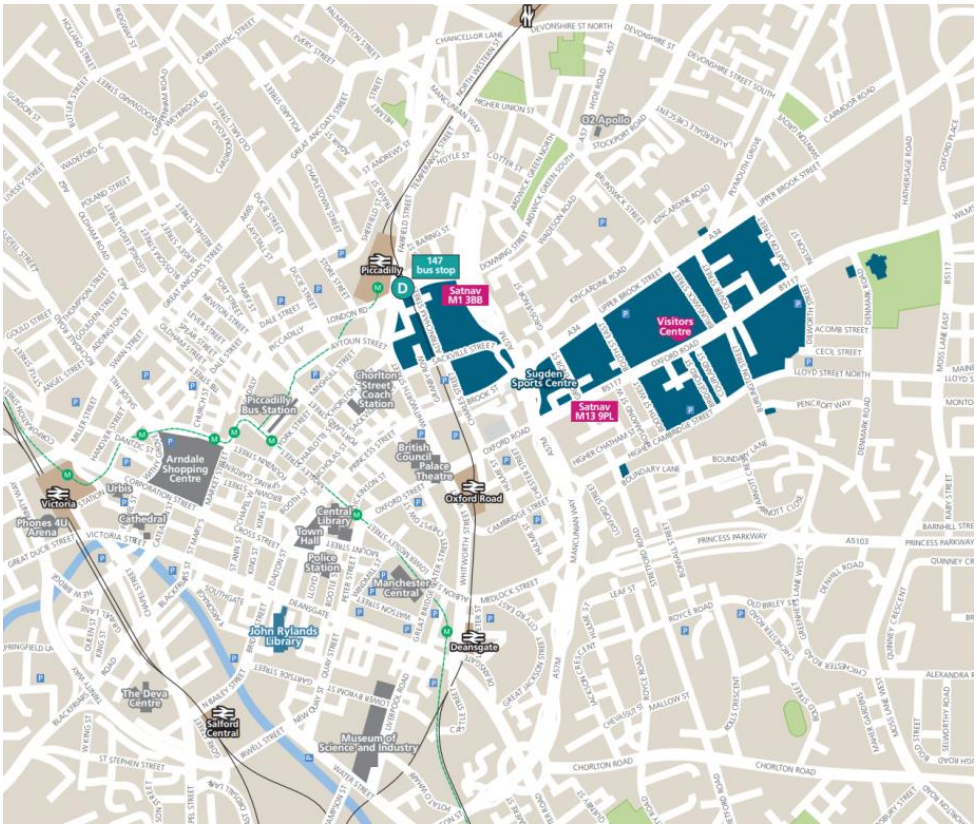

Figure 2 Location of the UoM campus in relation to MCC (UoM, 2018)

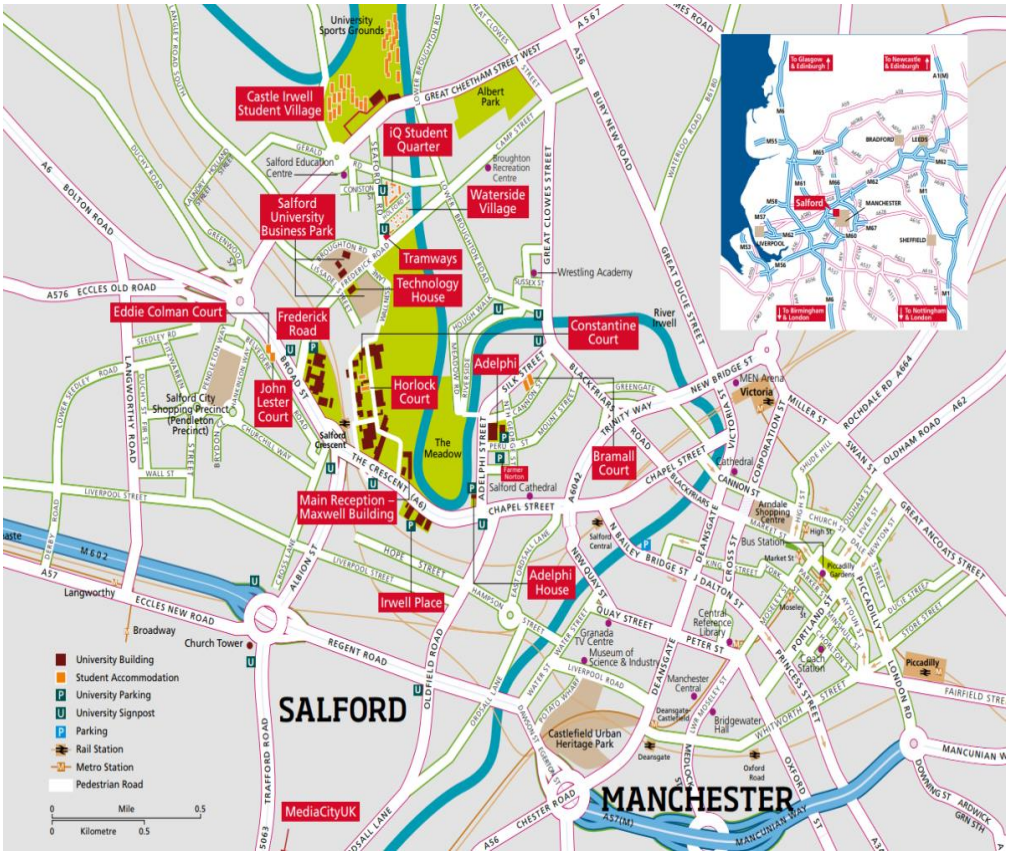

Figure 3 Location of the UoS campus in relation to MCC (UoS, 2018)

3.3 Interviews and Focus Groups

Measuring the behaviour of commuters is important to gauge the effectiveness of TPs; the most common way in which this is conducted is through the use of questionnaires or travel surveys, whether it be face to face or online. Normally travel behaviours are assessed through comparison of surveys before and after the implementation of the TP (Ampt et al., 2009). The high rate of use of surveys has raised concerns over the reliability and validity of the data, [[[is due to the low response rates and not being able to capture a complete set of results that are representative of the modal share.

There appears to be little evaluation of workplace TPs, beyond the simple comparison of data before the implementation of a TP and after TP implementation (Wake et al., 2010). Although a simple before and after comparison of data can be useful for estimating the baseline mode shares and providing useful input for the development of a TP there are many downsides of using it as the sole method to collect data. One such shortcoming is the quality of the data collected for one objective may not be sufficient for another, for example Miralles – Guasch and Domene (2010) compared the change in the method chosen for the commute which could have been influenced by the TP. Small inaccuracies in the baseline data may seem insignificant for a standalone study, but these small inaccuracies could hide changes recorded during a follow up survey. Bonsall (2008) suggests that quantitative data collected on sustainable travel behaviour is highly prone to response and reporting bias, likely making it inaccurate.

Watts and Stephenson (2000) targeted 500 out of 5800 staff to complete a questionnaire regarding their journeys to work, although the random sample was stratified by staff type there was only 184 usable responses (37.5% response rate), which equates to about 3.5% of the total workforce. Sullivan and Percy (2008) notes that it is often very difficult to achieve a five percent response rate.. Although the response rates are relatively low they do not pose a

huge problem to the baseline result, the response bias raises the notion that slight changes may not be a result of the TP when compared to a follow up survey.

By using more qualitative means of primary data collection some of these biases can be mitigated, this is shown in the study by Cass and Faulconbridge (2016) where they interviewed participants about their commuting habits. Instead of targeting participants and receiving responses a snowballing method was conceived where one participant would recruit another for the study, this method meant that the participants did not have to be representative of the total population as what was sought is a range of experiences that could be explored in depth.

Qualitative research methods are used to gather primary data as they can provide a breadth and depth to research, through identifying the variety, extent, quality and nuances of beliefs, understandings, explanation, supporting societal narratives and discourses, empirical details and identity related justifications for social actions (Cass & Faulconbridge, 2016). Explanations of context were drawn out by probing the underlying factors and motivations, through qualitative methods, while conscious norms, values attitudes and other factors hidden within routines were also unearthed (Lucas, 2013; Schwanen et al., 2011). By using open ended questions, the knock-on effects, consequences and limits of behaviour change were observed, while contextual factors that affect the travel choices were explored much further than it is possible with a survey or questionnaire (Lucas, 2013). Qualitative research was undertaken in this thesis to provide crucial insights into behaviour change that quantitative surveys were unable to provide (Chatterjee, 2009; Cohen, 2010; Thogersen, 2009).

Primary data was collected through the use of interviews and focus groups with students and staff of all three universities. Focus groups were used, because they are able to assess a large number of participants without them feeling the pressure and intimidation of an interview

(Maller, 2015), Hitchings (2012) noted that not everyone has the ability or feels comfortable to openly talk about some practices within a structured or semi-structured interview. A series of interviews were useful for this thesis, as people were able to open up much more about mundane topics (such as daily commutes) than in the questionnaire (Hitchings, 2012). In total 13 travel interviews were conducted, 3 with students and 10 with members of staff. Member of staff preferred to be interviewed instead of partaking in the focus groups because they could not commit to the time needed for a focus group. Two interviews were conducted with travel and sustainability officers of UoM and UoS to compare their motivations for TP implementation and whether they are the same as the needs of the students or staff. Participants of the focus groups and interviews will be anonymized as shown in Table 4.

Table 4 Abbreviations used to anonymize focus group and interview participants.

Participant	Abbreviation
Student Interview Participant #	StuIP#
Staff Interview Participant #	StaIP#
University of Manchester Sustainable Campus Officer	UoMSCO
University of Salford Environmental Sustainability Officer	UoSESO
University of Salford Travel and Transport Officer	UoSTTO
Focus Group 1 Participant	FG1P#
Focus Group 2 Participant	FG2P#

An exploration into the social practices and habits that related to sustainability regularly entails digging into the subtle nuances of everyday life (Browne, 2016). Focus groups have been extensively used in studies of market research and consumer sciences, such as Holbrook and Jackson (1996) and Grandclément and Gaglio (2011). Simons et al. (2014) used focus groups to understand the rationale behind choices of transportation of young adults, while Gardner and Abrahams (2007) looked more specifically at the motivation of commuters using the car to commute. Within the field of human geography focus groups have the power to offer opportunities where the researcher can encourage participants to talk about difficult to access experiential knowledge, meanings and opinions (Hopkins, 2007).

Within the focus groups a safe space for conversation was created, where participants could share stories about themselves, friends or family (Browne, 2016).

An understanding of commuting patterns was gained by conducting two focus groups with members of staff and students, a maximum of eight were in each focus group because this is the optimum number of people (Hakim, 2000). Each focus group included a range of different people including a combination of car drivers, cyclists, walkers and public transport users. Focus group one (FG1) included 6 participants and focus group two (FG2) had 4 participants.

3.4 Recruitment

26 participants were recruited using 'snowball' or 'chain' sampling because it had the ability to lead to dynamic moments of unique interactional social knowledge being created (Denzin & Lincoln, 2011; Hay, 2000; Limb & Dwyer, 2001). Snowball sampling is achieved by finding participants through other participants, when repeated the researcher will be able to expand their network of participants (Noy, 2008). Snowballing is a particularly effective tool for obtaining information and accessing the 'hidden populations' (Noy, 2008). There was a danger with employing this sampling strategy as gaining further participants was solely dependent on the impression left on the participants and whether they trusted and sympathised with the researcher, if the participants felt discontented after the focus group they were unlikely to supply a referral (Noy, 2008). To ensure a reasonable turnout for each focus group over recruitment will be employed, as not all of the participants are likely to be present (Wilkinson, 2008).

In order to comply with UoS ethics, an ethics form was completed before any primary data collection, the ethics approval letter is included within the appendix. To ensure participants understood how they would remain anonymous throughout the study and how the data

acquired would be used within the study a datasheet was provided and a consent form was signed by the researcher and the participant prior to any data collection. Copies of both the consent form and information sheet are included in the appendix

3.5 Analysis

If managed properly qualitative data can produce meaningful findings (Miles & Huberman, 1994) To transcribe and analyse the data a programme called NVivo was used. Nvivo is software that is designed to facilitate the categorisation, and analysis of qualitative data, such as data in this research project.

The acquired data was thematically analysed. Thematic analysis (TA) is a method for systematically identifying, organizing, and offering insight into patterns of meaning (themes) across a data set (Braun et al., 2014). The aim of conducting TA was not to single out unique or individual meanings or experiences within the data set but to collect together any likely themes. By using this software, connections within the qualitative data were discovered and new insights acquired.

The qualitative data that was collected was highly detailed and complex, Clifton and Handy (2001) suggest that heuristic frameworks are useful for exploring detailed and complex data. Practice theory is able to address the micro and macro scale of social structure and actions through the concept of practice. When practice is taken as the unit of analysis the materials, meanings and competences behind each commuting practice is revealed and the barriers preventing the uptake of sustainable transport were uncovered.

As Cass and Faulconbridge (2016) found the practices of commuting are different from the practice of travelling for leisure because they are conducted for different purposes. The purpose of commuting practices is to travel from the place of residence to the place of work and then back again. The thesis will explore both the commute as a practice and as the

purpose for travel because each mobility practice used for commuting has its own competences, materials and meanings.

4. Review of Travel Plans

4.1 Introduction

This chapter will explore the literature on existing TP case studies through a systematic literature review (SLR) and analyse the TPs of the three GMU. The SLR will first explore the motivations behind why the TP was implemented by the case studies in the literature, and then look at how the existing TP initiatives are monitored. Next the review will delve into the TDM measures used by the case studies and the effects that these measures have had on the modal share.

The information learnt from the SLR will be used as a comparison to the data in the three university TPs. Exploring the motivations behind the TP implementation, the TDM measures implemented by the TP and the effect the TP has had on the university and the surrounding area.

The SLR and TP analysis of the three GMU aims to identify how TPs are able to create a modal shift towards forms of transport that are sustainable.

Specific research objectives include:

- To identify the motivations behind implementing a TP in a large workplace.
- To evaluate how different TDM measures have been employed by large workplaces and their relative success

The SLR will meet the overall aim of the thesis by understanding the motivations behind implementing a TP in order to identify whether the effectiveness of the TP if is decreased if they become part of governmental planning policies. Also do compulsory motivations effect the willingness of employees to use sustainable transportation systems. Each large workplace is unique in its situation and location, but by exploring the TDM measures

implemented by the TP patterns can be observed, and can these patterns explain if a TP will be successful at promoting sustainable travel.

4.2 Systematic Literature Review

4.2.01 Methodology

A SLR of academic research and industry reports was conducted to consolidate knowledge on existing workplace TPs and their effectiveness at reducing SOC travel. The data attained from the SLR will be used as a framework to analyse the TPs of the three GMU. A review done systematically was undertaken as it can bring together results of primary investigations to form reliable answers to questions (Cooper & Hedges, 1994; Higgins & Green, 2008; Petticrew & Roberts, 2006).

To source the literature three databases were searched: Science Direct, SCOPUS and Web of Science. Some of the search terms that were used include TPs, travel demand management plans, green transport plans, mobility management plans and trip reduction plans. The full search strings and the number of articles found in each database can be seen in Table 5.

Table 5. Databases used in the SLR, the search strings used, and the number of articles found in each database which explored travel plan case studies.

Database	Search string	Number of articles which explored travel plan case studies
Web of Science	TS = (Travel plan OR Transport Demand Management OR Green Transport Plan OR Mobility Management plan OR Trip Reduction plans) AND TS = (Workplace OR University OR Higher Education or Office* or Hospital or railway station or shopping centre or Sporting venue or Airport) NOT (Bio* or Chronic or * Illu* or Engineer* or Hepa* or Transaction* or Physic* or Vaccin* or Poet* or Chem*) NOT SU= (Business Economics or Healthcare Science Services or Engineering or Computer Science or Public Administration or General Internal Medicine or Communication or Film Radio Television or Education Educational Research or Paediatrics or Parasitology or Infectious Diseases or Robotics or Research Experimental Medicine or Automation Control Systems or Mathematics or Geriatrics Gerontology or Surgery or Respiratory Systems or Rehabilitation or Pathology or Orthopaedics or Operation Research Management Science or Nursing or History or Gastroenterology Hepatology or emergency Medicine or Anatomy Morphology or Agriculture)	12
SCOPUS	ALL (Travel plan OR Transport Demand Management OR Green Transport Plan OR Mobility Management plan OR Trip Reduction plans) AND TS = (Workplace OR University OR Higher Education or Office* or Hospital or railway station or shopping centre or Sporting venue or Airport) NOT (Bio* or Chronic or * Illu* or Engineer* or Hepa* or Transaction* or Physic* or Vaccin* or Poet* or Chem*) And (Exclude (Subjarea , "Engi") Or Exclude (Subjarea , "Comp") Or Exclude (Subjarea , "Busi") Or Exclude (Subjarea , "Medi") Or Exclude (Subjarea , "Econ") Or Exclude (Subjarea , "Math") Or Exclude (Subjarea , "Deci") Or Exclude (Subjarea , "Eart") Or Exclude (Subjarea , "Agri") Or Exclude (Subjarea , "Bioc") Or Exclude (Subjarea , "Mate") Or Exclude (Subjarea , "Nurs") Or Exclude (Subjarea , "Phys") Or Exclude (Subjarea , "Ceng") Or Exclude (Subjarea , "Heal") Or Exclude (Subjarea , "Chem"))	17
Science Direct	(Travel plan OR Transport Demand Management OR Green Transport Plan OR Mobility Management plan OR Trip Reduction plans) AND (Workplace OR University OR Higher Education or Office* or Hospital or railway station or shopping centre or Sporting venue or Airport) AND NOT (Bioc* or Biol* or Chronic or Illu* or Engineer* or Hepa* or Transaction* or Physic* or Vaccin* or Chem*).	19

Using measures such as searching multiple databases, snowballing and including studies from around the world ensured that the search has captured as complete as set of papers as possible.

The focus of this SLR is to collate and explore literature regarding large workplace TPs in order to meet the overall objective of this thesis plans. The study omitted studies conducted within smaller organisations, such as school as the number of students or staff are not comparable to that of a university. Organisations with a comparable number of people affected by the TP include hospitals, shopping centres, and sporting venues. Articles that studied areas of housing were not included because they are not classified as workplaces. Articles reviewing TPs for the development of existing sites were included, but articles which review TPs that have not been implemented were omitted, this is done in order to obtain data that has actually been collected and is not just hypothetical. Although this study focusses on the commuting patterns it is useful to understand and explore the different scenarios where people travel as there could be issues and solutions that overlap. Only articles which studied the effects of TP policies on a case study were included, this was so changes in modal share could be compared with each other and the TPs of the three GMU. The articles that explain the premise behind a TP or certain TDM measures, such as carpooling, parking restrictions etc., were omitted or used as supporting evidence as they do not contain results comparable case studies. Articles which use hypothetical models to show a possible modal shift due to a TP policy were omitted as the results are estimations and cannot be compared to results from a TP case study.

By scanning the title, abstract and introduction a total of over 200 publications were deemed to be related to TPs or plans that have implemented TDM measures, further examination through the abstracts and introductions found 48 publications that explored case studies of existing workplaces with TPs, this can be seen in Table 6. Of the 48 possible studies only 31

of them explored policies for large existing workplaces, a large workplace is one that consists of over 1000 employees as shown in Table 6.

Table 6. Criteria and justification for publications.

Criteria	Justification	Number of articles identified
Relating to travel demand management (TDM), travel plans, green transport plans, mobility management plans, trip reduction plans.	Purpose of the SLR is to explore current literature on the effects of the implementation of TDM measures in large workplaces.	Over 200
Study was conducted on an existing workplace.	In the UK all new developments are required to create a travel plan before planning permission is granted (Rye et al., 2011). Existing workplaces implement travel plans primarily to address onsite problems and are predominantly done voluntarily. This changes the motivation and willingness of the workplace to partake in a travel plan.	48
Workplace is large, defined by Ampt et al. (2009) as a workplace with a population of over 1000.	Universities are large workplaces that have a large number of students and staff. Small workplaces are incomparable due to the scale of problems faced and motivations for implementation of a travel plan.	31
Study explores the results of the overall travel plan/s and not just the effect of a TDM measure.	A workplace that implements a TMD measure does not necessarily have a travel plan policy. Overall study is researching the effects of travel plans as a whole on the commuting patterns, in order to have data that is comparable.	6

From the 31 publications only six were deemed suitable for the SLR after further screening because the other 25 explored individual TDM measures and not the results of the TP, the six articles selected for the SLR can be seen in Table 7, Table 7 also shows the where the case studies within the literature are located.

Table 7. Publications used for the SLR.

Title	Sustainable Campus Transportation Through Transit Partnership and TDM, a Case Study of The University of Florida	Physical Activity by Stealth? The Potential Health Benefits of a Workplace Transport Plan	Delivering Sustainable and Integrated Bus Network in a De-regulated environment: a Comparative Study of a Higher Education Institute and Pharmaceutical Company	Carrots and Sticks Vs Carrots: Comparing Approaches to Workplace Travel Plans Using Disincentives for Driving and Incentives for Active Travel	Effects of a Workplace Travel Plan Intervention Encouraging Active Travel to Work: Outcomes from a Three-Year Time-Series Study	Evaluating an employer transport plan: effects on travel behaviour of parking charges and associated measures introduced at the University of Sheffield
Author	Bond & Steiner	Brockman & Fox	Copsey, Waters, Elliot & Southern	Petrunoff, Rissel, Wen & Martin	Petrunoff, Wen & Rissel	Watts and Stephenson
Aim/ Objective	Can TDM measures be used to change the way students and staff travel	To investigate the effect of a workplace travel plan, which mainly focused on restricting parking opportunities, on levels of active commuting and its contribution to public health?	The paper attempts to determine the reason behind the University of Hertfordshire and the pharmaceutical company, Pfizer adopting their respective travel approaches and discusses which approach best provides a sustainable model for implementing local public transport solutions for other counties/ organisations to learn from.	Comparison of 2 travel plans as a retrospective, controlled before and after study in 2006 and 2013, to inform the development of active travel plans.	To evaluate the effects of a three-year workplace travel plan intervention on increasing active travel to work.	This paper attempts to establish whether the ETP reduced car use amongst employees, and what facilitated or impeded its effects.
Year	2006	2011	2014	2015	2016	2000
Organisations' travel plan reviewed	University of Florida	University of Bristol	University of Hertfordshire Pfizer Pharmaceutical Company	Queen Elizabeth II Hospital Hollywood Private Hospital	Liverpool Hospital	University of Sheffield
Country	USA	UK	UK	Australia	Australia	UK

4.2.02 Motivations for Implementing a Workplace Travel Plan

This section will explore why organisations are motivated to implement TPs, generally these motivations can be grouped into two broad categories: externally compulsory, internally voluntarily (Roby, 2010). Externally compulsory encompasses themes where a TP document is required in order to gain planning permission, while internally voluntarily includes motivations to respond to specific environmental or social onsite issues (Potter et al., 1999). The next part of this section will delve into the motivations of the literature identified for the SLR, these motivations will be compared to the motivations of the three GMU plans. Understanding the motivations behind implementing a TP is essential in order to understand why TPs progress and evolve.

Roby (2010) explored how motivations for implementing a TP have changed over time and the effect different motivations have on the long term success of the TP. Potter et al., (1999) reviewed different organisations who had implemented TPs and found there were three distinct themes of motives for implementation: motives where the environment was a factor, motives in order to gain planning and development permission and motives linked to estate management issues or would benefit staff. Rye (2002) updated the three main motivation themes found by Potter et al. (1999) by splitting environmental motives into creating a positive image and leading by example, the key motivations described by Rye (2002) can be seen in Table 8. The two themes of motivation created by Rye (2002) are normally exhibited by companies who have a strong environmental ethos or hold a great deal of influential power, such as governmental organisations and environmental organisations. These types of organisations try to use their power to promote sustainable practices through TPs and inspire others to follow suit.

Table 8. Key Motivations of travel plans.

Motivation	Explanation	Case study
Estate management, accessibility and amenities	This theme includes a variety of site-specific problems, such as parking, accessibility and onsite congestion problems. In many cases addressing a parking problem is the primary motivation, but there is not enough space or resources to accommodate for expansion. In other cases, a travel plan is seen as a cost-effective remedy to the parking situation. An example of where travel plans have been used to address parking is in hospitals, where the income supplemented by parking charges could be attractive. A travel plan may also stem from the organisation's land space being limited and being used for more commercially viable purposes.	Bond and Steiner (2006)- University of Bristol Copsey et al. (2014)- University of Hertfordshire Copsey et al. (2014)- Pfizer Pharmaceutical Company Petrunoff et al. (2015)- Hollywood Private Hospital Watts and Stephenson (2000)- University of Sheffield
External regulation	Travel plans are increasingly being instigated in order to conform to planning regulations. For example, in the UK section 106 of the Town and Country Planning Act (1990) is a powerful tool the local authorities have to encourage travel plans. This section allows local authorities to create a legal agreement with the developer that they have to implement provisions of travel sustainability.	Petrunoff et al. (2015)- Queen Elizabeth II Hospital Petrunoff et al. (2016)- Liverpool Hospital
Creating a positive image	Corporate beliefs are able to motivate companies to develop and follow a travel plan. Being motivated in this way is heavily reliant on the ethos and environmental values of the organisation. Examples of such organisations are the Royal Society for the Protection of Birds and The Body Shop who have created travel plans which reflect their environmental beliefs.	
Leading by example	Government departments and local authorities are being pressured to lead by example in order to inspire other companies to follow suit. Some companies' core business model revolves around being at the forefront of environmental market and it is in their commercial interest to lead by example in developing environmental approaches or products.	Bond and Steiner (2006)- University of Florida

Table 8 shows the primary motivations each case study had for implementing a TP; five of the TPs explored by the publications were motivated to create a TP in order to ease site specific problems of estates management, accessibility and amenities.

This supports the evidence of the importance of addressing onsite issues in order to create a successful TP highlighted by Cairns et al (2010). Although the TPs were all addressing the

issue of car parking and its management, they employed different strategies as each location is unique in its situation and surroundings. While Brockman and Fox (2011) opted to tackle the issue by limiting parking spaces and tightening the conditions to obtain a parking permit as way of the stick, Bond and Steiner (2006) adopted more of a carrot approach where they used bus initiatives to create a modal shift.

Uptake and continuation of the TP can be dependent on the motivation as found in Roby (2010). For those who have developed their TPs in relationship to creating a better self-image or to tackle on site issues there was a higher uptake and the motivation to continue and renew the plan was much greater similar the results found by Potter et al. (1999). For those whose primary motivation was to gain planning permission Cairns et al. (2010) found many of the participants also cited perceived problems on their own sites and altruistic reasons for implementing a TP as secondary motivations, these secondary motivation were sometimes the cause for the TP to be renewed. But this was highly dependent on the company seeing value in continuation of the TP initiative. After the compulsory implementation of the initial TP, workplaces may not have the impetus to continue having a TP due to a lack of governmental stimulus. Often these TPs do not have the desired effect because initiatives are not get embedded into the workforce and the TP is discontinued without contributing to tackling the onsite problems.

The motivation for implementing a TP sets the tone of the whole scheme, sometimes they are part of the requirement to gain planning permission and others they are done voluntarily to benefit the environment and the workforce. The ultimate success of the TP is down to the integration into the workforce, and a workforce who is motivated to partake in a TP often leads to a greater modal shift towards active transport.

4.2.03 TDM Measures Implemented Through Travel Plans

The main goal of a TDM measure is to influence travel behaviour, Meyer (1999, p. 576) describes the measures as ‘ any action or set of actions aimed at influencing people’s travel behaviour in such a way that alternative mobility options are presented and/or congestion is reduced.’ A TDM measure is a way to reduce the demand for travel by single occupancy motor vehicles, instead of catering for the demand or managing the road networks on which the cars travel (Ison & Rye, 2008). TDM measures have been employed primarily to address issues of traffic congestion, but they also have been used to improve air quality and to reduce the reliance SOCs. TPs act as means of delivering TDM measures to address on site issues and sometimes some area wide issues such as lack of cycle lanes for cyclists or public transport infrastructure.

According to Meyer (1999) TDM measures within TPs can broadly be grouped into three types of actions to address different aspects of transport, which includes commutes, business travel and fleet vehicles. The actions are:

- Giving travellers the option of using alternative modes of transportation to the SOC.
- Creating incentives/disincentives or carrots and sticks to reduce SOC travels
- Creating ways in which the trip purpose can be accomplished without the need to travel, such as teleworking.

A TP normally implements a variety of TDM measures to maximise the potential of creating modal shifts, this does not mean they try to implement as many measures as possible though. Table 9 shows how the reviewed TPs of the SLR have implemented a mixture of TDM measures and the general classifications that they fall under. Cairns et al. (2010) says it is not necessary that a TP does every measure imaginable as long as the measures being employed are attractive alternatives to using single occupancy motor vehicles.

Table 9. TDM measures used by each case study, adapted from Meyer (1999) and Enoch & Zhang (2008).

Category	Tool	Organisation
Creating the option for alternative modes of transportation		
Public transport	Providing information for public transport	Liverpool Hospital (AUS), University of Sheffield (UK)
	Access to rail planner	
	Negotiating with local public transport operators for new or better services at cheaper prices	University of Florida (USA), University of Sheffield (UK)
	Paying for new services	University of Bristol (UK), University of Hertfordshire (UK), Pfizer Pharmaceutical Company (UK)
Cycling	Pool bikes	
	Providing better facilities for cyclists	University of Florida (USA), University of Bristol (UK), Pfizer Pharmaceutical Company (UK), Queen Elizabeth II Hospital (AUS), Hollywood Private Hospital (AUS), Liverpool Hospital (AUS), University of Sheffield (UK)
	Encouraging cycling	Hollywood Private Hospital (AUS), Liverpool Hospital (AUS), University of Sheffield (UK)
	Schemes for loaning bikes	
Walking	Providing better walking facilities	University of Florida (USA), University of Bristol (UK), Queen Elizabeth II Hospital (AUS), University of Sheffield (UK)
	Encouraging walking	Liverpool Hospital (AUS)
Car sharing	Prioritised car parking spaces for car sharers	University of Florida (USA),
	Scheme to guarantee a ride home	University of Florida (USA), University of Bristol (UK)
	Promotion of car share databases	University of Florida (USA), University of Bristol (UK), Pfizer Pharmaceutical Company (UK), Queen Elizabeth II Hospital (AUS), Liverpool Hospital (AUS),
Incentives/Disincentives or ways to push trips towards off peak hours		
Incentives	Incentives for walkers	Pfizer Pharmaceutical Company (UK), Queen Elizabeth II Hospital (AUS)
	Discounts on bicycle and equipment purchase	University of Bristol (UK)
	Providing subsidies for public transport	University of Florida (USA), University of Bristol (UK), Pfizer Pharmaceutical Company (UK), Queen Elizabeth II Hospital (AUS), Liverpool Hospital (AUS)
Disincentives	Reducing parking supply	University of Florida (USA), University of Bristol (UK), Queen Elizabeth II Hospital (AUS), University of Sheffield (UK)
Non-transport means		
Technology/ operations	Flexible working hours	
	Telecommunication/ Teleworking/ Teleconferencing	
Culture	Creating a culture that is car-free	

People are often unaware of the alternative modes of transportation available to them (Sloman, 2004). The TP for the Queen Elizabeth II Hospital in Australia provided promotional material and educated its staff on the public transport systems available to them, Petrunoff et al. (2015) who reviewed the TP found this method was able to significantly raise awareness of the transport resources available to the staff.

Car-pooling and car sharing programmes are measures that are commonly adopted in TPs. Strategies of car-pooling and car sharing are frequently used in tandem with car parking policies, where car-poolers or car sharers receive preferential treatment through dedicated parking spaces seen in the TPs at the University of Florida reviewed by Bond and Steiner (2006). Another measure that is commonly adopted within TPs is car-pooling, Bond and Steiner (2006) explored a TP which instigated a carpooling programme that allowed car-poolers to gain preferential parking spaces. Another publication whose TP implemented a car pooling programme was Petrunoff et al. (2016).

Initiatives to increase the use of active transport are also prevalent. Measures employed within TPs usually are on a smaller scale, such as creating pedestrian routes, cycle lanes, lockers, shower facilities and cycle racks. Among other TDM measures the University of Sheffield TP reviewed by Watts and Stephenson (2000) has introduced information for walkers which included increased signage relating to walking paths. Building infrastructure for cyclists, whether it is cycle racks or showers, is a policy used in seven out of eight workplace TPs, showing the importance travel planners have placed on facilitating the cycling practice in order to encourage more site users to take up this form of commuting.

Larger initiatives to increase the use of active transport include working with local organisations to provide new services, such as the free bus service at the University of Bristol that served local bus and train stations, the bus service created and owned by the University of Hertfordshire to move students between its campuses and the local hospitals,

and the Pfizer subsidised contract buses for their employees to serve the Sandwich site. Copsey et al (2014) found there were difficulties between Pfizer and the external bus operator which resulted in the service not reaching its full potential, even without reaching full potential the service Pfizer provided successfully reduced their employee travel impacts on the local community.

Bus initiatives have the potential to not only reduce employee travel impacts but also affect the wider community through the provision of infrastructure and services as in the case of the University of Hertfordshire. The impact on the community is dependent on how the relationship between the bus operator and the organisation, Pfizer's bus route was solely provided and subsidised by the company itself and community users could not afford the fare, as a result the removal of the funding led to the service stopping. As a result this bus service model is unsustainable unlike the model the University of Hertfordshire created which serves the needs of not only the university but also the needs of the wider community (Copsey et al., 2014).

TPs normally employ initiatives to supply incentives and or disincentives in order to make the sustainable or active forms of travel more effective or appealing to the workforce. Incentives include discounts on public transport tickets and avoiding taxation by having travel expenses coming directly out of an employee's salary (see: Potter et al. (1999) for more information on taxation in the UK). Disincentives are likely to be in the form of car parking as a TP is trying to persuade workers not to use single occupancy motor vehicles. The TP Bond and Steiner (2006) reviewed, increased parking prices and introduced parking restrictions, while the TP reviewed by Brockman and Fox (2011) reduced the number of parking spaces, made the requirements to gain a parking permit more difficult and increased the parking charge for those without a permit.

The priorities for workplaces that have implemented TPs are to promote existing sustainable transport materials and competences, and to further facilitate sustainable transport. From the literature this often involves the use of many short to medium term measures, such as promoting car share schemes of active travel infrastructure. Although these initiatives will not create a revolutionary change to the commuting culture, they facilitate for those who want to use sustainable transport and create a modal shift towards it. Similar to changing motivations, when the TPs mature so do the TDM measures, they start to target long term cultural change and affecting the local community.

4.2.03 Measurements of Effectiveness

A TPs effectiveness is highly dependent on the motivation for implementing a plan, the types of measures used, the uptake of the measures, the management of the measures, how the measures are assessed throughout the plan and the demographic being targeted (Litman, 2003). Taylor and Ampt (2003) noted because of the many factors influencing a TP, the evaluation is always a complicated process. When evaluating TPs effectiveness the most commonly used indicator in UK, continental European and American literature is the reduction in car use, however this indicator often does not show the baseline before the implementation of any TDM strategy (Cairns et al., 2010; Cairns et al., 2004). The results of the analysed TPs are shown in Table 10. However, this indicator is limited in the fact that it does not show the baseline before the implementation of the TP. In conjunction with the reduction in trips made by SOCs other measurements should be taken, such as the change in modal share or the ratio of car journeys made to employees.

Table 10. Results of the analysed travel plans.

Author	Year	Results
Bond & Steiner	2006	In 2004 the number of bus commuters doubled that of car commuters, sustainable transport system was created, mutually beneficial programme.
Brockman and Fox	2011	Percentage of respondents who usually walk commuted increased from 19% to 30% Percentage of cyclists increased from 7% to 12% Percentage of car users decreased from 50% to 33%
Copsey et al	2014	University of Hertfordshire- Reduction of employee car use of around 15%, left a legacy for the community Pfizer Pharmaceutical Company- achieved a reduction in private car usage but the local community did not benefit. Did not leave a legacy, positive results for the company but once the travel plan stopped (company left) community reverted back to old.
Petrunoff et al	2015	Queen Elizabeth 2 - decrease from 85% to 43% of car drivers in 4 years, public transport increased from 6% to 32%, walking/cycling increased by 7 to 12% Hollywood - driving decrease from 80% to 75%, PT increase 8% to 11%, walking/ cycling decreased from 5% to 4%
Petrunoff et al	2016	Driving to work decreased 83% to 74% in 2012, 73% in 2013 and 70% in 2014, public transport increased from 11% to 14% in 2012, 13% in 2013 and 12% in 2014, walking/ cycling was 5% to 7% to 5%. Active travel increased from 16% to 20% in 2012, to 22% in 2013, to 20% in 2014
Watts & Stephenson	2000	Reduction of car journeys by 7.3%

Research conducted on behalf of the UK Department for Transport by Cairns et al. (2004) found from start to finish a TP which includes parking management schemes on average reduced SOC journeys by 15- 20% at each site. In a more specific study by Cairns et al., (2002) examined a number of UK public and private sector organisations and found on average that TPs on average resulted in companies having at least 14 fewer car journeys per 100 staff, which represents about an 18% reduction. Cairns et al. (2002) also found on average the uptake of active transport was nearly doubled and there was a considerable increase in the amount of car sharing.

Four of the studied TPs have achieved a similar reduction of around 5- 20% to single occupancy motor vehicles (Brockman & Fox, 2011; Cairns et al., 2010; Copsey et al., 2014;

Petrunoff et al., 2015), while a 13% decrease was found by Petrunoff et al. (2016). Petrunoff et al. (2015) is an interesting case study because it is a comparison of two hospitals in two adjoining sites, but one hospital decreased car drivers by 42% while the other only managed 5%. The 37% disparity was explained by the different car park management strategy, where the Queen Elizabeth II hospital restricted staff parking spaces and introduced parking charges. The study by Cairns et al. (2010) highlighted the importance of TPs addressing parking in some ways, the study found organisations that did this achieved a reductions double that of those that didn't.

TPs that have shown the greatest modal shift are those who have implemented TDM measures that are suitable for each individual site, this is apparent in the review of the University of Sheffield TP by Watts and Stephenson (2000). Even though a system of parking permits and parking charges to address car parking was used, there was only a total reduction of 7.3% to SOC travel, the relatively modest modal shift was attributed to the cost of parking being perceived as cheaper than using public transport by the workforce and the availability of nearby off-site parking.

4.2.04 Summary

Even though a substantial amount of research has been conducted on the TP and its effectiveness as a cost-effective method of reducing trips done by single occupancy vehicles, there is a lack of academic exploration into the results of large workplace TPs. This is evident as there were over 200 publications relating to TDM and TPs, but only 31 were studies conducted on large existing workplaces. Many of the studies focus on the results of specific TDM measures instead of the results from the overall TP.

Some observations that can be made are relating to the motivation of a company to enact a TP has affected the amount of overall modal shift; a company who enacts a plan voluntarily is likely to create a greater modal shift than one that created a TP due to it being mandatory.

Another observation is that the majority of TDM initiatives used in the TPs are short to medium term initiatives, aimed at encouraging and facilitating sustainable practices instead of changing the commuting culture. By employing fast acting initiatives that are suitable for the site, TPs were able to create notable modal shifts away from SOCs. Long term initiatives embedded into the workplace and its employees will be required in order to create a cultural shift towards sustainable transport.

The literature within the systematic review has created a means of comparing TPs through the categories of motivations, the TDM measures used and success. The next section will use the findings from the SLR to analyse the TPs of the three GMU.

4.3 University Travel Plan Analysis

The University TP analysis section of this thesis will compare the findings from the SLR to findings from the three GMU TPs. The SLR has found there are four different motivations for TP implementation; these are to manage estates, accessibility and amenities, to comply with external regulations and or to create a positive image and to lead by example. The motivations of TP implementation will be categorised into primary and secondary motivations. Next the information from the SLR will be used to understand the measures implemented by the university TPs and whether they are suitable for the site.

4.3.01 Context and Motivations for Travel Plans

The MMU Campus TP (2011- ongoing) was triggered because of the proposed redevelopment of the Mabel Tylecote building on the university's All Saints campus (AECOM, 2015), the university wanted to demolish and replace the existing building that currently occupies that plot of land. The new university building will house replacement facilities that include a new theatre, academic offices, supporting rehearsal studios and specialist language spaces, the TP acts as a measure to implement sustainable travel

initiatives and tackle the expected increase in students and staff who will use the building (AECOM, 2015). This TP is ongoing and is part of the university's Environmental Sustainability Strategy 2014- 2020, which consists of 11 different policy areas. MMU was primarily motivated to implement their TP in order to address site specific problems that would arise from developing the new building.

The UoS created a campus plan in 2011 to be a vision for the university for the next 20 years; the aim of this plan is to bring together the university's four campuses. Phase one of the plan included the construction of the "Gateway Building" and changes to the university car parking portfolio and in order to gain planning permission a TP had to be created (Binder, 2013). The new more ambitious TP was designed to replace the old TP and cover the period of the campus plan's phase one from 2011 to 2016. The opportunity for the new TP arose because the university space was changing and there was the opportunity from people moving (UoSESO, 2017). The new TP was used to pick out soft measures that could facilitate behaviour changes (UoSTTO, 2017). Phase one of campus redevelopment has now finished and the TP ended with it in 2017. The TP is now up for renewal.

The TP also contributes to the UoS Strategic Plan 2009/10 to 2017/18, which details how the challenges that the university faces will be tackled and to realise their aspirations up to 2017. The Strategic Plan had 6 targeted goal areas with the TP contributing towards half of these: Goal 3 – Transforming engagement, Goal 4 – Our people, Goal 5 – Infrastructure and services. The TP supports the Strategic Plan by supplying key values, such as sustainable built and human environments, energy efficiency, low carbon lifestyles and promoting health and wellbeing.

For UoS the TP was part of the external regulation to gain planning permission and motivation for renewal is low. But the situation of the UoS TP is similar to the results found

by Cairns et al. (2010) where there are many secondary motivations for the UoS to renew their TP.

The most recent TP for the UoM was introduced to build on their previous TPs which date back to the early 2000s (UoMSCO, 2017). Whereas the previous plans only focused on staff commutes, the new TP aims to incorporate all student and staff travel, including business trips and journeys conducted by the University's fleet vehicles, in order to produce meaningful targets that are not too dissimilar to those set for staff commuter travel. The TP is part of a range of university documents that support the Environmental Sustainability Plan (ESP), which aims to bring together all the areas of environmental sustainability. Overall this TP is a more mature plan than that of MMU and UoS, where the aim of this plan is to progress previous plans and embed a culture of sustainable travel within students and staff (Hough, 2013).

Ensuring the standards of students and staff health and wellbeing is very important to the three GMU. Similar to the workplace TPs in the SLR, the three GMU are motivated to implement a TP in order to elevate student's and staff's health and wellbeing.

4.3.02 Aims and Targets

This section will explore the TP aims stated in Table 10, of the three GMU and their targets. Even though each of the three GMU is at different stages in their TPs, there has been a recent push from the Higher Education Funding Council for England (HEFCE) and GHG Protocol to include scope three emissions into annual reports (GHGP, 2017). The creation of the TPs was seen as an opportunity for the universities to proactively align themselves with the requirements from HEFCE to install systems of monitoring and reducing emissions produced by sources not directly controlled by the universities, such as staff or student commutes, business travel and fleet vehicles (AECOM, 2015; Binder, 2013; Hough, 2013).

In order to reduce GHG emissions the Universities have targeted reductions in the share of journeys made by single occupancy vehicles, these targets are shown in Table 11

Table 11. GMU travel plan aims and targets.

University	Aims	Modal shift targets
Manchester Metropolitan University (MMU)	The aim of the travel plan is to minimise the impact of staff and student travel and encourage the use of environmentally efficient modes of transport that reduce environmental impact, congestion and air pollution. The aim of the travel plan document is to ensure that a toolkit of measures is developed, and appropriate infrastructure is available, to facilitate staff and student travel to and from the University by sustainable modes of travel.	Reduction of single occupancy driving to 40% (Decrease by 4%) by 2014-2015 compared to 2007 results. Increase proportion of commuter journeys travelled by sustainable modes to 60% (Increase of 3%) compared to 2007. Increase the proportion of business travel by sustainable modes by 5% compared to 2007.
University of Manchester (UoM)	The aim of the travel plan is to embed a culture of sustainable travel whereby staff and students understand the impact of their travel habits and choose to walk, cycle, use public transport, car share or video conference whenever feasible The aim of the travel plan document is to build on previous travel plans that date back to 2000, by increasing the scope to cover travel in a broader sense. Previous travel plans only focused on staff commutes.	Decrease staff single occupancy driving by 5.3% compared to 2010 survey results. Increase car sharing by 2.5% compared to 2010 staff survey results. Increase train usage by 1.6%. Increase bus usage by 0.5% Increase Bicycle usage by 1.7% An initial baseline survey of student commuting habits was scheduled for 2013, of which student targets are based.
University of Salford (UoS)	The aim of the travel plan is to increase the number of staff and students who travel to the University by sustainable modes, such as train, bus, bicycle, on foot or by car sharing. Reduce the need for single occupancy vehicle trips to the University.	Reduce staff travelling by single occupancy vehicle from 46.5% to 36.5% (10% reduction) by November 2017. Reduce students travelling by single occupancy vehicle from 16.3% to 14% (2.3% reduction) by November 2017. Increase student and staff cycling from 4.1% and 5.7% respectively to 8% (3.9% and 2.3% increase) for both.

Reducing and monitoring GHG emissions from travel is only one of the drivers behind the creation of the TPs, each of the universities are unique and have differing rationale according to their present and future circumstances. Along with changes to governmental policies, the University TPs are driven by the health and wellbeing of students and staff in addition to creating more environmentally sustainable commuting practices.

AECOM were commissioned to update the current TP for MMU in 2011, as seen in Table 11, the aim of the TP was to reduce the impact of student and staff travel and promote more sustainable modes of transportation. The TP is part of the university's Environmental Sustainability Strategy 2014 – 2020; it comprises of all 11 of the policy areas that make up the Estates and Operations. Overall the TP itself aims to minimise the impact of staff and student travel and encourage the use of more efficient modes of travel that reduce environmental impacts and congestion. As shown in Table 11, The UoM aims to:

"Embed a culture of sustainable travel whereby staff and students understand the impacts of their travel habits and choose to walk, cycle, use public transport, car share or video conference wherever feasible." (UoM, 2015, p 2).

The TP has progressed from trying to just promote sustainable transport to trying to engrain them as a primary form of transportation for not only the commute but also for business travel and fleet vehicle use. This plan is a much more mature plan than those of UoS and MMU,

"We have built up sort of a mature package of initiatives around encouraging sustainable travel and it was seen that, that has become our business as usual day to day activities" (UoMSCO, 2017).

UoS aspired to use the TP as a springboard to raise awareness towards sustainable travel as shown in the aims described in Table 11, where the aim is to promote sustainable travel and reduce the need to travel. In the past there was a lack of priority towards infrastructure and initiatives to promote active travel as well as reducing solo private car journeys (Binder, 2013). The UoS TP aims to create better access to sustainable modes of transport networks in order to persuade staff and students to choose sustainable modes of travel as their primary form of transportation to and from the university campus. The TP for the UoS is building a foundation that can be built upon by future TPs. The TP brings to light some of the problems relating to sustainable travel that the university faces, such as the lack of infrastructure put in place in order for people to sustainably travel.

4.3.03 TDM Measures Implemented by the Three GMU

In order to achieve the aims and objectives of the university TPs a series of TDM measures have to be employed. Some of these measures are quick, easy to implement and are fully controlled by the university, such as providing public transport information and the creation of onsite cycling facilities, but others require cooperation with the council and local transport operators, such as the creation of new bus routes. The measures outlined in the university TPs can be broken down into the three actions found in the SLR; measures that offer site users alternative to driving SOCs, incentives and disincentive or measures to accomplish the task without the need to travel. By categorising the TDM measures used in the three university TPs and any previous measures an understanding of how the universities plan to achieve their aims and objectives can be found.

Within all three of the university TPs the commute of student and staff is only one aspect of travel, the TPs have also implemented measures to reduce all transport related scope three emissions. These measures are aimed at reducing vehicular emissions from business travel and emissions from their fleet vehicles, measures implemented by MMU, UoM and UoS include the option to claim back money for using sustainable transportation during business trips and using more sustainable fleet vehicles.

Using the actions outlined by Meyers (1999) and Enoch and Zhang (2008), Appendix D Part A, B and C show the spread of TDM measures present before the TP and the measures implemented by the TPs. The measures implemented due to the TPs favour the creation of options for alternative modes of transport through the creation of onsite facilities and providing travel information, this is similar to the measures implemented by the case studies in the SLR. Unlike the SLR TPs progression can be analysed by exploring the TDM measures implemented by the TPs.

Appendix D Part A, B and C shows the three universities have provided and have plans to increase the amount of sustainable transport information provided to students and staff The initiatives the universities have implemented to provide transport information are relatively inexpensive and can be very effective at increasing the number of students and staff who use sustainable transport.

Another measure employed by the universities is providing or funding bus services between areas of large student residence and the campuses. MMU and UoM have subsidised the 147 intercampus shuttle buses, while UoS provides subsidies for the 50 bus which connects the Media City Campus to the City Centre. Public transport information strategies can be implemented quickly by the universities but working in partnership with local bus operators and authorities is slow and could take a long time to become fully operational. Attached to the creation of a bus service is the inherent risk of failure, where a lot or resources are invested for not a lot of change in modal share.

To encourage cycling and walking commutes the three universities have implemented measures to better facilitate them. This has been done in various ways, such as increasing safe onsite bicycle storage, increasing and promoting shower facilities, erecting signage and providing maps of cycle paths and walkways. Measures to create better onsite walking and cycling facilities provide a fast and very visual return; this can be useful for showing the TP's impact on modal share and encouraging the continued use of it. To aid in the uptake of cycling each university has its own cycling group and local partners. With these local partners the universities have created cycle to work schemes for staff as shown in Appendix D Part A, B and C, these schemes help staff to buy the necessary equipment required to commute to work via cycling.

The three universities also have worked in cooperation with Transport for Greater Manchester (TfGM) and the Manchester, Salford and Rochdale Councils to create the Cross-

City Bus Initiative. The Cross-City Bus Package is part of the £1.5 billion TfGM investment package to deliver transport improvements from 2010 to 2020. The package itself aims to improve transport connections along three of GM's busiest roads through the City Centre to provide new education, healthcare and employment opportunities by enabling bus services from Middleton, Salford and East Didsbury to run across the City Centre and along Oxford Road without needing to change buses, the initiative is shown in Figure 4

Figure 4 Greater Manchester Cross City Bus initiative routes (TfGM, 2012)

By working in cooperation with TfGM and the local councils a more sustainable service can be achieved and is able to have a wider effect on the community instead of only affecting the university's students and staff.

The majority of the TDM initiatives that are shown in Appendix D Part A, B and C are carrots pulling students and staff towards more sustainable travel practices. The initiatives facilitate and provide incentives to choose a sustainable form of transportation and discourage the use of SOCs. The only push measure implemented by the three universities is to implement or continue to use a car parking policy that raises the cost of parking or reduces the amount of parking spaces. This shows a preference to shape the student's and staff's

choice and allow them to voluntarily change their travelling habits rather than use direct policy interventions to force a modal shift (Barr & Prillwitz, 2014; Cairns et al., 2008). One of the reasons for implementing a TP is the ability to obtain a quick and observable modal shift, which explains why there are lots of small initiatives that can be enacted onsite and a few larger initiatives which may be more long term that change the culture of travelling but take longer to implement, such as introducing a homeworking policy or creating a parking policy which is fair to those who are unable to use sustainable forms of transportation or occasionally have to drive commute. The progression of a TP's maturity can be seen with the amount of short- and long-term initiatives, a new TPs starts with lots of short-term initiatives to remedy onsite travel issues as the plan matures the plan begins to introduce less new short-term strategies and more long term policies aimed at changing the culture of travelling.

TDM measures are always changing with the implementation and availability of new technologies, for example in the past the internet made communicating information a lot faster and cheaper. Recently there has been a rise in the use and ownership of hybrid or electric cars as they are seen to be more environmentally friendly than a traditional car, to facilitate and encourage the use of these vehicles the universities have installed a number of charging points.

4.3.04 Social Responsibility and Community Engagement

The TPs do not only focus on the university's campuses. By being large institutions with influential power the three universities feel that they have a social responsibility to work with the local and regional sustainable transport schemes. Manchester City Council has adopted the Greater Manchester Local Development Framework – Core Strategy Development Plan on 11th July 2012, this document is a key part of Manchester's Local Development Framework that will cover a period of 15 years from 2012 to 2027. The

document details a 2012 Manchester and how the council envisions Manchester in 2027. The MMU TPs fits into the Council's vision as it is a project that aims to deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel towards public transport (AECOM, 2015)

Both the MMU and UoS TPs have been influenced by the Greater Manchester Local Transport Plan (LTP), which sets out a five-year programme of investment for local transportation within GM (Binder, 2013; Hough, 2013). The LTP creates a strategy to manage, maintain, develop and monitor the transport systems within GM (MCC, 2011). The 10 boroughs of GM, Greater Manchester Passenger Transport Authority (GMPTA) and the stakeholders of local institutes have developed the LTP. Within the LTP University transport plans are useful for tools in delivering sustainable transport objectives such as, ensuring transport networks improve the life chances of residents and success of businesses within GM, active and healthy lifestyles are facilitated for, carbon emissions are reduced and are on track to reach UK Governmental targets.

The Corridor Manchester is a local project that MMU and UoM seek to actively promote and support because they both have campuses situated along Oxford road. Corridor Manchester is a project of 243 hectares running from south St. Peter's Square, down Oxford road to Whitworth Park, the project has brought together the Manchester City council the UoM and many other big institutions like the Royal Northern College of Music (RNCM). The project aims to support and grow innovation clusters, enhance the creation of jobs and create economic growth along the "corridor".

"By 2025, Corridor Manchester will be Manchester's cosmopolitan hub and world-class innovation district, where talented people from the city and across the world learn, create, work, socialise, live and do business; contributing to the economic and social dynamism of one of Europe's leading cities." (Corridor Manchester, 2018).

Regarding travel and commuting the Corridor project will redevelop and transform Oxford Road into a pedestrian friendly boulevard, giving priority to buses, hackney carriages, emergency vehicles and bicycles (Corridor Manchester, 2018).

The UoMSCO says the universities contribute to the Corridor Project by:

"work(ing) with our partners, that include the hospital (Central Manchester University Hospitals NHS Foundation Trust & Bruntwood), RNCM, Manchester Science Park initiatives as well, and we all contribute a certain amount of money into a pot. Then we use that to find things like monthly cycle breakfasts, the annual cycle events and other joint initiatives that we can do around sustainable travel" (UoMSCO, 2017).

The creators of the TPs need to find efficient and effective ways to communicate the TP and its initiatives to not only the students and staff but to the university. The advantage of creating a TP is that it brings together lots of data and ideas into an organised package that can be delivered, but a problem arises when the timeline for the TP is over and it comes to creating a new plan or ensuring the initiatives are continued. By creating a TP the three universities have been able to communicate ideas of sustainable travel but only MMU and UoS have outlined a detailed timetable for monitoring and reviewing, UoM only mentioned that the plan will be updated annually.

4.3.05 Measuring the Effects of TDM Initiatives

In the case of the three GMU TPs have been implemented as part of their carbon management strategies in accordance with HEFCE guidelines. Within the carbon management strategies of the universities, the TPs have been implemented to measure and reduce scope three carbon emitted through commuting, business travel and from fleet vehicles. Scope three carbon emissions are defined as emissions that are emitted indirectly as a result of an organisation's operations by assets that the organisation does not directly own or control (GHGP, 2017).

Scope three emissions are difficult to measure and monitor because they are often emitted offsite through the commute, so an alternative measurement is needed. Instead of directly trying to calculate the scope three emissions, commuting modal share data from student and staff travel surveys are used. UoS used a travel survey in 2011, which was completed by 655 students, representing a 3.1% response rate; the response rate for staff was a lot better as 862 completed surveys, representing a 34.5% response rate. The response rate is in line with those noted by Sullivan and Percy (2008), where a 5% response rate was said to be very difficult to achieve. Even though the rate of response represents only a small portion of the students and staff it was possible to extrapolate an estimated baseline value for the modal split of commutes.

Using modal split data in accordance to HEFCE guidelines gives an indication of which types of transportation are being used the most for commuting; the UoM travel survey 2010 found 30% of the respondents of a staff travel survey commuted by SOCs but emitted nearly 68% of the travel GHG emissions. In theory creating a modal shift away from SOCs towards more sustainable forms of transport will significantly reduce the amount of scope three emissions from travel. The baseline calculated from the travel surveys were used to form the modal shift targets. To achieve the targets serious consideration has to be made about the targeted audience as the success of the TP is highly dependent on how well they adopt the chosen measures.

4.3.06 Evolution of the University Travel Plans

Due to the UoM TP ending in 2015, it is possible to understand how the TP has evolved and been developed further even though it is not specifically stated in the TP:

(Their TP) “has guided a lot of what has happened at the university and been I guess like a vehicle for moving the targets and initiatives incorporated forwards.” (UoMSCO, 2017).

In order to ensure the UoM TP continues move forward, the Environmental Sustainability team at the UoM have tried to look at the university more holistically and try to incorporate the other areas of the university whenever possible, there is still a focus on how students and staff travel as per the TP, but other areas they have worked with include health and wellbeing, greenspace and sustainable resources.

(Basically) "what we use as a university in order to maintain our operations and that covers a whole host of things." (UoMSCO, 2017).

Although the UoS wrote in their TP that a new TP for 2017 to 2022 would be created using data from the 2012 to 2017 TP, they have not begun reviewing it due to changing circumstances within the university. Martin Hall was the vice- chancellor of the university at the time of the TP's conception and became interested with the idea of TPs, because he wanted to understand more about the impact that the university had on the local and global environment (UoSTTO, 2017). He used his power as vice-chancellor and acted as a champion to give some priority to TPs. Without having a champion to push the idea of a TP forward the use of the TP could have been severely limited (Silliman et al., 2016).

In 2015 the vice-chancellor position changed and the drive for TPs was gone. The team that was tasked with dealing with the TP was disbanded, and UoSESO was tasked with reviewing the TP (UoSESO, 2017).

"Since the travel and transport officer's role left and hasn't been replaced, it wasn't supposed to be part of my role, it was going to be a strategic role… the role has since gone and not been replaced, and our team has been restructured into facilities management, and so travel doesn't really come into it that much… so it will be looked at in terms of the Masterplan… until the Masterplan is decided, I don't think we will look at doing a TP" (UoSESO, 2017).

The situation within a workplace like a university is always changing; therefore, the TP is a document that is always evolving to suit the university's needs. To accommodate for the changes the TP has to have a clear plan for monitoring the situation and be able to adapt quickly, and then have the capacity to efficiently communicate these changes.

4.3.07 Summary

By conducting a SLR and analysis of three GMU this thesis has found there are four categories of motivation behind workplace TP implementation. The only involuntary motivation is when a TP is conceived in order to gain planning permission, the other three motivations TP implementation are internally voluntary, where the organisation chooses to create and use a TP. Organisations are motivated voluntarily to implement TPs to resolve their onsite travel issues, to promote their ethos and environmental agendas or to use their influencing power to lead by example.

The primary motivation for the UoS to implement their TP was to gain planning permission in order for the university to begin onsite construction. Similarly, the primary motivation for MMU was to address on site construction, but unlike UoS the TP was created and implemented voluntarily. Instead of trying to solve an onsite problem the UoM has been motivated to promote the University's own positive environmental and sustainability image through the implementation of a TP. Even though the three GMU have different motivations for TP implementation, their overall aims remain the same- to reduce travel GHG emissions and enhance the health and wellbeing of their students and staff.

To achieve the TP aims and targets, workplaces have employed unique packages of TDM measures to create alternative options for travel and provide incentives to use sustainable forms of transport and disincentives to SOCs. The most successful TPs from the SLR were those who chose and implemented TDM measures that were tailored to the site user and specific to the onsite travel problems an organisation faced. As onsite problems are solved the focus of the TP changes to address the different problems and maturing in the process. Initially TPs may focus on employing initiatives to control traffic and car parking issues as seen in the SLR and in MMU and UoS TPs.

The next Chapter in this thesis – Qualitative data analysis, will explore how the universities are meetings their TP targets by using interviews and focus groups with staff and students from the three GMU.

5. Qualitative Data Analysis

The commute to and from university may seem mundane and repetitive at first, but when practice theory is applied to the different facets of the practice many different insights can be uncovered. When practice theory is applied, and the commute is studied as a practice the nuances behind the formation of travel behaviours and their performance can be better understood. Leading to explorations of the issue's faced by university TPs and how effective they are at changing the way students and staff choose to commute.

As a practice the commute is not represented solely by the time spent travelling to and from campus. Rather the practice also includes the routines and habits exhibited before the student or member of staff has left their place of residence and those while they are on campus. Commuting and the commute can be seen as the overarching practice comprised of many other travelling practices (Shove et al., 2012). This chapter assesses the multiple practices that make up a commute, some of these include: preparation practices, practices of drive commuting, practices of safely commuting, practices at the destination, the list of practices that make up the commuting practice is as long or as short as imaginable and each of these practices have materials, meaning and competences attached to them. Driving, using the bus, train or any form of public transport, cycling and walking can all be practices in their own right, but when used for the purpose of commuting they fall under the overarching practice of commuting.

In order to give a better understanding of the commuting practice this section will split the commuting practice into practices before travelling and practices while travelling. By conducting thematic analysis on the primary data key recruitment themes were found and these could be separated into themes where recruitment to a practice was a result of habits and behaviours conducted before the commute and those found during the commute. Within each phase of travel the behaviours and habits of the interview participants and focus group

participants were assessed to understand their relationships with the commuting practice and if the TPs have changed some of these practices.

5.1 Practices Before Traveling

5.1.01 Preparing for the day ahead

Even before leaving the place of residence or campus the practice of commuting has already began in the form of preparation practices. For some it might be when they wake up in the morning and the routines they follow to prepare for the day ahead, for others it begins the night before. Participants who were going to cycle commute were more likely to prepare for the next day's commute the night before. To prepare for the following day's cycle commute StaIP4, StaIP6 and StaIP11 would have to gather together all the material that they needed the night before. By preparing the night before it ensured that cycle commuters were ready to leave promptly in the morning in order to guarantee they had enough time for the journey.

StaIP4 says:

"It takes an hour (to cycle in) and there's also the extra preparation. If I'm going to drive, I'd just put my clothes on and get in the car. If I'm going to cycle I have to lay out everything, make sure the bike is ready to go in the morning. So, the night before I make sure everything is ready…so in the morning I can just get on my bike and go."

Having extra preparation was also noted by StaIP6, by committing to cycle commuting the next day the participant had to ensure cycle commuting did not disrupt the next day's plan.

StaIP6 says:

"I normally think about it before hand and think about what I have got to do today…whereas walking I don't actually have to do any of that, I can just go."

The convenience of being able to "just go" makes walking commuting, if viable, and drive commuting appealing.

The inconvenience of having to prepare a bicycle for the days commute was often cited as causing extra hassle and excess stress as it was another thing that they would have to remember to do. FG2P1 felt it would be a major inconvenience to his day if he had to wake up earlier to prepare to cycle to campus and any potential time or monetary gains would not be worth the extra stress he would have to endure. FG2P1 said:

"I don't think you can try because everyone has got work stress, uni stress…it's a full day nine to five. So, if someone is waking up to cycle, someone will have to wake up an hour earlier from … to get up and get ready … whereas in a car you can wake up an hour later… It's the stresses of life that nobody wants."

Practices of commute preparation often entail gathering and readying of materials required for the commute and the day ahead. Sometimes preparation requires a significant amount of time and elicits meanings associated with inconvenience and unnecessary stress. For some individuals the meanings of inconvenience and stress evoked through practices of preparation are enough to deter them using certain modes of transportation.

5.1.02 The carrot and the stick

Is it that people cannot physically or mentally commute in a certain way, or are they choosing not to? Sometimes commuting decisions are forced by the surrounding environment and controlled by the materials and competences available to individuals; this "stick" is inflexible and forces individuals into making commuting decisions. On the other hand, individuals may choose a commuting option based on the meanings they associate it, often these decisions are able to be swayed through the use of "carrot".

StuIP12 lives in an area where he believes that driving or taking the bus is his only option of transportation that he can take to get to university. Whenever he had to get to university by 9 am he had to wake up at half 6. By having no other option, he was forced to change his habits by way of the stick and create a routine that enabled him to not be late. A TP cannot change where someone decides to reside and has little control over the variety of transport

infrastructure available to them, but it is able maximise the potential of what already exists. One way the use of public transport can be maximised is through price reduction schemes such as bus passes and season tickets, FG1P5 notes that by having a bus pass she felt:

"It was more economical… to make as much use of my bus pass as possible"

Another way that the university and TPs can encourage the use of more sustainable transport is by employing flexible work and lecture time tables, allowing students and staff more time to prepare before their commutes. Having a flexible timetable would be a "carrot" to encourage the use of sustainable transportation systems. Being an academic within a university results in a degree of flexibility not found in many other occupations, as StaIP11 puts it:

"I aim to get in at half past 8, but if I get in at… quarter past 9, unless I book in a meeting or I have a class then nobody minds, as long as I get my work done… as long as you do your hours."

The meanings of flexibility gained by being a member of academic staff are unfortunately lost when governed by external "sticks", for example the time StaIP11 has to leave the university is governed by the "stick" of her child's nursery, which closes at 6pm. By cycle commuting to university she has to cycle commute back home, this means having to retrieve the bicycle from where ever it has been stored and then preparing it for the commute home. All the preparations have to be completed before half past five at the latest in order to arrive at the nursery before 6pm. StaIP11 explains how "sticks" that are governed by the university restrict her flexibility:

"I have to be at the nursery by 6 o'clock… so I tend to leave here around 5 … but as long as I'm out by half past 5 I'm ok… I got to pick the bike up and get him … if I was scheduled for a class 5 to 6, I couldn't teach it because the university nursery closes at 6 o'clock ... I have to be there at least 5 to … which means I have to leave here at quarter to, if I'm walking, but if I have to pick up my bike…I need to leave here at twenty to at the absolute latest, which means getting out of my lecture wherever the lecture theatre is situated… But you're not allowed to say that you cannot teach that slot because of children, the university won't let you."

"Sticks" often force individuals into specific commuting habits, for StuIP12 offsite materials force him to bus commute. Even though StaIP11 has onsite flexibility, offsite restrictions have formed impenetrable barriers which have influenced her commuting habits.

A key directive of the TPs is to reduce the car parking demand and traffic congestion around the university. "Carrot" initiatives that have been employed around the universities include push bike storage facilities and reductions in the cost of public transport season tickets. These initiatives intend to influence the choices that the students and staff make and nudge them towards more sustainable forms of transportation. One of these "carrots" is the cycle to work scheme, for some it was exactly what they needed to give them that final push to cycle commute, but it is irrelevant for those who already have the equipment or those who have no interest in cycle commuting. StaIP11 who has used the cycle to work scheme to buy cycling equipment outlines who she feels can be persuaded by a cycle to work scheme:

(The person) "has to be naturally inclined to want to get on a bike, if that is not your experience it's quite a jump…but somebody who never cycled or not cycled much is probably not going to be incentivised…just because there is a cycle to work scheme."

For StaIP11 the scheme acted as a spark to ignite the thought of:

"Oh look there's this scheme, let's take advantage of it"

StaIP4 and StaIP11 greatly benefited from the cycle to work scheme as it allowed them to acquire their road bikes. On the other hand, for StaIP1 and STAIP2 who already owned road bikes, felt that cycle to work schemes did not concern them and did not pay much attention to them.

Other initiatives that act as a "carrot" involve the creation of facilities, the facilities act as infrastructure to enable an active commute. Without the facilities people cannot and will not travel in certain ways. For example, if someone decided to run commute or cycle commute and they arrive all sweaty, a shower area would allow them to commute this way and then be refreshed for the day ahead. Without the facility the commuter would have to spend the rest

of the day being very uncomfortable and thinking was that form of commute worth it.

StaIP11 expresses how in the summer not having shower facilities can be a problem:

"If it's a warm day you may get very hot …you don't want to get into your class being all sticky and sweaty."

But StaIP4 explains how the shower facilities for him are located in a very inconvenient area of the campus and it would require him to spend even more time on his commute:

"There's a shower in … the sports centre but it's too much of a faff … it would add too much time to use them, if there was one in the Peel building then I would use that, otherwise it would just add another half an hour to go over to the sport centre… get a shower… and come back"

On the other hand, onsite bicycle storage facilities have been instrumental in enabling StaIP1 and StaIP11 to cycle commute, as they provide a relatively safe storage space for their bicycles while on campus. StaIP11 says

"If the cycle facilities are conveniently placed and easily located they can be a great help to cyclists… on the other hand the shower facilities are located in very limited locations and are hard to find, making them inconvenient."

The location of facilities has an impact on their level of usage and can act as a carrot, StaIP11 felt the showers were in a very inconvenient place for her to use, but the bicycle storage facilities were located outside her office and were convenient for her to access.

The same is true for transportation links, if they are conveniently located or within an acceptable distance the participants would use them. StaIP3 explicitly cites the close proximity of the train station to the university as a reason for his decision to commute the majority of the journey via train:

"If I didn't have the convenience of the railway station… I would probably be driving"

Taking the train for StaIP3 is convenient because it is direct and does not involve any changes. Conversely public transport links may not be convenient for others and other commuting practices are employed. For StaIP5 taking the bus would be very indirect and take more time:

(Driving is preferred) "Because the bus route… would either be a bus then a train, a bus and a 20 minute walk or a long bus journey with a 10 minute walk before it, so the car journey is

the quickest…If there was a bus that went …directly to the university rather than stopping in the city centre… I'd probably get that bus every day"

FG2P2 noted how there were no bus routes close by that would be more convenient than walking:

"There isn't a bus or anything that goes straight from my house to campus; you'd have to go all the way round."

FG2P1 and FG2P3 bring up the notion of the convenient option, FG2P3 says:

"People want to take the most convenient option."

While FG2P1 adds:

"The convenient way…why do you think there are drive thrus? Because nobody can be arsed to get out of the car.... People are just lazy…If you give me the option I could get out…"

The meanings of convenience from some forms of transport are "carrots" that can attract individuals towards commuting practices, conversely inconvenience acts as a "stick" which pushes commuters away from using certain forms of transportation. Convenience allows for people to potentially better utilise their resources, such as time. An example is StaIP3, the carrot of convenience arises from having a direct train route and not having to spend time waiting for transport. On the other hand, the inconvenience of public transport being indirect can be considered a stick. StaIP5 prefers to drive instead of using public transport because the bus route he would need to take is not ideal for his needs.

5.1.03 Facilities facilitating practices

As with drive commuting, storage and parking of the bicycle can be a problem, especially for the participants who lived in student housing and student accommodation, such as FG2P2, FG2P4 and StuIP13. While on campus FG2P4 said he feels his bicycle is safer in the bike shelters than "around Salford" (FG2P4, 2017). While FG2P2 felt unsafe putting her bike outside her accommodation:

"We have a shed…I wouldn't trust putting my bike there"

StuIP13 felt the cycle storage facilities at his student accommodation were inadequate and made him uneasy about keeping his bicycle there overnight. He notes how the storage for bicycles at his student accommodation were always full and promoted unsafe storage practices outside, which lead to high rates of cycle theft:

"There's not enough space inside… people leaving bikes that don't use them, it is a little shack… With a bike getting stolen every other day, it 100% puts you off cycling."

UoSESO says bicycle theft is:

"A massive problem… If you're not in a secure shelter … it's not going to be there when you get back."

The TPs have addressed cycle theft onsite by providing safe storage solutions and guides for safe storage practices. Although the facilities for bicycle storage are available to students and staff, many students who are the victims of theft cited they did not know how to gain access to the shelters. UoSESO explains:

"90% of the feedback from students who have ever had bicycles pinched is that they don't know how to access those secure shelters; they just think it is for staff."

Participants would often have to bring equipment for the day ahead to university, such as bikes, coats and spare clothing. StuIP13:

"I was carrying round stuff that I couldn't fit in my bag"

StaIP4 feels he is fortunate because he is able to store things that he might need throughout the day within his office, a luxury that not all students and staff have. Simply having a place to store his bike and dry his clothes if they got wet meant he knew his journey home would not be compromised. StaIP4:

I'm… lucky because I have my own office… I can keep my bike here and if my clothes are wet I can stick them on the radiator, whereas a lot of people, a lot of staff or students don't have that"

A locker system is in place within MMU but is used for short term storage. A system where students or staff can leave commuting equipment is unavailable, StaIP6 explains:

"There are lockers … but they are really designed for people putting bags in during lessons or practicals … there isn't a locker where they can put stuff in all day."

Storage acts as an incentive to drive, as students and staff are able to keep whatever they need for the day in a safe inside their cars. Instead of having to carry around the provisions, the students or staff can just deposit it in their car. StaIP11 elaborates:

"Something that I think is under appreciated is… in a car you can bring whatever…you want, if you come on a bus or bike you have to carry stuff and there are very limited facilities for storage of things during the day, for example… you want to go to the gym, … you have to carry that bag…around all day if you got the bus, but if you come in a car you can drop that in… your boot."

Without the storage materials required for practices individuals do not feel comfortable commuting in certain ways. For cycle commuters safe bike storage facilities are crucial and to encourage cycling the TPs have implemented securely locked bicycle sheds and bike racks. Onsite storage is easily addressed by the University TP, but safe offsite storage can still be a problem which the Universities are generally unable to address.

5.1.04 The role of confidence

Competences of confidence are very important to the commute; in many cases being confident can lead to a safe commute. For example, the participants who had a history of cycling were more likely to cycle commute as they have a greater confidence for road cycling, which has been built up over the time that they have cycle commuted. StuIP13 has cycled on the roads for many years to build up enough confidence to cycle along the roads:

"When I started at college I was on the pavement… but by university I was pretty comfortable doing the road route."

Starting road cycling in a busy city like Manchester is not for everyone and can be very daunting due to the large volume of cars on the roads, StaIP6 who has cycle commuted since she was a student still finds that it is stressful to cycle in Manchester. StaIP6 revealed:

"I find cycling in Manchester scary… I find walking a bit more restful, and cycling can be a bit stressful… (Cycling) is very scary in… Manchester and has got increasingly scary. This

is partly why I have stopped cycling as much. There are some really great cycle paths, but they're not everywhere."

StaIP8 echoes how her fears over safety and her confidence in her ability to cycle on busy roads dissuades her from picking up a bicycle and cycling to work:

"I'm not confident or comfortable with cycling and I think Manchester in particular is quite dangerous"

In the beginning cycling alone can be a daunting task, especially for those who are not accustomed to cycling along busy roads next to traffic. Building up the confidence to cycle commute can be tricky but it is possible. StaIP11 gained her confidence of cycling on the roads through cycling along cycling routes and then progressing onto roads when they were not as busy. StaIP11 felt she was fortunate that:

(She had) "a husband who's very confident on a bike… I didn't cycle for a long time, and when you are away from it, that impacts your confidence, we cycled as a family at the weekends… on cycle trails… and certainly to start with I was much wobblier… then I'd have been comfortable with on a road, having someone with whom to cycle helps … get my confidence up, we cycled the route that I was going to take…to start with I was uncomfortable having my son on the bike … so I'd cycle on my husband's bike to the park, that we'd cycle round … and then I'd have my son, … until I got used to him being on the bike and I got used to being back on a bike myself… we cycled the route … at the weekend when there was no cars … then one day we just went and it was brilliant and I was like "why didn't we do this every day?"

For those who cannot find someone who is confident at cycling that can build up their confidence, they can take note of the way that StaIP11 has built up her experience. By starting off in a safe environment, say a park or trail, she was able to build up some of the skills that she would need while cycling on the roads. When she was confident about her abilities to cycle safely she moved onto cycling on roads that were relatively quiet to get a feel for how to deal with cars and or pedestrians, and after a few times cycling the route she would take felt confident enough to fully commit to cycle commuting.

StaIP4 built up his confidence while road cycling on weekends in the Peak District, he explains that there are not as many cars and he found it was more enjoyable. Having this

original experience and confidence, knowing that he could safely cycle on the roads is huge. StaIP4 explains:

"I'm used to dealing with traffic; I've even noticed … the more I've done it the better I've got at it."

Confidence is built up through repetition, but obtaining the original confidence is a challenge and a barrier to the uptake of cycle commuting. Having the competences to accommodate for different scenarios takes time to acquire, StaIP4 has cycle commuted for over two years and he is still learning little things about danger spots and positioning on the road.

5.1.05 Missing the advertisement

The TPs have delivered a variety of initiatives to students and members of staff in order to encourage a modal shift towards sustainable transportation, such initiatives include cycle to work schemes, the creating of university cycling groups and information promoting events. The problem with these initiatives is that if missed the information is very hard to find. Focus group one participant five did not find out that her university offered a reduction in price for bus passes until her second year because she did not attend the university's fresher's fair. The participants of focus group one felt that the travel initiatives that their university provided were not well advertised and easily missed. FG1P5:

"I didn't know about the free bus until 3rd year. They didn't advertise it at all."

The lack of advertisement is echoed by FG1P4:

"Had my friend not told me… I wouldn't have known (about the free bus)."

StuIP12 felt that the university did not promote or advertise any of the initiatives that would help his commute. He felt he really had to search for information regarding travel, which he felt would not be at the forefront of someone's mind that is starting at university. StuIP12 says:

“It’s something that the university could give you an answer for. But it’s not something that they would… push in your face."

Part of the difficulty that StuIP12 found was that the information was only located in one area of the university and unless someone visited this area they could not find out about any of the things that could potentially save them money. He felt that advertisement of the schemes and initiatives could be easily promoted through:

“Email or maybe a message saying what changes or offers they’ve got”

StaIP4 discovered the cycle to work scheme advertised at a bike store he visited but found that the university did not openly advertise or promote the scheme. Information about the cycle to work scheme provided by the university can be found in the Travel and Transport section within the staff section of the university website. StaIP4 notes how he did not find out about the university bike scheme directly from the university:

“I did the cycle to work scheme here… but I had to search for it…it wasn’t advertised at the university.”

Key information is easily missed unless it is constantly advertised in easy to reach places, most students and staff have enough to worry about already. For most of the students and staff having to actively search for information is quite difficult to encourage, therefor it is imperative that important information about travel and schemes to be continually promoted through different channels of communication.

5.1.06 Perceptions of class and culture (social structure)

Throughout history stratified societies have always existed and this has affected the way that people travel. The link between a person or communities’ social origins and cultural practices can offer insights on why the participants had a preferred method of commuting. “People learn to consume culture and this education is differentiated by social class” (Jenkins, 2002, p. 138). When the first modern cars were conceived in the late 19th century only the upper echelons of society could afford to own or travel through the use of a car. As

acquiring and traveling by car became cheaper, it became accessible to a wider range of people. In Britain the number of vehicles went from 2.6 million vehicles in 1951 to 27 million vehicles in 2001 (Whelan, 2007). Although the car now has become a common feature within everyday lifestyle there is still an association of driving with power and class (Hitchings, 2012).

StaIP8 believes that some people are afraid to travel on certain forms of transportation because of their culture and position in society:

"There are some people who won't ever get on a bus because they think it was below them because it isn't actually very nice…my parents aren't even posh but because they are older, they would think bottles and crisp packets and mud everywhere … it isn't a very nice environment… But I do think that trains are associated with more with suits and business men … you have that image of the business man in his suit with his briefcase, and you would never have that image for the bus journeys. I don't think I have ever seen anyone on a bus in a suit ever."

The preconception of classes and the types of people are likely to be found on each form of transportation often deters a participant from using public transport, FG1P3 says:

"Don't you think when the bus is empty… everyone thinks… you probably are going to job centre."

Rightly or wrongly there is an underlying stigma with taking different forms of transportation in Manchester, as has mentioned people who use the bus are often seen as having a lower social status than someone who owns their own car. StaIP8 explains how societal class is seen within her daily life:

"That stereotype… I always associate walking with… professional… I always think the bus is lower class… it has got a stigma associated with it, like on the Inbetweeners, … you are perceived to be lower because you get the bus in."

Due to history and culture, different forms of transportation have been associated with different meanings of class. The car for example used to be a luxury that few could afford; in the past this would have conveyed meanings of wealth and power, and these symbolic meanings are still evident today even though cars are now widespread. Symbolic meanings

are also found in other modes of transportation, such as bus commuting is reserved for the lower class. Changing the meanings associated with different forms of transportation can be achieved through first hand experiences and information, both of which TPs are able to supply.

5.1.07 Repetition and routines

Culture and habits follow a path leading to becoming a lifestyle. First the position within society is combined with the existing conditions, and this forms the habitus; the habitus consists of a series of schemes that generate practices and perception, over time these become a lifestyle of practices (Bourdieu, 1984). The majority of the student population within the university consists of young adults, during this time many adult behaviours and practiced are developed (Buckworth & Nigg, 2004). For many, university offers a new-found freedom and increased control over their lifestyle StaIP7 and StaIP9 both studied at universities in Manchester and developed commuting techniques, such as cycling and taking the bus.

People tend to prefer repetition and not to deviate away from what they are comfortable with, StaIP11 says:

“People like what they know”

StaIP2 has commuted by car for 25 years and cites having to waste time standing on the platforms waiting for trains as why he does not use them as a primary form of transport. Every day the participant would travel down a similar route to and from university, and this has become a routine that is very hard to change. Once people have figured out the commuting method that suits their needs, they tend to stick with them. StaIP3 experimented with his commute to university which resulted in a car journey to the train station and then a train into the university campus, he explains that:

(The journey) "is … two thirds train and a third car. I've done the whole thing by car … but it's much quicker this way… I've tried the whole train journey and I've tried the whole car journey, so I've now found a happy medium."

Once the participants found a practice that was comfortable their choice of route and transportation became mundane, it became part of their daily routine and was done without much thought. FG2P4 says:

"When it becomes the same route day in day out it becomes a bit more of a necessity."

As a student who has studied for four years at the same university, StuIP12 believes that because he has followed the same routines for the previous three years, it was too late to change for his fourth year:

"I'm in my final year now and I've been like this since the first year… It's not really bothered me that much… none of it's going to change now because I'm used to what I'm doing."

Changing the daily habits becomes more and more difficult the longer the habits have been followed (Verplanken & Wood). For change to happen there has to be an event or series of events that forces a change to the normal routine and the commuter has to rethink about their commute, for example moving to university or starting a new job (Wood et al., 2005).

5.1.08 The past and how it effects the present

Experiences and actions performed in the past often change the perception of travel. As seen before having previous experience of cycling can lead to being more confident cycle commuting on the roads. Past experiences create comfort and people generally prefer to do what they are comfortable with. Looking beyond the individual to a more cultural community uncovers instances where the participants have experienced different cultures and habits and have incorporated them into their lifestyles because they have found comfort in them.

For StaIP11 it was meeting her husband and moving to Australia that really reignited her interest in cycle commuting. The city she moved to had the infrastructure and culture to make her comfortable with using cycling as the main form of transportation. The lifestyle choice of cycling and using it as the main form of transportation has followed her back to England, where cycle commuting is not as popular. StaIP11 explains:

"I used to cycle at school and then I had an accident… I didn't go on a bike or motorbike for well over a decade and then I met my husband and…we moved to Australia… we were in a city called Brisbane… and they have amazing cycle routes… we bought cheap push bikes…we got into the cycling… when we got back here and my son... could sit upright well enough in a bike seat that we started cycling again."

Cultural and communal practices that have been previously learnt can affect the daily lifestyle, for example walking through different environments. StaIP7 has spent many years of her life in Colombia, and she feel this has prepared her for walking around England. She feels that in England walking is much safer than in Colombia, therefore she is less afraid to walk:

"In Colombia there are…places I feel I'm not safe, even during the day … I feel quite safe here…. I've been in bad places in Colombia, so I don't know if I know how to behave but there is something… but I would be able to confront someone … it's something that you learn when you need to take care of yourself …you need to have a certain energy or certain way of doing something… or just to disappear and not to be seen, to be really cautious of where you are walking, just checking who is around you."

Past experiences have the ability to create positive and negative meanings, in the case of StaP11 an accident attributed negative meanings towards cycling, but a positive experience while in Australia created positive meanings which have followed her back to the UK. Past experiences are also able to teach competences and skills that enable practices. For example, StaIP7 the competences and skills created from walking through potentially dangerous areas of Colombia make her comfortable walking alone in the UK.

Students and staff at some point will move on from the University, the positive and negative experiences created from the journey through university will follow them. The job of the TP

is to ensure sustainable transportation remains a positive experience that is used during the time at university and is embedded into the lifestyle.

5.1.09 Uncovering hidden wants and changing the routine

Unless the students and staff are inclined to cycling it is very hard to persuade them to do so as it is a big jump from cycling sporadically to cycling every day in traffic. StaIP11 feels that without wanting to cycle commute the advertisements and initiatives are not going to influence you in a way where you would want to pick up a bike:

"there are training courses … they send me emails … about bike maintenance and cycling on the road that people can sign up for, but …you have to be naturally inclined to want to get on a …bike, if that isn't your experience it is quite a jump… somebody who never cycled or not cycled much is probably not going to be incentivised … just because there is a cycle to work scheme."

As a university there is a high turnover of students, where students are always coming and going ever year, staff are more permanent, but the same principles can be applied. The initiatives around promoting sustainable transport that the TP enacts need to predominantly those who are about to join the institution, these are the people who have not yet created a routine and are open to using sustainable transport systems. UoSTTO explains how the rapid turnover of students is beneficial to creating a modal shift towards sustainable transport:

"Staff they're here longer, but with student you get a turnover, so students who come next year the change is normal for them, and after a few years it is forgotten in terms of what was there before."

StaIP4 believes only facilitating the commute is not enough, there has to be proactive encouragement to show potential commuters how to use the facilities, and how they will benefit from using them:

"There's a difference… they have to encourage it. It isn't enough to make the facilities available … I think you have to advertise it, almost like to let people see, visualise what it would be like for them, what would their routine look like?"

Encouragement could come in the form of signage to show the benefits of active transport for both themselves and the environment. StaIP8 highlights what kind of initiatives she thinks could be useful:

"Maybe more education… because we haven't had anyone coming in and speak to us about how to travel in … if they gave us statistics on this many people are driving in, we want to cut it by this amount and this is the measures we are going to do to get there… how many calories you burned… or how much money they'd save… because people obviously care about the environment but … it takes more than that to get a different range of people, if you could swing it in a health and economic benefits as well"

Overall the initiatives have to create an interest in active commuting.

5.1.10 Physical activity, energy and time management

The effects of physical activity and overall health have been well documented (Keating et al., 2005; Rouse & Biddle, 2010) . Studies by Sallis (2000) and Zick et al. (2007) have shown how a decline in physical activity during adolescence continues into adulthood.

StaIP5 says he does not get to exercise during his commute, but he resolves this by using the time and energy saved during the car commute to go to the gym, StaIP5 explains:

"I factor in the fact that I don't get the exercise from my commute, just… go to the gym in the evenings."

StaIP3 feels that by not cycling or walking to the train station he saves his energy so that he can do other physical activities that he enjoys. He feels if he cycled every day he wouldn't want to do any other form of exercise because he would already be tired:

"I'd prefer to do other things with my energy…if you cycled everyday then you wouldn't do other things because you'd be tired, and you'll think I've already done loads of exercise already this week on my bike, so you wouldn't do other things which you enjoy more."

Starting from early in the morning and not leaving university until late at night offers little time for StaIP2 to exercise, he says:

"I'm getting more …concerned about sitting; I sit in that chair a lot… I'm getting much more aware of sitting in front of a desk and then getting into a car and sitting another hour or 2"

One way in which he feels he could incorporate it into his daily commute is by cycling to his local train station. To be able to do this he believes there has to be the right mechanisms in place:

"I might be tempted to cycle… to my local train station…I would quite like to do that but again the other connections have to be right to do that."

For StaIP1, StaIP6, StaIP7, StaIP9 and FG1P1, FG1P4, FG1P5 and FG1P6 the commute was a means to incorporate exercise into their daily routines. StaIP6 would rather walk or cycle commute than use the car due to the increased amount of exercise:

"One of the reasons I walk is because it gives me some exercise and it is a way of incorporating exercise into my day, same with cycling. So, I'd prefer to do that rather than drive."

Generally, the walking commute increases the daily amount of exercise and emits much less pollution than public transport or a private car. StaIP9 explains why she chooses to walk and train commute instead of drive commuting:

(I decide to walk to the train station) "For health reasons really and because I don't want to use the car if I don't have to… I'm a sustainability person… personal health and also so we're not using excess fuel or creating emissions or just basically dragging people around with me when they don't need to."

The NHS recommend healthy adults do at least 150 minutes of aerobic exercise per week, over a 5-day week this equates to around 30 minutes per day. The premise behind active travel is to incorporate physical exercise into the daily routine, by taking advantage of the time spent commuting. Active commuting primarily includes human powered transportation such as walking and cycling, but the use of public transport can also include some form of active commute since it is not door to door and involves some measure of humans powered movement in order to travel to the station and form the station to the destination. StaIP6 and StaIP9 strongly agree with the commute being a good means of incorporating exercise into the daily routine, while StaIP5 does not see the commute as beneficial to his health.

5.1.11 Time as a finite commodity, prioritising the use of time and flexibility

Time is a very important aspect in the fact that it is both a constraint and a resource for social interaction. Time itself, and the perception of it is a social construct built from natural cycles – days and nights, four seasons, growth and decay (Jenkins, 2002) "Time stretches out, given a rhythm by the round of work and holidays and by the succession of nights and days" (P. Bourdieu, 1964, p. 57). In an urban or city environment the commute and travel is structured around the school run, the start and end of the work day and large events, where large numbers of people are travelling at the same time. A person's time is finite, and each day only lasts for 24 hours. As a result, different people prioritise different things that are important to them. For FG2P1 the importance of being able to have enough sleep is prioritised over cycling practices:

"We're all going sleep later… well I am anyway, twelve or 1 o'clock, I don't know about anyone else but that is late to me… If I was to cycle in I'd have to wake up an hour earlier, so I'd only have 5 hours sleep and if I am walking the dog I have to get up even earlier, it's just no point."

Responsibilities like FG2P1 having to walk the dog in the morning are likely to take priority over the commute. There may be a want to use different travel options, but time restrictions do not allow for it to happen, as time has already been allocated for activities with higher priority. In the case of StaIP8, she chooses to only be away from her home for a maximum of eight hours because she has to care for her dog, she feels in order to make best use of this time and not let down her students that she cannot rely on the bus to transport her. Originally, she would commute by bus and then walk 20 to 25 minutes to her place of work, now she feels that buses have become unreliable. Due to being restricted by the unpredictability of buses and the bus timetables there may be instances where the time needed to take the bus is insufficient:

"It doesn't actually save me that much time getting the bus because if I walked it would probably be an hour walk… but I leave an hour for my journey anyway for the bus bit and the walking bit, sometimes if I'm waiting for a bus and it's not turning up then I'd be even longer than that anyway."

Having the ability to choose when to leave the house and then the office in the evenings was a big part of why StaIP2 chose to drive over any other form of transport. He did not have to work around the timetable of the trains, which gave him a degree of flexibility. StaIP2 reasons:

"I think the most important thing is flexibility, that I decide when I'm coming in and when I'm going home and that to me is probably the main reason why I drive most of the time, it's time to go or stay another 5 minutes. I don't have to look at the train times... you might miss a train and have a half hour wait … I'd rather just get in the car."

Flexibility is also key to the routine of StaIP11 because she does not know exactly when she will be able to leave the house in the morning. On a bike StaIP11 would be able to get on her bike and leave, but if she was bus commuting and missed the previous bus she may have to wait at the stop for a long time for the next bus to arrive. StaIP11 explains:

"Whenever we leave, finally leave the house five minutes later then we planned, on a bike I get to work 5 minutes later, but on a bus, I might miss a bus and get to work 20 minutes later depending on when the next bus comes."

By taking public transport the StaIP2 and StaIP8 felt they were restricted by the timetable and schedule of the transportation system. This inflexibility often makes the participants look for other means of commuting. StaIP2 cites inflexibility as to why he decides to drive commute, he notes that he would like to use the train, but the journey will longer because he has to wait for the connecting train:

"Probably flexibility, and when I do travel by train it's not a straight forward route … I have to get a little local train to Liverpool and Oxford road to Salford and the delay in transferring between those 2 makes it a long journey."

Also, the flexibility of driving allows him to leave when he wants to. This flexibility the car brings was a big factor in the decisions of StaIP2 to drive:

"I choose to drive as its flexible when I leave, I tend to leave either very early in the morning or a little bit later to miss the rush hour and the same in the evening."

On the other hand, a regular train service provides the flexibility that allows StaIP3 to quickly return home. Drive commuting would take longer and there is the chance of congestion slowing him down further:

"At the moment I like to be able to get home quickly if I need to, because I've got my Dad, he's very old and not well, living near"

Each day there is only a certain amount of time available to individuals, therefore certain activities have priority over others. Some of the participants' travel choices have been made with priorities in mind, such as prioritising recreational time, family time and responsibilities. Competences of flexibility arise when materials are available to individuals, for StaIP3 plentiful and regular trains means he is not controlled by the train timetable, giving him flexibility. In the case of StaIP2, the materials needed for train commuting are limited, which creates inflexibility, leading to a preference to using a single occupancy motor vehicle to commute.

5.1.12 Managing and predicting time

Making the most of the time in the morning is very important, especially for those who do not live near the destination, as time is often constrained. This explains why some participants decide to prepare their provisions the night before.

StaIP8 felt that these time constraints were not encountered less during her commute away from campus, therefore are more relaxed about the type of transport they are going to take. StaIP8 says:

"I'm less annoyed waiting at the end of the working day for a bus"

Having to spend longer on the commute to university can be frustrating, but StuIP12 feels that it is overcome by your motivation to be at university:

"When you wake up, you know you're going into university. … So, if it takes longer than normal… it is frustrating, but in the end, you're doing it anyway."

When the participants are commuting to campus they are required to be there at certain times, whether it be a lecture, meeting or the start of the work day. This means that they have to leave their residence at a particular time in order to ensure they arrive in time.

Although the points of arrival and departure are set, the unpredictability of using a car or public transport dissuaded many participants from using them. On the roads the major factor that was noted to cause unpredictability was congestion, congestion and accounting for congestion has made StaIP2, StaIP4, StaIP5, StaIP7, StaIP9, StuIP12 and FG1 and FG2 increase the amount of time they committed to their commutes. By walking the time needed to commute was constant and predictable for StaIP8. Being able to control the time it took for the commute played a large role in why commuters chose to use human powered transportation. The view of walking instead of taking the bus is echoed by StaIP6 who cites that the bus can be quicker than walking on some occasions but on others it can take longer, so consistently knowing when she was going to arrive was a factor in why she chose to predominantly walk commute:

"I know how long it takes to walk, the bus can take sort of about 20 minutes, but it can also take longer than it takes me to walk, so I'd rather just walk and know when I am going to get there."

StuIP12 expands on the unpredictability of the buses:

"Obviously, bus services are always late, they're never really on time or either they're late for like half an hour… Because where I live, you're meant to have a bus, during peak times, every 5 minutes. There've been like…60% of the time where I've gotten to the bus stop, waited… For 40 odd minutes, no buses come and then all of a sudden, six buses come."

StaIP5 is lucky in a sense that he does not have to sit through traffic while driving because he is able to have the flexibility of when his work starts, but admits:

"I can start work anytime in between 8 and 10 but I noticed that if I try to get in for 9 it takes me absolutely ages, about 45 minutes to get in, if I aim to get in for kind of 8 – 8:15 it only takes me 20 minutes."

Sometimes the congestion is unavoidable, participants have meetings, lectures etc.

StaIP2 says:

"When having to leave at times where they will encounter peak congestion a journey that normally takes under an hour can take almost three hours"

When StaIP2 has to get to university for nine o'clock in the morning he finds it

difficult to drive as he is caught up in the congestion:

"Sometimes if I need to be in early in the morning… to be in for 9 o'clock here is difficult, I tend to have to leave at around half past 6 to get in for 9 o'clock"

StaIP5 chooses to drive a route that avoids the majority of the main roads in order to bypass

the majority of the traffic. By not having to contest with the congestion the time it takes for

him to commute is shortened, StaIP3 explains his commute:

"I don't go onto many main roads, I try to take the back roads if I can."

StaIP4 felt that a way to evade the traffic was by walking or cycling, he explains:

"If I drive in rush hour it can take me an hour and a half, so it is actually quicker to cycle, as you just sort of cycle past all the traffic, but if I drove outside of rush hour…it would only take me 30 minutes to drive, but this is not always possible."

By taking the train StaIP3 notes that he is able to bypass the congestion on the roads coming

into Manchester, reducing the time he needs to commute:

"The train goes through the really busy bit, when I drive from Southport West of Wigan, so it is quite quiet, … I leave home at 7 and drive 25 – 30 minutes, get the train at 20 to eight and that takes another 45 minutes, so I am here by 20 past 25 past 8. So, it's an hour and 20 (instead of almost 2 hours by only using the car)."

Reducing the time spent commuting through congestion was poignant in StaIP4,

StaIP5 and StaIP8 and was a major reason why many of the participants from FG1

except decided on the uptake of cycle commuting.

5.1.13 Unforeseen circumstances that affect the routine and responsibilities

When external factors such as family and pets are included, sometimes unforeseen

circumstances can hinder the best preparations. Having the flexibility of leaving her

residence when StaIP11 and her child were ready instead of rushing and potentially missing

the bus was a factor in swaying the participant to choose cycling over using the bus to commute:

"I'm completely in control of when we'll leave the house, so I don't have to worry about… it is impossible to know exactly when you are going to leave the house when you are with a toddler. Whenever we leave…on a bike I get to work…later, but on a bus, I might miss a bus and get to work 20 minutes later depending on when the next bus comes."

Having responsibilities for family and pets often has an impact on the commute. StaIP4, StaIP7, StaIP9 and StaIP11 are all responsible for taking care of their children, whether it be getting them ready for school, taking them to school and or picking them up from school. The parents had to accommodate their commutes to include the extra time that would be needed. StaIP4 is responsible for taking his children to school every other day, if he chose to commute by car after doing the school run he would get stuck in the morning traffic. To avoid being part of the congestion he chose to cycle. StaIP4:

"Traffic has a knock of effect because it rules out driving at certain times, if I've got to do it … it would take me an hour ... if I'm doing drop off in the morning then I prefer to then take my bike because I'm going to be traveling in rush hour."

On the days that she needs to take her child to school, StaIP7 does not have enough time to complete the preferred 35 to 40-minute walk to the bus station. Instead she has to transport her child via driving and then drive to the bus station. She is unable to drop her child off at school any earlier because the school only starts at 7:30 and the walk back would mean she misses the 7:44 bus to university. StaIP7 explains:

"the school starts at half 7 and we don't have anybody, if I had the time I would walk but because we need to take him to the school and then go to work we just have the exact time to do it by car, if not I'd prefer to walk."

5.1.14 Moving closer to reduce time spent on the commute

Time often gives structure to the day and decisions are made based off it, some might be small like preparing provisions the day before. Others are more radical, for example StaIP11 and StuIP13 moved their residences in order to reduce the amount of time

spent commuting. StuIP13 notes that through the past experience of his sister having to commute every day he feels that a lot of time was wasted:

"My sister spent a lot on travel to and from Salford when she was studying around there, so I knew that I didn't want to do any of that, and so walking would be the easiest way, so that is why I moved in."

By living closer to the university StuIP13 was able to control the time that he left his accommodation to walk or cycle commute to campus. There was not a reliance on the bus or train schedules, which gave him the flexibility to commute whenever he wanted to, he says that:

(Traveling was) "On your own time, you would get there when you want, depending on how quick you wanted to cycle or when you leave…so yeah really flexible."

StaIP11 moved residence in order to reduce the time it took for her husband to commute to work. By moving a small amount of extra time and distance has been added to her commute, but she accepts that by moving closer to the motorway each of her husband's commutes are shortened by 10 minutes. Although it takes longer for her to get to university, it means that her husband has to spend less time in the car stressing about driving:

"My husband works at Liverpool Hope University, and he has to drive every day because there is no viable public transport and we moved closer to where he needs to get on the motorway. So, it is 10 minutes off his journey every day each way."

5.2 Practices while commuting

5.2.01 Personal comfort

During peak commuting times all forms of motorised commute are affected by congestion, for example StaIP9 the morning commute can be made difficult due to the number of people also trying to commute, luckily her job is quite flexible and most of the time allows her to avoid the worst of the congestion on the trains. Sometimes she is

required to be at her workplace for 9 am and has to use the train during the most

congested times:

(The trains) “they’re very crowded between sort of 8 and 9 …I’m lucky… I can get on the train, but the trains that stop at the 2 stops afterwards… quite often there are people left on the platform after because they can't get on the train...it’s very stressful for people standing up as well because people are shouting at each other to move up, it isn’t always the most relaxing of rides.”

As with trains during peak times, trying to get on the bus can sometime be a struggle

due to the number of people already squashed onto the bus, FG1P2 says:

“The bus gets annoying, you have no space and sometimes you don’t even get on the bus because it’s too cramped, and it goes.”

Being able to alight and get a seat on public transport makes the commute much more

comfortable, StuIP12 explains how especially during rush hour getting a seat can make

all the difference:

“When you have seats, it’s not that bad. But when you’re kind of forced into standing, it’s an absolute nightmare because you’re shuffling past people that are trying to get off the bus and … It’s so tiring …and I’m not too big a fan of being in overcrowded spaces.”

For StaIP2 a drive commute guarantees a seat, whereas if he took train commuted he

could be standing for the whole journey, especially during peak times:

“There have been times when I’ve gone in the morning where I’ve been standing all the way from Liverpool to Manchester.”

During the busiest periods of the day, the stop start nature of the bus commute can

make it very off putting for the commuter. The buses are overcrowded; people are

pushing past to get on or off the bus, and the general experience of being on the bus is

unpleasant. StuIP12 explains how it feels to be on a bus during peak times:

“I know during peak times when it’s busy, there are a lot of people wanting to get on the bus, bus drivers do let more people on. And sometimes that can go past what they’re recommended to take on and when that happens, it’s a nightmare because for every stop … you have six or seven people at the front that have to get off the bus for two or three people to get off …you can be at a bus stop for a good three or four minutes each time just doing that. Sometimes, for short journeys… you have seven or eight bus stops in between, you’re stopping there for a good 15/20 minutes and it’s just… I don’t know… It’s not worth it.”

StaIP8 comments the buses are often very full and there is not enough space during peak times is something that would deter her from using the bus:

"Not having enough space, having to be squashed in like sardines, ideally I'd have a seat, quite often the only seats remaining are the priority seats"

Due to the hot, cramped conditions on the bus, StaIP8 and StuIP12 feel nauseated. Often StaIP8 cannot wait to get off the bus, she says:

"I've felt really ill on them because they have been so hot, … I actually felt really travel sick in them…and I'm so excited to get off the bus for uni and sometimes I've actually got off the bus a couple of stops earlier just so I can get a bit of fresh air."

Personal comfort can deter individuals from choosing certain forms of transportation, such as buses and train, because they do not feel comfortable while travelling. Discomfort has arisen from having to take these forms of public transport with many other individuals during peak times. Changing travel times often created a more comfortable experience, this is something that a University could affect through the use of flexible staff working timetables and reducing the need for students to travel during peak times.

5.2.02 Stress during the journey as a deterrent

Participants of the interviews and focus groups cited driven commutes and commutes via public transport elicited some form of stress, whether it is from delays due to traffic, other road users or poor infrastructure. Whereas for those participants who cycled and walk commuted they felt that the commute was a way of reducing stress levels, especially when not constrained by time. Focus group two participant two says:

"When I allow myself enough time to walk in the morning, instead of rushing I can relax but if I have to be at a certain point in town or in uni, I don't like to rush."

As Gatersleben and Uzzell (2007) found one end of the spectrum is the commute being stressful and boring and the other being relaxing and exciting, FG2P4 says;

"When it becomes the same route day in day out it becomes a bit more of a necessity"

The level of tolerance for stress varies between participants and different forms of commute are perceived to create more or less stress.

On public transport stress often arises from the unpredictability of the mode of transport, through delays and cancellations. As mentioned by StaIP9 getting on the trains can be stressful, FG2P4 explains how the sheer number of people on the trains in the mornings acts as a deterrent:

"I took a train once from my home last year before I moved in… and it was very packed in the morning. It makes me not want to take the train at all really to uni… You don't even know if you're going to get on sometimes or you just get shoved onto a train."

Unpredictability and the length of time public transport takes was found in StaIP8 and StuIP12 to cause the most stress, this cause of stress has also been found in research by Evans et al. (2002) and Wener et al. (2003). StuIP12 reveals how many a time he will be commuting for more time than he spends on campus:

"an hour and a half each day, going to and from uni. …across five days, that's over seven and a half hours already wasted. And then on a bad day where it can take as much as two hours, sometimes for one journey… Let's say three hours to and from, across five days that's fifteen hours. That's more than half a day just gone, sat on a bus doing absolutely nothing."

When the time spent on campus is also factored in, it leaves very little time for relaxation:

"You spend a good, seven or eight hours in uni, your commute can take three or four hours… You don't really have much time to do any of your own personal stuff as well."

The unpredictability of public transport systems in the UK causes stress for the commuters. Every time StaIP8 has to teach in the mornings she has to account for any delays and cancellations that possibly could occur, the stress of being late results in her having to dedicate much longer to her commute. StaIP8:

"I'll get the bus at 7 and I'll be in uni before 8… just because I'm so scared that the bus will not get me in on time, so I'm basically leaving then 2 hours in advance because I know that the morning is when the buses are the least reliable."

While driving, the car is an extension of the driver's own body, where "the identity of person and car kinaesthetically intertwine" (Thrift, 2004, p. 47). During the practice of driving, the

driver and car are sometimes one entity (Katz, 1999). The driver of the car is part of the praxis of driving, feeling every bump, not as contact between road and tire but to themselves. Swaying with the car as it rounds a bend as to help the car around the corner or changing their grip on the steering wheel as a way of interacting with other cars (Katz, 1999).

Driving becomes a mixture of raw emotions that are constantly brewing and are ready to boil over at any time. Stress builds up as there is no release because everything is held within the little bubble of the car as there is a distinct lack of personal interaction between drivers (Thrift, 2004).

Car commuters often perceive the car as an extension to their body and any adverse manoeuvres they are subjected to results in tension and anger. Commuters often attach emotions and meanings to manoeuvres, making driving a highly emotional and stressful practice (Katz, 1999). Small petty incidents can fester and turn into anger, creating dangerous situations. Focus group one participant three recalls a story of how a small thing as someone cutting into her lane became a very stressful situation:

"I was driving on the Mancunian Way… and it was a bit of congestion, I was standing there and those guys behind me kept coming over and kept pushing right in and it was making me so angry… This guy was coming in from this way… He has priority, so I let him in and then another guy tried getting in there too. So, I was like no, no no and then gassed it."

StaIP11 reveals that the stress of being stuck in congestion is one of the reasons why she decides to cycle commute every day, she understands that by being in a private motor vehicle each person is in their own personal space and away from their surroundings. On the other hand, while cycle commuting she is on the outside, open to the wind, rain and occasional insult. StaIP11 describes why she feels people prefer driving:

"I mean cars, I don't understand how people can sit in traffic jams…when I cycle past them, I don't understand how they are not going stir crazy, but they're in their own bubble, they don't have to deal with anybody else, they can control their heat, they can control their

music, people are used to that level of comfort, I'd find a traffic jam excessively discomfortable, to not make me want to do it, but people like what they know in general."

Competences of stress are interwoven into the commuting practice, many of the participants who drove or used public transport to commute said there was always some form of stress along their journeys as a result of unpredictability or road traffic. Whereas the opposite was said from individuals who chose to walk or cycle commute, these commuters said during their walking or cycling journeys they felt their stress levels were decreased. Stress is able to rapidly accumulate and become a factor that has a negative effect on the productivity of students and staff. In the interest of the university, promoting stress relieving transportation through a TP may be able to alleviate stress levels and create a better working environment.

5.2.03 Safety and hazards while commuting on the road

Personal safety and feeling safe has a high degree of influence on how the participants choses to commute. StaIP9 states explicitly that she feels her route would be too unsafe to commute via cycling, because she would have to travel along some very busy roads. StaIP9 explains:

"The risks of being knocked off your bike; to me it isn't worth it because I'd have to come down some major main roads. I couldn't go off-piste to say."

There is a feeling of vulnerability shown by interview participants one and four as cycle commuting involves sharing the road with much more dangerous vehicles, a motor vehicle is likely to do more damage to a cyclist than a cyclist to a car. Participant four explains how a car can be much more destructive and dangerous than a bicycle.

"You're not on a machine that you can do a lot of damage with, you can't cycle 70 mph on a street …whereas other vehicles are much more dangerous driving on them."

StaIP1, StaIP4, StaIP9 and StaIP11 feel there are not enough safety provisions on the roads to ensure they can commute safely to university. A major concern is that they are sharing the

road with heavier and faster vehicles, while having very little protection. For StaIP4 cars passing too close to him or other cyclists have become a daily occurrence and have made him feel that the car drivers do not want him on the road:

"I would say every day I cycle in there is at least one incident where someone in a vehicle does a close pass or someone's pulling out after you in a junction… it's just having cars behind you, trying to overtake you and doing silly things and dangerous things, you kind of feel a bit unwelcome on the roads."

In the UK the roads are dominated by motor vehicles and are design to accommodate them, which makes cycling more difficult (Thrift, 2004). For a car to cut across a lane it is relatively straight forward, but for a cyclist it can be problematic, especially if there is no infrastructure to aid the manoeuvre. StaIP1 says her cycle commute requires her to cut across lanes of traffic that are going in the opposite direction:

"In order to turn right…to get to Salford Central Train Station, you have to cross a whole bunch of lanes and if the traffic is moving faster than you are its really hard to cross"

Aside from other vehicles, the road can cause different safety concerns if it is broken and uneven or slippery due to ice. Cyclists are more likely to feel safe cycling on the road if there is well maintained infrastructure, such as segregated cycle lanes or underpasses. StaIP11 comments:

"I certainly saw where there were lots of cycle lanes in other place in Brisbane… you got more people cycling, you'd feel safer, and nobody is coming to encroach on your space. Everybody knows you should be there."

If the roads and cycle paths are not well maintained they can degrade and form potholes, swerving to avoid the potholes can bring the cyclist closer to the motor vehicles. StaIP1 explains how potholes can create unsafe situations:

"I don't think it's very safe because the part where you cycle on the road is all sort of torn up and it's got lots of pot holes, so you kind of swerve quite a lot, so I'd say … It's a bit dangerous… almost every day I swerve into the traffic."

In the same way that StaIP1 feels a segregated cycle lane would provide shelter and safety from motor vehicles, StuIP12 explains how the bus provides him with a physical

barrier to the outside. The bus shelters him from the weather or other vehicles on the road:

"I think being in a bus is kind of like being in a little shelter, I'd say with big wheels that can get you where you need to go."

The physical shelter that a bus provides creates an aura of security and safety for StuIP12.

Unfortunately, darkness creates a sense of insecurity, especially in participants who have to incorporate walking into their commutes. While walking during hours of darkness participants felt they were more exposed to crime, so would rather take other forms of transportation or take a safer route to reduce the risk of becoming a target.

StaIP8:

"I think with walking now… you'd be walking to work in the dark and walking back from it and that's a lot scarier than in the summer…I don't normally get scared about walking back on my own … but you do hear about awful things happening …it's probably less safe than some other forms of transport."

StaIP6:

(Walking home at night) "I do that less often, I walk in more often and going home I might take the bus, but in the summer, it's quite nice to walk home, I often leave at around 7…now it's not so nice to walk home, and I don't usually do that in the…at night I don't walk through parks… being in the dark in places where you can't kind of see around corners … makes me a bit unsettled."

Being inside a vehicle when it is dark outside exudes a sense of safety as explained before by StuIP12. Many a time when it is dark StaIP9 would limit the time she has to walk and be exposed to the darkness. Instead of walking to the train station where the trains are more frequent but is located further away, she elects to walk to a closer train station. For StaIP9 walking to the closer train station is possible because she knows the timetable for the trains and can leave the university accordingly. StaIP9:

"When it gets dark at night I am not overly comfortable walking over to Piccadilly… especially if I'm carrying my laptop and my phone and my purse, … you kind of err on the side of caution … I will try and time leaving here so I can get a direct train from Oxford road."

To commuters safety is very important; individuals only used transportation which made them feel safe. Often it is the fear of danger which deterred individuals. As a result individuals would change their commuting habits to avoid unsafe situations, such as taking different routes home when it was dark or being picked up instead of walking home. In the UK commuting during hours of darkness is inevitable, a system which creates safe commuting conditions during these times could be invaluable.

5.2.04 Productive use of time

Unless governed by teaching schedules, meetings or other commitments interview participants seven and nine have flexible schedules which allow for days where they are able to work from home or by pass the congestion and come into university later in the day. StaIP9 says:

"there are certain times when I have to be here at certain times, if I'm teaching say at 9 o'clock I have to be regardless at 9 o'clock but other than that it's quite flexible."

By working from home both participants feel they are using the time that would be spent commuting more productively. Instead of having to worry about the time spent commuting all focus can be on work from the moment StaIP9 wakes up:

"I just roll out of bed, do my work and then it's great, and I can actually make up quite a lot of things then because I'm not taking that extra 2 hours out of my day, so I can be much more productive at times."

StaIP7 adds that without the commute to and from university she is able to continuously focus on her work from the morning through to the evening:

"It's quite useful to stay at home and work… it's quite useful just sit down, sometimes I start at 7 and go all the way to 5 or 6, so that gives me a lot of time to focus."

Commuting by public transport there are times when you do not have to stress about getting to the destination and the conditions outside. StuIP12 describes the bus as:

"The bus is a big, spacious metal box where someone takes me to work or school every day."

While travelling by public transport the passengers are immobile and the vehicle is mobile (Thrift, 2004), resulting in the stresses of driving not being on you and the time spent commuting can be to be used in a productive manner whether it be working or collecting thoughts, "I love buses they are so relaxing, once you are on the bus it is out of your hands" (focus group one participant five, 2017). Throughout the day there is not much chance to be able to just sit and think. StaIP3 feels that his journey of 40 – 45 minutes on the train is the right amount of time to be productive:

"I'll sit there and think. You don't get much chance, time to do that these days. But it's a nice distance on the train because it's like a 40- 45 minute, so you can read, it's not too far and it's not too short."

StaIP7 explains she feels during her bus commute that she can be more focused on work compared to when working at home. She feels this way because she is confined inside the bus and is able to focus on her work, instead of worrying about chores or housework. StaIP7 describes:

"I think sometimes doing work in the bus it's a lot more useful than at home… because you are there confined, nobody is talking to you, you can really focus on what you are doing, … it really feels like a moment where I can really focus, so what I do sometimes on the bus is writing or reading because I can really focus, if I have emails I may do the emails at home or at work, but definitely for writing and reading or coding interviews and for anything that requires my full attention I prefer to do it on the bus"

Being able to work on the bus takes away some of the pressures of congestion as StaIP7 feels that even while in traffic she is still working. With the implementation of Wi-Fi and plug sockets on some buses it is easier now to stay connected and be able to make use of the commuting time, participants who used the bus said they could read emails, journals or books and relax. Although the participants are in a public space they are able to gain some of

the privacy associated with driving through the use of headphones, all the while they are exempt from the stresses of driving.

5.3 Summary

This chapter of this thesis has explored some of the interrelated competences, materials and meanings which contribute to the commuting practices of students and staff at MMU, UoM and UoS. Looking at the focus group and interview data thematically has shown the commute to be constructed from many elements of practice and is not as simple as the journeys from work and back home. First of all the commuting practices require materials and physical entities, for example bicycles are essential to cycle commuting. Continuing with the example of cycle commuting, the practice is consists of many interrelated competences, some of these include cycle proficiency skills, road safety skills, knowledge of the route and experience. Last but not least practices consist of meanings. The meaning, ideas and aspirations related to the commute are the hardest elements for a TP to affect because of the myriad of different dispositions.

The practice of commuting consists of interrelated elements that are integrated when individuals travel to and from work (Shove et al., 2012), the key competences, materials and meanings for the main commuting modes are shown in Table 12.

Table 12. Key competences, materials and meanings of commuting practices.

Practice	Materials	Meanings	Competences
Driving a car	Car Roads Parking	Stressful Quick Cheap Convenient Flexibility Unpredictable	Driving skills Knowledge of the route Driving safety
Using the bus	Bus Bus stops Roads/ bus lanes Bus routes Bus timetable	Crowded Slow Cheap Dirty Inconvenient Low class Inflexible	Timetable reading skills Knowledge of the route
Using the train	Train Train stations Rail roads Train routes	Expensive Inconvenient Inconsistent Inflexible	Timetable reading skills Knowledge of the route
Cycling	Bicycle Bicycle equipment Weather protection Extra clothes Safe bicycle storage Roads/ cycle paths Showers	Quick Cheap Efficient Stressful Dangerous Flexible Predictable	Road safety skills Bicycle riding skills Knowledge of the route Confidence
Walking	Weather protection Extra clothes	Dependable Convenient Spontaneous flexible	Knowledge of the route Walking safely Knowledge of the duration

The interview and focus group data has also been used to understand why people use and do not use different forms of transportation for their commute. Individuals have gravitated towards modes of transportation for their commute based on meanings of convenience, flexibility and cost. Students from UoS who lived in student accommodation found walk

commuting to be convenient; whereas the staff found the distance they had to commute made walking inconvenient, as a result cycle and drive commuting were more preferable.

Due to the location of MMU and UoM campuses being in Manchester City Centre, drive commuting was found to be very inconvenient for both students and staff. But by being located within the City Centre means other forms of transport are better facilitated for, which has resulted in a higher usage of these forms of transportation. Unlike MMU and UoM, UoS is located outside of the City Centre; as a result there are not enough materials to make public transport flexible or convenient. In order for public transport to convey meanings of flexibility and convenience there has to be regular and direct services. This suggests individuals may be persuaded to use different forms of transportation if their surrounding environments change to accommodate flexibility and convenience.

Time provides the tempo for life and dictates the practices that individuals can achieve. Therefore individuals have to prioritise practices in order to maximise their potential. Unfortunately the commute is often not given the time and attention that other practices are afforded, even though it is regularly practiced. This regularity may be the reason why the commute is thought as being mundane and a necessity rather than something new and exciting. In order to make the commute as hassle free as possible individuals base their commuting practices on which form of transportation is the most convenient, the least stressful and best suited for their needs.

The findings from the interview and focus group analysis will be discussed in terms of how TPs may be able to change the perceptions of the commute and provide the materials and competences to ensure convenience and flexibility.

6. Discussion

6.1 Introduction

This chapter will discuss the key findings from the focus groups and interviews along with the literature from the SLR. First the key findings from the SLR and GMU TP analysis will be used to discuss the impact of primary motivations on the integration of TPs into a workplace, the types of TDM measures that have been employed and why using students and staff surveys may not be the most optimal way of monitoring TPs. Then the key findings from the interview and focus group analysis will be used to discuss why participants chose unsustainable forms of transportation even though they could access sustainable transportation and the power of the TP to change perceptions and practice. The next section will discuss how the research findings in this paper relate to the existing literature. To conclude there will is a discussion of the whether the three Manchester University TPs have been effective at creating a modal shift.

6.1.01 Key findings from the Systematic Literature Review

The SLR found that TPs which were initiated with the primary motivations of gaining planning permission were less likely to be effective at creating a modal shift. In the UK a TP is required in order to gain planning permission for any new onsite developments, expansions or change in land use (DETR, 2001). This strategy of enforcing TPs has both benefits and drawbacks. One major disadvantage arises because once planning permission is granted the government does not enforce the use of the TP, sometimes leading to little or no integration into the workforce (Cairns et al., 2010).

Implementations of TPs with motives in line with reducing GHG emissions or to benefit the site users are more likely to be integrated into the workplace and the workforce because they play towards the corporate ethos and social responsibilities. Companies and workers who

were motivated voluntarily felt a greater sense of motivation to use sustainable modes of transport instead of SOCs.

Although similar TDM measures are employed by different workplaces each measure has to be tailored to the site user and the specific problem that the TP is trying to address (Cairns et al., 2010). There is not a one size fits all approach, as no two workplaces are exactly the same. By implementing measures that are unique and personalised to the on-site issues, more site users are likely to engage with the TPs and their initiatives. These are only successful if uptakes of TDM measures are high within site users.

Measuring the impact of a workplace TP normally consists of assessing the change in modal split through travel surveys, but other more qualitative measures are also feasible (Cass & Faulconbridge, 2016). A qualitative measure could be to assess whether TP initiatives have impacted an individual's travelling behaviours. The benefit of using qualitative methods is being able to understand why people practice practices and how they can be persuaded to enact a modal shift. The problem with travel surveys is that they rely on acquiring a high participation rates in order to gain representative results, but qualitative methods do not require this as key themes such as time, distance, cost and safety become apparent with a lot fewer participants (Sullivan & Percy, 2008).

6.1.02 Key findings from analysing three university travel plans

The SLR has identified some key factors in which contribute to TPs that produce a greater modal shift towards sustainable transport. These key factors have been used to analyse the most recent iterations of TPs from MMU (2011-ongoing), UoM (2012-2015) and UoS (2012-2017).

Primary motivations for the development of the TPs within the three universities are similar to those found in the SLR, MMU was motivated by achieving university wide carbon

reduction goals and creating a sustainable development; UoM was motivated to embed the same culture of sustainable travel into the student community; while UoS was motivated by campus development and gaining planning permission.

The primary motivations can be seen as an indicator of the maturity of the TP, the UoM TP is the most mature as it has moved away from being driven by facility management and towards achieving GHG reduction targets (Hough, 2013). The UoS TP is a relatively young plan initially implemented to conform to planning permission guidelines along with tackling onsite facility issues (campus redevelopment, car parks). The TP is now up for renewal, but the primary involuntary motivation of gaining planning permission is gone and renewal is based on the university seeing the TP as a viable means of resolving the onsite issues that still persist.

The three universities were also motivated to update or create a travel because the HEFCE required higher education institutions in the UK to not only monitor scope one and two emissions but also scope three emissions. The TP was a way in which the universities were able to implement mechanisms to estimate the amount of scope three emissions released through travel. To calculate scope three emissions the average distance and modes of transport used by site users are collected through travel surveys, then compared to known emissions data for each mode of transport (GHGP, 2017). The targets for the carbon management strategies and TPs are based on estimations because gaining data from every single trip is impossible in a university environment as the number of trips is too large.

In order to reduce emissions released through commuting, the three university TPs have used TDM measures which create options for alternative modes of travel, incentivise using active transport and disincentives drive commuting or reduce the need to travel. The majority of the mechanisms used to improve the rate of sustainable transport usage are short term and in the form of creating alternative travel options and incentives; the only real disincentive is in the

form of implementing car parking policies. The mechanisms implemented by the university TPs have caused some students and staff to change their commuting habits, but there is the potential to create a larger modal shift towards sustainable transportation options.

6.1.03 Key findings from analysis of the primary data

The university TPs have employed TDM measures to reduce GHG emissions relating to travel, their main target are students and staff as they produce the majority of the commutes, other groups affected by the TPs include fleet vehicle users and visitors. From the interviews and focus groups it became clear that some participants would use sustainable forms of transportation without interacting with any of the TP initiatives and likewise the initiatives to discourage single occupancy driving did not deter drivers who had access to sustainable modes of travel.

Using practice theory as a framework has helped to unravel why the interview and focus group participants have an indisposition to certain modes of transport and an affinity to others. The power of the TP and the TDM measures implemented to change one's commuting habits may be minimal if the person does not want to consciously change but can be massively influential for those who do. Practices are not fixed or permanent and going to study or work at a university can provide the enough environmental and social change to alter previous conceptions. The correct TDM measures, not only have to be able to facilitate and aid those who already use sustainable means of transport but also those who are thinking about using sustainable transportation. In order for a large change in modal shift to occur there must be the impetus to change and a TP coupled with possible lifestyle changes has the potential to provide it.

6.2 Motivations behind travel plan implementation

As workplaces, universities are always trying to become more environmentally sustainable, whether it is through reducing carbon emissions or educating employees. Within the three GMU there has been the adoption of campus wide TPs primarily to reduce travel by single occupancy vehicles and promote the use of active transport as a means of reducing GHG emissions resulting from student and staff travel. How primary motives have affected TP integration into the three universities, the importance of having a fair and effective car park management strategy and how the maturation of TPs change the motives are discussed below.

Cairns et al., (2010) demonstrated that TPs offer a means of cost effectively delivering transport demand management measures to the workplace in order to reduce GHG emissions. By being cost effective and providing results that are both quick and noticeable TP uptake by workplaces is slowly increasing. In the past all three GMU have developed, and incorporated TPs into their sustainability policies and seen varying degrees of success.

The university TPs are constantly evolving, with new iterations addressing problems arising from the previous version. Due to the TP being part of the university's wider sustainability objectives, they have often been used to target specific on-site facility management issues such as redevelopment of MMU campus or changing the university car parking portfolio at the UoS. This can also be seen in the reviews of other large workplace TPs, where the TP primarily targets one onsite travel problem (car parking, redevelopment etc.) and initiatives are built around it. The motivational themes of estates management, external regulations, creating a positive image and leading by example, described by Rye (2002), provide criteria for examining why TPs have been implemented in a workplace. The motivations behind the TPs of the three GMU can be categorised into the motivations described by Rye (2002), provide insights into how well the TP has been embedded into the workplace. If the themes

of motivation described by Rye (2002) are used to describe the plans MMU would be motivated primarily by motives linked to estate management and sustainability, this is because the University's main objective was to redevelop the Mabel Tylecote building on the All Saints Campus and the TP is part of their Environmental Sustainability Strategy 2014-2020.

Similarly, UoS was going through a phase of campus redevelopment as part of the campus plan for the next 20 years; to aid phase one of the redevelopment of the campus a TP was created. Like the TPs studied by Brockman and Fox (2011), Petrunoff et al. (2015), Watts and Stephenson (2000), the UoS TP uses the issue of car parking as a secondary motivation for TP implementation. This highlights the importance of car park management as a form of deterring unnecessary SOC trips in the eyes of the TP creators. Such emphasis is put onto car park management of UoS because the modal split data is dominated by SOC trips and having space to park the car facilitates this. A car parking strategy which acts as a deterrent of unnecessary SOCs, while also accommodating the needs of those who have to commute via SOC needs to be implemented before a TP can mature and focus on other travel sustainability targets (Cairns et al., 2010).

The long-term success of a TP is related to why a workplace was motivated to do so. A TP done solely for the purpose of gaining planning permission is less likely to be implemented and embedded by site users, whereas a plan which works towards the goal and priorities of the organisation has a higher probability of being successful (Roby, 2010). At the time of writing the UoS 2012-2017 TP period has come to an end and talking with the environmental sustainability manager has revealed internal motivations for plan for renewal are low.

The UoS TP has followed a similar pattern to Queen Elizabeth II Hospital (Petrunoff et al., 2015) and Liverpool Hospital (Petrunoff et al., 2016). In order to gain planning permission,

these there workplaces were required to implement a TP which covered existing and future transport issues.

On the other hand, UoM has as seen in its TP 2012-2015, motivations of embedding a sustainable travel culture in all the users of the campus and working to align with the ethos of the University. At the UoS, the ethos is to create a good student experience and make the university campuses highly accessible by vehicles, whereas UoM aligns their TP towards being able to emulate the success they achieved in reducing single occupancy vehicle commutes with student commutes.

In the interview with the UoM sustainability representative the progression of the TP was discussed, the representative felt pride in how they had created a culture of sustainable travel and how a TP would be unable to produce meaningful reductions in single occupancy vehicle travel. In their opinion the TP has been successful in creating a culture where sustainable travel initiatives are embedded into both student and staff's travel choices. The success of the TP can be attributed to the voluntary adoption by the University and those that use the site. Instead of feeling forced to comply in order to gain planning permission, the UoM was able to mould the TP around student commutes, business travel and fleet vehicle emissions.

If a workplace decides to create another TP to follow up the initial plan or update the current plan the motivations can change, this is because the plan is now initiated voluntarily. The TP becomes voluntary as the Government in the UK only requires a TP document to be included with the request for planning permission and the actual implementation is not monitored. The new TP can now target the specific onsite issues that the workplace feels would benefit them the most, more often than not a TP will target onsite car parking issues and create a new parking policy discourage site users from commuting via SOCs and pull them towards more sustainable forms of transport.

Motivations driving the TP forward are able to change; as a TP matures the primary motivations that initiated the plan are not necessary what will sustain it. After the motives of car parking are fulfilled, motives are able to shift towards more environmental issues and implementing more long-term initiatives that in the future will be self-sustaining and create a legacy.

6.3 Why are students and staff recruited to commuting practices?

The student and staff population of the universities are a large part of society around the GM area. The vast majority of students and staff have to regularly commute to and from university which results in a tremendous number of journeys. Through exploration of student and staff commuting practices it is clear that various social, economic and environmental factors relating to materials, meanings and competences can strongly influence the decisions made through travel (Shove & Pantzar, 2007). The materials, meanings and competences that contribute to the commuting practice make each person's commuting needs unique to the environment that surrounds them.

The following section will discuss the ideas of convenience and flexibility contributing to recruitment to modes of transportation, how time as a commodity changes the way in which individuals commute and how facilities can promote practices of mobility and safety. To conclude there will be a discussion of how repetition creates habits.

6.3.01 Convenience and flexibility

During the interviews and focus groups convenience and flexibility were mentioned numerous times by both students and staff as to why they chose a specific mode of transportation. Convenience or the perception of convenience changed the way in which the participants would think about the commute, for example the inconvenience of having to

prepare bicycle equipment or finding a place to safely store a bicycle was enough to deter some from even trying. For many the car is seen as the ultimate convenience device, it is instantly ready to go, takes you wherever you want to go and you don't have to worry about it at the end of the journey (Shove, 2003). On the other hand public transport is seen as clunky and rigid. Unlike the car which for the majority of time is always there waiting, the trains and buses are bound by timetables and stations. The commuter has to first inconvenience themselves with getting to the station or bus stop, depending on how far and how long it took to get there some may have already been disheartened and turned back towards the car. Therefore, to encourage the use of sustainable transport the TP needs to find a way to make public transport a more convenient method of commuting than driving.

Whereas the car waits for the driver, the commuter has to wait for the public transport as they are at the mercy of the timetables and or strikes. A reason why commuters find walking convenient is they have the same freedom to get up and go associated with driving a car: while driving is considered unsustainable, walking has the benefit of being an active form of travel and sustainable. Although car sharing would increase the efficiency of driving a car, the flexibility is lost when your commute relies on someone else or someone else's commute relies on you. Car sharing schemes have been implemented by various TPs, but there is still the fear of losing the flexibility gained from driving.

Car convenience is not something that has recently appeared in the UK, on the contrary decades of urban planning centred on the car has created systems where in almost all situations the most appealing option is to drive a car. People tend to choose a commuting option that results in the most direct journey and are often deterred by having to wait at a station or platform for connections or delays. The appeal of the car commute is that once you are inside you do not have to leave until you arrive at the destination. The same principle applies for public transport, people will consider it if it goes from close to their residence

directly their workplace. In order for TP aims to be achieved the main goal has to be to either reduce the appeal of the car by making it more inconvenient to drive or by sustainable transport options being more convenient and appealing, for example offering more direct public transport routes and reducing journey times.

MMU and UoM are located in close proximity to Manchester Town Centre; as a result, active transport is more convenient due to parking resources being limited. As a result, the modal shift for students of MMU is towards commuting by bus. In order to create such a modal shift away from the car initiatives employed by the TPs have to collectively be equal or greater than the effect of a lack of parking resources on convenience.

6.3.02 Time as a commodity

Time is a commodity that is often the most important reason for choosing a commuting practice after convenience, because time is a finite resource, once gone it cannot be recovered. Time devoted to the commuting practice cannot be invested into another practice. Practices become competitors for time, and individuals place different values on different practices (Shove et al., 2012) People do not want to spend time commuting, as it is time taken away from them doing what they perceive as more valuable activities and in most cases the commute to and from the workplace is unpaid, so there is no value in using more than the minimal amount of time required. There is a tendency for individuals to choose a commuting practice which takes the least amount of time, in the UK the direct nature of the car often results in it being the commuting method which uses the least amount of time; however there are cases where other forms of transportation can consume less time due to road traffic congestions or being able to travel in a more direct route..

An individual's day is constructed of a pattern of practices, from waking up and getting ready for the day ahead to practices of going to sleep at night. Commuting is just another practice that is woven into the rhythm of the day.

Each practice takes time, but the amount of time allocated to a given practice is dependent on the individual. Every commuting method requires a minimum amount of time because it is bound by its materials, but it is down to the individual to decide how much total time is devoted to the commute (Shove et al., 2012). The total amount of time allocated to the commuting practice is dependent on the knowledge and past experience of the individual or their competences (Shove, 2009). The time required for a commuting practice can never be 100% predictable, but some practices are perceived to be more stable than others, for example the time needed to walk, or cycle commuting is seen as being more consistent than travelling by bus. Choosing how to commute for some practitioners is based on the predictability of the time taken to commute, they chose to walk or cycle because the travel times were more consistent and felt they were less likely to be affected by elements that they could not control.

6.3.03 Materials facilitating or recruiting practitioners

Without materials there cannot be practices of commuting, for example not having access to a bicycle makes cycle commuting very difficult. Without mobility facilitating material there would be no commuting practices (Shove et al., 2012). In the UK the dominant commuting practice is driving a SOC and there is an abundance of facilities to facilitate it, such as car parks and roads (DfT, 2016). The abundance of facilities results in driving being relatively accessible to those who have access to a car; wherever the driver wants to go there is likely to be facilities enabling the car to get there. Unlike drive commuting, train commuting is severely hampered by its facilities; trains can only access areas where there are railway tracks and only stop at places where there is a train station, as a result practitioners are recruited to the practice of driving by the city being designed around the use of the car and the facilities available to them (Burke, 1996; Shove et al., 2012).

Facilities for cycling are similar to driving in the sense that the vehicle needs to be stored safely when not in use, in the case of a car it is in designated parking spaces and for bicycles it is a bike rack or bike shelter. From the primary research data, having access to safe bicycle storage facilities at the start and end of the journey was found to facilitate the uptake of cycle commuting. Providing on site facilities and provisions is a balance that the TP has to skew towards sustainable modes of transportation in order to create a modal shift, if the organisations provide lots of car parking options this encourages the use of cars because individuals gain all the benefits of driving while also being assured their car is relatively safe from theft and vandalism. By implementing facilities which encourage safe storage cycling practices throughout the workplace, cyclists are more likely to feel the same security that car parks give drivers and as a result more inclined to cycle commute. Although providing sustainable transport facilities does not guarantee a modal shift, it at least provides a viable option that practitioners can potentially utilize.

6.3.04 Commuting habits created through repetition.

When individuals are recruited to a new practice they are seen as ‘outsiders’, who do not have much experience or expertise in such a practice, even though they may already be fully fledge members of similar practices (Becker, 1963). For example, an individual could have many competences in leisure cycling but have very few in commuting cycling, both are similar in the fact that they require the use of a bicycle but the competences required for both are very different. During the outsider stage, practitioners are still consciously thinking about every step they need to do in order to achieve certain outcomes, they are not completely comfortable with the practice and can easily abandon the practice altogether. At this stage the practice is still volatile because the practitioner is still learning key competences, in order to retain new recruits to sustainable travel practices the TPs have to provide the key

competences and materials or the practitioner will search for means of transportation that they are more comfortable with.

With continued commitment to a commuting practice, the outsiders gain competences and become enmeshed in the practice and it becomes part of them, they become that which they do, they become car, bus, train, cycle or walk commuters (Becker, 1977). The practitioners begin to become comfortable with the commuting practice, their decision making starts to recede and actions are based on the environment around them, the commute becomes a collection of habits that are very hard to change (Shove et al., 2012; Verplanken & Wood, 2006).

Although difficult it is not impossible to break the routines and commuting habits through the use of a combination of environmental changes and information schemes. When the living environment around a practitioner naturally changes their habits can be disrupted and they potentially have the impetus to think about their actions and make new decisions (Wood et al., 2005). Through TP initiatives of spreading information, workplaces can take advantage of the natural occurring changes in living environments because the change in environment leaves individuals with strong existing habits open to new transport information. The environmental changes that disrupt habits are also able to challenge habitual mind sets make individuals more susceptible to trying new experiences and learning new things. The well-practiced practices become less automated by the environmental changes, enabling an openness to explore the commuting practices that are available to them.

In summary repetition of practices creates familiarity and habits as practitioners gain competences. The practitioner becomes enmeshed into the practice and their commuting decisions become less conscious and their actions more to do with the environment around them. Breaking commuting habits can be difficult but with the right impetus it is possible. A

university environment creates natural environmental changes that can drive individuals to change their commuting habits and be more open to new transport information.

6.4 Effectiveness of the three Manchester Universities' travel plans

On the outside the success and effectiveness of the university TPs are based on meeting targets of reducing GHG emissions and attaining modal share aims, but it is when the achievements of the TP to promote sustainable and active modes of transportation are explored, is the true effectiveness found. To begin with the TPs of the three GMU have brought attention to the issues relating to the use of unsustainable transportation (pollution, congestions, health etc.) and the need for change. Acknowledging that there are problems is the first step to rectifying the problems. At all three Universities the TPs have been able to successfully implement and conduct TDM measures that have reached a wide variety of students and staffs. Some notable TDM measures include the bicycle user groups, the 147 bus service of MMU and UoM and the 50 bus service of UoS which transport students around campus.

6.4.01 More than reductions in CO_2 emissions

Being institutions of power, universities have the means to drive sustainable practices forward. One measure of effectiveness is the integration of the TP into not only the university but also into the wider community, a very effective TP is able to spread the university's sphere of influence into the surrounding areas and have an impact on local travel affairs. By joining local transport groups and initiatives such as the Cross City Bus Initiative and LTP the Universities have been able to exert their ideas and influence on creating sustainable travel initiatives which reduce the number of commutes made by private cars.

MMU and UoM have been able to create safe cycling and pedestrian access to connect their areas of student residence to the campuses by working together with The Corridor Manchester Project.

Without the help of projects such as The Corridor Manchester or cooperation from the local City Council the campuses could become islands where the areas owned by the Universities have some of the materials needed to necessitate sustainable commuting practices but access to them is limited due to the lack of facilities within the surrounding areas. For example, cycle pathing is available within the City Centre and around the university campuses but outside of it there are key stretches of road where it is not. Using the Universities' influencing power, cycle pathing has been implemented along the main stretches of road from the campuses to the main areas of student residence. Implementing facilities such as cycle pathing and bus routes also has the effect of encouraging locals to use these facilities.

6.4.02 How effective are the universities promoting sustainable transport options?

Advertisement campaigns and information providing initiatives are very important to recruit students and staff to a practice and changing their habits. To be successful transport information has to be plentiful and easily accessible. All three GMU TPs have implemented numerous information spreading initiatives but the interview and focus group data from MMU and UoS point to inconsistencies in the volume of data provided and difficulties in trying to find this data.

At the start of the academic year the three GMU have provided lots of initiatives and schemes of fairs and flyers to recruit students and staff to commute via sustainable practices, but they are not consistent throughout the year. The start of the year is when the majority of staff and students face the largest changes to the environment around them, so it is understandable why a substantial amount of the schemes and initiatives are promoted during

this period. But information is sought all year round, and students and staff suggest that finding travel information is very difficult after the initial information providing schemes have passed. The difficulty in finding travel information has led to students and staff being unaware of what is available to them, which has limited the effectiveness of the TPs.

6.5 Future policies that can be employed by the universities

For any TP to be effective the initiatives have to be suitable for the site users, how widely they are applied and adopted (Enoch & Zhang, 2012). Dealing with current onsite transport issues is important, but in order to create a lasting and self-sustained modal shift future transport policies need to target changes within social norms (Bartle & Avineri, 2014); in order to do this the different factors behind the choice of commuting practice have to be examined. Although the individual practices of commuting may be different for each site user, there are still similarities between their commuting choices. While practices of leisure travelling are constructed from pleasure and symbolic meanings, commuting practices are chosen through availability of materials, competences and how the practice can benefit the individual, future TPs will have to tailor initiatives to address some of the site users' needs. Some of the needs include childcare, lack of alternative options, flexibility and convenience.

6.5.01 Off- site issues

A lot of attention from the TPs has been focused on onsite initiatives to provide materials and competences but the choice of commuting practices is also a result of access to offsite resources. In order to create a modal shift the offsite needs of the commuter have to be addressed, this is often hard to do because the university is unable influence the materials available to commuters in the areas where they reside. Moving students closer to the

university campuses and transport facilities has had a positive effect on reducing commuting via SOCs. In the future building affordable student accommodation that is within walking, cycling distance to the university or has easy access to public transport maybe a viable long-term policy.

Likewise, not every student is able to move into accommodation that has good transport links or is close to the university. Policies will never be able to satisfy the needs of everyone, but a TP is a very useful tool for the amalgamation of policies in order to cover a wide range of people as possible. TPs ensure university TDM measures and policies work in unison to achieve the goal of reducing the use of SOCs.

6.5.02 Fulfilling the needs of commuters.

In a university environment the biggest problem and why there is the need for a TP is the high number of commutes consistently being conducted. Reducing the number of non-essential trips should be a priority. Currently the main reasons for students commuting to university campuses are to receive contact hours, work or use the university facilities. Quite often contact hours are spread thinly across the week and require students to commute to university multiple times per week, thus generating a large number of trips. A condensed timetable which suits both the students and staff would be an option for reducing the number of commutes.

Having condensed student contact hours and utilising flexible working hours would also be of great benefit to teaching staff that may have childcare obligations or have complex commutes, to adopt sustainable commuting practices. Childcare needs and environmental needs often have a restricting effect on the transport options available due to timing issues. Parents often are unable to accommodate the extra time needed for sustainable practices by leaving earlier as they are restricted to when they can drop off their children at school. The focus groups and interviews found as a parent getting to university for contact time at 9 am

using sustainable commuting practices became very difficult when the child's school timetable did not align with the time needed for a sustainable commute. Taking a child to school while cycling often meant having extra equipment, making extra trips or taking detours which increased the time needed for the commuting practice, The convenience and flexibility of driving practices allowed for parents to be able to complete their commutes as well as cater for their childcare needs.

For students and staff commuting to UoS practices of driving fulfil many of materials, meanings and competences required for commuting. Unless public transport systems can match or exceed what the car can offer, SOC commuters will continue with their commuting habits. Without radical environmental change that affects SOC users, practitioners of SOC commuting will continue to drive and adapt to policies implemented by TPs.

By being located in close proximity the city centre, the needs of the commuters travelling to and from MMU and UoM are better fulfilled by public transport networks. The city centre is designed in a way which makes driving and finding parking very difficult, especially during peak times. Being the hub for transport links in GM many of the public transport services radiate outwards from the city centre resulting in a large number of routes and options for travelling creating greater travel flexibility and predictability. The city centre creates materials that encourage the practices of using public transport and discourages driving practices, in time forming habits of sustainable transport use.

7. Conclusion

7.1 Summary of Aims and Objectives

The aim of this research was to evaluate the effectiveness of TPs in promoting and encouraging sustainable travel behaviours in GM's University sector. In order to meet the aim of the thesis a series of objectives were created, these are:

- To consolidate current knowledge on the implementation of TPs
- To analyse the TPs of MMU, UoM and UoS
- Through a practice theory lens evaluate the commuting behaviours of students and staff at UoS, MMU and UoM.
- To identify challenges and barriers to sustainable commuting.

The effectiveness of TPs at promoting and encouraging sustainable behaviour in GM's university sector has been evaluated by conducting a SLR, studying the three GMU TPs and analysing the commuting habits of students and staff from the three universities. From the SLR, this study has found the primary motivation for TP implementation is very important to the success of the overall plan. Even though the primary motivations for travel plan implementation are different within the three universities, they have all experienced a positive modal shift towards commuting using sustainable transportation. This is because the universities are heavily motivated towards reducing GHG emissions. In the sense of reducing GHG emissions and shifting travel away from SOCs the universities have all implemented successful travel plans. Whether the travel plans will continue to be effective at reducing GHG emissions will be dependent on how the TPs mature and evolve to suit the future needs of the Universities and the students and staff.

Using practice theory to explore the commuting habits of students and staff has enabled the key commuter needs to be uncovered and to what extent have these needs been fulfilled by

the current GMU TPs. Overall the key needs of the commuter are forms of transportation which are able to provide convenience, flexibility and time efficiency. In terms of convenience commuters sought transportation which was readily available and offered a service which was direct or did not involve many changes. Evidence from the interviews and focus groups showed participants preferred to use modes of transportation which created flexibility, or a sense of being able to just get up and go. Convenience and flexibility stem from the materials available to the commuter. Currently driving a SOC is seen to be the most convenient and flexible form of transportation because the practice's materials are well catered for as a result of the car favouring developments in the past. Time efficiency is very important to commuters as there is only a finite amount time. Commuters often choose modes of transportation which transports them to their destination in the least amount of time. Meanings of reliability and control are also taken into consideration, as modes of transportation which are thought to be more consistent timewise are more preferable.

Inconvenient travelling, inflexibility and time inefficient transport are the perceived barriers to the uptake of sustainable transport, in order to alleviate the effect of these barriers future TPs will have to work in partnership with the local community to understand how to provide site users with suitable initiatives which provide convenience, flexibility and time efficiency.

7.2 Limitations

Limitations with the study include the availability of resources, such as time and finance. Due to only having a limited amount of time the thesis only studied three universities. With greater resources of time and finance a greater range of UK Universities could be studied. By only studying three universities, the research findings and policy recommendations may not be fully representative of all UK workplaces and universities. But the research does show practice theory can act as the basis to further the development of modal shift policies.

Another limitation arises from the time and frequency of data collection. Data gathering could only be conducted once during a period at the start of the academic year due to time limitations. As a result the study could not snowball and efficiently recruit participants, any new participants were likely to belong to similar social groups and meant variations in culture was limited. Only having one period of data collection meant the study could not fully explore the small deviations to the environment, such as road closures or timetable changes, which could disrupt and change practices.

7.3 Future Research

This study has highlighted the effectiveness of TPs as a means of creating a modal shift within site users and some of the key site user needs. But it has not explored the barriers to the implementation of TDM measures faced by organisations. In order to further research on creating feasible modal shift policies an understanding of why organisations may not be able to meet the needs of their site users is required. As every organisation is unique, each organisation will encounter different barriers to the implementation of TDM measures, by understanding the barriers policies can be employed to remove these obstacles. By removing the barriers TDM measures which suit the site users and better fulfil their needs can be implemented, creating a TP which will be better integrated into the organisation.

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9. Appendices

Appendix A - Letter of ethical approval

University of Salford MANCHESTER

Research, Innovation and Academic Engagement Ethical Approval Panel

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4 August 2017

Julian Tang

Dear Julian,

RE: ETHICS APPLICATION STR1617-100: Evaluating the Significance of Travel Plans in Shaping Commuting Practices Within the University Sector in Greater Manchester.

Based on the information you provided, I am pleased to inform you that your application STR1617-100 has been approved.

If there are any changes to the project and/ or its methodology, please inform the Panel as soon as possible by contacting S&T-ResearchEthics@salford.ac.uk

Yours sincerely,

Dr Anthony Higham
Chair of the Science & Technology Research Ethics Panel

Appendix B – Participant information sheet

University of Salford MANCHESTER

Geography and Environmental Management

Information Sheet

Evaluating the Significance of Travel Plans in Shaping Commuting Practices Within the University Sector in Greater Manchester

Before you decide whether you want to take part, it is important for you to understand why the research is being carried out and what your participation will involve. Please take time to read the following information carefully. Just ask if anything is unclear or if you would like more information.

What is the purpose of this study?

This research aims to understand more about the ways in which students and staff commute within the university sector of Greater Manchester. It focuses on identifying the relationship between the university travel plans and their effects on the commuting practice and whether they can be used to promote and encourage sustainable travel behaviours.

The aims of the research are:

- Consolidate current knowledge on travel plan implementation using a systematic literature review.
- Through a practice theory lens evaluate the commuting behaviours of students and staff at University of Salford, Manchester Metropolitan University and University of Manchester.
- To identify challenges and barriers to sustainable commuting.
- To analyse the travel plans of three major universities in the Greater Manchester region.
- To produce a set of recommendations for future iterations of travel plans that might "nudge" commuters onto more sustainable transport.

I would be very grateful if you could help in this important research project aimed at finding out more about the relationship between commuting practices and travel plans within universities.

What am I being asked to do?

The project is a yearlong masters level study into the effect of travel plans on commuting practices. You will be asked to participate in a focus group aimed to discuss your daily commuting habits, such as how you commute to university and

why do you choose this type of transportation. After the focus group you may be asked to perform a follow up interview, which will explore deeper into specifics than the focus group.

What about confidentiality?

In any published materials your identity will be anonymised – you will be given a pseudonym rather than using your real name. However, your actual words may be used in text form. Photos that you take may be published if people are unidentifiable or if they contain no people. All data will be stored in a manner compliant with the Data Protection Act, on a password protected computer, and locked in a secure office. You may request a copy of this data if you are interested.

How will the data be used?

The research will be used to examine the reasons behind certain commuting practices and be included into the final research thesis. No individuals will be identifiable in the report or further publications.

Please note that:

- You can decide to withdraw from the research at any point
- You need not answer questions that you do not wish to
- If you withdraw from the study all data will be withdrawn and destroyed if you so wish
- This research has obtained ethical approval from The University of Salford ethics committee. If you have a complaint about the way in which the researcher has carried out the research you can contact the research supervisor, Dr Mags Adams at M.Adams@salford.ac.uk

Thank You for your Participation

You may contact us for any further information on:
j.tang@edu.salford.ac.uk

Appendix C – Participant consent form

University of Salford MANCHESTER

Geography and Environmental Management

Consent Form

Title of Project: Evaluating the Significance of Travel Plans in Shaping Commuting Practices Within the University Sector in Greater Manchester.

Name of Researcher: Julian Tang

(Circle as appropriate)

➢ I confirm that I have read and understood the information sheet for the above study and what my contribution will be	**Yes**	**No**
➢ I have been given the opportunity to ask questions (face to face, via telephone and/or e-mail)	**Yes**	**No**
➢ I agree to voice recordings being taken during the research exercises	**Yes**	**No**
➢ I understand that my participation is voluntary and that I can withdraw from the research at any time **without giving any reason**	**Yes**	**No**
➢ I understand how the researcher will use my responses, who will see them and how the data will be stored	**Yes**	**No**
➢ I understand that my name will not be used but that what I have said or written as part of this study will be used in reports, publications and other research outputs	**Yes**	**No**

Finally:

➢ **I agree to take part in the above study**	**Yes**	**No**
➢ **I am willing to be contacted about further research on this topic but understand that this forms no obligation on my part to participate in further research**	**Yes**	**No**

Signatures:

Participant Name:	Signature
Researcher taking consent: Julian Tang	Signature
Date	

Appendix D – TDM measures implemented by the three GMU

Part A - Manchester Metropolitan University

Category	Measure	Transport demand management measures already implemented.	TDM measures implemented by the travel plan
Creating the option for alternative modes of transportation			
Public transport	Providing information for public transport	Bus, train and Metrolink timetables on the university website. Travel information boards. Personal travel planning events. Promoted the health benefits of alternate forms of transportation to staff. Promoted the travel plan.	Sustainable travel campus maps for students and staff available online. Providing personal journey planners for students and staff travelling by bus. The travel plan has been integrated with Masters Students undertaking transport courses. Promoting the travel plan through social media.
	Access to rail planner		
	Negotiating with local public transport operators for new or better services at cheaper prices		Increasing Metro shuttle links between Manchester City Centre and the Birley Fields Campus, 2 new bus routes have been added (141 and 86) Integrating the university with the Cross- City bus package Manchester.
	Paying for new services	Providing funding for the 147 Oxford Road Link bus service.	Implementing a Smart Card system for public transport (Met Card)
Cycling	Pool bikes		
	Providing better facilities for cyclists		New lockers, new cycle shelters, cycle repair stand and pump have been installed. Regularly reviewing bicycle storage facilities to meet the demand.
	Encouraging cycling	Cycle to work events. Creation of the bicycle user group (ManMetrider). 15% discount on bicycle insurance for staff from the Environmental Transport Association. Option to claim back 17 pence per mile cycled during business trips.	Informing students and staff of the health and fitness benefits of cycling. Continued promotion of the bicycle user group.
	Schemes for loaning bikes	ICYCLEMANCHESTER, a student led project providing low cost bicycle hire for students and staff.	
Walking	Providing better walking facilities		Well- maintained internal pedestrian linkages throughout the university.

			Safe crossing points around the university and linkages between the Birley Fields and All Saints campuses.
	Encouraging walking	Schemes to encourage the use of walking route planners.	Personal alarms are offered to students and staff who are concerned over personal safety. Informing staff and students of the health and fitness benefits of walking. Wayfinding and signage towards walkways.
Car sharing	Encouraging car sharing		Car share bays are reserved for car sharers until 9.30am.
	Scheme to guarantee a ride home		
	Promotion of car share databases	Car share websites have been promoted. Developed an on campus car club.	
Incentives/disincentives			
Incentives	Incentives for walkers		
	Discounts on bicycle and equipment purchase	Discounts for staff buying cycling equipment.	Cycle to work scheme (C2Work)
	Providing subsidies for public transport	Interest free loans to buy annual public transport tickets, which are repaid straight out of the staff's salary.	
Disincentives	Reducing parking supply	Development of a car parking policy.	
Non-transport means			
Technology/ operations	Flexible working hours		Exploring the opportunities for flexible working arrangements for staff.
	Telecommunication/ Teleworking/ Teleconferencing		Increased the number of teleconferencing facilities. Exploring opportunities for staff to work from home.
Culture	Creating a culture that is car-free		Reviewing postcode data and thematic mapping to identify opportunities for encouraging sustainable travel patterns. Sustainable travel events, such as bike to work weeks and in town without my car day, catch the bus week, TfGM event for walking. Timetable of monitoring and reviewing the travel plan.

Part B - University of Manchester

Category	Measure	Transport demand management measures already implemented.	TDM measures implemented by the travel plan
Creating the option for alternative modes of transportation			
Public transport	Providing information for public transport	Installed public transport way-finder information boards within the University main reception areas. Journey planning workshops for staff.	Ensuring new students are aware of the travel options and advising them against bringing a car into Manchester. Using social networking to provide transport information to students and staff. Providing information and guidance to new staff about sustainable travel options. Looked to improve the promotion of corporate discounts to staff.
	Access to rail planner		
	Liaise with local public transport operators for new or better services at cheaper prices		Supported and promoted the development of the bus priority scheme and acted as a key stakeholder with regards to highway and access alterations on Oxford Road. Supported and promoted the development of large scale projects designed to improve sustainable travel access (Northern Hub Rail scheme and Metrolink). Encourages TfGM to improve the quality of buses in terms of emissions and passenger experience, particularly of services running along Oxford road and Wilmslow road, Lobbied for real time information to be displayed at bus stops. Provided evidence of overcrowding on public transport systems. Provided evidence of poor performing routes and opportunities to improve services. Provided transport operators evidence of opportunities for additional services in order to provide better public transport connections to the University. Provided evidence that operators needed to better cater for occasional public transport users in terms of cost and experience.
	Paying for new services	147 Oxford Road inter campus shuttle.	
Cycling	Pool bikes		Introduced a pool bike system for staff business trips.

	Providing better facilities for cyclists	Cycle strategy for all new build schemes. Signage to direct cyclists to safe and convenient cycle routes. Maps of cycle routes and facilities across campus.	Increased the number of bicycle stands by 100 to 2560. Increased the capacity of bicycle shelter by 120 to 570. Installed bicycle shelters at the halls of residences and improved the quality of existing facilities. Increased the number of showers available to cyclists in current buildings from 32 to 42. Installed 50 clothing and equipment lockers near shower provisions. Installed CCTV cameras in all the current bicycle shelters. Made the cycle routes across campus clearer. Provided basic tool stands across campus for minor repairs,
	Encouraging cycling	Bike user group (UMBUG). Cycle proficiency training	Bike maintenance sessions. Internal bicycle marking scheme and raising awareness to reduce the number of bicycle thefts. Promoting cycling to students through route advisory, emissions information, road safety, health and security.
	Schemes for loaning bikes		Supporting Biko Bikes, a student led project for bicycle rentals
Walking	Providing better walking facilities		
	Encouraging walking		Built relationships with local and regional walking groups with a view to promoting walking opportunities and providing on campus walking sessions.
Car sharing	Encouraging car sharing		Installed 20 designated car share bays across campus.
	Scheme to guarantee a ride home		Provide reimbursement for car sharers whose lift home fails due to unforeseen circumstances.
	Promotion of car share databases		Reviewing the car share database.
Incentives/Disincentives			
Incentives	Incentives for walkers		
	Discounts on bicycle and equipment purchase		Continued support for the Cycle to Work tax free scheme.
	Providing subsidies for public transport	Discounts on public transport tickets for staff Interest free loan for staff that use	Cycle mileage rate for business trips. Car share mileage rate for business

		public transport.	trips. Expenses claim for public transport for business journeys. Interest free loans for the purchase of annual tickets.
Disincentives	Reducing parking supply	Car parking permits are based on a first come, first served basis with a salary banded charging structure.	Staff car parking policy
Non-transport means			
Technology/ operations	Flexible working hours		Provide options for flexible working policies that enable the use of sustainable travel where it is currently not possible under normal working conditions.
	Telecommunication/ Teleworking/ Teleconferencing	Three video conferencing suites.	New video conferencing facilities.
Culture	Creating a culture that is car-free		Granting students access to staff cycling events. Promoting and increasing the take up of lunch time walks. Providing eco-friendly driver training for fleet vehicle drivers.

Part C - University of Salford

Category	**Measure**	**Transport demand management measures already implemented.**	**TDM measures implemented by the travel plan**
Creating the option for alternative modes of transportation			
Public transport	Providing information for public transport	Local public transport information is on the Sustainable Travel website. Providing information on the University campus bus service to new students. Promoting sustainable travel through online articles on the staff/student intranet. Promoting sustainable travel at various welcome events. Sustainable travel stories published on the Environmental and Sustainability team's blog.	Providing University-specific sustainable public transport information to current, new and prospective students and staff. Real time passenger information screens installed in principle building foyers. Creation of travel information points in primary buildings primarily through digital media. Regular events promoting sustainable travel.
	Access to rail planner		

	Negotiating with local public transport operators for new or better services at cheaper prices	Is a member of various transport committees/ groups to explore possible collaborations.	Continued partnership with local transport operators, Salford City Council and Transport for Greater Manchester. Work with Bluebird Buses to improve the University campus bus link.
	Paying for new services	Subsidised the Salford Quayslink/City. Connect 50 bus service, providing students and staff free travel between the main campus and MediaCityUK.	
Cycling	Pool bikes		
	Providing better facilities for cyclists	Secure bicycle storage facilities.	Upgrading existing storage facilities and adding more secure storage facilities. Increasing and upgrading the complimentary cycler infrastructure. Providing maps of cycle facilities external to the University.
	Encouraging cycling	Established a university bicycle user group. Offer 20p per mile rate for cycling business trips. Activities to promote cycling.	Cycle training for all students and staff. Cycle maintenance for all students and staff.
	Schemes for loaning bikes		University wide cycle hire scheme.
Walking	Providing better walking facilities	Well maintained access routes across campus.	Providing information pertaining to safe walking routes across the University to key destinations. Providing signage to allow for ease of information across campus.
	Encouraging walking	Worked with and supported initiatives that promoted walking. (University 5k, health and wellbeing expos).	
Car Sharing	Encouraging car sharing	Car sharers are eligible for a 50% reduction in the cost of an annual car park permit.	Car share only spaces in preferential locations.
	Scheme to guarantee a ride home		
	Promotion of car share databases	A University portal was established on carsharegm.com for both students and staff.	
Incentives/ Disincentives			

Incentives	Incentives for walkers		
	Discounts on bicycle and equipment purchase	Cycle to work scheme. Subsidising locks and safety equipment.	
	Providing subsidies for public transport	Interest free loans for public transport season tickets paid via salary deductions	
Disincentives	Reducing parking supply		Car park parking policy.
Non-transport means			
Technology/ operations	Flexible working hours		Introduced a flexible working policy to allow for travel outside of peak periods
	Telecommunication/ Teleworking/ Teleconferencing		Increased the number of video conferencing facilities. Homeworking policy to allow for work to be done off site. Remote working policy to allow for work to be done during transit.
Culture	Creating a culture that is car-free		