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How Shrewsbury town centre can be transformed into a car-free zone from a sustainable mobility perspective?

Source: Original Shrewsbury (2018).

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Abstract:

This thesis is concerned with the concept of car-free and what the necessary conditions are to foresee a successful sustainable mobility transition towards a car-free city centre, using a case study. The case study that was selected is the town of Shrewsbury in the UK. The main issue the dissertation was concerned with was how such a radical approach could be implemented in a British town. The main aim was related to the societal relevance of this research, and finding the best strategy for creating a car-free centre that is most importantly agreed upon by the residents as they are the people who will be most affected. The study was based on both primary and secondary research sources. Secondary sources included: multi-level policy documents, existing literature and academic journals. This research helped to highlight key strategies that have been implemented and analyse how specific contextual factors such as history, politics, environment and spatial planning can affect a settlements vision and outlook on creating a sustainable transport network. Primary research was also used within the study in the form of photographs and a questionnaire. The questionnaire included 60 participants from a case study town. The evidence collected from both primary and secondary research indicated that adequate provision of high quality and safe infrastructure influenced the number of people that chose to use alternative modes. Overall, the analysis indicated that there might be potential for Shrewsbury to implement such car-free zones, if there was to be an investment in dedicated infrastructure on a large and long-term scale with constant public involvement. Further research is required in order to establish an action plan to decide how it is going to take place.

Keywords:
Car-free, sustainable mobility, public participation, alternative transport modes

Table of Contents

List of Figures:

List of Tables:

1.0 Introduction

In this chapter, the research topic and the relevance of the study will be introduced, along with the general structure of the thesis. The background of the research topic is described first in 1.1. Following this in 1.2 will be the goal of the research and the research questions. In paragraph 1.3 the societal and academic relevance will be discussed. To conclude, an overview of the structure of the thesis will be provided in 1.4.

1.1 Background of the study

Car dependency is an ever-occurring situation in the western world that is now beginning to spread to the emerging countries of Asia and Africa. Since the early 1990s there has been a growing number of conferences on car-free cities and sustainable transport to tackle the problem. However, back in the early 1900s when the first mass production car was put on the market it was created in a rural context, and not for the city centre and short trips that we use it for today. The twentieth century saw the rise of the motor vehicle, ultimately leading to the generation of high levels of carbon dioxide (Dennis & Urry, 2009). Cars quickly gained a dominating role amongst planners, architects and politicians and they had to prioritise it in the urban landscape. These car-dominated cities are now challenging the transition towards a sustainable environment to live in.

It should first be noted how mobility is an important requirement in human lives. Movements between home, education, work, and leisure activities form a key part of our daily routines. Historically, people first travelled by foot and later by boat or train. When the car was invented, people switched to this mode of transport as it gave the opportunity to travel faster, further, and more independently.

The creation of car-free developments is not a new phenomenon, but has been present for many decades in places such as Bologna, Lubeck, Aachten, and York (Topp and Pharoah, 1994). Surprisingly, before the introduction of cars the most essential need for cities was walkability, which Southworth (2005) describes, “cities of the middle ages were remarkable in their walkability and typically packed all the necessities of urban living into an area no more than half a mile from the central square” (p. 247). This is a factor that should be taken forward and implemented into present planning policies. Dennis & Urry (2009) state “the cars’ flexibility enables car drivers to get into their car and start it without permission or the expertise of others” (p. 39). Motor vehicles are promoted as a very desirable system, and a system that will be difficult to change. However, there are several alternative transport

modes which need to be drawn attention to, and over time, will change the behaviour related to car dependency.

The English town of Shrewsbury forms the foundation of this study. The town was founded in the 9th century and contains many examples of unspoilt medieval streets and listed buildings. The town centre sits within a loop of the River Severn, the longest river in the UK, almost imitating its own island. The town has a population of 71,715 as of the last census in 2011, and the borough, which covers neighbouring villages, contains 102,328 (ONS, 2013). Although it is not the largest settlement in the county of Shropshire, it is the most important geographically, serving as a commercial centre for the whole county and across the border into Mid-Wales. It is situated just 9 miles (14km) east of the Welsh border, giving it the title of the 'Gateway to Wales' (Original Shrewsbury, 2018). The town also boasts direct connections to major destinations including Birmingham, Manchester, Cardiff and London. The use of this case study will be used to research into the local publics perception of weaknesses and strengths in the mobility of their town and what they believe can be changed. It also allows for the analysis of policy documents from all levels of government to see where there are possibilities for a transition towards sustainable mobility.

Figure 1: Location of Shrewsbury in the UK (Source: Digimap)

1.2 Goal and Research Questions

The objective of this study is to find out what the current necessary conditions are with regards to creating a car-free town centre with the use of research methods including insights from academia into the sustainable mobility perspective, the key variables of the car-free concept, and behavioural theories. This will be in combination with primary research including surveys and a policy analysis. The second main goal of this thesis, related to the societal relevance of this research, is finding the best strategy for creating a car-free centre that is most importantly agreed upon by the residents as they are the people who will be most affected. The research presented in the thesis specifically aims at guiding policy-making processes to realise effective car-free plans in the UK and thereby help in providing useful information with concrete suggestions for planning practitioners.

A further aim of this study is to investigate how countries have taken various strategy approaches to infrastructure and policy development that is devoted to restricting vehicular usage, with a focus on implementing these findings in the English town of Shrewsbury. Existing literature specifically relating to car-free development is, as yet, limited, so there are many research gaps to be analysed. The literature review will investigate studies and will make use of evidence from European car-free developments. However it may be asked how relevant such evidence would be to UK circumstances. In his research into the sustainable mobility paradigm, Banister (2007) explains some key policy measures to foster an alternative approach to sustainable mobility. These could be important tools in understanding the transition to sustainability and aid this thesis in examining the whole process in terms of societal benefits, where all options and implications are considered.

The main question of this research is:
"In what way can the centre of Shrewsbury be planned so that it can become car-free in order to enhance sustainable mobility from the perspective of residents?"

In order to answer the main question, the following sub-questions have been formulated and will be addressed in this thesis:

1. How can car-free cities be conceptualised from a theoretical perspective?
2. What are the necessary conditions for a successful sustainable mobility transition towards a car-free city?
3. What are the current weaknesses and strengths in the mobility of Shrewsbury town centre according to residents and what are their views on the concept of car-free?
4. To what extent can the findings from academic research on sustainable mobility be implemented in Shrewsbury?

1.3 Relevance of the study

In terms of the relevance of this research topic, it will incorporate the subject areas surrounding car-free cities, sustainable mobility theory, theory of planned behaviour, alternative transportation modes, and pedestrianised/walk-able zones. These are highly important issues in modern-day city planning that are continuously being researched in order to create improvements for the future. Dühr et al. (2010) state how the EU Transport Policy has encouraged a sustainable approach to forms of mobility across Europe. Although, Haq (1997) recognised that there was a knowledge gap in Britain, as it did not have a strategic transport policy covering all modes. Policies that were developed tended to be 'road centric' to the disadvantage of other less polluting modes and lacked integration with other policy areas such as environment and land use. The rise in car ownership in the UK, which began after WW2, has continued to increase almost without interruption until the present day. This increase in the number of vehicles and traffic can be blamed for many things: consuming land in a way which damages the fabric of cities (Crawford, 2000), weakening community cohesion (Appleyard and Lintell 1972), worsening congestion (Goodwin and Lyons, 2010), air pollution (DfT, 2017) and climate change (Greenpeace, 2008) to list just some of the negative externalities which have been identified through research. Car-free cities are an increasing phenomenon in Europe, but in the UK it is less common. Morris et al. (2009) state that in Britain "there is some resistance among UK developers to implementing car-reduced areas". Current UK Government policy contains some encouragement for car-free development, however these policies mainly reflect the limited UK concept of housing with no parking and do not appear to contain any significant obstacles to the broader European concept of car-free cities. Therefore, it shall be interesting to research what conditions are needed in implement such car-free zones in the town of Shrewsbury.

1.4 Structure of the thesis

This paper will consist of six chapters. Chapter one is the introduction to the research topic and why it has been chosen. In chapter two the theoretical framework is discussed, consisting of relevant academic theories in relation to the topic, and concluding with a conceptual model. In chapter three, the thesis will introduce the methodology. This will include the case selection, data methods, analysis description and ethical considerations. The data collected and results will be presented in chapter four. Following this, the results will be analysed. Finally, the last chapter (five) will conclude the findings of the thesis and reflect upon the study, ultimately providing recommendations for future research and a reflection.

2.0 Theoretical Framework

The concept of a car-free city centre is a growing phenomenon, mainly in Europe. McKenzie (1999) identifies two distinct definitions of a car free city, 'radical' and 'conservative'. A radical car-free city is environment-led and integrates the environment with social issues whilst pursuing a participative political process. Whereas a conservative car-free city is one that is economy-led and concentrates on narrower environmental protection issues, which is committed only to consultative political processes. Ideally, a radical car free city would be implemented, however this could be problematic as by 2030 there are expected to be two billion cars worldwide (Gross, 2016) with car density being most problematic in cities. In Europe around 70–80% of people live in cities and this also tends to be the space where people generally congregate as a result of economic and social activities and urban planning patterns (Nieuwenhuijsen and Khreis, 2016). Cars and their related infrastructure take up large amounts of space that could be used for more green purposes. Therefore, the reduction in the number of cars and therefore a reduction in the need for parking places and road space provide opportunities to increase green space and green networks in cities. In turn this can lead to many beneficial health effects whilst also creating more opportunities for people to interact with each other in public space. Efficient public transport systems can also strengthen social capital by providing a safety net of transport options for (economically) disadvantaged groups, encouraging high-density living and enabling social interaction with fellow users during trips. Loo (2018) reflects how "most car-free development is in Europe and that beyond Europe, research papers on car-free development have mainly been limited to the drawing board or the conceptual stage" (Alameri, 2011., Borges and Goldner, 2015., Minh, 2016., Zhu et al., 2015)

This chapter will provide a theoretical framework for the research topic, beginning with a discussion on car-free cities and their characteristics. Secondly, the chapter will explain some key policy aspects of car-free cities as adopted from Nieuwenhuijsen and Khreis (2016). Following this will be an insight into academic theory in relation to the sustainable mobility paradigm and what are the conditions needed to achieve this transition along with a discussion of the relevance of the Theory of Planned Behaviour. Finally, the theoretical framework will conclude with a conceptual model.

2.1 Defining car-free cities

Topp and Pharoah (1994) describe car-free centres as "a city centre, where motor traffic is limited by an area-wide ban to that which is considered to be functionally necessary". This

ultimately leads to increased attractiveness and economic vitality than the current car dominated cities, and can provide a competitive advantage in attracting certain population groups notably highly educated young professionals. A suitable size for an entirely car-free city is small to medium-size of about 15,000 people as suggested by the research of Crawford (2000, 2009). However in larger cities it is recommended that the 'downtown' area or the city centres are the most suitable selected areas for implementing car-restraint policy measures or car-free measures. This is notable in much of Europe, especially the Netherlands where prime shopping streets within the centre are predominantly car-free. A survey by EMNID in 1991 revealed that 85% of the population support "drastic limitation of car traffic within big cities". Research has proven the potential benefits of introducing car-free areas, with Loo (2018) discussing both the temporal (car-free days) and spatial (car-free zones) strategies. The most common benefit is the reduced environmental impacts, particularly in terms of a reduction of greenhouse gas emissions, traffic noise and the 'urban heat island' effect. But there is also the opportunity for increased social capital, economic vitality, and less road accidents. Although, it seems most governments have so far not implemented such radical approaches in fear that they will lose political support.

Nieuwenhuijsen and Khreis (2016) argue that a car free city would provide a catalyst for better town planning by generating a shift from the need to facilitate car mobility and instead ensuring that urban areas are planned around the people that live there, the functionality and thus creating better-built environments for current residents and future generations. A car-free city allows the freeing up of public space and can contribute to active mobility and social interaction (Loo, 2018). Brown (2017) makes an interesting argument when discussing the concept of 'car-free'. According to him although being 'car-free' can signal liberation from the costs and hassle of car ownership he indicates that what if the majority of car-free cities are not in fact car-free, but rather 'car-less' and "not owning a car continues to represent a mobility burden rather than a chosen freedom?" Just a small change in semantics can make the difference between making a choice and having a constraint. Being 'car-free' assumes that someone does not own a car because they choose not to, and rather being 'car-less' deems that people do not own a car because of financial or physical restriction. It is thus important when designing a 'car-free' city centre to ensure that the residents do not feel like they are 'losing their right to drive', rather that they are making a conscious behavioural change in response to the negative effects associated with automobiles.

There is an ever-increasing popularity in the car-free narrative, one that has captivated the popular media and galvanised car-free policies. For example journalists in The New York

Times and The Wall Street Journal broadcast “the end of car culture” and “the end of car ownership” (Higgins, 2017; Rosenthal, 2013). It gives people the feeling of being “unburdened, even liberated, and sometimes joyful” travelling around the city without a car (Gatto, 2017). Brown (2017) notes that in many of these cases, going car-free is presented as “an exotic adventure, or a temporary experiment motivated by a friendly dare”.

It is important to note that the concept of ‘car-free’ does not refer to having no cars at all, rather promoting alternative modes or implementing restrictions or taxes on motor vehicles within a predetermined geographical boundary often referred to as ‘car-free centres’, ‘car-free zones or districts’. The introduction of car-free days does serve a good purpose of showcasing the future possibilities and that “behaviour change is possible without any significant changes to existing infrastructure” (Badiozamani, 2003, p. 302). However, the benefits are short lived unless a long-term strategy is constructed.

Banister (2007) identifies what he believes to be the required actions for a sustainable mobility shift to car-free cities. He states these as the reduction in the need to travel (less trips), to encourage modal shift, to reduce trip lengths and to encourage greater efficiency in the transport system. Brown (2017) also discusses two travel behaviour observations that have advanced the narrative of going car-free, particularly the next generation of young adults who are more open-minded and willing to use alternative modes and are thus shunning cars and embracing a new lifestyle. One of the most important factors in this is the reduction in the number of youths obtaining their driving license and the rising cost of car insurance (Hickey, 2017). A strategy to promote car-free lifestyles, as advocated by Brown (2017), is providing supportive infrastructure for alternative transport modes or providing more awareness and education to encourage people to leave driving behind and embrace sustainable methods. Planning for a ‘car-free’ city centre with plentiful public transport, cycling, and safe pedestrianised zones can provide robust alternatives to car travel and help to increase mobility opportunities for both those looking to become ‘car-free’, and those who are ‘car-less’. Loo (2018) predicts that if local resident needs are fulfilled, the car-free identity and social cohesion are strengthened to make the car-free development sustainable. The key is to develop positive measures to fulfil people’s various needs, with the addition of interactive policy-making, and reinforcing the appeal of the car-free environment, rather than focusing mainly on the control measures such as parking restrictions or the complete banning of private cars.

This thesis will elaborate on the research by Banister (2007) about different sustainable mobility approaches to transport planning including modal shift, distance reduction and efficiency increase. By using these actions it is hoped that three key policy instruments for car restrictions as researched by Nieuwenhuijsen and Khreis (2016) to help to foster successful car-free centres. These being;

1. Ensuring public transport availability
2. Cycling infrastructure
3. Inviting and secure pedestrian areas.

Alongside this, each characteristic will be discussed using the variables of generalised costs (monetary and non-monetary), policy (institutional and infrastructure) and social/individual factors (cultural) as elaborated from the 'General Framework of Factors' from Rietveld and Daniel (2004). Sub-section 2.4 of the thesis will discuss these three characteristics of car-free cities in further detail. The framework by Rietveld and Daniel (2004) was selected as it clearly identifies the factors, which influence various transport mode usage. It can easily be adapted to a local context, for example problems relating to extremely warm temperatures will not be relevant to the British context. Ultimately, it can help to identify the required ways to encourage a modal shift in a particular location.

2.2 Sustainable Mobility

The focus of the sustainable mobility paradigm has been on encouraging engagement and behavioural change amongst people, supported by strong and consistent government action (Banister, 2008). However, Banister revised these priorities in 2018 to be: environmental and health; and inequality and distributional issues, although they are dependent on schizophrenic futures (Banister, 2018). This showcases how over time there has been a paradigm change, as sustainable mobility constantly adapts to the changing context surrounding it. Within the sustainable mobility paradigm, urban mobility is based on ecology, liveability and sustainable transport. For example: considering the road as a public place, focusing on accessibility and people, and emphasising reasonable and reliable travel times.

There are four actions to foster Sustainable Mobility as identified by David Banister (2008):

1. Make use of technology
2. Regulations
3. Land-use measures
4. Marketing information

These actions reduce the need to travel, encourage modal shift, reduce trip lengths and encourage greater efficiency in the transport system (figure 2). All four actions can be fostered through the introduction of sustainable transport alternatives such as public transit systems, cycling and safe walkable zones, which will be discussed in further detail in 2.4. Banister (2008) describes the sustainable mobility paradigm as "moving towards an objective-based planning system that tries to implement a range of policy interventions, but with the support of all stakeholders".

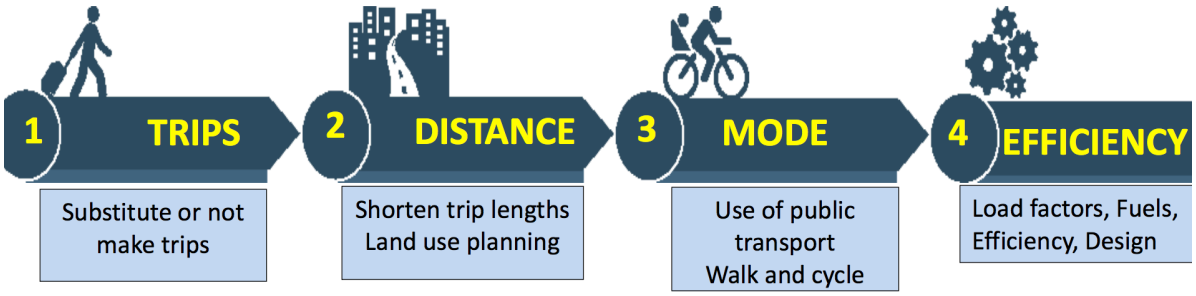

Figure 2: Sustainable Mobility Paradigm (Source: Banister, 2018)

The sustainable mobility paradigm consists of seven main components according to Banister (2018) revised version, of which these fit into the categories seen in figure 2:

1. Reasonable travel time (not minimisation of travel time)
2. Seeing travel as a valued activity (not only a derived demand)
3. Reducing the need to travel (through distance reduction and working remotely)
4. Achieving significant modal shift (to walking, cycling and public transport)
5. Lower levels of pollution and noise from transport, and greater energy efficiency
6. More efficient management and use of infrastructure and capacity through higher occupancy and load factors, and through pricing
7. Increasing the quality of places and spaces within cities

The main focus of this thesis will therefore be upon the 'mode' factor from the sustainable mobility paradigm (figure 2) and point 4 (achieving modal shift) and 7 (increasing quality of spaces within a city) of the seven main components as listed above. These fit in conjunction with Nieuwenhuijsen and Khreis's (2016) key policy instruments and can ultimately aid in fostering a car-free city centre. However, the public can have a large role in deciding whether or not this shift is possible, as will be discussed in the following sub-section.

2.2.1 Involving the people

Banister (2008) notes that a small change can lead to new attitudes towards the car if it is sufficiently supported. Through an active and participatory process change can be realised. Schade and Schlag (2003) showcase the importance of fairness in urban transport planning and the need to guide and force change to achieve a high level of commitment towards sustainable mobility. Banister (2008) identifies two key factors that stakeholders must agree to in order to see real change, these being: willingness to change and an acceptance of collective responsibility.

In order to change the behaviour of people and create public acceptability for such a radical change of creating a car-free city a process of dialogue between actors needs to be developed. Mehaffy (2014) writes "cities perform best when they offer some control of spatial structure to residents." Trust and respect must be built up through legitimacy based on participatory approaches that explain to local residents the need for changes in their behaviour and travel patterns, whilst also convincing them of the importance of their contribution (Banister, 2008). Throgmorton (1996, p. 360-361) identifies that for planners to become true promoters of a public democratic discourse, they should learn to "listen to their audience stories", learn "to persuade their audience" and learn "that their rhetoric has the potential to create new communities and a new culture of interaction". Planners can thus act as facilitators or hinder such communicative processes (Healey 1992, Innes 1995, Forester 1994). There is often a tendency in planning to underestimate the role of collective and individual agency. It should be noted that knowledge gained in collective situations can be particularly relevant and openly conflicts with planners' knowledge, a position that Healey recognizes as useful in combining various values and beliefs (1997, p.29). Ultimately, broad coalitions should be formed to include actors from various backgrounds. Only once these are formed can real change towards a sustainable mobility paradigm take place (Banister, 2008).

Nevertheless, it should be emphasised that in the last decade the sustainable mobility paradigm has emerged to produce a concept that does not fight against undesired modes of transport, but rather reduces the need for travel, encourages a modal split, decreases trip lengths and improves efficiency in the transport system.

2.3 Theory of Planned Behaviour

It is assumed that people act and are influenced between various modes of transport according to rational principles. The theory of planned behaviour was proposed by Icek Ajzen to improve on the predictive power of the theory of reasoned action by including

perceived behavioural control (Ajzen, 1991). TPB assumes that a person's choice is dependent on their perception of his or her ability to execute certain behaviour, making it possible to explain the choice of travel mode (Ajzen, 1985). Intentions are assumed to capture the motivational factors that influence behaviour.

The intention behind a certain behaviour is dependent on these factors:

- Attitude to the behaviour
- Subjective norms
- Perceived behavioural control

Attitude with regard to behaviour: this concerns the attitude or opinion that a person has in relation to a certain behaviour (e.g. travelling by bicycle).

Subjective norm: people like to belong to a group, because of this the opinions and behaviours of others are very important and certainly of influence from their environment.

Perceived behavioural control: this involves the extent to which someone thinks that the behaviour can actually be carried out. So it is not about whether they really can do it, but about whether they think they can do it (e.g. how difficult someone believes it is to travel by bus).

The attitude has a particularly important function to this thesis as it relates to a person's view on various transport modes, which are influenced by the key variables (generalised costs, socio-cultural, and policy). With regards to the subjective norm, it could potentially be asked of residents "if more people cycled would you then be more inclined to cycle as well?" However, this could make the thesis become too psychological. Similarly in relation to perceived behavioural control, which involves finding out why taking different modes of transport is difficult for certain individuals and their own perceptions. Nevertheless, it may be interesting to include some of these aspects in data collection.

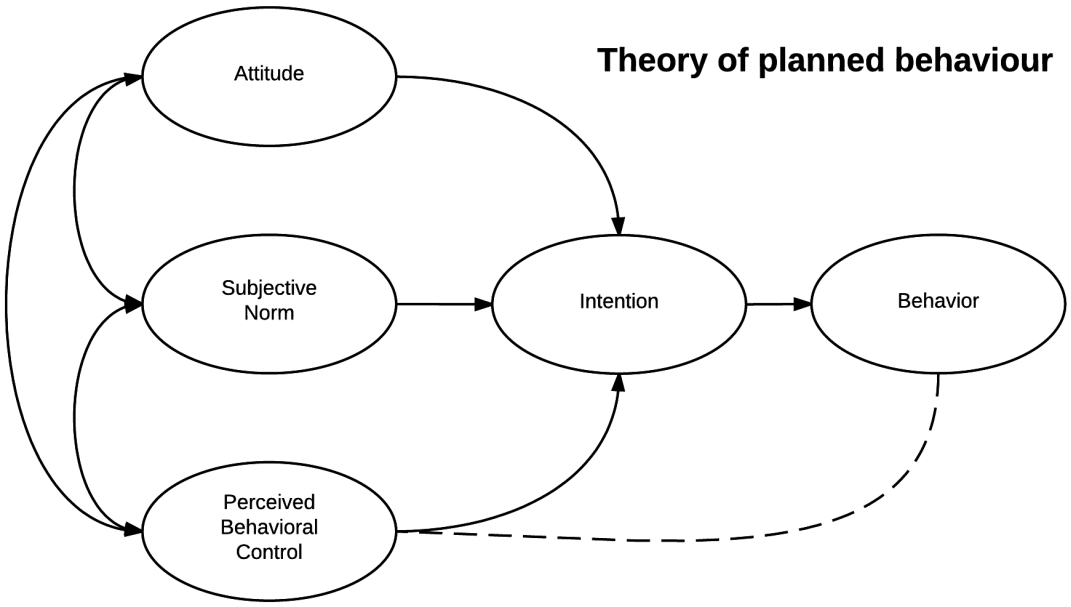

Figure 3: Theory of Planned Behaviour (Source: Ajzen, 1991)

A general rule of TPB is that the more favourable the attitude and subjective norm towards a behaviour, and the greater the perceived behavioural control, the stronger a persons intention to perform the behaviour. TPB suggests that it is possible to change an individual's behaviour by influencing their attitude, subjective norm and perceived behavioural control. For example in an attempt to increase public transportation usage, peoples attitudes towards it can be influenced by offering 'test trips' to give them a better personal experience making them more likely to switch to this mode. In relation to the subjective norm, 'role models' or 'ambassadors', including celebrities and politicians, can also influence this.

Nonetheless, there has been notable criticism of attitude-based theories like TPB. Rystam (1998) concluded that in fact it was a changed behaviour that led to respondents changing their attitudes, rather than the other way around. Therefore, this thesis will try to understand why particular individuals decide to take certain transport modes and what factors influence them whether it is economic, social, or institutional.

2.4 Key characteristics of car-free cities

2.4.1 Key characteristics of car-free cities – Public transport

It is important to understand what the key conditions are for transiting towards a car-free city. For the purpose of this thesis, the characteristics described by Nieuwenhuijsen and Khreis (2016) will be elaborated on. The first key aspect of understanding a successful car-free city could lie with ensuring the capacity of public transport systems. Investment in an

extensive, integrated public transport system, resulting in a decrease in car use and therefore lower levels of congestion is a common solution strategy along with improvement to existing infrastructure for example; bus lanes, and trolleybuses. These adjustments should not just be within the CBD but also on main routes throughout the city to create a fully functioning network. With fewer cars on the roads public transport modes can achieve shorter journey times because of less traffic on the bus routes. Public transport can act as an important tool in addressing car dependency (Currie and Wallis, 2008). Topp and Pharoah (1994) discuss how since the role of public transport is enhanced by the creation of a car-free city centre, some cities have improved the services with "more frequent buses, an express service, a ring route to connect the park-and-ride spaces with the city centre, free-of-charge services within the CBD, and the provision of special baggage-carrying buses". Nevertheless they make an important argument that in smaller cities bicycles and buses actually compete with each other rather than with the car, so that high bicycle use tends to be accompanied by low bus ridership (Pharoah 1993). This can be seen in the English city of York whereby the City Council has no powers to finance public transport operation to influence its market share, except for social reasons such as evening services and concessionary fares for the elderly. However, it is widely recognised that the most important supporting measure for creating car-free centres concerns the provision of efficient public transport services. Only in this way can socially and environmentally compatible accessibility be achieved. This mode of transport will now be discussed in terms of the variables presented by Rietveld and Daniel (2004)

Generalised Costs

Generalised costs of transport do not focus only on the economic factors related to money; rather they encompass a variety of features such as travel time, comfort, personal security etc. (Rietveld and Daniel, 2004). There is much resistance to public transport use currently as people believe their car is a faster method of travel. However, research by Nieuwenhuijsen and Khreis (2016) indicated that although speed by transport mode differs by city, there is evidence that the average speeds of cars in cities do not differ much from average speeds of public transport modes. Currie and Stanley (2008) note that public transport use can strengthen social capital by providing a safety net of transport options for (economically) disadvantaged groups, encouraging high-density living and enabling social interaction with fellow users during trips. Nonetheless many countries are stuck in a lock-in, notably the United States, where there has always been relatively low fuel prices in comparison to other countries. That is why cars as a mode of transport have been financially more attractive than public transport and therefore embedded in the way the Americans move about, making it difficult to change their behavioural patterns (Sorensen, 2008).

According to the OECD and ITF (2014) public transport can be decomposed into four generic elements, these being: safety, cost, comfort and convenience. However it is noted that comfort and convenience can be defined in various ways dependent on an individual and the context. Comfort generally refers to how enjoyable or bearable a service is whereas convenience is the efficiency in which a user is transported. Trompet et al. (2013) identify some key features that affect the convenience of public transport, these being:

1. Availability
2. Accessibility
3. Information
4. Time
5. Customer care
6. Comfort
7. Security
8. Environment

As you can see from above comfort is in fact a variable of convenience. In relation to comfort of public transportation, the key factors are temperature, ventilation, comfort of journey, cleanliness and overcrowding. These can all have effects on the usage and popularity of public transport, although the OECD and ITF (2014) believe that availability is the most important factor relating to convenience. These convenience variables play a large role in the attractiveness of public transport and open opportunities for it to be more competitive. Current transportation often focuses more on improving price and time, and simply disregarding comfort and convenience.

Social

Public transport provides a lifeline service for many individuals to work, school and recreation, especially for those unable to drive, from low-income households, students or the elderly (Social Exclusion Unit, 2003). Although, these socio-demographic characteristics (e.g. income, age, and housing) can also be the reason for limited transport capacity and influence travel behaviour (Titheridge et al., 2014). Over the years, some of the most vulnerable groups notably women are those that feel most unsafe when on public transportation. A study by Thrasher and Schnell (1974) was one of the first studies to research criminal incidents on public transport and indicated that personal security is one of the most important factors for users in deciding which mode of transport to take. Heal and Laycock (1986) also showcase the importance not only of safety on public transport but also on the environment surrounding bus stops and train stations. Although an important finding from Olsson (2003) is that women are less car-oriented than men, with men finding

individual modes of transport (car, bicycle or motorbike) more desirable. However, it should be noted that an individual's upbringing and cultural background could result in a different outcome.

Another important social-cultural feature is how the capability of an individual can influence their travel behaviour, and can be categorised into physical, mental and financial aspects as seen in table 1 (Liu, 2017).

Categories of Capability	Features	Example
Physical	Age, children in household, household size, driving license and car ownership	As a person gets older they are more likely to use public transport
Mental	Education and occupation	Distance to travel to work, or more highly educated people are aware of the negative impacts of cars
Financial	Income	Lower income people can not afford a car because of financial limitation

Table 1: Categories of Capability (adapted from Liu, 2017)

Policy

Countries participating in the World Summit on Sustainable Development agreed on the importance of public transport and called for "greater investment in and partnerships for public mass transportation systems and pointed the way to better land use and reduction of harmful emissions" (UN, 2002). A possible alternative solution could lie in the field of 'Mobility as a Service' also known as 'MaaS'. Jittrapirom et al. (2017) describe MaaS as a concept that can contribute to the goal of achieving multi-modal systems, replacing private vehicles with alternative modes and ultimately counteracting the negative consequences on urban contexts and environments. MaaS is conceptualised as a socio-technical phenomenon by Giesecke et al. (2016) showcasing the importance of citizen participation and acceptance to adopt this new system along with changing their travel behaviour to become more sustainable. It combines various transport modes into a tailor-made package in one single interface, thus presenting a shift from an ownership-based transport to an access-based one (Jittrapirom et al., 2017). An example of a MaaS system can include the bundling of public transport, bike rental, car sharing and taxis, along with a pay-monthly contract. As the system matures more transport providers will want to join the platform, thus the benefit for travellers will increase due to more options being available.

Nevertheless, there can be some problems with MaaS, notably in the integration of different transport providers. Governing a number of private and public can be problematic as pointed out by Jittrapirom et al., (2017) who argue that by increasing the required level of integration can be most challenging for public transport providers in relation to their decision on integration with other providers. This is because public transport services have traditionally been provided by "a monopoly or multi-service provider who benefits from economies of scope and scale" (Viton, 1992; Farsi et al., 2007). However, public transport providers will ultimately benefit from MaaS in the long-term as it offers them with an advanced version of integrated public transport services which facilitates smart interactions between both travellers and suppliers of transport services.

To conclude, from the above research into public transit systems it is clear to see the importance of having a fully functioning and integrated network. Public transport networks must provide faster journey times in comparison to motor vehicles and stations should be strategically located. Furthermore, overall safety and convenience must be improved to change people's behaviour towards public transit. A strategy discussed that could provide a solution is MaaS. However, this is a timely process that cities have to be dedicated towards implementing fully, rather than just pick 'n' mixing certain aspects. All of the aforementioned measures can ultimately help to form an essential foundation in creating a car-free city centre by giving people from all backgrounds the access to an alternative mode of transport.

2.4.2 Key characteristics of car-free cities – Cycling infrastructure

This next sub-section will focus on whether cycling could provide another sustainable mode and aid contemporary challenges put on cities. Cycling can enhance liveability because it is better for the environment, healthy, faster in urban areas, cheaper for both society (infrastructure costs) and for individuals, requires less space and creates limited noise. Nevertheless, the definitions of a cycling city are very broad and often contain varying specific conditions that are required in order to be classified as a cycling city. Jansen et al. (1997) do however give a definition of an 'active cycling city', albeit very standard, in which they define an active cycling city as a city where the bicycle is the main transport mode. Forester (2001, p. 557) coined the term "vehicular cycling" to suggest that "cyclists fare best when they act and are treated as drivers of vehicles" meaning that they should share the road with the same rights as other vehicles. Research suggests that bicycle lanes not only improve cycling safety (Reynolds et al., 2009) but also the perception of safety for would-be cyclists (Fishman et al., 2012).

Generalised Costs

There are various generalized costs associated with bicycling (Rietveld and Daniel, 2004), these being: monetary, risk of injury, travel time, theft, comfort, physical needs and personal security. Time is often the main constraining factor for cycling as it is dependent on such features as the spatial structure of a city, the provision of adequate supporting infrastructure, and whether suitable and fast routes are available. Weather and landscape can play a defining role also, however it should be addressed that both the Netherlands and Denmark are leading countries in cycling but do not possess warm Mediterranean climates. Rather it seems weather is a behavioural constraint instead of a physical one. According to Rietveld and Koetse (2003) the risk of bicycle theft, especially in larger cities, makes people more reluctant to use a bicycle or own a high-quality model due to increased fear of vandalism or robbery. Safety can also be felt on a personal level. The more at ease people feel about going out at any time of the day and to any district of the city can increase their (un)likeliness to use a bike.

One of the main benefits of cycling is the health advantage. However, this is often a problem in the UK where obesity levels have tripled in the last 30 years and already 62% of adults are classified as overweight (WHO, 2017). The study by WHO also identified that the physical requirements of cycling are a barrier to those lacking fitness, resulting in the UK spending £48 billion each year dealing with health care in relation to obesity. However, Cycling UK assure that the benefits of cycling far outweigh the risks associated and that the more people who cycle then the safer it becomes. Cycling also causes negligible harm to others in comparison to motor vehicles, thus a modal switch would improve overall road safety considerably.

Social

Rietveld and Daniel (2004) suggest that religion and political preferences can impact travel mode. They identify that in the Netherlands Catholics are more likely to use bicycles for leisure purposes, where as Protestants use it more for commuting and daily life. There is also a trend of decreasing bicycle use amongst VVD voters, who tend to represent upper-middle and professional classes. Whereas in England it is particularly interesting to see that cycling is more common amongst well-educated individuals in managerial positions, as well as the common age group of students. Cycling has generally been known as a 'poor mans' method of transport since the early 1900s, however according to figure 4, those not in employment are less likely to cycle compared to people with increased household incomes. Statistics from the DfT also show that ethnicity plays a large role on those more likely to cycle. People who

identified themselves as 'white' are more likely to cycle at least three times a week compared to other ethnicities.

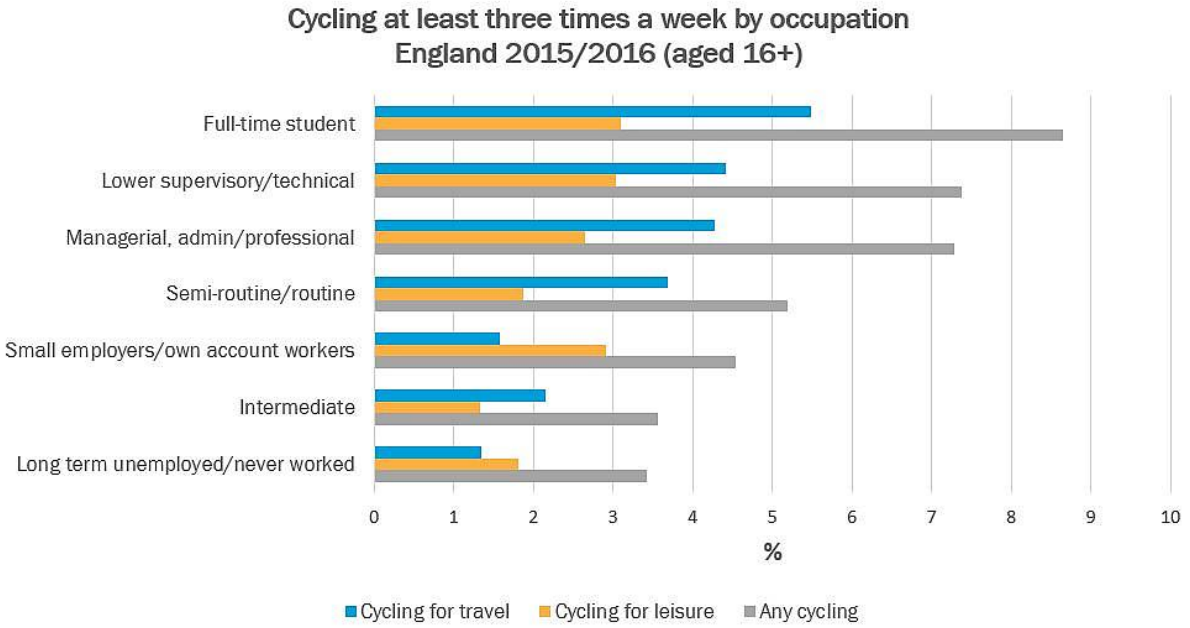

Figure 4: Cycling demographics in England (Source: DfT, 2017)

Policy

A key method of understanding this lack in popularity of cycling could lie within the provision of infrastructure or resistance from people. Policies in the UK have tended to disregard cycling, with Haq (1997) acknowledging that there was a knowledge gap in Britain, as it did not have a strategic transport policy covering all modes. Policies that were developed tended to be 'road centric' to the disadvantage of other less polluting modes (cycling) and lacked integration with other policy areas such as environment and land use. Local and national strategies and policies should be mutually supportive towards cycling and promote and facilitate this mode. Cycling UK (2018) suggest taking a cross-sectoral approach towards planning to tackle the serious, costly and growing crisis of physical inactivity and the health problems associated with it.

With CO_2 levels continuing to rise across many British cities and having serious health risks, Lowe (1989) believes that technical solutions have little to offer; instead we should look more towards land use and behavioural changes to reduce the demand for travel itself by switching to cycling. Cycle infrastructure, in many cases in the UK, is shared with motor traffic. For example, on-road cycle lanes and junctions. Patterson (2014) believes this sharing of infrastructure leads to potential conflict and also means that promotion of one mode of transport could be negatively impacting on the other thus a radical change is needed.

Improving accessibility for cycling in turn provides a valuable solution, which would have a number of positive impacts, including on health and benefiting local economies. Patterson (2014) states that "the optimised placement of urban cycle networks to match user requirements are likely to increase modal shift which would result in carbon reductions, improvements in urban air quality, less crowded roads, and potentially have a positive impact on health and overall quality of life". With the current world population of bicycles being 800 million, outnumbering cars by two to one, especially in Asia where bicycles alone transport more people than all of the world's cars do, (Lowe, 1989) describes how particularly in third world countries bicycles can contribute highly towards improving sustainability. When looking into potential strategies notable success stories come from the Dutch and Danish cycling utopias, where investment into cycling is amongst the highest (Keuster, 2017). The UK has a lot to learn from these pioneers, especially when on average £10 per head is spent on the promotion of cycling, a vast improvement on what was once historically £1 per head. However, this is still significantly less than our European neighbours who receive between £15-£20 per head (Leeds Cycling Campaign, 2014).

It can be concluded that in comparison to public transport, cycling may prove more difficult to promote due to behavioural patterns, the current health of residents, and poorly designed cities. Nevertheless, it should be noted that if governments are willing to invest in schemes and grants to create optimised cycle networks, along with efficient education and promotion of this mode, then it could be seen as a potential success in the future.

2.4.3 Key characteristics of car-free cities – Pedestrianised zones

The final policy instrument to be discussed will be walking and pedestrianised areas. It will be investigated whether implementing such restrictions will have a positive effect on residents and create changes in attitudes. Walkability according to Southworth (2005, p. 247-248) is "the extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network". The most important aspects of walkability as elaborated from Alfonso (2005) are: accessibility, connectivity, comfort, attractiveness, safety (traffic safety and social safety), and a mix of functions. Car-free city centres often cause much controversy when implementing a pedestrian zone or traffic-calmed area, mostly with regards to the retail traders. However, according to Topp and Pharoah (1994) in nearly every pedestrian zone and traffic-calmed area the turnover of the shops has actually increased. There is a

tendency for the introduction of mixed town centre activities in these pedestrianised spaces, which provide a rich and varied urban experience. Although it is vital to ensure that over time these "do not disintegrate and leave behind a single-activity shopping zones or tourist centre determined solely by the profit and floor space ratio" (Topp and Pharoah, 1994, p. 234).

Pedestrianised areas are particularly favourable in historic centres as they help to protect and preserve the important building structures and streets. In history, many cities started to pedestrianize streets in their centres at the end of the 20th century as a first step to restrict the use of cars. However in the 1950s this changed as the effect of the advances in motor vehicle technologies and increased car ownership was experienced all over Europe. In the early 1970s, when the oil crisis and the growing concern over the negative impacts of car use increased, there was a renewed interest in non-motorised forms of transport and pedestrianisation in some European countries, notably the Netherlands.

Generalised Costs

Walking is the most accessible form of transport possible, having no financial cost and being available to almost anyone, dependent on health conditions. According to the latest figures from the Active Lives Survey (ALS) for the year ending mid-November 2016, 42% of adults in the UK walk for travel at least once a week.

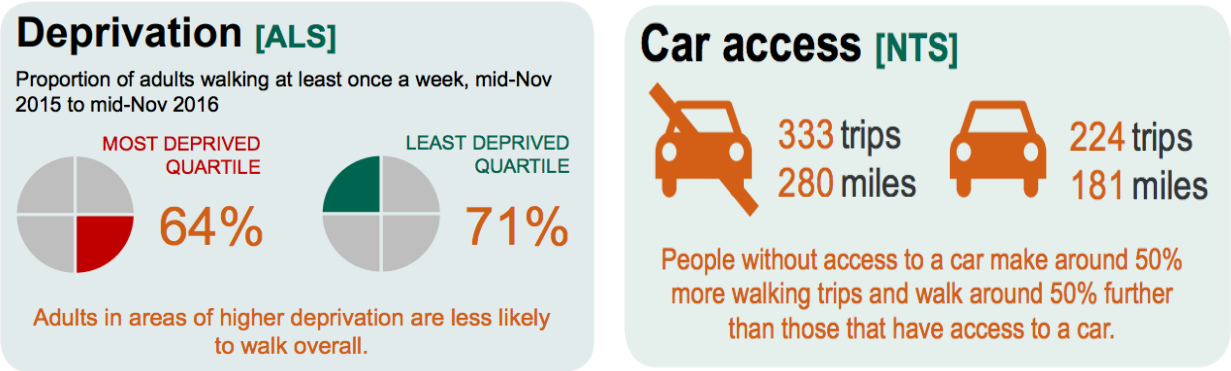

Figure 5: Deprivation, car access and walking (Source: DfT, 2017)

However, what is interesting to see from figure 5 is that those living without a car make the most trips by foot, usually because of financial constraint and unemployment. Nevertheless in figure 5, it suggests adults living in more deprived areas are less likely to walk overall, thus the two results do not correlate. This could potentially suggest that even those with lower incomes and do not have a car choose not to walk because of potential risk and safety problems.

Non-motorised travel modes like walking cause virtually no noise or air pollution. The only energy they require is provided directly by the traveller, and offers valuable cardiovascular exercise. However, as discussed in chapter 2.4.2 the current fitness of the population could pose obstacles to them partaking in these healthier modes of transport. Pucher and Dijkstra (2000) discuss some of the other key features restricting current pedestrians:

- The ease, low cost, and young age for obtaining a drivers license in some countries
- The lack of appropriate facilities for cycling and walking
- Poor urban planning
- Culture and lifestyle of Westernised countries, which are oriented to the car, and which require extremely high levels of mobility with maximum possible comfort, ease, convenience, and speed
- The real or perceived danger of cycling and walking in cities

The last point is of particular interest as pedestrian and bicyclist injuries are a serious public health problem. In contrast, pedestrian and bicyclist safety has been at the core of transportation and land-use planning in the Netherlands and Denmark (Pucher and Dijkstra, 2000). The achievement is down to implementing a wide range of measures such as: better facilities for walking and cycling; traffic calming; urban design oriented to people and not cars; restrictions on vehicles; education and training programmes; and stricter enforcement of traffic laws. It is essential that planners and policymakers examine what we can learn from these successful measures to reduce the serious dangers that people face every time they walk or cycle.

Social

Pedestrianisation of the public realm offers more opportunities for social interaction between different age groups, ethnicities and genders (Nieuwenhuijsen et al., 2014). Alongside this, urban planning practices such as "providing mixed land-use, street furniture, safe urban environments and pedestrian-friendly amenities could all promote positive physical activity patterns and help residents to build them into daily routines" (Scheepers et al., 2014; Heinen et al., 2010). Nevertheless, as seen in figure 5 an individual's income and background in the UK actually results in them walking less. A survey by Cancer Research UK sought out to discover why people are walking less. Results showed that the main reasons for decreased activity were time and weather (Marsh, 2017). It should be promoted to the public that active transportation modes like walking could reduce other detrimental impacts of transportation including accidents and congestion. However it can only be realised when cities are made more compact, where urban infrastructure supports cyclists and pedestrians, and when local people agree to change their behavioural patterns.

Policy

Implementing pedestrian zones is a suitable first step in becoming car-free as they can usually be realised by a small relocation of parking and require no change in the modal split to begin with. Over time this will aid in changing the behaviour and habits of residents in favour of walking more. Although it is important to know that pedestrian zones usually involve a special legal procedure and demand higher standards of layout and design (Topp and Pharoah, 1994). Consequently the installation of a pedestrian zone takes longer and is more expensive. Nevertheless, the overall benefits of creating these car-free zones on urban roads can be used to transform them into routes for pedestrians and bikes that link parks and open spaces. These plans have the aspiration of absorbing CO2 and bringing a city closer to a goal of reducing greenhouse gas emissions (Nieuwenhuijsen and Khreis, 2016).

Perhaps one of the most renowned people in the field of creating sustainable shared spaces, Danish architect Jan Gehl, has pioneered for the creation of effective and attractive public spaces and designing cities for the people. He studied New Road in the city of Brighton in the UK. During research he identified the number of pedestrians rose by 62% after the street was converted into a pedestrian-priority street in 2006. New Road shifted status from a transit street to a 'destination' in itself and can be used as a good argument for prioritising other pedestrian projects, both local and general (Gehl and Svarre, 2013). He did note that many successful historical examples of pedestrianisation did not come without opposition and protest, notably Copenhagen's main street, Strøget, which was converted from a traffic street to a pedestrian street in November 1962 in a pioneering effort. It was not the first street closed to cars in Europe, but one of the first major streets that marked willingness to reduce the pressure from cars in the city centre (Gehl and Svarre, 2013).

Ultimately, it can be seen from the research into pedestrianisation and walkability that these strategies can have numerous positive effects on city centres. Notably, encouraging healthier lifestyles, creating attractive and safe urban environments, as well as bringing economic benefits to shop owners. However, implementing these pedestrian zones must be done in a suitable manner in order to see these benefits. The streets should not become thoroughfares used to travel from one destination to another. Rather they should become a destination in themselves and become at the heart of a city.

The literature that has been discussed in this chapter gives a good foundation for research into creating a car-free city centre. From the combination of conceptual theories from academia (2.2 and 2.3) along with the necessary contextual conditions and policy measures (2.1 and 2.4) it is hoped to create a suitable recommendation for the future.

2.5 Conceptual Model

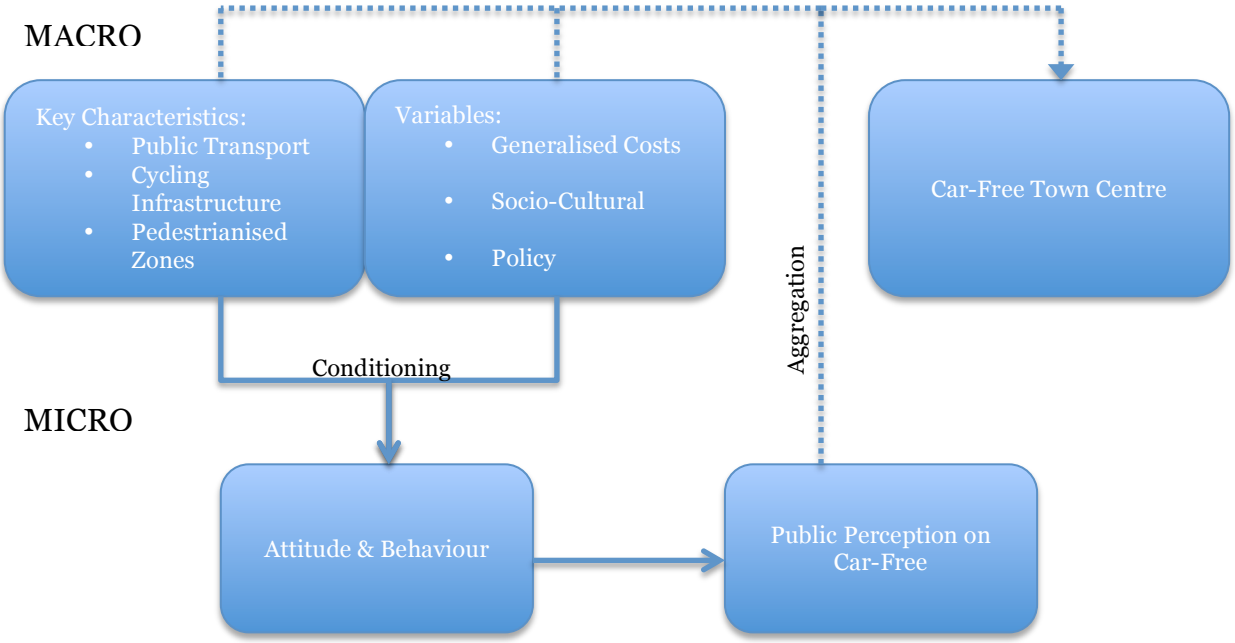

Figure 6: Conceptual Model

Based upon the theories researched, sustainable mobility paradigm and theory of planned behaviour, it has been recognised that involving the public is definitely a key function in creating a car-free centre. Today, stakeholder engagement is essential in any development to ensure transparency and mutual trust, along with notable behavioural changes. As mentioned in chapter 2.4 there are key characteristics defined within a car-free development: a sufficient public transport network, adequate cycling infrastructure, and safe pedestrian zones. The success of these features is dependent on variables (generalised costs, policy, and socio-cultural factors) (Rietveld and Daniel, 2004). From this chapter it can be seen that the concept of car-free cities can have various definitions, thus the aforementioned theories and characteristics will act as a solid foundation and synergise into a common framework for understanding this notion of 'car-free-ness' within this research project. At the macro level we see key changes taking place on varying spatial scales. These determine the conditions for attitude and behavioural choices at the micro level. Through integrating public perception in a process of it could lead to changes (aggregation) at the macro level. Ultimately leading to the implementation of car-free areas (seen through the dotted line).

3.0 Methodology

In this chapter the research methods will be discussed. In chapter 1, a research question and sub questions have been identified. To answer those questions, the sub questions have to be put apart and a suitable method to answer each of those has to be recognised using a more empirical method to be understood. Therefore, this chapter provides an explanation of the methods as well as a description of why these methods are suitable for this research. Firstly the methodology will be introduced as well as why the decision to use a case study was made. Thereafter, the research design is presented and the different methods are described, including the policy document analysis and surveys. In paragraph 3.2.3 the recruitment of participants for the survey is explained, as well as the process of data collection. Following this will be the analysis of all gathered data. To conclude, ethical considerations and limitations of the research will be explained.

3.1 Research Methodology

This thesis uses a case study methodology to address the research objective as according to Baxter & Jack (2008, p. 544) this "facilitates [the] exploration of a phenomenon within its context [...] through [...] a variety of lenses which allow for multiple facets of the phenomenon to be revealed and understood". Yin (2003) states that a case study approach is particularly suitable when the study's focus is set on answering "how" and "why" questions regarding a phenomenon as well as when the contextual conditions that need to be covered. Both conditions hold true for this thesis indicated by the main research question, which explicitly asks how a change based on the restriction of cars and promotion of alternative modes can be fostered in the context of Shrewsbury. The purpose of this thesis centres on exploring how a physical and behavioural change within Shrewsbury can be fostered. However, several of the sub-research questions have an explanatory nature. Since only Shrewsbury is studied as a case, this thesis is thus a single case study (Yin, 2003).

3.2 Data Collection and Research Methods

The collection of data for this research can predominantly be distinguished into four, complementing methods, which form the research strategy together. The first of which is a literature study. The results from this can be seen in chapter 2, theoretical framework and subsequently the conceptual model. Preceding this, a case study approach is used. According to Rose (1991) this helps to create a concept, which can be generalised for other networks. The next method is surveys, which will be conducted in the case study town. The final

method is a policy analysis approach that has been chosen to identify the dependent variable and compare the local case study policies to similar policy at different levels of government.

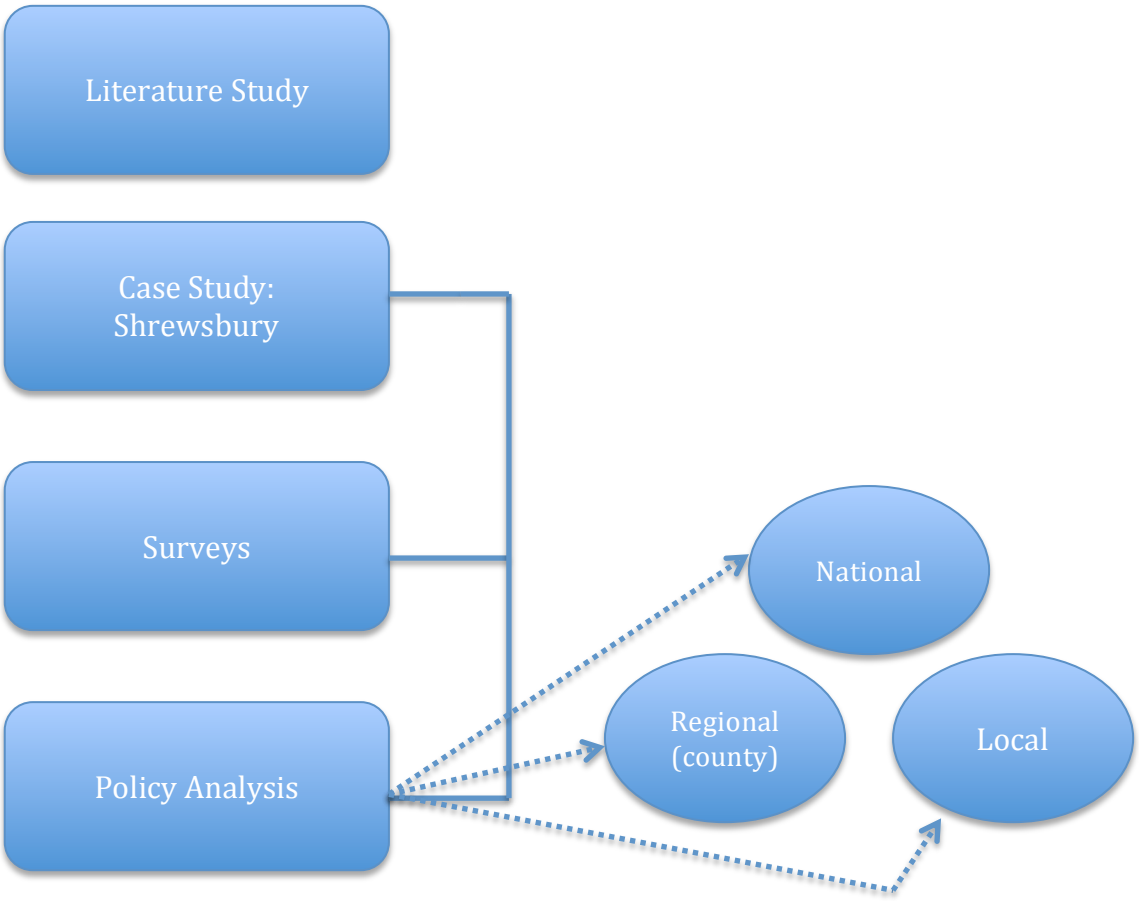

Figure 7: Research Methods Design

3.2.1 Literature Study

The literature study is the first method conducted in this thesis within the theoretical framework, which is an essential part of the research design, and aids in answering the first two sub-research questions. It also forms an essential part of answering the further sub-questions by discussing the empirical results with insights from other publications. Therefore, the literature study covers thematically a broad range from the concept of 'car-free', sustainable transport, the sustainable mobility paradigm and the theory of planned behaviour, not just in the UK but also with insights from abroad. Conducting a literature review allows the researcher to expand their knowledge and understanding by building upon the work of other researchers (Neuman, 2007). The literature study has predominantly been done by studying academic articles as well as looking at online articles, books and policy documents to complement this. These were accessed using either Google Scholar or

WorldCat. The authors give various perspectives, shown through the journals coming from different disciplines such as geography, planning, psychology and economics.

3.2.2 Case Study and Case Selection

For this thesis a case study approach has been used. A case study is a qualitative method requiring intensive knowledge about one or a few cases (Clifford et al., 2010). According to Yin (2008, p. 18) a case study is used to "investigate a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". Case studies are one of the best ways to stimulate new research, and if the findings are valuable, they can lead to new and advanced research in a field. However, a disadvantage of this method is that case studies require intensive knowledge (Clifford et al., 2010) and can be seen as highly subjective in terms of case selection and interpretation.

The case selected for this research is the English town of Shrewsbury. The deliberate choice of this case is based upon a number of reasons, notably its geographical potential to become 'car-free' in accordance to its historical importance. Moreover there are also significant policy documents and strategies in place at national and local levels of government, which give scope for good comparison. These factors along with further reasons that lead to the selection of this case are further elaborated on in chapter 4.

3.2.3 Surveys

In relation to primary research, the overarching methodological approach to this study was conducting a questionnaire. It was constructed of pre-defined questions that required a mixture of qualitative and quantitative responses. The collection of this primary data allowed for the analysis of the local residents thoughts concerning varying modes of transport in Shrewsbury and to get first hand views from locals on the condition of infrastructure within their local town, backed up by visual images that were also gathered during the research trips. The use of photographs alongside the data helps to give a better perspective of the differences between the case study cities and allows readers to see any potential innovative designs, and how effective or non effective the transport management is.

The questionnaire was conducted on 60 people who remain completely anonymous and were offered the choice to withdraw themselves from the study up until an assigned date, set as June 6th 2018 at 5pm. This date was set to allow enough time to adjust any results and assumptions made from the research collected, whilst permitting time to conduct any

additional questionnaires if needed. Participants were chosen on a random basis. Upon approach they were asked if they were interested in completing the survey, ensuring them they have the right to decline. To ensure enough questionnaires were completed for the research, there was also the option to partake in the questionnaires online. The website was shared via social media, and through the use of a QR code handed out on flyers and through mailboxes.

Nevertheless there are some limitations that can occur as a result of this methodological approach, specifically in relation to the location in which they take place. Certain places attract different groups of people, for example if the research was to be conducted near the university, most of the participants would be young people who could have potentially contradicting views to adults or the elderly and the results may end up being bias. Another component to the questionnaire, which could have potentially caused issues, is in relation to the actual questions. It was important to ensure questions were simple, straight forward and to the point, as long complex questions might discourage people from participating. Also ensuring no technical terminology was used, or that its definition was clearly explained to participants. Furthermore, it was key to take into account the layout of the questionnaire, as this is an essential aspect because this is the first thing a participant will see thus influencing their decision whether to take part.

3.2.4 Policy Analysis

The final method of data collection is through a policy analysis. Documents from national, regional and local level will be analysed in accordance to the key characteristics and variables identified in the conceptual model (2.5). This helps to see whether there are any notable comparisons or indeed differences. This can help to understand perhaps why attempts to create a modal shift towards sustainable modes of transport and reduce car dependency have so far been relatively unsuccessful. When conducting a comparative study it is essential to ensure a common variable is chosen to compare within each of the policies otherwise other external variables could influence the study. However, it can often be difficult to access comparable data thus findings cannot be systematically compared. Data is easily influenced and “their source, the purpose for which they were gathered, the criteria used and the method of collection may vary considerably from one place to another, and the criteria adopted for coding data may change over time” (Hantrais, 1995).

3.3 Analysis of Data

Analysing the data gained from the theoretical literature is summarised in the conceptual model (2.5). Subsequently, the specific case data with regards to the questionnaire will be analysed using SPSS and presented through suitable graphs and tables in chapter 4. Thereafter, the policy documents will be analysed systematically. Finally, the results of the research are analysed based on the research question and sub questions (1.2).

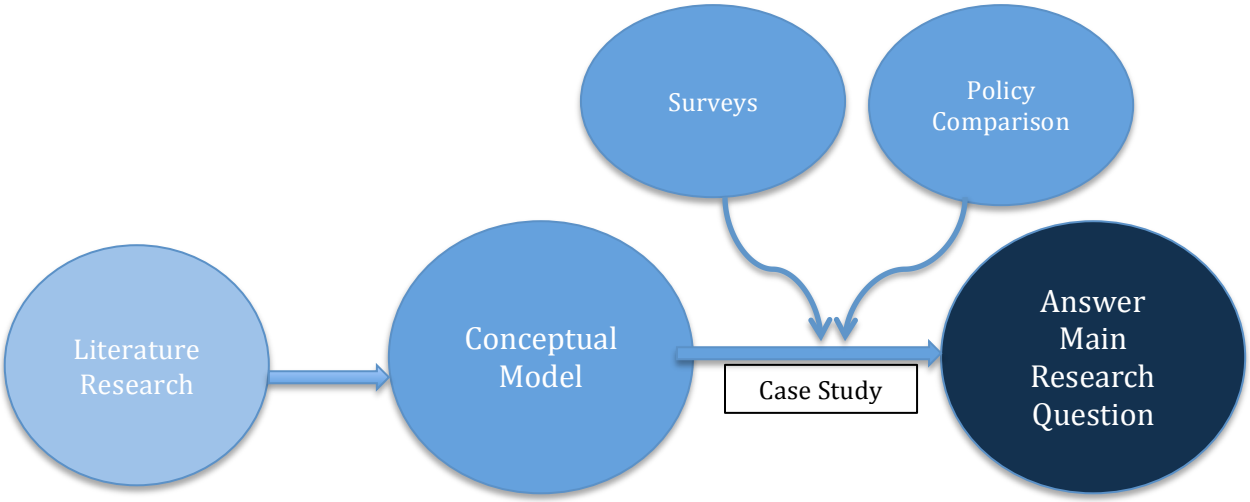

Figure 8: Research Strategy

3.4 Ethical Considerations

The main ethical consideration to consider in the study is that the primary research was conducted alone off-campus, and also outside of the Netherlands. To overcome this issue it was essential to bring another individual along to accompany myself where possible when conducting research to make it safer. When this was not possible, it was key to ensure the collection of data was organised in daylight hours and on relatively busy streets, rather than quiet back alleys. It was also a priority to carry a mobile phone at all times in case of an emergency. The involvement of human participants had to be considered when maintaining their confidentiality and anonymity. To limit any other complicated ethical issues the study did not collect data from any at risk or vulnerable participants, such as those under the age of 16.

This thesis aims to have a high validity due to the fact that statistical and policy data, and surveys were collected in a legitimate and justifiable manner, and because it is based on well-grounded research structure backed with academic theories. However, one could say that this project has an inadequate reliability but this could be increased with more data from interviews, wider statistical information or a case comparison.

A final important point to note is that another influence on the analysis of the data emerges from the researcher and the participants, and their positionality (e.g. their identities, values, beliefs) in relation to their research (Bourke, 2014). Positionality accepts that no research can be done in a completely objective manner, thus the researcher should take account of how their position might subjectively influence the research, process, and results (Bourke, 2014; England, 1994). In the case of this thesis, it needs to be acknowledged that I am aware of this bias that might arise from how I approach, analyse and interpret the research.

4.0 Data Collection and Analysis

In this chapter the results of the data collection will be presented. Firstly, the town of Shrewsbury will be discussed and the factors as to why it was chosen as a suitable case study will be introduced. Following this will be a policy analysis showcasing the key aspects of national and local planning policies with regards to sustainable transport. Finally, in 4.3 the survey results are presented and examined using SPSS and Maptionnaire. The data collected aims to answer two sub-research questions, these being: "What are the current weaknesses and strengths in the mobility of Shrewsbury town centre according to residents and what are their views on the concept of car-free?" and "To what extent can the findings from academic research on sustainable mobility be implemented in Shrewsbury?" Finally, the chapter will conclude with an analysis of all the data collected.

4.1 Case Selection

Shrewsbury is a large town located in the rural county of Shropshire in the West Midlands region of England. It has been an important settlement throughout history, once being a centre for the wool trade, later serving as a vital railway hub, and now acting as a commercial centre. The town was selected as a case study for this research project due to three factors:

- Historic street design
- Geographic suitability
- Policy documents

4.1.1 Historic Street Design

The town was founded in the 9th century, however recent archaeological evidence suggests occupation of the settlement could date back to before 2,000BC (Ward, 2017). It reached its economical height during the Middle Ages, and saw little growth during the Industrial Revolution compared to other English towns. This meant that the town retained much of its historical architecture and street design. The town contains many examples of Tudor[1] style buildings and grand mansions once occupied by the elite. Today they contain an array of quirky and independent stores that keep the vitality of the town centre growing. Surrounding the centre is the Town Walls first built as defensive walls between 1100 and 1135 (Shrewsbury Local History, 2017). The road circling the walls is now a busy one-way route around the centre, frequently incurring damage to the historic walls. The town contains a primarily one-way system, notably Castle Gates, Dogpole, High Street and Shoplatch.

[1] Tudor period was between 1485-1603 under which the Tudor family were reigning monarchs

However, these streets, especially High Street, are crammed with buses, cars and delivery vans on what is an original cobblestone street. Creating a car-free zone on these streets would aid in preserving the historic streets from decaying due to overuse from motor vehicles.

In the heart of the town is The Square, a pedestrianised area containing the Old Market Hall. A common occurrence across much of Europe, the square acts as the central meeting place in the town and is surrounded by many shops and restaurants. The Square also plays host to annual music and cultural events, as well as a twice-monthly food market. As noted by Nieuwenhuijsen et al. (2014) in chapter 2.4.3, having such pedestrianised spaces enables social interaction, through the aforementioned events, between people from all cultural backgrounds. If streets surrounding The Square were also pedestrianised or made in shared spaces this could encourage further social and economic capital, whilst preserving the historic and natural environment. Something that Shrewsbury can hope to achieve in the future.

4.1.2 Geographic Suitability

Another factor for choosing Shrewsbury as a case study is its geographic suitability. The old centre is built on a hill surrounded by the River Severn. It is almost a complete island, with exception to the area in the north by the railway station. The town centre is often acknowledged as 'the loop' and is accessible via seven bridges. However access by motor vehicles is granted through just three of the bridges, the Welsh Bridge and the English Bridge, alongside a further toll bridge known as Kingsland Bridge that charges drivers a modest fee of £0.20p for use (Shropshire Star, 2012). Being encompassed by the river could allow for the centre to become car-free. Instead cars can use the inner and outer ring roads rather than travelling through the town centre to get to their destination (see figure 10). Further improvements to the outer ring road are needed to cope with the increased car numbers as a result of restricting them from entering the town. Notably an extension in the northwest of the town to connect the two end points of the dual carriageway to create a fully encircling ring road around the town.

Figure 9: Car-free town centre shown within Shrewsbury (Google Earth, 2018)

4.1.3 Policy Documents

The third reason for choosing Shrewsbury was because of the availability of relevant policy documents. National, county and local level policies will be further examined and analysed in chapter 4.2. The UK's planning structure is an example of a decentralised system, whereby the national government set basic rules and requirements but allow local authorities the freedom to develop their own Local Plan in accordance to their particular context. Many parts of England have three tiers of local government (Department for Communities and Local Government, 2015):

- County councils
- District, borough or city councils
- Parish or town councils

For the purpose of this thesis, the National Planning Policy Framework, alongside Shropshire County Council documents will be analysed. This is because Shropshire Council is a unitary authority and thus has the powers of a non-metropolitan county and district council combined. It replaced a once two-tier system where Shrewsbury and Atcham Borough Council along with four other councils were abolished. Shropshire Council has since established three area-planning committees (North, Central, and South) who deal with more

localised town planning matters. For the purpose of this thesis the Central division will only be referred to as this encompasses Shrewsbury.

4.2 Policy Analysis

The Department for Communities and Local Government (2015) state that "planning [policies] ensure that the right development happens in the right place at the right time, benefitting communities and the economy". It also sets the framework under which decisions on planning applications are made. The British planning system has four key aims:

1. Ensure that planning enables sustainable development
2. Simplify the planning system
3. Enable planning decisions to be taken at the lowest possible level with the involvement of local people, and
4. Ensure strong protections are in place to conserve and enhance the natural and historic environment.

For the purpose of this thesis, entire policy documents will not be analysed, as this will provide too much information on areas not relevant to this research. Instead, policies and strategies with regards to sustainable transport will be focused on to give the analysis a core base.

4.2.1 National Level

The National Planning Policy Framework (NPPF) was created by the Department for Communities and Local Government (2012) and was first established in March 2012. The policies in the NPPF should be taken into account when preparing Local Plans. However, it does not dictate how Local Plans should be written or planning outcomes, but is rather a framework for producing distinctive Local plans, which ultimately meet local needs (Department for Communities and Local Government, 2015). The overriding goal of the NPPF is achieving sustainable development, by ensuring a balance between social, economic and environmental dimensions.

Nevertheless, it can be argued that having this goal of sustainable development can actually result in a compromise between economic growth and strategies to protect the environment. There is an antagonistic relation between economic growth and development, and environment protection and ecology. This is because often any form of economic growth is considered harmful. On the other hand it can also be argued that their relationship can be complementary. This is because you need to pursue economic growth and development so as

to create technological innovation that helps us to solve environmental and ecological issues. In the context of this thesis it could be the creation of hybrid vehicles and smart technologies that can reduce car dependency and promote alternative modes. Jordan (2008) mentions the messy nature of such sustainable development, referring to Hajer (1995) who said that if sustainable development were ever to actually be defined precisely it could lead to the collapse of coalitions and trust within local governments. It is a container concept, which unites conflicting perspectives because its definition is vague and abstract enough so as to not take a position in such conflict. This allows it to be adopted by almost any institution to become tailor made, ultimately inspiring innovation even if it does not exactly indicate how.

In the context of the British planning system, this could allow the government to avoid certain decisions with regards to sustainability because it has such a fuzzy definition. Nevertheless, it can also allow for the integration of diverging public dialogue as well. The UK government's definition of sustainable development is as follows:

"Making the necessary decisions now to realise our vision of stimulating economic growth and tackling the deficit, maximising wellbeing and protecting our environment, without negatively impacting on the ability of future generations to do the same." (Department for Environment, Food and Rural Affairs, 2011)

In the NPPF there is an emphasis on sustainable development through encouraging green modes of transport and giving a balance in favour of these modes in order to give people a 'real choice'. This is achieved through upgrading the infrastructure, the introduction of smarter technologies, and collaborative measures. It is stated that each local authority should create a Travel Plan alongside the Local Plan, subject to their needs. This is a way of assessing and mitigating the negative transport impacts of development in order to promote sustainable development. A detailed list of policy measures for promoting sustainable transport at the national level can be found in Appendix 1.

Such definition of sustainable development, as mentioned above, is attractive as it has the rhetorical power to unite parties with opposing perspectives in a collaborative setting. Jordan (2008) argues that the practical meaning of sustainable development will have to emerge out of an interactive process of social dialogue and reflection. Systems of governance will be needed to guide and steer these collective discussions towards a satisfactory level of consensus. He concludes that maybe even central planning could be the answer. Nevertheless, the British planning system remains an example of a decentralised system whereby local authorities can develop policies in a dynamic local setting that are tailored to

local circumstances. This is crucial for developing more proactive policies by benefiting from knowledge of local priorities and opportunities for developing integrated policies. This can help to address interrelated issues, power dispersal and social fragmentation.

4.2.2 Local Level – County

The UK saw the abolishment of regional level planning under the Conservative coalition government with the Liberal Democrats, who came to power after the 2010 general election. This allowed for the return of planning powers to the local communities, as the government believes plans are more effective when the people they affect are an integral part of the plan-making process (Department for Communities and Local Government, 2015). Such localised planning provides a degree of certainty for communities, businesses and investors, and a framework for guiding decisions on individual planning applications. The Local Plan for Shropshire, the county within which Shrewsbury is located, includes a core strategy named the Shropshire Local Development Framework. It sets out a strategic planning policy in conformity with the NPPF for the period between 2010-2016. The document acts as a starting point in the planning process for the determination of applications. It guides Shropshire Council, in conjunction with other stakeholders to ensure the successful implementation of a strategy. Central to the core strategy, corresponding to the NPPF, is the presence of sustainability. It aims to create both sustainable urban and rural places that not only meet the needs of the current population, but also are resilient and can adapt to future challenges.

Within the core strategy is a sub-section regarding communications and transport, which sets out to improve accessibility, manage the need to travel, offer options for different travel needs and reduce the impacts of transport. This is supported by the Local Transport Plan to help deliver key policy requirements for the next generation. Some of the key measures can be seen below:

- Reduce car dependency
- Promote awareness of travel behaviour and influence through the workplace
- Enhance cycle and pedestrian networks – continue to develop Shrewsbury as a ‘cycling town’
- Provide an integrated transport system
- Use of new technologies to manage traffic flow
- Invest in rail and bus services inc. Park & Ride

Local Transport Plan

The policy measures set out in the Shropshire Local Development Framework are further elaborated on and extended in the Local Transport Plan for Shropshire. It is important to note that all plans mentioned so far do not solely regard Shrewsbury; rather they focus on the entire county of Shropshire, which is primarily rural. According to Shropshire Council (2011) the role of the Local Transport Plan is to "guide the development of the transport system in Shropshire in a way which will maximise the benefits travel can bring while minimising the disadvantages and costs to our wider society". The Transport Plan supports the Strategic Objective 8 from the Shropshire Local Development Framework:

"Support the improvement of Shropshire's transport system in a sustainable and integrated way and locate development to improve accessibility by quality public transport, cycling and walking, help reduce car dependency and the impact of traffic on local communities and the environment." (Shropshire Council, 2011)

The document contains numerous policy objectives, however some of the most notable include network management strategies. Firstly, there is a network capacity management hierarchy to tackle and prevent congestion. This is done by reducing the demand for motor vehicles through encouraging the use of alternative modes. The second step of network management involves the introduction of Urban Traffic Flow Management and Control Systems to tackle congestion. These systems provide many solutions including:

- Better management of road capacity
- Create smooth traffic flows
- Respond to live events on a network
- Encourage the use of alternative routes (e.g. not using town centre roads)
- Give greater priority to pedestrians, cyclists and buses

Infrastructural improvements are not the only solutions presented in the Local Transport Plan. Rather there is also a focus upon behavioural changes, something, which Ajzen (1991) researched considerably. The more favourable the attitude, subjective norm and perceived behavioural control are towards a certain behaviour, in this case restricting car usage, the stronger a persons intention to perform the behaviour is. Encouraging people to make more sustainable travel choices is a key policy measure in the Transport Plan whereby councils work with schools and workplaces to develop their own Travel Plans. This is done alongside utilising personalised travel planning techniques that are targeted at people experiencing these lifestyle changes to support them in reducing car dependency. Enhanced marketing,

incentives, and awareness campaigns will further promote sustainable modes for commuters.

To further discourage car usage, especially in town centres, car parking plays a central role in the Transport Plan. The policy sets out a hierarchy for parking charges whereby prices reflect the size and demand of each town, whilst also making public transport a cheaper option. Improved signage will divert and discourage drivers from unnecessary journeys through town centres whilst encouraging long-stayers to use out-of-town car parks e.g. Park & Ride schemes. Contradictory to this, the policy also states that there should be adequate provision of town centre parking to meet the demand. This inconsistency in policy aims could be problematic. However, a short-term solution to this could be that in the larger towns, like Shrewsbury, the required amount of spaces could be split between town centre parking and edge of town Park & Ride provision instead.

The Local Transport Plan ultimately hopes to make improvements to the County's transport infrastructure by attempting to expand transport choices and reduce car dependency, whilst improving accessibility and connectivity both within and beyond Shropshire (Shropshire Council 2011). Further policies can be seen in Appendix 1. Within Shropshire, each of the larger towns is also eligible to construct its own Transport Strategy, of which the Shrewsbury Integrated Transport Package will be discussed next.

4.2.3 Local Level - Shrewsbury Integrated Transport Package

Shrewsbury was identified as a 'growth point' in the region (Shropshire Council, 2018), with transport playing an important role in sustaining its economy. The Shrewsbury Integrated Transport Package (SITP) aligns closely with a number of national and local policy documents including the Local Transport Plan and Local Development Framework. It will see a £12.1 million investment secured through The Marches LEP Regional Growth Fund and Shropshire Council developer contributions to achieve its core objectives. Within the package there are an array of strategies for improving the towns transport (Shropshire Council, 2018):

- **Key junction improvements** - upgrading current highway infrastructure, including traffic signals to improve vehicle capacity and pedestrian and cycle facilities, with the aim of reducing congestion.

- **Implementing further phases of the SCOOT[2] network** - to improve traffic signal operation and manage traffic flows on main arterial routes. Direct town centre through-traffic onto the inner relief road or, alternatively, towards car parks and park and ride facilities.
- **Enhancements to pedestrian and cycle links** - to increase accessibility to the town centre for active and sustainable modes of transport.
- **Improved pedestrian wayfinding[3] within and around the 'river loop'** - to generate a highly accessible and connected town centre for pedestrians.
- **Enhancements to the public realm** - to improve the public realm and highlight pedestrian facilities.

Currently as so far, the key junction improvements have been completed. The next step of the process is a range of traffic management and public realm enhancements, notably on Pride Hill, one of the main shopping streets in the town centre that also happens to be a pedestrianised area. This work will include resurfacing of the entire area in keeping with the historic character, replacing old street furniture whilst ensuring not to clutter, improving pedestrian access, and maintaining the trees. Furthermore, significant improvements are to be made to one of the main vehicle access bridges into the town centre, the English Bridge. This will involve the upgrading of pathways and kerbing materials, plus carriageway resurfacing. The purpose of this is to enhance the area and make Abbey Foregate the 'gateway' to the town centre.

Looking to the future it will be interesting to observe whether the local council will actually implement all of the policies, promises and innovative ideas set out by 2026. All of the improvements with regards to sustainable modes of transport are yet to begin, and are not planned to be completed for at least two more years (Shropshire Council, 2018). Therefore it cannot yet be judged whether these infrastructural adjustments will alone change local residents travel behaviour. In table 2 measures from national, county and local level policy documents have been combined to showcase the different strategy approaches that have been taken. These have been categorised in relation to the micro and macro levels seen in the conceptual model (2.5).

[2] SCOOT (split cycle offset optimisation technique) is a technology for managing and maximising the efficiency of traffic signal junctions in urban areas

[3] Wayfinding within the SITP refers to information systems that guide people through and around the town, and enhance their understanding and experience of it

Macro		Micro
• Reduce car parks in town centre & increase charges	• Urban Traffic Control Management & Control Systems	• Workplace & School Travel Plans
• Priority at crossings for bikes and pedestrians	• Smart ticketing	• Incentives and marketing
• Park & Ride expansion	• Real Time info	• Awareness campaigns
• Bicycle facilities	• Journey planning services	• Personalised Travel Planning
• Infrastructure (renew and improve)	• Integrate bus and rail schedules	• Car sharing
• Extended bus routes	• Personalised marketing	• Promotional activities on health benefits
• Speed restrictions	• SCOOT network	
• Signage	• Pedestrian wayfinding	
• Increased street lighting and CCTV	• Disabled-friendly public transport	

Table 2: Combined strategies from the four policy documents on a matrix level

From table 2 it can be observed that both national and local governments have used a mixture of techniques from basic infrastructural improvements to encourage use of alternative modes, to technological advances that make travelling more convenient and easier than ever, and finally, behavioural strategies to make people more aware and conscious of the impact that their travel behaviour has. Such solutions on the macro level determine the conditions for choosing alternative modes at the micro level. Through time these changes at the micro level can lead to a process of further change at the macro level, which can aid the ultimate goal of creating car-free areas. The next sub-chapter will present the findings from questionnaires collected in Shrewsbury. Questions were formulated using the results of the conceptual model. They cover cycling, public transport, pedestrianisation, as well as considering the variables identified by Rietveld and Daniel (2004). It will be analysed and then discussed to see whether the aforementioned policies would suit the contextual requirements of Shrewsbury and also conform to the views and values of local residents.

4.3 Survey Data

In this sub-chapter, the results from the questionnaire will be presented. The questionnaire was initially completed during a three-day period of 28-30 May 2018, with 60 respondents. There were 31 male respondents, 29 females and the mean age was 41. They were

undertaken at a specific location, The Square in Shrewsbury. This location was chosen because it is a central meeting place in the town centre, with many people passing through regularly. However, some further questionnaires were also completed online up until 6th June 2018 to ensure enough results were collected to make informed assumptions. The results will be presented using SPSS, along with relevant charts and graphs. Not all of the questions from the survey will be presented, but can be found in Appendix 2. Firstly, the data from the multiple-choice questions will be discussed. Following that will be the results from the open-ended questions. Finally, the two map questions will be discussed. Respondents were required to draw lines on a map provided to indicate the most and least pedestrian/cycle friendly streets in the town centre.

4.3.1 Multiple-choice results

Characteristics

Firstly, the characteristics of the respondents will be analysed. A total of 60 people completed the questionnaire in full or part. Participants were first asked, "*What is your main reason for using the town centre?"* as seen in figure 11. The majority of respondents answered with 'resident of the town', which is 57% (34 people). A considerable amount of people (17%) stated that they live within the county of Shropshire and travel to Shrewsbury to complete weekly shopping trips and access necessary amenities. 13% of respondents live within the town centre. It is also interesting to note that 3% of participants selected the 'other' option. These people travelled from across the border in Wales. This conforms to the information presented in 1.1 whereby Shrewsbury serves as a commercial centre for the whole county and across the border into Mid-Wales.

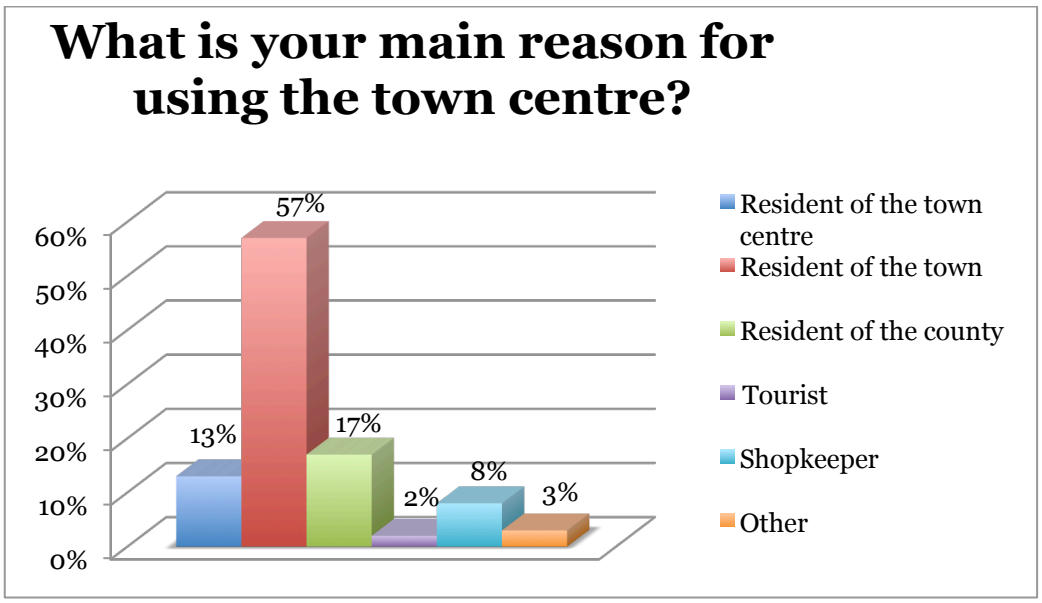

Figure 10: What is your main reason for using the town centre?

Motor vehicles are the overriding and most popular mode of transport, with 56% of respondents stating that they access the town centre by car (figure 12). This represents the UK as a whole whereby cars continue to be the most used form of travel. However, a quarter of people explained that they accessed the town centre by foot. Many of these responses came from people living within the town centre, or young adults who perhaps cannot afford to own a car. Of the other responses, bus and train both had 8% and just 3% of people stated that they cycled.

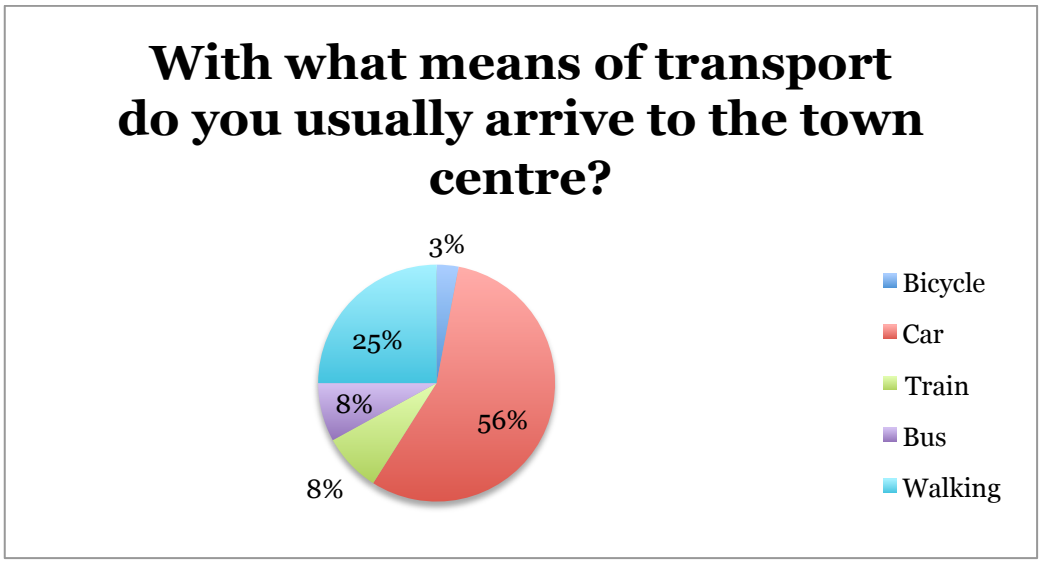

Figure 11: With what means of transport do you usually arrive to the town centre?

Most of the respondents (45%) use the town centre once or twice a week as a pedestrian, most likely during the weekend. There is a considerable amount of people (25%) that claim to use the town centre on a daily basis. This could be because they either live, work or study in this area. A further 15% said they used the town centre 3-5 times per week and 18% said less than once a week. Finally, just 2% responded with almost never. The 2% were most likely tourists.

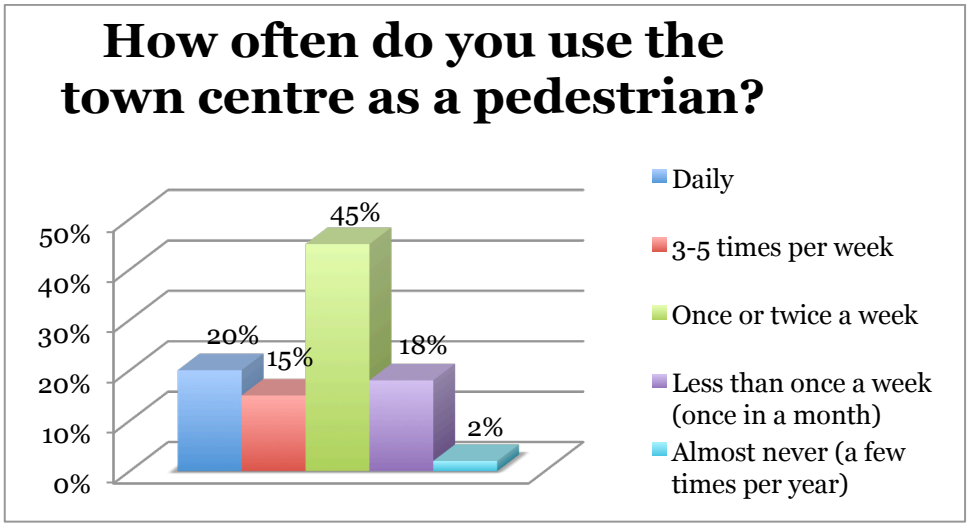

Figure 12: How often do you use the town centre as a pedestrian?

In relation to whom people use the town centre with, the majority of respondents answered either 'with friends' (32%) or 'alone' (28%). 30% of participants stated that they use the centre with their partner and either with or without children. Shrewsbury has a number of families living there, especially with the presence of two high performing private schools and numerous outstanding state schools that exceed national grade requirements. 1 respondent who was aged 79 did also mention that they access the town centre with a carer (figure 14).

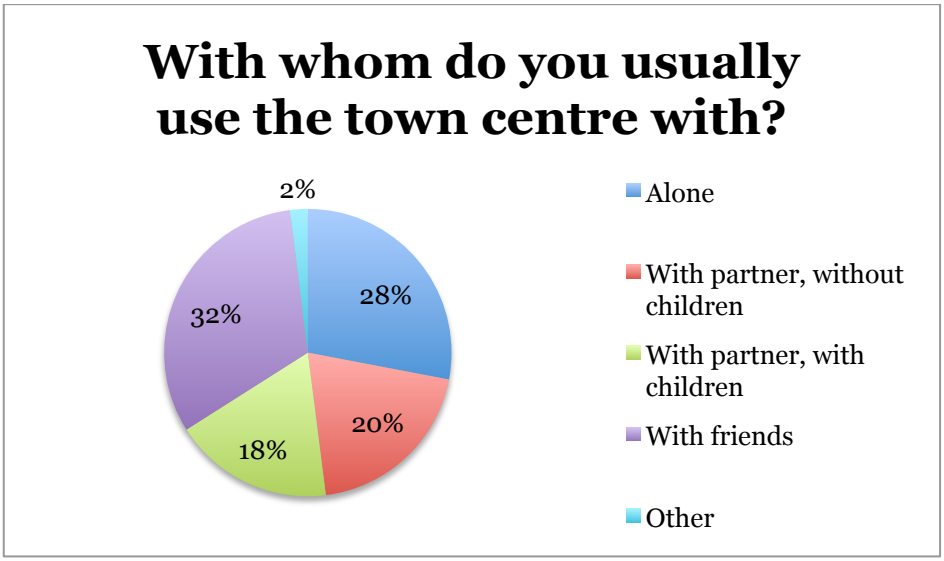

Figure 13: With whom do you usually use the town centre with?

Public Transport

Next, the thesis will discuss the results regarding public transportation in Shrewsbury. Public transit was one of the key characteristics of car-free developments, set out in the conceptual model (2.5). The participants were asked, "From the town centre public transport is easily accessible on foot". In figure 15 it is clear to see that respondents are extremely happy with how accessible public transport is on foot. A staggering 98% of people voted 'agree' or 'strongly agree'. The town centre of Shrewsbury currently has buses running directly through the historic core, with many bus stops outside popular shopping areas. There is also a large central bus station attached to one of the main shopping centres.

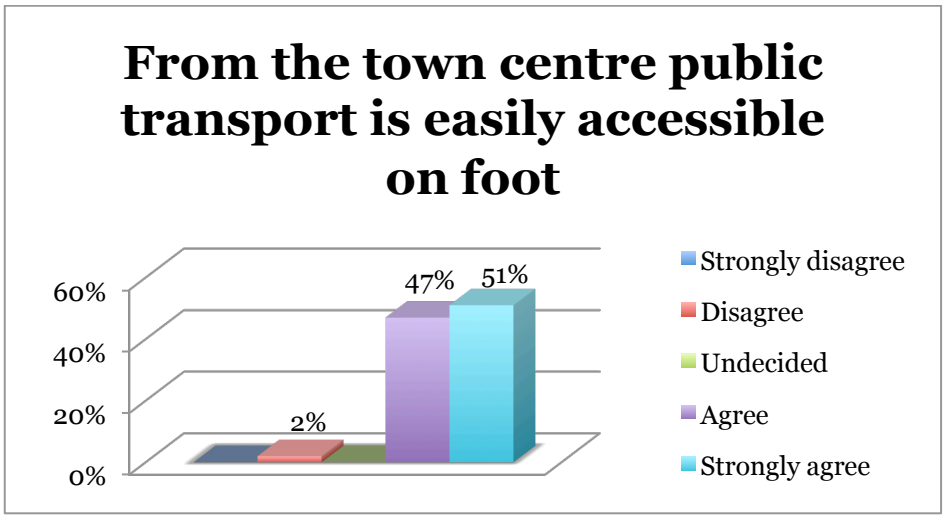

Figure 14: From the town centre public transport is easily accessible on foot

Furthermore, in figure 16 residents also believe that they have relatively easy access to public transport from their homes as well as within the town centre. 65% of respondents answered 'agree' and 31% said 'strongly agree'. Therefore, it could be interesting to find out why people decide not to use this service. One of the factors could be related to the cost.

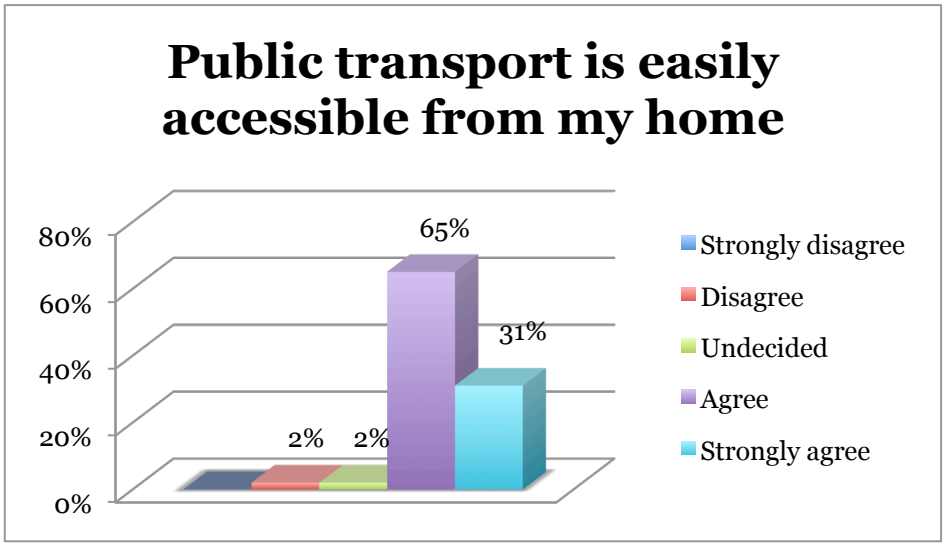

Figure 15: Public transport is easily accessible from my home

In figure 17, it can be seen that respondents have very mixed views upon the price of public transit in Shrewsbury. The largest majority answered 'undecided' (38%). This indicates that either people do not know if the cost is large or low in comparison to other towns and cities in the UK, or they simply do not use the services enough to know how much it can cost. Nevertheless, 37% of respondents do believe that the public transport is not affordable (disagree or strongly disagree). According to Arriva (2018) a one-day adult bus ticket for the urban area of Shrewsbury will cost you £4.20. A 12 month rail pass from Shrewsbury to the commuter town Wellington will also set people back £936 (National Rail, 2018). In comparison to this, Abbey Foregate car park, located 10 minutes walking distance from the

centre, will cost just £405 for an annual pass (Shropshire Council, 2017). Therefore, motor vehicles are currently being promoted as the cheapest travel option in the town.

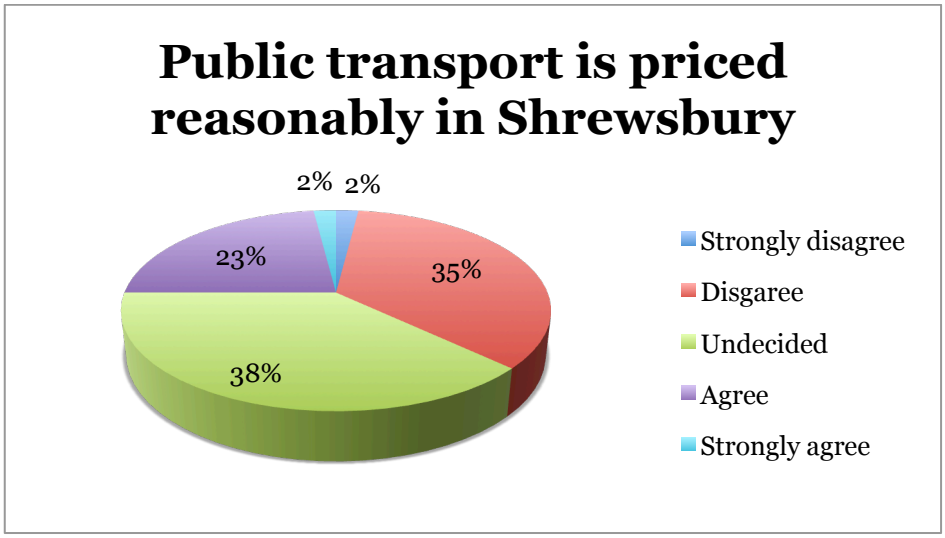

Figure 16: Public transport is priced reasonably in Shrewsbury

The final question asked in relation to public transit is "*There are sufficient out of town parking facilities (park & ride)*" (figure 18). Once again, there was a mixed outcome of results for this question. However, the same as in figure 17, 'undecided' was the most common answer with 35% of respondents selecting this. Shrewsbury currently has three park & ride schemes in operation, Oxon in the west, Meole Brace in the south, and Harlescott in the north. In the Local Transport Plan for Shropshire it was stated that there would be further investments into park & ride schemes (Shropshire Council, 2011). A fourth park & ride site will be developed alongside the construction of 'Shrewsbury Parkway' station in the eastern edge of the town. The allocation of this site is a strategic choice because it is currently the only area of the town without a park & ride service. There are also lots of new housing developments being developed in the east, along with the opening of a large new Lidl store.

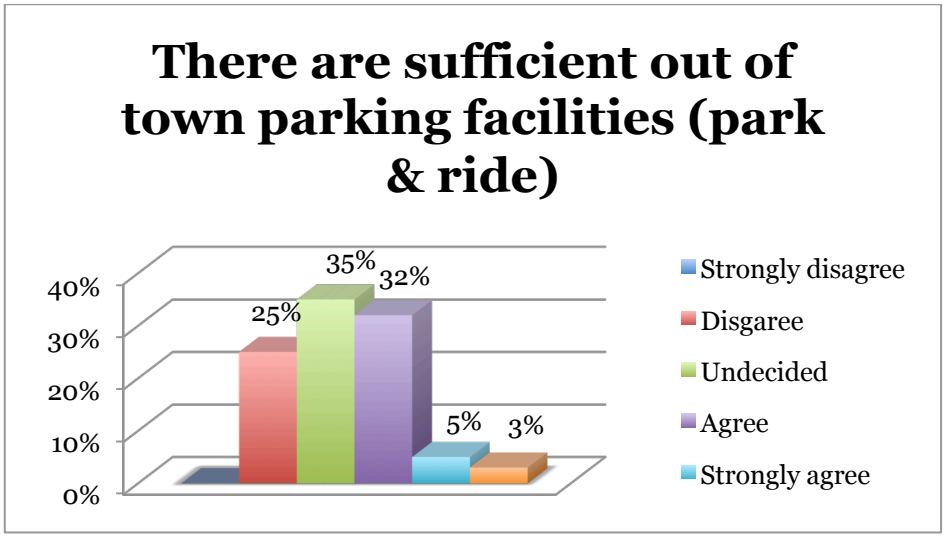

Figure 17: There are sufficient out of town parking facilities (park & ride)

Cycling

The next section will analyse the results from questions regarding cycling in Shrewsbury including safety and provision of adequate infrastructure. It can be interesting to use SPSS to investigate if there is a correlation between traffic safety for cyclists and whether people thus feel encouraged to cycle in the town as a result of this. Figure 19 showcases such relationship between the two variables of traffic safety for cyclists and whether people feel encouraged to cycle. From figure 19 there is a clearly defined positive relationship between the two variables. The results indicate that the less satisfied and safe people feel with traffic safety, the less encouraged they feel to cycle. The X-axis represents the scale from 1 = 'strongly disagree' to 5 = 'strongly agree'. The Y-axis thus represents the percentage of people that answered each option. The results were then joined together by a line to show the correlation.

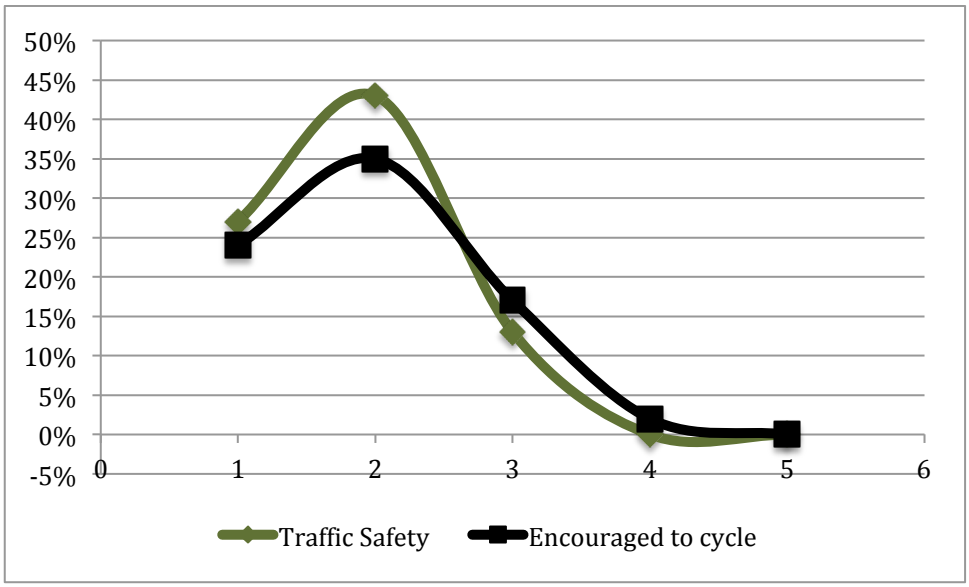

Figure 18: Relationship between traffic safety and encouragement to cycle (Data: SPSS)

The next results to be discussed are in reference to the following statement, "*There are sufficient places in the town centre to store a bicycle*". 28% of participants said 'not applicable', indicating that they do not use any of the bicycle storage facilities that are currently in operation or they are not aware of any within the town centre. A considerable amount of respondents agreed that there are not enough places to store a bicycle, with 60% selecting either 'strongly disagree' or 'disagree'.

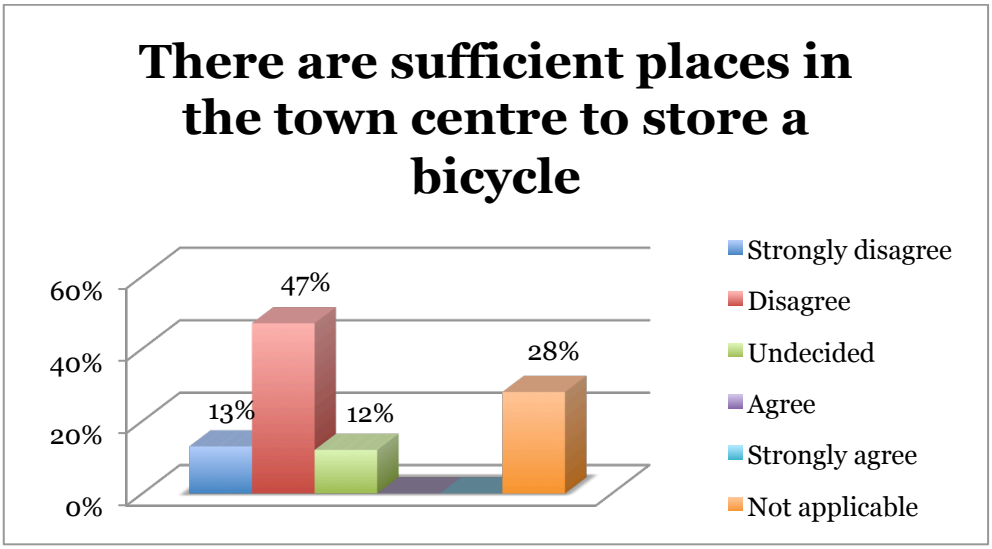

Figure 19: There are sufficient places in the town centre to store a bicycle

A follow up question to the one mentioned in figure 20 was provided. It asked participants whether they use any bicycle facilities in the town centre, and then they were required to state any that they do use if answered 'yes'. Only 3 people said they used any facilities to park a bicycle, of which they named: "*in The Quarry*", "*in The Square*", and "*at the top of Pride Hill*". The aforementioned places all provide parking places for bicycles, be it very limited and lacklustre. An example of such infrastructure can be seen in figure 21.

Figure 20: Bicycle parking in The Quarry Park (Source: Author)

Pedestrians

The proceeding results to be discussed from the questionnaire are those regarding pedestrians and walkability within Shrewsbury town centre. In figure 12 a quarter of respondents stated that they arrive to the centre by foot and 45% of them identified as using the town centre as a pedestrian on a weekly basis (figure 13). Therefore, it is interesting to see whether they use the centre as a pedestrian because the street design makes them feel at home as a mode of travel. From figure 22, 73% of participants said they felt at home as a

pedestrian in Shrewsbury town centre. With a further 15% being 'undecided' and 12% saying that they 'disagree' with the statement.

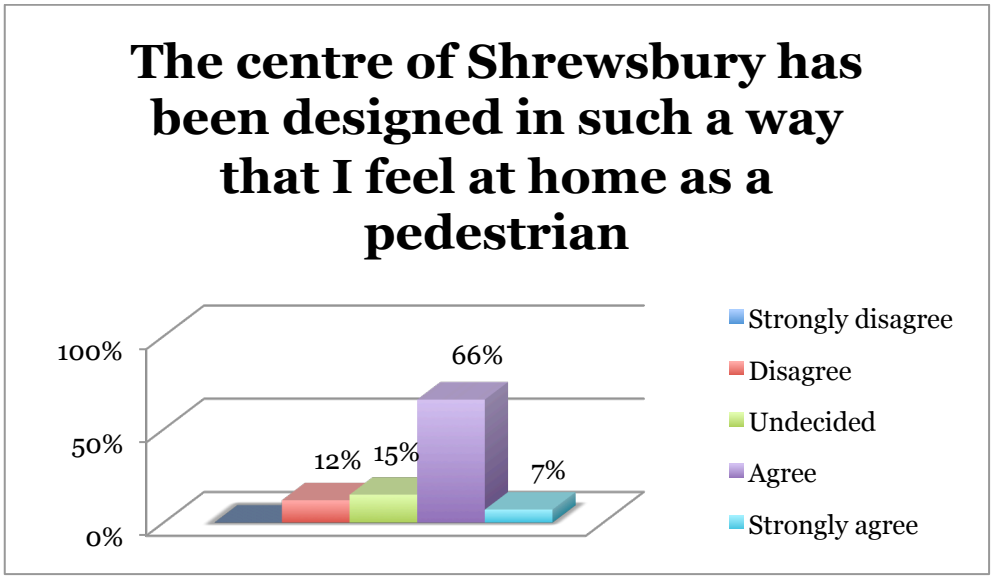

Figure 21: The centre of Shrewsbury has been designed in such a way that I feel at home as a pedestrian

Nevertheless, even though people feel at home as a pedestrian they do not necessarily feel safe. As seen in figure 23, 45% of respondents selected 'undecided'. This suggests that parts of the centre may feel safe, but on the other hand there are also numerous streets that do not feel safe. Shrewsbury still contains much of its medieval street layout, which was historically built when motor vehicles had not been invented. Thus pedestrians were the priority when it was designed. Nonetheless, over time pedestrians have felt the strain as the roads began to accommodate motor vehicles. As mentioned in 4.1.1 much of the one-way system in the town centre contains the original cobblestone streets, which ultimately are not designed for cars and therefore should be protected through planning policies.

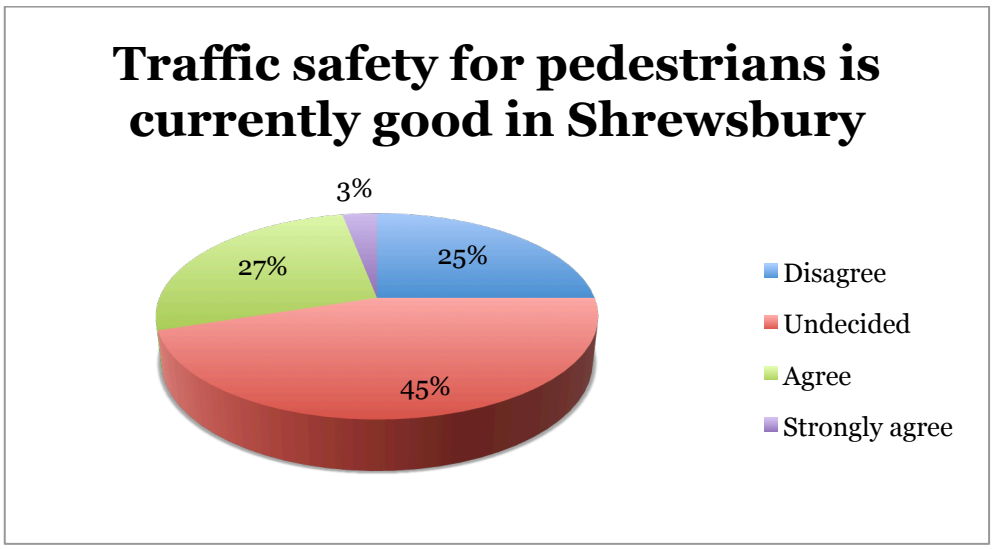

Figure 22: Traffic safety for pedestrians is currently good in Shrewsbury

Car-Free

The final topic to be discussed from the multiple-choice questions is related to the concept of 'car-free'. Participants were all asked, "*Would you be open to the idea of creating a car-free town centre?*" The results shown in figure 24 indicate that a substantial amount of people are in favour of the idea (68%). Nevertheless, 27% were 'undecided' upon their opinion. Possible reasons for this cautious decision may be seen in the results from an open-ended question that was also presented to respondents in the questionnaire.

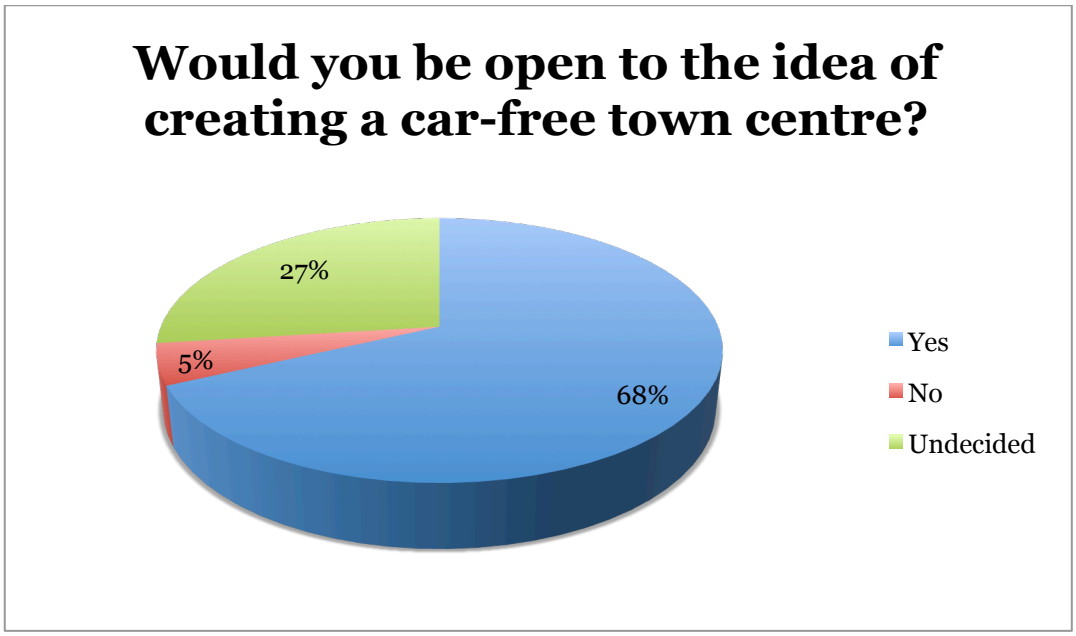

Figure 23: Would you be open to the idea of creating a car-free town centre?

A selection of responses from the open-ended question "*How would you feel about a shared space concept on High Street and Shoplatch (=shared use of space between public transport, cyclists and pedestrians, without any traffic rules)*" will now be presented. Shared space areas can act as a gradual process that can help to change people's behaviour and ultimately lead to a more radical innovation such as car-free.

Female, 21: *"I would be open to the idea, especially if it has been tried and tested in other European countries"*

Male, 47: *"My children currently go to school in the town centre so this could add journey time to our school-run"*

Female, 29: *"As someone who lives in the town centre I think it will create a more quiet and liveable centre"*

Male, 59: *"As a shop owner I would hope this would boost the economic vitality of the town centre"*

Male, 68: *"If this is done make sure to retain old cobblestone streets as this is the history of the town"*

Male, 23: *"It would encourage healthier lifestyles"*

Presented above is a selection of some of the responses given in the questionnaire results. A variety of viewpoints from both males and females of all ages have been included to showcase differing opinions. Even though 68% of participants agreed with implementing the concept of 'car-free' (figure 24), people do still have concerns. A male respondent aged 68 made an important request that should a shared space measure be implemented, the historic character within the town centre should be maintained as this is of importance to the culture of the town. A picture of a shared space development was provided in the survey, along with a definition to aid participants in making their decision (figure 25). A male respondent aged 47 did voice his opinion about how implementing a car-free zone would add time to his daily school-run journey. Nonetheless, this participant will need to see a behavioural change in order to appreciate the long-term benefits associated with car-free developments.

Figure 24: Shared space concept (Source: Google)

From the results of the multiple-choice questions, it can be seen that current public transport, cycling and pedestrian infrastructure is not adequate. Cars continue to be a

cheaper and more convenient option for residents. Rail and bus services are both owned by private companies who do not work together to create integrated travel options. More investments are needed in cycling infrastructure, along with strategies to change peoples perception on this mode of transport However, it seems that a large proportion of local people are willing to see a radical change take place in the shape of a 'car-free' zone.

4.3.2 Maptionnaire results

In this sub-chapter the results from two open questions will be discussed. Respondents were asked what are the most and least pedestrian/cycle friendly streets in Shrewsbury. Responses were limited to the 'loop of the river' to ensure all data was within the town centre boundaries. There was also a limit of three answers that each participant could provide so as to not overcrowd the map. A thicker line represents a street whereby many people have indicated this as either one of the 'most' or 'least friendly.

Figure 26 shows the results from the 'least' pedestrian/cycle friendly streets. It can be seen that the majority of the main routes through the town centre have been identified as not very safe places. The respondents are not necessarily divided over which street is the least pedestrian/cycle friendly, rather they believe that much of the centre is not adequate. Nevertheless, a total of 120 lines were drawn, with particularly thick lines on High Street, Smithfield Road, Castle Gates, Town Walls and Claremont Bank. High Street is the main road through the town centre with many buses stopping along this route, similarly on Castle Gates. Smithfield Road is popular route used by cars travelling from suburbs in the west to the north of the town, and it also leads to the main bus station and train station. Finally, Town Walls is a historically important road as mentioned in 4.1.1 whereby it is extremely difficult to build a wide footpath within the old fortifications. Motor vehicles entering via the English Bridge use Town Walls as a route to bypass the central shopping district (High Street), instead leading onto Claremont Bank. At the bottom of Claremont Bank is a large junction where all one-way traffic from the town centre meets at a set of traffic lights, which is often gridlocked.

Figure 25: Least pedestrian/cycle friendly streets in Shrewsbury town centre (Source: Maptionnaire)

One of the respondents of the question "How would you feel about a shared space concept on High Street and Shoplatch (=shared use of space between public transport, cyclists and pedestrians, without any traffic rules)" did provide this answer:

Female, 79: *"As long as the bus stops remain in The Square as it is hard for me to walk far"*

When creating such 'shared space' or 'car-free' areas it is key to take into consideration the individual requirements of residents, particularly if it is health related. But ultimately you do end up with contradicting views to the aforementioned (see below):

Female, 33: *"[I] would feel more comfortable if it wasn't shared with public transport"*

Male, 39: *"I have young children so would be cautious about their safety"*

Subsequently, participants were then asked what they believe are the 'most' pedestrian/cycle friendly streets in Shrewsbury town centre. From figure 27 it can be seen that there is much less variation in the number of streets that respondents indicated. The most popular streets chosen were Pride Hill, Claremont Hill, The Square, Butcher Row and Market Street. All of these streets, besides Market Street, are pedestrianised. This conforms to research by

Scheepers et al., (2014) and Heinen et al., (2010) who state that "[by] providing mixed land-use, street furniture, safe urban environments and creating pedestrian-friendly [areas] could all promote positive physical activity patterns and help residents to build them into daily routines".

Numerous respondents also chose Market Street, which is located at the rear of The Square, as a safe street. This road is not completely car-free, but does have restrictions in place. This includes no through-traffic, and access-only use for delivery vehicles and residents. Therefore, the road is relatively quiet. Restaurants along the street provide plentiful outdoor seating, which helps to create a pleasant and attractive urban environment.

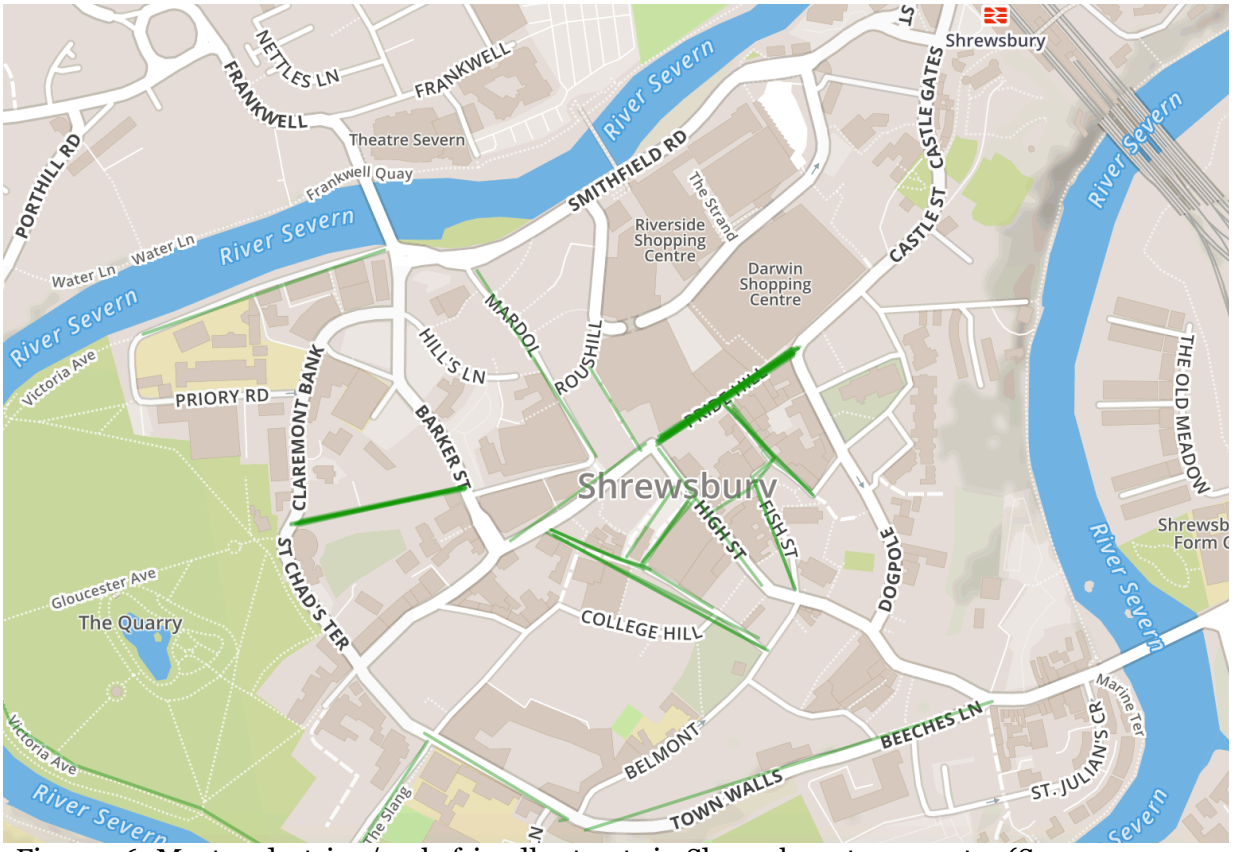

Figure 26: Most pedestrian/cycle friendly streets in Shrewsbury town centre (Source: Maptionnaire)

4.4 Analysis of Data

The following sub-chapter will discuss the results collected throughout chapter 4 and analyse how they relate to the theoretical concepts studied in chapter 2. Each key characteristic of the car-free concept from the conceptual model (2.5) will be discussed separately. Following this, the results will be discussed in relation to the overall idea of car-free city centres.

4.4.1 Public Transport

From the questionnaire results conducted in Shrewsbury it can be seen that overall the public are satisfied with the current provision and accessibility of public transit. But, it seems that the cost of this service is the main underlying problem. The Shrewsbury Integrated Transport Strategy has overriding aims to further improve public transport in the town, with significant developments on infrastructure, as well as technological and marketing innovations. This ties in three of the four actions (make use of technology, land-use measures, and marketing information) that Banister (2008) identifies as helping to foster a sustainable mobility transition.

By developing public transport services further, to include policy measures as mentioned in table 2 such as smart ticketing, real time info and priority at traffic signals for buses, it increases the convenience of using public transit. Trompet et al. (2013) identify these convenience factors including information, accessibility and time, that can all influence the usage and popularity of transport. These factors are often disregarded, however the Local Transport Plan has taken a step forward in the right direction towards making public transport more attractive with the addition of the aforementioned measures.

From the survey most respondents stated that they chose to drive a car because of convenience, thus it is vital to implement such policy measures to make public transport the more viable and convenient option for travel. As discussed in chapter 2.4.1 a MaaS system could provide such a solution. This would allow for the integration of journey planning, ticketing and real time info all in a tailor made app. MaaS creates a simple and convenient platform for residents of all ages to use and promote the use of public transport. Nevertheless, the system functions better if transport providers are working together or publicly owned. This could be problematic in Shrewsbury because rail and bus services are both privately owned and there are numerous providers of each including Arriva, West Mid Rail, and Celtic Travel who run services into Wales. However, renationalising such services is an unrealistic solution. Nevertheless, the current providers will ultimately see benefits in the long-term as a result of MaaS. This is because it provides them with state of the art integrated technology platform that facilitates interactions between travellers and transport providers.

Overall, Shrewsbury has sufficient existing services to foster a modal shift away from motor vehicles, but there are still some improvements needed. If all measures stated in the key policy documents are undertaken by 2026, along with the potential of a MaaS system this could foster a behavioural change amongst residents.

4.4.2 Cycling

The current provision of infrastructure for cycling in Shrewsbury is inadequate and is not promoting the option to cycle. As seen in figure 19, without suitable infrastructure dedicated to cycling people thus feel less safe and unlikely to travel with this mode. It seems cycling is currently constrained by behavioural differences as well as physical ones. The Local Transport Plan has stated however its aims to promote cycling further and develop the network of paths, identifying Shrewsbury as a core 'cycling town'.

Rietveld and Daniel (2004) identified some generalised costs associated with cycling, as seen in chapter 4.2.2. It can be seen that in Shrewsbury these play a vital role in the popularity of bicycles. For example, time can be a constraining factor in why people choose not to cycle. If there is not adequate provision of infrastructure then residents will not feel inclined to change their travel behaviour. This process can be seen in the conceptual model whereby if local councils make investments in such features as dedicated infrastructure and awareness programmes then over time a change in attitude and behavioural towards a travel mode will be seen. Having these supporting schemes can not only create faster journeys, but also increase safety, comfort and personal security.

From the survey a considerable amount of respondents stated that there is not currently sufficient provision of bicycle storage in the town centre. Just three people named a storage facility that they have used, one of which can be seen in figure 21. By not having optimised placement of such features means that achieving a modal shift is much less likely. In 1997 Haq noted that there was a knowledge gap in the UK in terms of a transport policy that covers all modes. 20 years later and this same outcome can still be concluded. Although government policies, such as the Local Transport Plan, have clearly defined guidelines in relation to cycling it seems that the priorities are still related to motor vehicles and their roads. In Shrewsbury thus so far only improvements to the road network have been made, with slow development taking place with regards to reducing car dependency and promoting alternative modes.

Therefore it can be concluded that the current technical solutions produced by governments are making little difference and thus maybe they should look towards fostering behavioural changes. This could be achieved through cross-sectoral planning strategies that produce supporting infrastructure and programmes that are not shared with other modes and can gradually lead to a change at the micro level.

4.4.3 Pedestrianisation

Shrewsbury already has many existing examples of pedestrianised areas, of which all have been selected as the 'most pedestrian friendly' streets in figure 27. As identified by Gehl and Svarre (2008) this can turn a normal street into a 'destination' in itself. This can be seen in Shrewsbury whereby both Pride Hill and The Square are central hubs within the town centre. Pride Hill has become a retail and economic zone, whilst The Square is a large open space used for varying activities and social interaction, helping to provide a unique urban experience.

Perhaps the most interesting results from the survey are that pedestrians frequently use the town centre and feel at home walking around, but they do not necessarily feel safe. This contradictory remark can indicate that paths and accessibility in the town centre are currently adequate but the inclusion of cars and buses passing through the town centre can lead people to feel unsafe. The town was historically designed for pedestrians and has only seen the addition of motor vehicles in the last century. Since the oil crisis of the 1970s many European countries saw renewed interest in non-motorised transport and begun to develop car-free zones and pedestrianised spaces in their centres. Topp and Pharoah (1994) noted that this in fact increases economic activity and creates a visually inviting environment. Therefore, this could provide a promising future for Shrewsbury. Behavioural changes would not necessarily be needed because 80% of respondents already stated that they use the town centre as a pedestrian already even if they currently feel unsafe.

4.4.4 Car-Free

Overall, a surprising result from the survey was the overriding support for a car-free town centre. Respondents believed it would create an attractive town centre and encourage more active lifestyles. Nevertheless, this is a very radical step to take. Therefore, it is best to first implement a shared space concept that restricts cars from certain areas within the town centre. Referring back to Ajzen's theory of planned behaviour, residents in Shrewsbury have already achieved a positive attitude towards car-free, therefore now the focus should be upon the subjective norm and perceived behavioural control towards alternative travel modes. By utilising the results from the three aforementioned characteristics of car-free developments this can be done. Therefore when fostering a sustainable mobility transition the introduction of sustainable transport alternatives such as public transit systems, cycling and safe walkable zones are key. Banister (2008) describes this process as "moving towards an objective-based planning system that tries to implement a range of policy interventions, but with the support of all stakeholders" so as to nurture such behavioural changes.

5.0 Conclusion

The following chapter will discuss the entire research process collectively. The main research question and sub-question will be presented to see whether they have all been answered suitably from my research. Subsequently, a discussion of the project will follow this. Furthermore, recommendations for future research and a reflection will conclude the chapter.

5.1 Research Questions

1. *How can car-free cities be conceptualised from a theoretical perspective?*

In chapter 2 the theoretical framework presents a clear definition of car-free, followed by some of the key characteristics and their determinants. The results can be seen in the conceptual model in 2.5. A key finding from academic research is that 'car-free' does not have to imply 'no cars' at all. Rather, the promotion of alternative modes or implementing restrictions on motor vehicles in predefined geographic areas. This can ultimately aid in fostering behavioural change amongst local people.

The key characteristics of car-free cities as presented by Nieuwenhuijsen and Khreis (2016) are as follows:

- Ensuring adequate provision of public transport
- Cycling infrastructure
- Inviting and secure pedestrian areas

The success of each of these characteristics leading to 'car-freeness' is dependent on a set of variables as seen in the conceptual model, including: generalised costs, socio-cultural, and policy. These take place at the macro level where we see changes taking place on varying spatial scales. These determine the conditions for attitude and behavioural choices at the micro level. Through integrating public perception of car-free in a process of public involvement it could lead to aggregation at the macro level. Ultimately leading to the implementation of successful car-free areas. The key characteristics and variables were then used to create the questions presented in the survey to showcase the current condition of mobility in Shrewsbury.

2. *What are the necessary conditions for a successful sustainable mobility transition towards a car-free city?*

The sustainable mobility paradigm by Banister (2008, 2018) is discussed in chapter 2.2. The necessary conditions for a transition are constantly adapting over time to the changing context and surroundings. Banister initially identifies four actions to help foster sustainable mobility, these being:

- Make use of technology
- Regulations
- Land-use measures
- Marketing information

These actions reduce the need to travel, encourage modal shift, reduce trip lengths and promote greater efficiency of transport systems. These actions help to foster the three characteristics presented by Nieuwenhuijsen and Khreis (2016) in accordance to the variables: generalised costs, socio-cultural, and policy. Banister further notes that the involvement of people helps to produce the conditions needed for a successful transition. Through active and participatory processes it can create public acceptability towards radical change. Ultimately changing the behaviour of people if they show willingness to change and an acceptance of collective responsibility, whilst seeing the importance of their contribution.

From analysing policy documents at national and local level, it can be established that by 2026 all four of the actions presented by Banister should have been implemented in Shrewsbury. By moving away from traditional technical solutions and promoting integrated land-use and technological measures it is hoped to foster significant behavioural changes.

3. *What are the current weaknesses and strengths in the mobility of Shrewsbury town centre according to residents and what are their views on the concept of car-free?*

The data collected in chapter 4 will help to answer this question. People have become dependent upon their cars due to their convenience and comfort. It seems the attitude towards alternative modes may be the biggest challenge faced in Shrewsbury. The town centre has potential to become car-free as a result of three factors:

- Historic street layout
- Geographic suitability
- Policy documents

Nevertheless, there are still large improvements needed, especially with regards to the provision of cycling infrastructure as discovered in the questionnaire and policy analysis. This includes implementing better storage, bicycle paths, awareness campaigns and

education in schools and workplaces. Furthermore, the introduction of a shared-space concept could initially increase safety levels for cyclists. Residents believe there is currently adequate provision and good accessibility to public transport, but the price is not fair. By making alternative modes cheaper than cars it can foster travel pattern changes. This can be done by not just by making public transport cheaper but also through measures such as increasing car-park prices, putting restrictions in place on certain town centre streets, and promoting the use of park & ride schemes. The town currently has three park & ride schemes in place, with another planned to open by 2026. As seen in the policy document analysis there are suggestions that infrastructure, technological and behavioural improvements are all in place and should also be completed by 2026. However, it could be argued that this statement is optimistic and misleading. Therefore, it may be interesting to further this research in 10 years time to see whether such policy measures actually take place, and car dependency actually reduces in the town.

4. *To what extent can the findings from academic research be implemented in Shrewsbury?*

The final sub-research question asks whether findings from academia can be relevant towards the case of Shrewsbury. The concept of car-free should be introduced through a positive strategy that fulfils the needs of local residents as suggested by Loo (2018). This can be through the addition of interactive policy-making, and reinforcing the appeal of the car-free environment, rather than focusing mainly on the control measures such as parking restrictions or the complete banning of private cars. The car-free identity and social cohesion are then strengthened to make the car-free development sustainable. In figure 28 the red line showcases where potential car-free roads can be implemented. Even though Smithfield Road (A458) was selected in figure 26 as being one of the least pedestrian/cycle friendly roads in Shrewsbury, it has not been allocated as a car-free space. This is because it serves as an important through-road, and provides access to the bus and train station for people living in the West and South, also being the only two-way street in the entire town centre. There is also a large car park situated off this road, connecting people to the two main shopping centres. Thus closing this road to cars would not be a feasible option and increase congestion coming from the North and East. Instead, Castle Gates, Dogpole, High Street, Wyle Cop, Town Walls, Shoplatch and Claremont Bank will become car-free, except for public transport. All of these streets were listed in figure 26 as being the least pedestrian/cycle friendly streets in the town centre.

Buses will still run through Castle Gates, Wyle Cop, Dogpole, High Street and Shoplatch, but these streets will become shared space areas to further increase safety for pedestrians and

cyclists. Residents were accepting of the idea of shared space, as long as an adequate amount of current bus stops remain in place in the town centre. Furthermore, Town Walls and Claremont Bank will become completely car-free. This allows for the original fortifications of the walls to be enjoyed by pedestrians and reinstate the original cobblestones along this route.

When applying academia to the context of Shrewsbury, it can be seen that ensuring the provision of public transit, cycling infrastructure and safe pedestrianised zones can help foster a sustainable transition. As mentioned in 4.4.4 Ajzen's theory of planned behaviour can be used with the residents in Shrewsbury. They have already achieved a positive attitude towards car-free, therefore now the focus should be upon the subjective norm and perceived behavioural control towards alternative travel modes. By utilising the results from the three aforementioned characteristics of car-free developments as researched in this thesis, it can be hoped that a functioning car-free zone can be achieved.

Figure 27: Potential Car-Free Roads

5.2 Discussion and Conclusion of Research

The research presented in this thesis set out to answer the main research question "*In what way can the centre of Shrewsbury be planned so that it can become car-free in order to enhance sustainable mobility from the perspective of residents?"* In order to answer this research question, it was important to first define what is the concept of 'car-free'. From the literature study into academic theories it emerged that the most important aspects that form the basis for creating a car-free area are:

- **Public transport**: Investment in an extensive, integrated public transport system, resulting in a decrease in car use and therefore lower levels of congestion is a common solution strategy along with improvement to existing infrastructure for example; bus lanes, and trams.
- **Cycling:** Introduce an active cycling town whereby cyclists are treated as "drivers of vehicles" meaning that they should share the road with the same rights as other vehicles. This can also include adding bicycle lanes, which not only improves cycling safety but also the perception of safety for would-be cyclists.
- **Pedestriansation**: Creating a built environment that supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network.
- **Generalised costs**: Generalised costs of transport do not focus only on the economic factors related to money; rather they encompass a variety of features such as travel time, comfort, personal security etc.
- **Socio-cultural**: This can include both socio-cultural factors like ethnicity, cultural background or general image of a certain transport mode, but can also consist of individual features such as income, gender and age.
- **Policy**: Local authority initiatives such as dedicated infrastructure, spatial design or pricing of motor vehicles, which all influence a persons travel choice.

Nieuwenhuijsen and Khreis (2016), Rietveld and Daniel (2004), Gehl and Svarre (2013), Banister (2008) and Topp and Pharoah (1994) all express the importance of these factors when creating such car-free developments. It has been found that the various theories have many similarities with each other, but also others differing from each other. In addition, a number of key aspects also interact with each other. The six aforementioned aspects of car-free have formed the basis for the conceptual model seen in 2.5.

When reflecting upon data collected from the perspective of residents, currently only 30% of residents feel safe as a pedestrian in Shrewsbury town centre. This figure drops to 0% when regarding cycling. This does not mean however that Shrewsbury is currently not pedestrian-friendly, as it has many pedestriansed streets and 73% of respondents believed the town centre had been designed to make pedestrians feel at home. Rather, the issue lies within motor vehicles and their role in the town centre. Respondents were asked their opinions on creating a 'car-free' town centre, with the majority being open to the concept. They believed it would create a safer environment for pedestrians and cyclists, ultimately leading to the increase in the use of alternative modes. Therefore it can be argued that providing the necessary infrastructure is just the beginning, with people ultimately having to adjust their behaviour and attitude towards sustainable transport in order to see future improvements.

If local government were to work in conjunction with residents through constant dialogue and consultations I believe they have the necessary foundation to begin phasing Shrewsbury into a car-free town centre. The available policy documents all provide positive and innovative solutions that if implemented, using expert knowledge along with residents specialist knowledge of local circumstances, can respectively help Shrewsbury to achieve a sustainable mobility transition.

Therefore, by using the sub-research questions to help answer the main research question it can be concluded that by making use of the key characteristics identified by Nieuwenhuijsen and Khreis (2016) and ensuring these meet the various elements within the variables described by Rietveld and Daniel (2004) it can provide the necessary supporting conditions to encourage a modal shift. It is important to note that the characteristics mentioned above interact with each other and therefore cannot be applied separately in order to function sustainably. In addition it can also depend on the context for each city or individual situation. So it can be difficult in a narrow street to apply a designated path for both cyclists and pedestrians. Therefore, the shared-space can be a promising solution. Residents should be provided with easy and friendly technological innovations to make their journeys as quick and convenient as possible. If Shrewsbury can provide the conditions required to foster a change, then over time people's attitudes towards certain transport modes will change. Furthermore, in reference to the conceptual model, these changes in public perception can lead to further improvements to infrastructure, ultimately creating a cycle of constant renewal according to changing contextual surroundings and public involvement.

5.3 Recommendations for future research

The research gave recommendation to many facets connected to sustainable mobility. However, there were elements that remained mostly untouched during this research or that where not touched upon enough. Due to time constraints I have not been able to interview various important actors involved within sustainable mobility and transport planning. To gain a more complete picture it could be helpful to interview actors in order to gain understanding of their roles and more in-depth information regarding policies. Moreover, the importance of the intrinsic will of people to get involved in participatory processes is only touched upon to a limited degree. To be precise, the importance of the individual and their behaviour is not really investigated in detail during this research. However, if interviews were conducted with local residents it could provide further information. This psychological element is perhaps the main weakness of the research; hence this is an element that could be improved upon. Hence one of the gaps in this research is the precise importance of the local people within a neighbourhood in order to achieve a successful transition towards car-free. So a recommendation for future research is gaining insight in the role of the individual's attitude on sustainable mobility.

In the Methodology chapter, it was mentioned that the recruitment method used for this research is reliance on random sampling. This enabled a representation of the target area and it can be controlled with this sampling method to eliminate any bias. However, it is difficult to achieve in a small amount of time. Therefore, it is recommended to use another recruitment method for future research if done within a small time period. Again due to time constraints survey collection was limited to a three-day period. In future research I would suggest extending this to at least a week to gain in excess of 100 responses.

A final recommendation for future research would be to do a comparative study between two cities, one successful example and another case that can draw lessons from this. A benefit of doing a comparative study is that it allows for the transfer of policies (Dolowitz and Marsh, 1996) by taking into account the different societal and political contexts.

5.4 Reflections

The strengths and weaknesses of the study over the past 8 months shall now be reflected upon. The research was completed using academic literature, surveys and policy documents to investigate how Shrewsbury town centre can become car-free.

At the beginning of the process I was sceptical whether there would be enough literature research about car-free developments as it can be a very controversial and fuzzy topic. Nevertheless, I was surprised to find an array of academic articles in relation to the subject. However, a lot of the literature available is rather out-dated, with the term 'sustainable' being coined in various different definitions over the last three decades. Each article also presents varying characteristics of car-free, depending on the size of the settlement. Nevertheless, the most common were public transport, cycling and walkability, therefore these were selected for the basis of this thesis.

Conducting the surveys and meeting local people was a great and a useful research method. However, due to logistical issues of conducting research in my native country, whilst living in the Netherlands, I encountered time constraints when conducting primary research. Therefore, I gathered much less survey data than would be preferred. In future, allowing time to complete the research in a traditional order would assist with an easier analysis process as information gathered would be more representative of the entire population of the town. It would also be interesting to add questions regarding why people currently choose not to cycle

When looking at the data collected through policy documents, there was limited information at the national level but very detailed policies on the local level. Policy documents appear to include all the discourse suggesting a transition towards sustainable transport. Nevertheless, I am still sceptical whether this will take place, especially in the short time period of between now (2018) and 2026. A further research project in 10 years would provide some interesting findings into whether local councils actually achieve their policy goals.

Despite the above comments, I believe that the results of this research are useful and can contribute towards the possibility of creating a car-free area in the town centre of Shrewsbury. Overall, I feel that this research project has been a valuable experience.

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7.0 Appendix

7.1 Appendix 1 – Policy documents

National – England
Local (county) – Shropshire
Local (town) - Shrewsbury

National: NPPF (National Planning Policy Framework)

Sustainable development is key
- Economic, environmental and social dimensions
- Create Local Plans – 15 year horizon (long term vision)

Promoting sustainable transport:
- Smarter use of technology to reduce the need to travel
- Transport systems balanced in favour of sustainable modes to give people a real choice
- Facilitate the use of sustainable modes
- Give priority to pedestrian and cycle movements and have access to high quality public transport facilities
- Safe and secure layouts to minimise conflicts between traffic and cyclists/pedestrians
- Consider the needs of all people e.g. disabled in public transport
- Each authority should create a Travel Plan
- Balance of land uses to minimise journey lengths
- Improve the quality of parking in town centres to be convenient, safe and secure
- Set appropriate parking charges that don't undermine the vitality of town centres

Collaborative approach working with communities

Local (county): Shropshire Local Development Framework – Core Strategy
- 2010-2026

Communications and transport sub-section:
- Shrewsbury will continue to develop as a 'cycling town'
- Reduce car dependency
- Create an integrated transport system
- Promoting greater awareness of travel behaviour to encourage more informed choices on the need to travel and alternative options
- Enhancing strategic and local cycling networks
- Enable the provision of accessible, affordable and demand responsive passenger transport services including bus, Park & Ride, rail, taxi, community transport services and car sharing initiatives
- Promoting improvements in local highway networks (Shrewsbury North West Relief Road – to create a full ring-road around the town)
- Influencing the location of developments that generate significant volumes of traffic
- Influence travel behaviour both through the workplace (travel planning, car sharing and flexible home working) and also through choices in our daily lives (offer a range of safe and convenient travel options using well-designed transport networks)
- Use of new technologies to offer transport solutions
- Manage the growth in traffic, reduce the adverse impacts on the town through air pollutants and reduce contribution to global warming

- Promote National Cycle Network routes
- Improved quality of walking and cycling infrastructure will encourage physical activity and improve health
- Establishment of a core bus network with bus priority measures in Shrewsbury
- Further development of Park & Ride network
- Investments to rail services and main train station

Local Transport Plan for Shropshire (2011-2026)

- Network capacity management hierarchy (tackle and prevent congestion)
    - Reduce demand through encouraging alternative modes, car sharing and use of sustainable modes
- Network management
    - Introducing Urban Traffic Management and Control Systems – smooth traffic flows, better manage road capacity, respond to events on the network, encourage the use of routes, and to give greater priority to pedestrians, cyclists and buses
- Tackling Shrewsbury's traffic problems
    - Transport Strategy for Shrewsbury
    - Improve walking, cycling and public transport networks to reduce traffic demand
    - Progressively reduce the levels of car parking within the river loop and prioritise the use of park & ride schemes and edge of town parking
    - Increased pedestrian priority and environmental enhancements including better connection of the town with the river
    - Encourage traffic to use the inner ring road and outer bypass
    - Urban Traffic Control
    - Development of Shrewsbury Parkway station and fourth park & ride site
- Car parking and park & ride
    - Setting parking charges in a consistent manner in towns based on a hierarchy reflecting size and parking demand in each town
    - Ensure provision of adequate town centre parking
    - Time restrictions for on-street parking
    - Encourage long-stayers to use alternative modes or distant car parks
    - Where alternatives are available – encourage a hierarchy of pricing that encourages bus use etc.
    - Improve car parking signage and discourage unnecessary traffic circulation in town centres
- Access to work
    - Reduce car dependency
    - Improve bus services in prime commuting times
    - Car sharing
    - Help employers to develop workplace travel plans
    - High priority on improving walking and cycling routes
    - Enhanced marking and incentives on park and ride usage for commuters
- Access to railway stations
    - Expand station parking facilities where required
    - Improve access by foot and cycling
    - Encourage bus and rail operators to coordinate their schedules
    - Combined ticketing
    - Ensure sufficient information regarding connecting modes is provided
    - Low emission buses
- Encouraging more sustainable travel choices

    - Reduce unnecessary business mileage and encouraging and rewarding more sustainable commuting practices
    - Work with schools to create School Travel Plans
    - Utilising Personalised Travel Planning techniques to encourage behavioural change – targeted at people experiencing a period of lifestyle change
    - Undertake awareness campaigns
- Reduce environmental impacts
    - Enhance quality of public realm and setting for historic buildings to protect historic structures from potential collisions
    - Upgrade street lightning
- Bus network enhancements
    - Better connect rural villages to major hubs
    - Smart ticketing
    - Address the affordability of public transport for low income groups, young people and job seekers
    - Improve timetable information and journey planning tools
    - Real Time information at bus stops
    - Personalised marking and promotion
    - Bus priority measures at congestion hotspots
    - Upgrading Shrewsbury bus station
    - Low floor buses
- Cycle infrastructure
    - Review of speed limits and enforcements
    - Prioritise access for cyclists
    - Provision of cycle tracks, lanes, junction improvements etc.
    - Appropriate storage for bicycles
    - Provide information on suitable routes and time it takes to cover a certain distance
    - Cycle training in schools
    - Promotion through the workplace
- Pedestrian infrastructure
    - Speed limits reduced to 20mph
    - Renew existing infrastructure
    - Greater priority to pedestrians at crossings
    - Promotional activities to emphasise health benefits
    - School travel plans
- Reduce personal security fears when travelling
    - Good surveillance on pedestrian and cycle routes
    - Improved lighting and CCTV on concealed areas
    - Secure cycle parking in public places

Local (town): Shrewsbury Integrated Transport Strategy

- £12.1 million investment secured through The Marches LEP Regional Growth Fund and Shropshire Council developer contributions
- Reduce the volume of traffic flows through the historic and commercial town centre
- Encourage sustainable modes of transport
- Improve safety
- Key junction improvements
    - Traffic signals to improve vehicle capacity and pedestrian and cycle facilities
- Implementation of the SCOOT network (split cycle offset optimisation technique)
    - Improves traffic signal operation and manage traffic flows
    - Variable message signage to direct town centre traffic onto inner ring road or towards car parks or park & ride facilities
- Enhancements to pedestrian and cycle links

- Improved pedestrian way finding (information systems that guide people) within and around the river loop
    - Highly accessible and connected town centre
- Enhancements to public realm e.g. Pride Hill, Shrewsbury Square and Mardol
    - Highlight pedestrian facilities
    - Linked to traffic management measures

7.2 Appendix 2 – Questionnaire

The questionnaire was originally uploaded on the Maptionnaire website, thus has been reformatted to fit a Word document thus will appear different to online. Rather all the question and answers have been listed in a basic format. Original survey can be found online at https://app.maptionnaire.com/en/4371

Mobility in Shrewsbury town centre

You are invited to take part in a survey on mobility in your local town. It forms part of a wider research project into the necessary conditions and contextual requirements for creating a car-free town centre.

If you decide to take part now, but change your mind at a later date, you can withdraw from the study at any time up until June 6th 2018 at 5pm. This survey should take you no longer than 10 minutes to complete and will not incur any costs.

On two questions you will be required to draw a line on the maps provided. Please keep your responses limited to within the boundary of the town centre (loop of the river up to the train station)!

This survey forms part of a study conducted for the Masters degree in Environmental & Infrastructure Planning at the Faculty of Spatial Sciences, University of Groningen. If you have any questions, please contact me on d.owen.1@student.rug.nl

1. **What is your main reason for using the town centre?**

- Resident of the town centre
- Resident of the town
- Resident of the county
- Tourist
- Shopkeeper
- Other
  If other, please specify

2. **With what means of transport do you usually arrive to the town centre?**

- Bicycle
- Car
- Train
- Bus
- Walking
- Other
  If other, please specify

3. **How often do you use the town centre as a pedestrian?**

- Daily
- 3-5 times per week
- Once or twice a week
- Less than once a week (once in a month)
- Almost never (a few times per year)

4. **The centre of Shrewsbury has been designed in such a way that I feel at home as a pedestrian**

- Strongly disagree

- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

5. The centre of Shrewsbury has been designed in such a way that I feel at home as a cyclist
- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

6. I am encouraged to use the town centre as a cyclist
- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

7. I am encouraged to use the town centre as a pedestrian
- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

8. Traffic safety for pedestrians is currently good in Shrewsbury
- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

9. Traffic safety for cyclists is currently good in Shrewsbury
- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

10. How would you feel about a shared space concept on High Street and Shoplatch (=shared use of space between public transport, cyclists and pedestrians, without any traffic rules) seen in the picture below?

11. Would you be open to the idea of creating a car-free town centre?

12. All of the functions in the town centre can be easily reached on foot

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

13. From the town centre public transport is easily accessible on foot

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

14. Public transport is priced reasonably in Shrewsbury

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

15. There are sufficient out of town parking facilities (park & ride)

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

16. Which streets in the town centre at the LEAST pedestrian/cycle friendly?

- Draw up to 3 lines on the map

17. Which streets in the town centre at the MOST pedestrian/cycle friendly?

- Draw up to 3 lines on the map

18. I feel encouraged to walk or cycle because of health benefits

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
- Not applicable

19. There are sufficient places in the town centre to store a bicycle

- Strongly disagree
- Disagree
- Undecided

- Agree
- Strongly agree
- Not applicable

20. Do you use any bicycle parking facilities?

- Yes
- No
  If yes, please specify which

21. I prefer to use a car because of…

- Cost
- Journey time
- Convenience
- Comfort
- Status
- Not applicable
- Other
  If other, please specify

22. What is your date of birth DDMMYY

23. What is your gender?

- Male
- Female
- Prefer not to say

24. With whom do you usually use the town centre?

- Alone
- Only with my children
- With partner, without children
- With partner, with children
- With friends
- With school/work/association etc.
- With another family
- Prefer not to say
- Other
  If other, please specify

25. What is your postcode?

26. Please provide your email address if you would like to receive the results

7.3 Appendix 3 – SPSS output data and results

```
FREQUENCIES VARIABLES=Use Other_use Transport_choice Other_transport
Usage_pedestrian
   At_home_pedestrian At_home_cyclist Encouraged_pedestrian Encouraged_cyclist
Safety_pedestrians
   Safety_cyclists Car_free Functions_on_feet Transport_on_feet Transport_price
Transport_access_home
   Park_and_ride Health_benefits Store_bicycle Use_bicycle_facilities If_yes_facility
Car_use
   Other_car_use Age Gender With_whom With_whom_other
  /ORDER=ANALYSIS.
```

Frequencies

Notes

Output Created		07-JUN-2018 13:39:29
Comments		
Input	Data	X:\My Documents\Masters\Thesis\ Questionnaire data.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	60
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.

Syntax		FREQUENCIES VARIABLES=Use Other_use Transport_choice Other_transport Usage_pedestrian At_home_pedestrian At_home_cyclist Encouraged_pedestrian Encouraged_cyclist Safety_pedestrians Safety_cyclists Car_free Functions_on_feet Transport_on_feet Transport_price Transport_access_home Park_and_ride Health_benefits Store_bicycle Use_bicycle_facilities If_yes_facility Car_use Other_car_use Age Gender With_whom With_whom_other /ORDER=ANALYSIS.
Resources	Processor Time	00:00:00,00
	Elapsed Time	00:00:00,02

Statistics

		What is your main reason for using the town centre?	Other_use	With what means of transport do you usually arrive to the town centre?	Other_transport	How often do you use the town centre as a pedestrian?
N	Valid	60	60	60	60	60
	Missing	0	0	0	0	0

		The centre of Shrewsbury has been designed in such a way that I feel at home as a pedestrian	The centre of Shrewsbury has been designed in such a way that I feel at home as a cyclist	I am encouraged to use the town centre as a pedestrian	I am encouraged to use the town centre as a cyclist	Traffic safety for pedestrians is currently good in Shrewsbury
N	Valid	60	60	60	60	60
	Missing	0	0	0	0	0

Statistics

		Traffic safety for cyclists is currently good in Shrewsbury	Would you be open to the idea of creating a car-free town centre?	All of the functions in the town centre can be easily reached on foot	From the town centre public transport is easily accessible on foot	Public transport is priced reasonably in Shrewsbury
N	Valid	60	60	60	60	60
	Missing	0	0	0	0	0

Statistics

		Public transport is easily accessible from my home	There are sufficient out of town parking facilities (park & ride)	I feel encouraged to walk or cycle because of health benefits	There are sufficient places in the town centre to store a bicycle	Do you use any bicycle parking facilities';
N	Valid	60	60	60	60	60
	Missing	0	0	0	0	0

Statistics

		If_yes_facility	I prefer to use a car because of...	Other_car_use	Age	Gender
N	Valid	60	60	60	60	60
	Missing	0	0	0	0	0

Statistics

		With whom do you usually use the town centre with?	With_whom_other
N	Valid	60	60
	Missing	0	0

Frequency Table

What is your main reason for using the town centre?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Resident of the town centre	8	13,3	13,3	13,3
	Resident of the town	34	56,7	56,7	70,0
	Resident of the county	10	16,7	16,7	86,7
	Tourist	1	1,7	1,7	88,3
	Shopkeeper	5	8,3	8,3	96,7
	Other	2	3,3	3,3	100,0
	Total	60	100,0	100,0	

Other_use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		58	96,7	96,7	96,7
	Live in Mid-Wales	1	1,7	1,7	98,3
	Resident from Wales	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

With what means of transport do you usually arrive to the town centre?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bicycle	2	3,3	3,3	3,3
	Car	33	55,0	55,0	58,3
	Train	5	8,3	8,3	66,7
	Bus	5	8,3	8,3	75,0
	Walking	15	25,0	25,0	100,0
	Total	60	100,0	100,0	

Other_transport

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		60	100,0	100,0	100,0

How often do you use the town centre as a pedestrian?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	12	20,0	20,0	20,0
	3-5 times per week	9	15,0	15,0	35,0
	Once or twice a week	27	45,0	45,0	80,0
	Less than once a week (once in a month)	11	18,3	18,3	98,3
	Almost never (a few times per year)	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

The centre of Shrewsbury has been designed in such a way that I feel at home as a pedestrian

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	7	11,7	11,7	11,7
	Undecided	9	15,0	15,0	26,7
	Agree	40	66,7	66,7	93,3
	Strongly agree	4	6,7	6,7	100,0
	Total	60	100,0	100,0	

The centre of Shrewsbury has been designed in such a way that I feel at home as a cyclist

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	26,7	26,7	26,7
	Disagree	19	31,7	31,7	58,3
	Undecided	11	18,3	18,3	76,7
	Agree	1	1,7	1,7	78,3
	Not applicable	13	21,7	21,7	100,0
	Total	60	100,0	100,0	

I am encouraged to use the town centre as a pedestrian

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	8,3	8,3	8,3
	Undecided	8	13,3	13,3	21,7
	Agree	42	70,0	70,0	91,7
	Strongly agree	5	8,3	8,3	100,0
	Total	60	100,0	100,0	

I am encouraged to use the town centre as a cyclist

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	15	25,0	25,0	25,0
	Disagree	21	35,0	35,0	60,0
	Undecided	10	16,7	16,7	76,7
	Agree	1	1,7	1,7	78,3
	Not applicable	13	21,7	21,7	100,0
	Total	60	100,0	100,0	

Traffic safety for pedestrians is currently good in Shrewsbury

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	15	25,0	25,0	25,0
	Undecided	27	45,0	45,0	70,0
	Agree	16	26,7	26,7	96,7
	Strongly agree	2	3,3	3,3	100,0
	Total	60	100,0	100,0	

Traffic safety for cyclists is currently good in Shrewsbury

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	26,7	26,7	26,7
	Disagree	26	43,3	43,3	70,0
	Undecided	8	13,3	13,3	83,3
	Not applicable	10	16,7	16,7	100,0
	Total	60	100,0	100,0	

Would you be open to the idea of creating a car-free town centre?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	41	68,3	68,3	68,3
	No	3	5,0	5,0	73,3
	Undecided	16	26,7	26,7	100,0
	Total	60	100,0	100,0	

All of the functions in the town centre can be easily reached on foot

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	28	46,7	46,7	46,7
	Strongly agree	32	53,3	53,3	100,0
	Total	60	100,0	100,0	

From the town centre public transport is easily accessible on foot

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1,7	1,7	1,7
	Agree	28	46,7	46,7	48,3
	Strongly agree	31	51,7	51,7	100,0
	Total	60	100,0	100,0	

Public transport is priced reasonably in Shrewsbury

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1,7	1,7	1,7
	Disagree	21	35,0	35,0	36,7
	Undecided	23	38,3	38,3	75,0
	Agree	14	23,3	23,3	98,3
	Not applicable	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

Public transport is easily accessible from my home

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1,7	1,7	1,7
	Undecided	1	1,7	1,7	3,3
	Agree	39	65,0	65,0	68,3
	Strongly agree	19	31,7	31,7	100,0
	Total	60	100,0	100,0	

There are sufficient out of town parking facilities (park & ride)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	15	25,0	25,0	25,0
	Undecided	21	35,0	35,0	60,0
	Agree	19	31,7	31,7	91,7
	Strongly disagree	3	5,0	5,0	96,7
	Not applicable	2	3,3	3,3	100,0
	Total	60	100,0	100,0	

I feel encouraged to walk or cycle because of health benefits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1,7	1,7	1,7
	Undecided	5	8,3	8,3	10,0
	Agree	31	51,7	51,7	61,7
	Strongly agree	23	38,3	38,3	100,0
	Total	60	100,0	100,0	

There are sufficient places in the town centre to store a bicycle

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	13,3	13,3	13,3
	Disagree	28	46,7	46,7	60,0
	Undecided	7	11,7	11,7	71,7
	Not applicable	17	28,3	28,3	100,0
	Total	60	100,0	100,0	

Do you use any bicycle parking facilities';

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	5,0	5,0	5,0
	No	57	95,0	95,0	100,0
	Total	60	100,0	100,0	

If_yes_facility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		57	95,0	95,0	95,0
	In the Quarry	1	1,7	1,7	96,7
	In the square	1	1,7	1,7	98,3
	Top of Pride Hill	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

I prefer to use a car because of...

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cost	5	8,3	8,3	8,3
	Journey time	7	11,7	11,7	20,0
	Convenience	25	41,7	41,7	61,7
	Comfort	12	20,0	20,0	81,7
	Status	1	1,7	1,7	83,3
	Not applicable	10	16,7	16,7	100,0
	Total	60	100,0	100,0	

Other_car_use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	60	100,0	100,0	100,0

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16,00	3	5,0	5,0	5,0
	17,00	1	1,7	1,7	6,7
	19,00	1	1,7	1,7	8,3
	20,00	1	1,7	1,7	10,0
	21,00	2	3,3	3,3	13,3
	22,00	3	5,0	5,0	18,3
	23,00	2	3,3	3,3	21,7
	24,00	1	1,7	1,7	23,3
	25,00	2	3,3	3,3	26,7
	26,00	1	1,7	1,7	28,3
	27,00	4	6,7	6,7	35,0
	29,00	2	3,3	3,3	38,3
	30,00	1	1,7	1,7	40,0
	32,00	2	3,3	3,3	43,3
	33,00	1	1,7	1,7	45,0
	34,00	1	1,7	1,7	46,7
	36,00	2	3,3	3,3	50,0
	37,00	2	3,3	3,3	53,3

	38,00	1	1,7	1,7	55,0
	39,00	2	3,3	3,3	58,3
	42,00	1	1,7	1,7	60,0
	44,00	1	1,7	1,7	61,7
	47,00	2	3,3	3,3	65,0
	48,00	2	3,3	3,3	68,3
	49,00	1	1,7	1,7	70,0
	51,00	1	1,7	1,7	71,7
	52,00	2	3,3	3,3	75,0
	53,00	1	1,7	1,7	76,7
	58,00	2	3,3	3,3	80,0
	59,00	1	1,7	1,7	81,7
	61,00	1	1,7	1,7	83,3
	62,00	1	1,7	1,7	85,0
	65,00	1	1,7	1,7	86,7
	68,00	1	1,7	1,7	88,3
	70,00	1	1,7	1,7	90,0
	74,00	2	3,3	3,3	93,3
	77,00	2	3,3	3,3	96,7
	79,00	2	3,3	3,3	100,0
	Total	60	100,0	100,0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	31	51,7	51,7	51,7
	Female	29	48,3	48,3	100,0
	Total	60	100,0	100,0	

With whom do you usually use the town centre with?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alone	17	28,3	28,3	28,3
	With partner, without children	12	20,0	20,0	48,3
	With partner, with children	11	18,3	18,3	66,7
	With friends	19	31,7	31,7	98,3
	Other	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

With_whom_other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		59	98,3	98,3	98,3
	Carer	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

```
DESCRIPTIVES VARIABLES=Use Transport_choice Usage_pedestrian
At_home_pedestrian At_home_cyclist
  Encouraged_pedestrian Encouraged_cyclist Safety_pedestrians Safety_cyclists
Car_free
  Functions_on_feet Transport_on_feet Transport_price Transport_access_home
Park_and_ride
  Health_benefits Store_bicycle Use_bicycle_facilities Car_use Age Gender With_whom
 /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Notes

Output Created		07-JUN-2018 13:40:32
Comments		
Input	Data	X:\My Documents\Masters\Thesis\Questionnaire data.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
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	N of Rows in Working Data File	60
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.

Syntax		DESCRIPTIVES VARIABLES=Use Transport_choice Usage_pedestrian At_home_pedestrian At_home_cyclist Encouraged_pedestrian Encouraged_cyclist Safety_pedestrians Safety_cyclists Car_free Functions_on_feet Transport_on_feet Transport_price Transport_access_home Park_and_ride Health_benefits Store_bicycle Use_bicycle_facilities Car_use Age Gender With_whom /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00,00
	Elapsed Time	00:00:00,00

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
What is your main reason for using the town centre?	60	1,00	6,00	2,4500	1,21327
With what means of transport do you usually arrive to the town centre?	60	1,00	5,00	2,9667	1,33996
How often do you use the town centre as a pedestrian?	60	1,00	5,00	2,6667	1,05230
The centre of Shrewsbury has been designed in such a way that I feel at home as a pedestrian	60	2,00	5,00	3,6833	,77002

The centre of Shrewsbury has been designed in such a way that I feel at home as a cyclist	60	1,00	6,00	2,8167	1,83646
I am encouraged to use the town centre as a pedestrian	60	2,00	5,00	3,7833	,71525
I am encouraged to use the town centre as a cyclist	60	1,00	6,00	2,8167	1,82721
Traffic safety for pedestrians is currently good in Shrewsbury	60	2,00	5,00	3,0833	,80867
Traffic safety for cyclists is currently good in Shrewsbury	60	1,00	6,00	2,5333	1,68208
Would you be open to the idea of creating a car-free town centre?	60	1,00	3,00	1,5833	,88857
All of the functions in the town centre can be easily reached on foot	60	4,00	5,00	4,5333	,50310
From the town centre public transport is easily accessible on foot	60	2,00	5,00	4,4833	,59636
Public transport is priced reasonably in Shrewsbury	60	1,00	6,00	2,9000	,89632
Public transport is easily accessible from my home	60	2,00	5,00	4,2667	,57833
There are sufficient out of town parking facilities (park & ride)	60	2,00	6,00	3,2667	1,00620
I feel encouraged to walk or cycle because of health benefits	60	2,00	5,00	4,2667	,68561
There are sufficient places in the town centre to store a bicycle	60	1,00	6,00	3,1167	1,89640
Do you use any bicycle parking facilities';	60	1,00	2,00	1,9500	,21978
I prefer to use a car because of...	60	1,00	6,00	3,4500	1,43119
Age	60	16,00	79,00	40,6833	18,76301
Gender	60	1,00	2,00	1,4833	,50394

With whom do you usually use the town centre with?	60	1,00	9,00	3,3500	1,76429
Valid N (listwise)	60				