# Stakeholder values of car parking

# STAKEHOLDER VALUES OF CAR PARKING

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## Abstract

Widespread car usage of around 800 million of cars travelling 30 billion of kilometres on a daily basis has led to many benefits but also to significant environmental and societal impacts such as congestion, air and noise pollution and urban sprawl. This thesis aims to investigate the stakeholder values of car parking in order to support and inform the decision makers who are tasked with how best to resolve challenging car parking dilemmas. A two phase progressive methodology is involved.

Phase one begins with conducting a series of in-depth semi-structured interviews with eight academics to identify whom the stakeholders are that are affected by car parking. Then a second series of 20 interviews are conducted with sector leaders of stakeholder groups to establish how the stakeholders are affected by car parking and importantly, how they value car parking. Finally a third series of nine interviews are conducted with nine different experts to help to bridge the gap between phase one and phase two. Phase one found that a broader reach of stakeholders (classified into four different groups) are affected by car parking than the literature might imply, and that they value car parking in eight different key ways. It also found that the values emerged from a context of governmental, social and consumer concerns.

Phase two of the methodology was quantitative and used the findings from phase one to develop four additional attributes considered meaningful across all four stakeholder groups, namely: safety, politics, public spaces and weekly household council tax. Choice based conjoint analysis was used to incorporate the attributes into three hypothetical scenarios namely; driver, strategy and social, as these were considered to be reflective of the value context unearthed previously in phase one. The scenarios were disseminated across England as part of a wider survey and achieved a sample size of 1107 responses. The results of which were then interpreted through willingness to pay (WTP) values.

Key findings included: how a persistent political undertone can impact on car parking policy setting; that the car parking industry is under pressure to provide a service chiefly motivated by a perceived consumer intolerance of market prices; and that stakeholders can not only appreciate but also experience the impact of car parking choices on other stakeholder groups.

Conclusions drawn included that the different stakeholder groups took issue with national government leadership believing it to currently be deficient in setting the standards for British car parking. Moreover, decision makers wrongly perceive that consumers of car parking do not

pass between the groups and are therefore hostile to policies which do not directly benefit them. The key implication being that decision makers are cautious to implement policies which are not necessarily advantageous to consumers but which may lead to gains for the remaining stakeholder groups.

In short, this thesis recommends amongst others that the governmental stakeholder group should seek to provide direction and guidelines for tariff setting which is reflective of the provision of a service that is conscious of the range of parking industry stakeholder values. Furthermore, as safety is an industry held value, practitioners should seek to better understand how it impacts their market. They should explore the relevance of schemes such as Park Mark to operators and their customers, by fundamentally investigating to what extent safety exists as a valid concern inside car parks and how it applies to personal safety, vehicle safety or general perceptions of safety. In addition, where the governmental stakeholder group remain mindful of the significance of securing political backing, the car parking industry would benefit from appreciating the sensitivities of political challenges faced by the governmental group when lobbying for any changes in parking policy programmes. Indeed, the parking industry should collaborate between the two parties and seek to unite in finding agreeable solutions which benefit constituents either directly or indirectly.

As car parking values might differ according to their geopolitical context and lead to the extraction of a different set of attributes, further work would include looking beyond England to first the UK and then to abroad to explore the effects of potential cultural differences and learn the relevant lessons.

KEY WORDS: car parking, stakeholders, value, choice based conjoint analysis, mixed logit

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# Glossary

| | |
|---|---|
| **ATCM** | Association of Town and City Management |
| **BOS** | Bristol Online Survey |
| **BPA** | British Parking Association |
| **CA** | Conjoint Analysis |
| **CAQDA** | Computer Aided Qualitative Data Analysis |
| **CBC** | Choice Based Conjoint Analysis |
| **CBD** | Central Business District |
| **CM** | Conjoint Measure |
| **CPE** | Civil Parking Enforcement |
| **CPZ** | Controlled Parking Zone |
| **CVM** | Contingent Valuation Method |
| **DCE** | Discrete Choice Experimentation |
| **DMUK** | Disabled Motoring UK |
| **GDP** | Gross Domestic Product |
| **IIA** | Independent of Irrelevant Alternatives |
| **IID** | Independently and Identically Distributed |
| **LS** | Living Streets |
| **MADE** | Multi Attribute Decision-making Environment |
| **MLE** | Maximum Likelihood Estimation |
| **MNL** | Multinomial Logit |
| **MMNL** | Mixed Logit |
| **P&R** | Park and Ride |
| **PARC** | Parking Access and Revenue Control |
| **PGI** | Parking Guidance Information |
| **PNR** | Private Non Residential parking |
| **RP** | Revealed Preference |
| **RUC** | Road User Charge |
| **SOV** | Single Occupancy Vehicle |
| **SP** | Stated Preference |
| **SVA** | Stakeholder Value Analysis |
| **TDM** | Transport Demand Management |
| **VKT** | Vehicle Kilometres of Travel |
| **VMT** | Vehicle Miles Travelled |
| **WPL** | Workplace Parking Levy |
| **WTP** | Willingness To Pay |

# Chapter 1 Introduction

## 1.1 Research problem

The overarching aim of this research is to develop a new way of considering local car parking policy by including a wider range of stakeholder perspectives. It is primarily intended to apply to the UK and more specifically to England due to marginal differences in car parking legislation that can apply in other areas within the British Isles, such as Scotland and Northern Ireland. Variation subtleties aside, car parking *problems* are largely common as they typically cross the geographical boarders by occurring in urban areas where competition for different uses of space is intense. Moreover, those affected by car parking, the *stakeholders*, are often familiar figures in general terms, regardless of their geographic boundaries.

This chapter starts by exploring the impacts of a growing demand for the private car and the role of car parking within the transport system. It then moves on to consider some of the important challenges caused by car parking, such as substantial land take and resulting urban sprawl. The chapter then introduces the idea that car parking can impact on various stakeholders. It goes on to state that the literature identifies that it is the behaviour of a single stakeholder group who is mostly responsible for many of the challenges previously mentioned and that their behaviour can be best manipulated through economic controls. Finally, this chapter concludes that economics may only explain part of how stakeholders value car parking and that it might be advantageous to unearth more about their values in order to give relevance to a wider range of different stakeholders and contribute more to finding better solutions.

Globally, around 737 million personal motor vehicles travel 30 billion kilometres every day, or roughly 10 trillion kilometres every day (Schiller et al, 2010). Furthermore, these figures are set to grow significantly over the next decades. Thus Chanon et al (2008) predict that car ownership will double between 2010 and 2030 to 1.47 billion, and double again between 2030 and 2050 to 2.9 billion, if current trends continue.

Such rapid growth will inevitably have major implications not only for how people travel, but how they live their lives. So, for some people in some locations life will improve thanks to more opportunities such as improved mobility and accessibility thus reducing overcrowding and improving employment prospects (Schiller et al, 2010). On the other hand though, for others things will deteriorate. In particular, one might expect congestion to worsen in many places (already estimated to cost between €63 billion and €753 billion or 0.5 – 8.5 percent of GDP

across 17 European Union States). Similarly other externalities (air quality, road accidents and noise) were estimated to cost a further €650 billion (7% of GDP) (Schreyer et al, 2004).

In mitigating the effects of such rapid growth on the performance of the transport system, managing car parking is often cited as being of key importance (Ison and Mulley, 2014). This makes sense when one recalls that cars are only moving three – four per cent of the time on average (Bates and Leibling, 2012), and that they are actually parked for 95% of the time (Valleley et al, 1997). The benefits of managing car parking to achieve urban objectives have been recognised as promising (Mcshane and Meyer, 1982). Part of the reluctance, it seems, stems from an enduring and, to some extent, a deep-seated belief that any reduction in supply might impact negatively on the retail and or commercial appeal of a city centre (Skegelhorst, 1971) and (Marsden, 2006), which could potentially cloud the acceptability of dilemma solutions. That is, car parking seems to have become an integral part of many people's lives and so the impacts and consequences of disrupting or interfering with the status quo can seem challenging even to contemplate.

From this, car parking is clearly a major component of the transport system, being part of everyday life since the invention of cars, likewise for the car parks built to accommodate them. For instance, destination decisions can be based around car parks, driver behaviour can be influenced by searching for a space to park in, plus they can induce a sense of danger as well as familiarity as they play a key part in both cultural and social life (Ben-Joseph, 2012). For transport planners car parking is a particularly frustrating issue given that the usefulness of a car is significantly reduced once it is parked, whilst an empty car parking space is ostensibly of even less utility. Indeed, Enoch (2014) went so far as to propose that the greater the proportion of unused car parking spaces per number of vehicles, the less efficient / effective the transport system. Also of concern in addition to the number of car parking spaces, is their size.

Specifically, cars increase a driver's mass by at least thirty times (Baker and Funaro, 1958) and although most cars can be parked in a space sixteen feet six inches long, by eight feet wide (Rowbotham, 1976), those parked in a car park require an area of approximately 150 square feet, excluding manoeuvring space (Baker and Funaro, 1958). Indeed, roughly 2,000 feet of kerbside parking will only accommodate a string of 100 cars (Bobrowski, 1969). In the United states it is estimated that there are 500 million surface parking spaces with car parks covering more than a third of land, in some cities (Ben-Joseph, 2012). Consequently, accommodating

parking either on or off-street in urban places, is considered to be a significant problem (Bloom, 1969).

Yet, space is both limited and costly in urban areas (Gongjun Yan et al., 2011) particularly when cars typically require more than one parking space, one residential plus another at the destination (Maddison et al. 1996). Hence, parking facilities themselves can be a major cost to society (Litman, 2011). Furthermore car parking structures are typically 200-300 feet by 110-130 feet (to accommodate up to 3,000 spaces) although far larger structures housing up to 12,000 spaces are not uncommon (Chrest, 2001). In point of fact, there are in excess of 6,000 multi-storey car parks in the UK, many dating from the sixties and seventies (Rawlinson, 2007). Hence, it is thought that any future parties interested in this era's urban life could be forgiven for thinking that packing multi-storey car parks with as many vehicles as possible, was the primary objective (Nelson, 2011).

The physical size of parking facilities not only consumes vast quantities of land, covering more surface area of the central business districts (CBD) of US cities than most other land uses (Ligocki and Clemenc, 1984), but they also leave a visual impact on the surroundings (Rowbotham, 1976). Parking facilities exist as surface lots or as structured buildings, located either above or below ground, or as a combination of the two (Rosenthal, 1995). Despite their functional purpose, developers are now aware of their potential impact on the visitor experience and some seek to use them to gain a competitive advantage (Rawlinson, 2007). For instance, a car park can form both the first and last impression that visitors have of an area (Ben-Joseph, 2012). Consequently, the experience received from the car park visitors use can be a major decider of whether or not to make a return visit (Hill, 2005).

Speculating on why car parking problems exist, (Ben-Joseph, 2012) suggests that historically, there were no allocated off-street spaces as cars took over from horses, as roads were constructed for vehicular *movement* (Bobrowski, 1969) while horses were stabled. As a consequence seeking locations for *stationary* storage once a destination has been reached, has become an increasingly common dilemma (Litman, 2011). In fact, it seems that during the summer, the most common activity engaged in by New York residents in their front and rear yards, is a no more impressive event than the parking of their car (Smardon, 1988).

Meanwhile, car parking quandaries have been further intensified because the industry itself appears to be so lucrative. It is thought that the European industry is worth approximately €30 billion and employs over 500,000 people (O'Brein, 2013), with the US commanding a similar

figure in terms of parking revenue (IPI, 2013). In the UK however, the focus is on the income generated from Civil Parking Enforcement (CPE), rather than parking ticket sales. Local authorities are estimated to achieve an annual car parking turnover of £1,500m per year (BPA, 2013) which is despite a recent UK government report describing that losses may also be incurred (Transport Committee, 2013).

Reflecting on these issues, the empirical research of (Shoup, 2005) provides a pivotal point from which parking perceptions are challenged. Amongst his concepts are suggestions that long searches for parking spaces (captured in the phrase, *cruising for parking*), cause drivers to waste excess Vehicle Miles Travelled (VMT) and that planning regulation's insistence for a minimum parking provision has heavily contributed to urban sprawl. Such views have been likened to a paradigm shift (Litman, 2011); (Palmer and Ferris, 2010) and there does indeed seem to be a recent influx of land-use focussed literature linked to parking, from authors such as (Davis et al, 2010); (McPherson, 2001); (Stevens at al., 2010) and (Miralles-Guasch and Domen, 2010).

In addition to the challenges of car parking is the impact that it has on the stakeholders affected by it. If the individual roles of stakeholders are not questioned, then what they value about car parking and the extent of their interest and potential for conflict is left unknown by those in key decision making positions (Cedefop, 2010), which can lead to further tensions and unbalances (van der Sluis, 2014) and leave room for oversight. In car parking the *consumer* group of stakeholders in particular, prevails above the rest and policies are designed primarily to impact on them, with 'good' policies leading to positive secondary effects on sustainable transport (Simićević et al., 2013). Yet despite consensus to influence the dominant group, there are often contradictions regarding the purpose.

On the one hand car parking policies seek to control supply through price, generating income from all manner of locales for suppliers, including airports (Budd et al., 2013). While on the other hand, satisfying consumer demand through the provision of *free* car parking, is a popular policy not only for the user, but also for some supplier groups, such as retailers, who believe that it will attract more customers, thus increasing opportunities for spend (Skegelhorst and Kirkus, 1973; Shoup, 2006). In some cases, employer paid car parking is even considered to be a labour *right* (Costa et al., 2014), which demonstrates the depth of feeling that car parking provision can generate.

Yet conflicting messages sent by policy makers regarding the extremes of *priced* or *free* parking for example, directed towards suppliers, can communicate confusion to individual users as their car parking behaviour is impacted on for opposing reasons, which may interfere with how they value car parking. Indeed, the stakeholder literature recognises that stakeholders are *individuals* rather than abstract beings, with often conflicting, multiple interests themselves and so endeavours should be made to focus more on understanding stakeholder *value* (Wagner Mainardes, et al., 2011). In fact, aligning stakeholder value with objectives can lead to advantages for all involved (Frow and Payne, 2011; Ravald and Grönroos, 1996) but, where contradictions exist, then what is actually valued about car parking by the different stakeholder groups can become fogged, hence the value of car parking is not made explicit in the car parking literature.

The literature speculatively takes the view that policy makers understand that car parking is predominantly valued in terms of *revenue*, either directly or indirectly, by suppliers and through *price* by consumers. Subsequently, the sentiment that car parking is widely valued economically can be felt through authors who are keen to use price to influence consumer behaviour in order to ease some of the afore mentioned car parking challenges. Yet reducing stakeholder value to a single factor, economics, presents a risk as it is likely to explain the propensity of only a small proportion of stakeholders and be of limited relevance to others (Crane and Truebottom, 2012).

For instance, Ottosson et al. (2013) introduce a pricing model whereby a consistent on-street parking occupancy at a desired level is achieved in order to alleviate environmental negativities such as air pollution. Quian and Rajagopal. (2013) show how their optimal pricing model can help to relieve parking congestion by impacting on consumer parking behaviour choices which they feel can be further improved through the use of information provision. Examples such as these suggest that car parking dilemmas are best addressed by impacting at the individual user level through priced parking, which could leave any potential that other stakeholder groups might command to be overlooked.

Moreover, there is an assumption in the literature that the value of car parking is comprised using a limited number of key attributes. For instance, the attribute *price* is included not only in the examples above, but it is also found together with the attributes of *time* and *distance* in the work of authors such as, Bonsall and Palmer (2004); Albert and Mahalel (2006); Kelly and Clinch (2006); and Kobus et al (2013). These papers are comparable as they all apply econometric techniques to explore the influence of these attributes on the car parking behaviour

of individual users. However, using attributes belonging to a stakeholder group's *supposed* value could result in a short coming, particularly if not only the value but the environment from which that value emerges is not predetermined Earl and Clift (1999). In other words, it might be more advantageous to establish different stakeholder value *first* and then isolate the associated attributes *second*.

In summary, car parking abounds with challenges which are generally thought to be predominantly caused by the behaviour of a single group of stakeholders, the *consumers* of car parking. Furthermore, influencing the behaviour of this group in order to address the challenges is mostly done through economically based controls, for instance by incorporating the attribute of 'price' into various car parking strategies. It seems that while the car parking literature has made the assumption that the consumer groups of stakeholders value car parking *economically*, the stakeholder literature finds that economic values can isolate other stakeholders from their contribution to resolving the dilemma due to a lack of relevance. In short, how car parking is really valued across a range of different stakeholders is not known and neither has the link regarding who the stakeholders that are affected by it been essentially explored.

From this study, the following research gap was identified.

## 1.2 Research gap

The research gap can be expressed in four parts:

First, the bulk of car parking literature focuses on looking at how to modify the behaviour of individual users. In doing so, it makes an assumption that car parking problems can only be resolved by them. This may not be the case.

Second, there are questions regarding how the attributes used to represent car parking are derived. This is because they are typically predetermined prior to acquiring knowledge of how the stakeholders value car parking.

Third, the link between stakeholders and how they value car parking is nowhere made explicit in the literature.

Fourth, the literature seems to be most attentive towards individual car parking users to the exclusion of other affected groups.

## 1.3 Aim and Objectives

The above discussion leads to one clear aim which feeds the impetus throughout this study:

**To investigate the stakeholder values of car parking to support and inform decision makers.**

This is supported by the following objectives:

A. To identify the stakeholders that are affected by car parking and to explore how they are affected by it

B. To examine what the different stakeholder groups value relating to car parking

C. To develop a series of additional attributes to better capture stakeholder value of car parking

D. To estimate the value of car parking from a range of different stakeholder perspectives

E. To develop recommendations for practitioners and policy makers to improve the formulation and implementation of car parking policy

## 1.3 Structure of Thesis

**Chapter 2** provides a review of the car parking, value and stakeholder literature and introduces the Stakeholder Value Analysis (SVA) pathway. **Chapter 3** presents the methodology adopted in this thesis and the research design. **Chapter 4** begins phase one of the study which is qualitative and focuses on identifying and exploring car parking stakeholders and their value of car parking. **Chapter 5** presents an analysis of the previous chapters' findings, while drawing out several conclusions, which are used to feed into the next chapter. It concludes phase one of the study **Chapter 6** opens phase two of the study which is quantitative and based on the findings of the previous two chapters which together comprise phase one. It designs a study focused on estimating stakeholder values of car parking, created using attributes obtained from predetermined stakeholder values of car parking established during phase one. **Chapter 7** presents an analysis of the previous chapters' findings, while drawing out several conclusions. It closes phase two of the study. **Chapter 8** concludes this thesis with a list of recommendations made to policy makers and practitioners, acknowledgment of the limitations of the research and direction for further research.

# Chapter 2 Literature Review

## 2.1 Introduction

Car parking as a facility and as an activity dominates everyday life in car-focussed cultures but is criticised for receiving limited attention in the realm of academic literature (Ison and Rye, 2006), especially when compared to, for example, road pricing. In particular, little has been written on the underlying fundamentals of the parking problem – either from a historical perspective, or on a scheme by scheme basis.

Car parking issues are largely treated in the literature from a classical economical perspective in terms of external cost, supplier surplus and, or market failure. For instance, D'Acierno at el (2006) are convinced that the external costs of congestion levels are caused by user preference for the private car. They consider that the cost can be addressed through the introduction of car parking fees in order to gain a more balanced modal split to reduce the levels. Building on the work of Anderson et al. (2006) and Tsamboulas (2001), Kelly and Clinch (2006) also acknowledge the challenge of external costs through their exploration into the impact of *varied* priced car parking aimed at particular market segments. They conclude that varied subset responses are not always noticeable until prices are gradually increased to create more disparate thresholds. Consequently, different types of car parking users display different price sensitivities and so the impact that tariffs have on external costs can vary.

The phenomenon of supplier surplus is widely believed to be exacerbated by planning regulations introduced to create more off-street supply via means of minimum parking regulations (Shoup, 1999). The car parking literature is mindful that the costs of land use to provide an off-street supply are frequently not allocated to the user (Marsden, 2014) moreover, driver incentive to seek alternate modes because of a plentiful supply is also reduced, thus further aggravating external costs (Ison and Wall, 2002). Indeed establishing equilibrium between different supply types (on- and off-street) occupies much of the literature as the market is considered failed where an imbalance is exposed. For instance, Arnott et al (1991) address the challenge where the imbalance is at its most conspicuous that is, during commuter hours, and reject competitive pricing as an ineffective solution, calling for market prices to apply to car parking instead.

The approach taken by the car parking literature in its response to the challenges of the economic aspects of external costs, supplier surplus and or market failure, is evident in its

recognition of a limited number of convenient factors. These include egress time and price, and are commonly accepted as being the route to finding suitable answers (Brooke et al, 2014). Although these attributes can be found in the work of many authors, Bonsall and Palmer (2004), admit that they leave wanting other considerations such as driver expectations, because of them not being readily available to the modeller, despite their significance in contributing to driver car parking behaviour.

With this in mind, this literature review will take a slightly different perspective from the classical economic one. Specifically, following each section a research proposition is concluded and stated in bold to summarise the conclusion drawn. Section 2.2 defines and categorises car parking. Section 2.3 presents a review of car parking issues in terms of under and oversupply and further complications, while section 2.4 investigates the urban goals that car parking can be used to achieve. Section 2.5 explores car parking behaviour in terms of policy and contextual factors and section 2.6 examines some of the attributes present in the car parking literature. Section 2.7 introduces the concept of value where the attributes are thought to exist, section 2.8 explores some of the stakeholders present in the car parking literature, and section 2.9 considers stakeholder value analysis which is identified as an appropriate pathway to follow throughout this study. Section 2.10 sets out the research propositions while finally, section 2.11 presents the research conclusions.

## 2.2 Defining car parking

First, there is the term 'parking' which can be used to describe *two* different factors, (Palmer and Ferris, 2010):

1. The infrastructure provided for the storage of vehicles; and
2. An *activity* forming part of the overall process of car travel

Second, there are car parking spaces and car parks. For the purposes of this study, the above description of car parking will be used according to which of the two contexts are applicable plus the following definitions will also be assumed

- Car parking Space: An area reserved specifically for the purpose of accommodating a single parked car within a defined structure or surface area that is usually subject to a revenue, permit or time restriction policy
- Car Park: A manned or unmanned, defined structure, underground or surface area that comprises spaces specifically reserved for the purpose of parking vehicles in and that is usually subject to a revenue, permit or time restriction policy

*Characteristics and categorising car parking*

Car parking is recognised as being able to *generate* and *attract* demand, (Smith, 2001) and once spaces become available, they can become vulnerable to restrictions imposed through policies designed to cultivate efficiencies within the transport network (Marsden, 2006). Some such instruments used to exert controls over parking spaces which would otherwise attract and generate potentially unlimited demand can involve time or revenue restrictions, including tariffs and permits (Cost, 2006) although, on-street parking may be more difficult to control, due to complexities around traffic management and enforcement.

Categorising car parking occurs in multiple ways. For example, it can be grouped by the parking space's *ownership, position* or by the *type of users* it attracts (Enoch, 2014), such as, 'publicly operated', 'private non-residential,' 'on-/off-street,' or 'commuters.' Equally, car parking can be branded by the user's *origin* or *destination* (Palmer and Ferris, 2010), such as, 'residential', or 'visitor' amongst others. Subject to numerous classification nuances renders parking less than standardised, and thus more arduous than it might appear to casual observers, who may only see a car parked in a space.

**Research proposition 1: There are many 'types' of car parking, it is not a homogenous entity.**

## 2.3 Issues in car parking

Focusing on more direct car parking issues, these stem from a mismatch in supply and demand. Firstly there is an *undersupply* at particular times in particular locations, which means that individual users struggle to find a space to park in, congestion is exacerbated and accessibility to central business districts (CBDs) is negatively impacted on. Secondly, in cases where there is an *oversupply*, there are the issues of land take, contribution to urban sprawl and the provision of free car parking. The next two sections explore the issues of under and oversupply and the third section raises the point that car parking has become a complex issue as a result.

### 2.3.1 Undersupply

This section draws together a collection of literature which has identified a common cause of frustration, particularly among individual users, which is the apparent undersupply of car parking provision. One of the issues that an undersupply can lead to results in users driving about searching for a space to park in, which can be not only frustrating, but time consuming. As car parking forms a crucial part of the transport system (Litman, 2011), the issue of searching for an available car parking space it seems, is not a new one (Gomes, 1986). Yet it remains unresolved (Qian and Rajagop, 2013). Such persistence could infer that the challenge of finding an available space to park in is not a straightforward one to overcome.

One author with an interest in the phenomena of searching for a car parking space is Shoup, D.C., who offers the cause, a solution and the consequences if the solution is ignored;

*"Because the government sets curb parking prices, planners and elected officials strongly influence drivers' decisions to cruise. The failure to charge market rates for curb parking congests traffic, pollutes the air, wastes fuel, and causes accidents. . . Even a small search time per car can create a surprising amount of traffic. . . Because this cruising adds to traffic that is already congested, it makes a bad situation even worse,"* Shoup (2006, pp479-480).

Another particularly determined author, Arnott, R., either alone or accompanied by Rowse, J., or Inci, E., has penned six different papers on the topic, (Arnott and Rowse, 1999); (Arnott, 2006); (Arnott and Inci, 2006); (Arnott and Rowse, 2009); (Arnott and Inci, 2010); (Arnott and Rowse, 2013). In each paper it is not clear who is searching for a parking space, nor in most cases, why, yet all involve economic modelling of sorts, moving from considering on-street car parking in isolation to including both on- and off-street types (Arnott and Inci remain loyal to on-street parking).

As a collective, these papers deliver some important considerations when it comes to understanding more about searching for a car parking space, as well as parking in general. For instance, in Arnott and Inci (2010, p260), they *define* searching for parking as, “Essentially a random access queue that interferes with traffic flow.” Plus, they highlight the numerous complexities that are involved in searching. For instance, the relationship between traffic flow velocity and density which is exacerbated by capacity, in addition to further considerations, such as the *costs* of travelling and the value of *time*.

Furthermore, in Arnott and Rowse (1999), it is explained that car parking is *a derived demand from a trip opportunity* which is usually taken as the individual intends to benefit from it. Moreover, they state that, “Parking may be modelled at varying degrees of sophistication . . . [which leaves it open to *dangers*, where] important insights may be lost,” (p120). In Arnott (2006), he points out that the market power in car parking is held by the off-street operators who are situated in desirable locations and so pushes local authorities to exert some level of control, fiscal or otherwise, in order to simulate competition. In other words, individual users are keen to reduce their walking time to their destination and are willing to pay a premium to do so. They also call for more competent and coherent future policies.

Other authors include (Salomon, 1986); (Thompson and Richardson, 1998); (Berenger Vianna et al, 2004); (Feitelson and Rotem, 2004); (Geng, 2012); (Giuffrea et al, 2012); (Ahmadi Azari et el, 2013), who all consider that correctly priced parking makes for an effective solution to the issue of searching for a car parking space.

As searching for a space contributes to congestion, congestion is an area of particular concern to Zhang et al (2008) and (2011) respectively. They describe the dynamics of ‘bottlenecks’ as where the road capacity is limited and convenes to the point of forming a queue at specific parking locations. An unexpected finding is revealed in that a decrease in supply could prove to be a positive policy as, “Reducing parking spots results in more commuters shifting from auto mode to transit mode, and thus decreases the travel cost of transit, due to the scale economics,” Zhang et al (2011, p1033). Yet, Merriman (1998) finds that increasing car parking supply at some commuter railway stations, lead to an increase in passengers boarding. “These results demonstrate that people are willing to alter their behavior in significant ways in response to changes in parking availability,” Merriman (1998, p581) is the conclusion drawn, from the ‘mode’ sub-group perspective category. Thus it seems that there could be modal change benefits from both reducing and increasing supply but most significantly to commuters.

Central business districts (CBDs) also appear to be a key issue in the car parking literature as they appear to be the location type affected by undersupply. A collection of papers show that the research progresses from the mid-1980s onwards: (Ligocki and Zonn, 1984); (Salomon, 1986); (Merriman, 1998); (Voith, 1998); (Hensher and King, 2001); (McPherson, 2001); (Simićević et al, 2012); (Kobus, 2013). This could suggest that car parking inside a CBD is an issue that has continued to develop. For instance, Ligocki and Zonn (1984, p350), describe the car parking situation in a CBD as, “A problem eventually faced by most participants in central business area activities. . . [moreover, parking] covers more surface area than most other land uses in the central business districts (CBDs) of US cities.” Thus suggesting that the size and scale of the problem is significant.

In their paper they seem frustrated by a lack of understanding by planners of parking dilemmas which, they opine, can lead to the creation of further parking problems. They call for a, “Development of a unit of individuals to delimit and monitor the dynamics of the CBD as they pertain to parking. . . An appreciation of these dynamics can only be obtained through a comprehensive, and continuous, assessment of the character of parking,” Ligocki and Zonn (1984, p355). This need for a better understanding of CBD parking is also recognised by Salomon (1986, p200), who explains that to ‘predict and provide’ is a common mentality, which he finds to be impractical in many cases, as it, “Requires massive capital investments for acquiring land, for construction and, as supply increases, demand increases follow, with the associated congestion, pollution, energy and safety side effects.” He is also sceptical of the solution where activities simply *exile* away from the CBD to the suburbs. He invites solutions where the market is comprehended, segmented accordingly and where the political perspective on policies addresses the social costs of car parking, instead of obliging the traditional consumer pressure for more construction and lower user costs.

Similar judgments regarding increasing parking supply in a CBD are raised by Qian et al (2012), written over ten years later. This time the effects of parking on the morning commute to a CBD was considered, as it was by Arnott et al (1991) some twenty years earlier. Qian et al (2012, p909) conclude that, “For a commuter, parking management offers greater advantage over congestion pricing because it reduces his or her commuting cost.” This is echoed by Ahmadi Azari et al (2013), where the findings are interpreted by means of Willingness To Pay (WTP). They use both stated and revealed preference data to estimate a multinomial logit model which established that the commuters in their CBD had, “A higher willingness to pay parking fees than congestion tolls,” Ahmadi Azari et al (2012, p8). They reflected that this was largely because of

driver anxiety over unfamiliarity with toll charges, rather than parking fees which were generally better understood and therefore better accepted.

Consideration is afforded to congestion tolls, parking fees and vehicle operating costs within a morning rush hour framework inside a Central business District (CBD) by Arnott et al (1991). They also explore the fees that private parking operators set and how congestion impacts on commuter departure time and parking location decisions. The paper concludes that the model they have used is too specific and simplistic to be regarded as entirely realistic. Moreover, reversing the model for the evening commute would prove unfeasible, as the homebound destination would almost always comprise a *free* parking space, such as the commuters own driveway or garage.

Importantly, the paper does draw attention to the reality that different commuters value *walking time* differently. Those on a higher income, such as executives, are more inclined to park closer to the CBD and pay more, than those commuters on a lower income, who prefer to pay less and walk further. Despite their model not being sophisticated enough to accommodate anything other than *linear* commuters, Arnott et al (1991, p328) note the value of the reality of this information, in cases where parking charges are compared with RUC, “This self-selection mechanism tends to make parking fees more progressive than road tolls.” The undersupply of car parking seems to be an issue which particularly affects *individual users* with regards to searching for a car parking space, *commuters* with regards to congestion and *commuters* again with regards to CBD locations. The next section considers the issue of car parking *oversupply*.

### 2.3.2 Oversupply

Whereas the previous section explored some of the key issues raised by an undersupply of car parking, this section considers *oversupply* as a direct car parking issue. Accommodating car parking, either on or off-street in larger towns and cities, has itself developed into a challenging issue (Rowbotham, 1976) as car parking space requires *land*. Plus vehicles require space in order to manoeuvre about in, regardless of their parking space location (Baker and Funaro 1958). As a result, car parking spaces naturally consume substantial amounts of land.

The amount of land that car parking requires, leads to further issues. For instance, car parking can disrupt, fragment and erode the urban landscape. In addition to this, the car parks themselves often look unsightly and rather than enhancing the area around them, car parks can be responsible for degenerating it, causing the area to be a most unappealing place to visit (Forinash et al., 2003). Furthermore, given that private cars account for 17% of total UK $CO^2$

emissions (Palmer and Ferris, 2010), links have been established between car parking, climate change (Kodama and Willson, 1996) and congestion (Glazer and Niskanen, 1992), as with undersupply (see previous section). Given these environmental negativities, it would seem that finding a means of providing car parking that is free from an environmental conscience, could be one of the principal challenges for car parking today.

In examining how such an issue has arisen, one often cited factor is the application of minimum parking standards (land-use measure) and providing *free* parking (pricing measure), which appear to have resulted in leading to an oversupply of car parking, which in some cases is provided for free. Attempting to predict and provide for appropriate levels of parking supply at the planning stage, has the potential to generate an oversupply and stimulate further car usage, thus resulting in the cyclical prospect of increasing demand and consequently provision (Shoup, 1995). However, as Forinash et al. (2003, p2) point out;

*"Requirements are based on maximum demand for parking, when parking is provided at no charge to users, and walking, biking, and transit are not available choices. This formula yields a surplus of parking area that is costly for developers to provide, and it subsidizes personal automobile use and encourages auto use even in areas where convenient transportation choices exist. Because of the way in which they are typically established, parking requirements are remarkably consistent across different cities, despite varying levels of economic vitality, population size, and development density."*

When an abundance of available parking supply is combined with the familiarity of free parking, a widely spread expectation exists which serves to preventing drivers from considering suitable alternatives (Shoup, 1997). The planning instrument of minimum parking standards and the policy instrument which allows for free parking, arguably a *subsidy* instrument, have led to various undesirable impacts.

For instance, minimum parking standards have laid the foundations for the current planning system, (Glaister et al., 1998) and are applied to help prevent on-street parking, considered to interfere with traffic flow (Valleley et al., 1997). Maximum parking standards (which required councils to *limit* the number of parking spaces allowed in new residential developments) have been in operation in the UK. However changes made to Planning Policy Guidance 13 in January 2011 removed both the national maximum planning restrictions put in place in 2001 and the setting of parking charges to encourage the use of alternative modes of transport. This seems unnecessary as it appears there is an *acceptance* of maximum parking standards, where they

are in place and understood and that inward investors are not be deterred from choosing locations by their presence (Finch and Maunsell, 2002).

Moreover, one of the main impacts of removing the cap on car parking provision is *urban sprawl*. Although urban sprawl lacks a single agreed definition, it is accepted that it involves commercially developed land areas, accessible only by private car (Davis et al., 2010), now a characteristic of urban form (Paquet et al., 2010). The increase in provision of parking in central areas not only stimulates car use and diminishes the need for public transport, but is also associated with reduced potential for residential development within the central city (Kenworthy and Laube, 1996). This suggests that increased Central Business District (CBD) car parking tends to work *against* efforts to improve urban sustainability by decreasing urban density and increasing urban sprawl

Organisations contribute to urban sprawl by locating their premises to more rural areas often solely to satisfy planners parking requirements. Parking provision was the main cause for companies in the 1980s, for instance, to locate to more spacious and rural areas (Glaister et al,1998), possibly a prelude to the advent of more recent P&R schemes. The consequences of planning around minimum parking requirements have been reported in connection with free parking, a common practice within the US and beyond (Shoup, 2005).

A study into free parking at the workplace revealed that in 1986, of the 5,060 commuters to downtown Los Angeles surveyed, the average variable cost of driving to work was reduced by 62 per cent for employees who parked at work for free. This may be perceived as a higher subsidy for the employees than if their employers were to pay for their fuel (Shoup, 1995). Such studies seem to suggest that employers seemingly provide little incentive for staff to find alternative modes (Feeney, 1989).

On the other hand, employers could restrict their available parking supply to visitors only. For instance, a study reported that some employers perceive visitor parking as an operational *need*, crucial to the functioning of their business or activity (Valleley et al., 1997). Whereas others are active in emanating pro-car messages through stipulation, such as requiring employees to have a driving licence or access to a car during working hours and equally through the provision of a company car and mileage incentives (Feeney, 1989). Aside from commuters, shoppers also seem responsive to free parking by occupying spaces for longer time periods than they would if they were subject to paid parking, thus lowering turnover rates and not necessarily raising customer spend (COST, 2006).

Car parking to enable accessibility is also thought to impact on the *vitality* of urban areas, in other words, how socially successful an urban space is (Jalaladdini and Oktay, 2010). Urban vitality describes a multitude of street life activities such as the pedestrian flows throughout the day (and night), the use of facilities, attendance at cultural events or other festive occasions, and as such urban vitality is considered to be particularly significant in the encouragement of social interaction and cultural exchange (Montgomery, 1998). Yet, car parking is a critical limitation on the general quality of the environment as it suppresses vitality when demand is increased by urban sprawl which escaltes the need for private car accessibility (Oktay, 2005).

This section has considered some of the key issues that an oversupply in car parking can create. Land use seems to be an unavoidable consequence of car parking provision. Yet this discussion has shown that blanket planning regulations such as minimum parking requirements, often linked to the provision of free car parking, can exacerbate the situation. Thus costs are incurred to the environment, transport system, developers and employers. The *individual users* of car parking themselves, such as *employees* and *visitors*, seem to be the only party to benefit from an oversupply.

**Research proposition 2: Car parking issues typically relate to undersupply and oversupply, achieving balance is challenging.**

### 2.3.3 Inherent complexity

The previous two sections have explored car parking in terms of two conflicting issues, under and oversupply, where achieving a balance between the two seems to be less than straightforward. This section considers some of the intricacies involved in the endeavour for answers where the need for compromise surfaces as the nature of car parking becomes increasingly multifaceted.

To start, car parking appears to attract a diversity of perspectives about what in particular matters in car parking. For instance, the work of Lautso (1981) studies how parking characteristics, such as they describe to be, ‘parking time’ and ‘turnover’, can be used to influence its *reduction*, while Mullan (2003) is concerned about how the *perceptions* of car parking could impact on overall well-being, and then Watters et al (2006) are interested in the *attitudes* of employees towards workplace parking policies. The different nuances that are placed on car parking can further cloud the issues at hand, leaving car parking to appear particularly complicated and in some cases, confusing.

For instance, with car parking experiencing links to external negativities, the policies available to address them, such as its provision, pricing and regulation can be fraught with issue challenges, often concerning boundary effects, user sensitivity to price and the impacts of a policy change on the economic vitality of the area concerned (Mully and Ison, 2012). This implies that whereas initially a policy might appear to provide an effective, solution, once implemented, further issues which sometimes fall beyond the realms of the policy can emerge. The policy itself is left compromised.

In the case of individual users, the frustration of searching for an apparently elusive space to park in, typically perceive that there are not enough spaces available. It is common for individual users to believe that this fundamentally a direct consequence of supply and demand which could be easily resolved by increasing provision (Salomon, 1986). In reality, finding the land and space to accommodate 'enough' car parking seems at times unrealistic, for the reasons discussed in the previous two sections. Nevertheless, an acknowledgement of this conventional view is reflected in Appendix 1. Here, from the 125 papers reviewed, only five were considered to be truly *not* written in a context of supply and demand.

Individuals can also be impacted on by the *absence* of a policy, or a car parking policy that is not clear. A case in point could be the issue of pavement parking (House of Commons Transport Committee, 2013, p8)

*"Outside London only a couple of English local authorities have banned pavement parking through private Acts of Parliament. The powers available to local authorities in Wales are broadly similar to those in England. In Northern Ireland, pavement parking is not permitted on urban clearways and where parking restrictions are marked on the road, these also apply to the pavement. In Scotland driving on pavements or obstructing access to a pavement are both illegal, however, there is a lack of clarity on the legality of pavement parking. . .*

*. . . In areas such as pavement parking, where there is a confusing patchwork approach across the country, local authorities must ensure that they communicate clearly to motorists."*

The citation implies that the issue spans the breadth of the United Kingdom and it is not peculiar to an individual nation, with policies varying accordingly. It is possible that unless the particular policy is clear in the specific area to which it applies, it is open to uncertainty for the potential pavement parker *user* and unnecessary inconvenience to the pedestrian affected.

This section has found that car parking issues can be more intricate and convoluted to resolve than they may appear to the casual observer and that solutions are prone to compromise. Together, this section and the previous two have highlighted some of the key issues that are current in car parking. It would seem that matters arising from either an undersupply or an oversupply of car parking are not easily resolved as the ramifications of both can be extensive. The next section moves forward to explore some of the benefits that car parking can bring in relation to achieving urban goals.

**Research proposition 3: Perception of car parking issues change according to the perspective of the observer.**

## 2.4 Goals of car parking

Arising from the issues given above, the following six goals as defined by McShane and Mayer (1982) have been proposed to help to address them.

The multifaceted nature of parking could be the reason why successful parking policy can help to achieve six desirable urban goals (McShane and Mayer, 1982, p133), which are:

1. Healthy economic climate, and a business community able to support local employment needs
2. Most efficient use of existing transportation, land, and other public resources;
3. Ease of mobility/accessibility
4. Equity of resource distribution and preferential allocation of some resources
5. Environmental goals, especially reduced air pollution and the related goal of minimized energy consumption and
6. Enhanced amenity and cultural attractiveness; preservation of a city's unique character

Parking can contribute to the first of these as it can raise significant revenue for a town as well as contributing to a town centre's appearance (Banister, 2005). Parking availability is also a major contributor to business accessibility (McShane and Meyer, 1982) and the revenue raised from workplace parking charges can be reinvested to benefit businesses.

For instance, ring-fenced income from parking charges can be used for tangible improvements such as upgrading or enhancing the workplace environment (Rye and Ison, 2005). In addition, earmarking revenue to be spent for a particular purpose provides a visible benefit for those who contributed (King et al, 2007) It would appear that it is important for those who contribute directly to parking revenue to receive more than just the space they park in but that they have a perceptible insight into how their contribution is spent.

Parking can contribute to the second of these urban objectives by striking a balance between parking's effect on the value of land and the value parking can add back to the land's use, perhaps through a shared parking policy for instance (McShane and Meyer, 1982). The practice of setting parking requirements based solely on land use and floor area size may not be the most suitable approach as the land devoted to parking often serves no other purpose and can stand empty during times when parking is not required (Shoup, 1995). Parking standards can also provide a consistency across towns and cities that are, inevitably, not always consistent entities, leading to an inefficient use of land for some, plus they fail to account for alternatives such as public transport provision (Fourinash et al., 2003).

The objective of the third urban goal of *ease of mobility/accessibility* is similar to land use as it is concerned with convenience, activity densities and walk trip lengths (McShane and Meyer, 1982). For instance, on- and off-street competitive pricing policies can impact on congestion by helping to reduce a drivers search for an available space (Calthrop and Proost, 2006), which can improve traffic flow, without impacting on through drivers (Anderson and de Palma, 2004).

Aside from land use and accessibility, the fourth urban goal's objective, *equity of resource distribution and preferential allocation of some resources*, can be achieved by considering parking stakeholder users. For instance, in areas of demand where the parking supply is deemed lacking, equity must be achieved among users by establishing a *hierarchy* (McShane and Meyer, 1982). Schemes such as residents permits or a Controlled Parking Zone (CPZ) (Rye et al., 2006), help to validate reasons for including or excluding parking stakeholders from a parking policy.

Meanwhile, the fifth urban goal concerns environmental objectives. These can be reached by the act of refraining from doing something in order to achieve a desired outcome (McShane and Meyer, 1982). For instance, *cash out* employer paid parking calls for employers to give their staff the opportunity to accept a cash sum deemed of equal value to that of receiving a parking space, when considered as a subsidy. The Californian policy targets particular employers within areas where the state's clean air standards have not been met (Shoup, 1997).

The UK uses the policy to achieve a range of objectives at an organisational level such as prompting a modal shift, reducing on site traffic, or as a means of addressing insufficient space stock unable to meet demand (Enoch, 2002). Despite these objectives, the environmental association between air quality and parking can be used as the basis for implementing parking charges policy to impact on Single Occupancy Vehicle (SOV) use, by reducing the number of vehicle miles travelled (Kodama and Willson, 1996). In addition, city parking 'freezes' linked to air quality can be employed (Enoch and Ison, 2006) and the environmental objective of preserving historical city centres appears also to benefit from effective parking policy (Bonnel, 1995).

The *enhanced amenity and cultural attractiveness; preservation of a city's unique character* is the sixth urban goal which parking policy can effectively contribute towards. Such policies may involve either diverting traffic away from or providing suitable alternative connecting modes to destinations, restricting of additional and gradual removal of on-street parking supply, and ranking proposal schemes for providing new parking supply (McShane and Meyer, 1982). Park

and Ride (P&R) schemes help to exemplify this as they provide a peripheral source of dedicated parking provision, intended to serve a town or city centre accessed from the car park via bus only (Meek et al., 2011).

These six comprehensive urban goals demonstrate a direct relationship between parking policy and urban objectives, yet also highlight areas of potential conflict. For instance, where available parking can be used to attract more users and nurture city centre development, such policies may conflict with achieving environmental goals, such as improving air quality (McShane and Meyer, 1982).

This section has explored the benefits that car parking can bring in helping to achieve six desirable urban goals. The discussion has shown how urban areas may have more than one goal that they would like to achieve. Depending on how car parking is valued and which goals are desired, will subsequently lead to decisions being made regarding how best to achieve them. The matter of how car parking is valued is key to this study, as being *value focused* helps to clarify first what is desired and second, how it can be obtained (Keeney, 1992) (see section 2.7).

In leading to this there is a collection of academic literature that supports the view that car parking is a direct result of *user* behaviour and so the choices that users make are an indication of how they might value car parking, (Salomon, 1986); (Thompson and Richardson, 1998); (Hensher and King, 2001); (Tsamboulas, 2001); (Barata et al, 2011); (Ma et al, 2013). Such work describes that user choices are based on a trade-off of value that either decreases or increases the value that is brought to the user as a result of making that choice. The next section considers car parking behaviour as a result of *individual user* choice.

**Research proposition 4: Car parking is fundamental in multiple societal goals**

## 2.5 Behaviour in car parking

The previous section considered how car parking can help to achieve six desirable urban goals. It also introduced the notion that decision making is often as a result of an individual's determination of value, in terms of the benefits it can bring them to them. Thus depending on what basis car parking is valued, which is often reflected in user behaviour, will lead to determining how best to use it in order to achieve user goals, or objectives. This section explores a portion of car parking with individual user behaviour as a central theme and leads to another section which explores the attributes that go towards influencing that choice.

There are two types of factors that influence car parking behaviour: those under the control of the policy maker (policy factors) and those which are not (contextual factors). These will now be considered in turn.

### 2.5.1 Policy factors

According to Vendung (1998), policy mechanisms available for influencing behaviour can be carrots (fiscal incentives), sticks (regulations) or sermons (information-based). In addition, it is sensible to acknowledge policy design factors. Dodds (2013) describes each as they apply in practice:

- Economic assets typically refer to cash-based instruments such as incentives, loans, taxes, charges and tariffs but could also include in-kind incentives or vouchers and work through a form of persuasion through economic self-interest.
- Regulatory measures can be absolute, conditional with exemptions, with permissions, or with obligation to notify, and hence include concessions, permits, licences, and authorisations and are 'enforced' through authority being applied on agents who are obligated to obey.
- Information measures can involve a range of media once again to persuade people to 'do the right thing', this time often through social and/or economic levers.

*Economic*

Dirickx and Jennergren (1975). They make reference to *individual users* of car parking and take an economic perspective using modelling to observe their car parking behaviour concerning *time* and *walking* costs, in the context of the supply and demand, for a specific urban location. The authors imply that parking is the 'problem,' and they strive to resolve it, suggesting recommendations to improve the efficiency of the parking system. Potentially, the premise here

is that *individual users are the cause* of the 'problem' and so by *changing* their behavior, the problem can be resolved.

The *pricing* of car parking in order to manipulate individual user car parking behaviour choices seems to emerge through the literature as a key theme. Authors such as Dirickx and Jennergren (1975) and (Florian and Loss, 1980; Wigan and Broughton, 1980; Calthrop et al, 2000; Ison and Wall, 2002; Beunen et al, 2006; Rye et al, 2008; Deka, 2012;Ma et al, 2013; Costa et al, 2014; van Ommeren, et al, 2014), have taken a generic interest in using *pricing* as a major mechanism to help control car parking behaviour.

Hensher and King (2001) apply choice modelling to their case study of the Central Business District (CBD) in Sydney. They were interested in the supply and *price* responsiveness of car parking in the CBD and took a broad approach by presenting the participants of their study with six different wide-ranging stated preference alternatives. These stretched from parking location choices, both in and outside, of the CBD, public transport choices, to choosing to forego the trip altogether. Their case study aimed to reflect the realism of some of the choices provided by Sydney's CBD. In contrast, in Leurent and Boujnak (2012) written over ten years later, the users they are referring to are not defined and neither is the context to any great extent, plus they limit their study to only two choices. They construct a more *abstract* model where the choices are pre-established and the probabilities determined accordingly.

While Hensher and King (2001) are constrained by a *simulation* of key CBD dilemmas, Leurent and Boujnak (2012) define their choices in terms of the model they create. Despite their diverse approaches both papers maintain a common perspective, that car parking behaviour is a matter of 'choice.' They also consider that *time* (in addition to price) plays a key part in user car parking choices and thus, it can be used to help influence individual driver choice.

Others developed their pricing strategies by bringing 'pricing' in line with *market prices* which (Anderson and de Palma, 2004; Arnott, 2006; Calthrop and Proost, 2006; Shoup, 2006; Jansson, 2010; Qian et al, 2011) argue is a more effective approach to controlling parking. While others still, (Arnott et al, 1991; Glazer and Niskanen, 1992; Zhang et al, 2008; Bonsall and Young, 2010; Wang and Sun, 2010) make the link between Road User Charging (RUC) and car parking pricing as two means of influencing user car parking behaviour choices, debating the effectiveness of each approach or of using a combination of the two. Charged parking mostly exists at the end of a trip and is considered by some to be inferior to RUC for this very reason, as the trip has already occurred (Glazer and Niskanen, 1992; Verhoef et al., 1995).

Also, individual business users are less likely to be impacted on by parking charges, than non-business users of car parking because business trips are deemed to be unavoidable or essential (Kelly and Clinch, 2006).

In a paper by Gillen (1977) an economic lens was used where the focus was on determining parking charges in order to influence *modal choice*. The concern raised the debate regarding the effectiveness of car parking vs. road charging levies and the focus of the study was on the impacts of introducing parking charges. It concluded that the impact of parking levies may not be as significant in reducing car usage as might be assumed, and that a redistribution of car parking locations could ensue, if particularly disproportionate charges were to be implemented.

Further to this, Arnott et al (1991, p303) construct a theoretical model that, amongst others, is interested in, "how effective parking fees can be, either as a supplement to or, as a substitute for, road pricing." They arrive at several conclusions including; parking charges can be at least as efficient as a RUC; that parking charges can be easier to implement than a RUC; that politically speaking, parking charges face less opposition than RUCs; and finally, that time-varying RUCs experience more issues regarding inequity than parking charges.

There are similar findings by Wang and Sun (2010), who conclude that it is the *combination* of parking charges and RUC pricing mechanisms that they reflect in their model, which produces the optimal results. Bonsall and Young (2010) support this perspective as they explore the consequences of *both* mechanisms and propose a set of circumstances which aims to produce an *optimal combined result*. However, they remain cautious and warn of potential implications. Bonsall and Young (2010, p332) agree, "A combined scheme would undoubtedly produce winners and losers," implying that equity remains a stubborn dilemma thus continuing the pricing debate.

A benefit of priced parking is that it raises revenue. Therefore, parking charges are capable of bringing considerable benefits to the public sector, more so than penalty charges and allowing for free parking provision (Parking Policy and Enforcement, 2006). Another impact of charging for parking is that it stimulates individual users to increase their car parking turnover. As a benefit, this is debatable. On the one hand, a higher turnover rate induces an increase in revenue raising capability, yet on the other, it potentially encourages more driving activity as the expectation of finding available parking space can decrease the need to seek alternatives.

The most effective pricing strategies should potentially incorporate both on- and off-street parking provision, utilising both time and fiscal regulation to achieve equilibrium, as individual users respond to market pricing (Calthrop and Proost, 2006); (Shoup, 2006). Parking charges may also impact on user behaviour choices as they acquire knowledge relative to the search for an available space (Arnott and Rowse, 1999) which could suggest that charged parking should be both in line with market prices and demand responsive (Shoup, 2005). Despite charged parking having the potential to act as an effective policy instrument by controlling parking close to a destination (Anderson and de Palma, 2004) parking fees are unlikely to ever be popular with many individual users (Bonsall and Young, 2010).

Another pricing control is the Workplace Parking Levy (WPL) which is a charge applicable to certain employers who provide free or relatively cheap parking within the workplace and is intended to change *commuter* user behaviour by impacting on traffic and reducing the negative effects of commuter congestion. A review of the take up of UK WPLs states that only one authority (Nottingham) was committed to implement it, implying the scheme suffered from unpopularity (Enoch and Ison, 2006). Aside from influencing commuter behaviour, another motive for adopting the scheme is as a revenue raiser in order to help fund the city's other congestion reducing projects (Frost and Ison, 2009). A potential concern for a WPL is that if the scheme is successful and does reduce commuter congestion, a negative modal shift from other commuters not in the scheme could occur as a result.

Although WPL is a pricing control on one level, it is also a regulatory factor on another.

*Regulation*

An example of another regulatory control, used to manipulate or restrict individual user behaviour is the implementation of a CPZ. A CPZ is usually an area radiating from a city centre, which is subject to specific parking control measures to relieve specific transport related problems within the zone. Car parking behaviour is thus manipulated as individual users are prompted to re-think their car parking, or indeed their transport options, as fiscal controls, such as car parking permits are sometimes coupled with physical controls such as bollards, are introduced.

A study of the impacts of a potential expansion to a CPZ in place in Edinburgh highlighted that it was initially driven by pressure from *residents* who were competing with *commuters* for on-street parking supply. This conflict between the two different types of individual users resulted in

residents being required to purchase permits for their on-street parking and non-residents parking was controlled through both time-limited and charged on-street parking (Rye et al., 2006). The study also suggested that most commuters without a company-provided parking space would simply change their parking location, with few paying for parking and preferring to change their mode instead, which is in line with similar behaviour findings (Feeney, 1989); (Young et al,1991). Expanding a CPZ, such as in Edinburgh, therefore, could lead to a positive modal split but a caveat of a potential exportation of the parking problem, within an individual user-perceived comfortable walking distance (Rye et al., 2006). In order for schemes such as CPZ to succeed, there needs to be an element of enforcement in place.

The author van der Goot (1982) does make the distinction between the *legality* of the spaces in his study, which would indicate that some car parking behaviour can take place illegally, the consequences of which can be costly. Indeed, this seems to be an important point as parking policy has the potential to be ineffectual without adequate enforcement (Rye, 2010) and basically aims to manage contraventions between the allotted share of road space between parked and moving traffic (Cullinane and Polak, 1992). Inadequate enforcement leads to consequences (Kodama and Wilson, 1996; Aoun et al, 2013; Ma et al, 2013) and illegal parking can cost the city of London £270 million a year (Local Authority Parking Enforcement, 2014).

Despite the consequences, an apathetic attitude to enforcement can exist which can result in policy failure, particularly regarding lost revenue potential (Petiot, 2004). Illegal parking can also result in the following impacts (Cullinance and Polak, 1992, p49)

- Reduced traffic speeds
- Congestion
- Changes in modal choice
- Loss of revenue from valid parking spaces
- A decline in respect for the law and even to accidents

Indifference to parking enforcement and its complex nature can act as barriers to its success (Bonnel, 1995) and the problems can be amplified by some countries lack of capability and overall reluctance (Barter, 2011). In the UK, the Road Traffic Act 1991 decriminalised parking enforcement (Civil Parking Enforcement, CPE) as a mandatory scheme for London boroughs and optional for other local authorities, while contract law prevails in the private operator's

sector enforcement. The scheme is so far successful (Local Authority Parking Enforcement, 2014) which serves to highlight the key role parking enforcement plays in achieving parking policy success.

With these on-street control measures such as CPZ in place, drivers have the choice to park off-street instead, where control measures may or may not always be in place. Authors who have considered off-street car parking where mechanisms are, or have the potential to be, in place include: (Qian and Rajagopala, 2013; Tsamboulas, 2001; Merriman, 1998; Albert and Mahalel, 2006; Aldridge et al, 2006). However, private non-residential (PNR) parking, which can cover between 40% and 80% of all town centre spaces, experiences no direct control (DfT, 2003).

*Information*

The idea of delivering information to users can be done in several ways, including through the means of using *technology*. The author Caicedo, F. seems prominent in this area, presenting three different papers: (Caicedo, 2009; Caicedo, 2010; Caicedo, 2012). In the first, he assesses two different levels of Parking Access and Revenue Control (PARC) systems, level two and level four, used in off-street car parks. The level two system is concerned with zoning and relies on the PARC system to display specific zone's parking space availability information to users, in order to manipulate their parking decisions throughout the zones. The level four system uses PARC to *censor* the information given to users by informing them that there is zero car parking space capacity remaining, when in fact there is up to ten per cent remaining, again to manipulate parking behaviour.

The findings of giving detailed and sometimes false information to users resulted in certain benefits to the user experience, such as the facility for the operator to charge in five minute intervals, instead of by the hour and a just over a sixteen per cent decrease in search time. Reducing search time through the use of technology in off-street car parks was also found to have a beneficial outcome Caicedo (2010). For instance, ten per cent efficiency in search time, again through the use of manipulating the information afforded to users, produced results such as a reduction in emissions and walk times. Underground urban car parks are the setting where technology is used to charge users by the minute Caicedo (2012). Using technology to charge for parking in this way was found to, "Increase the parking garage turnover and reduce the number of cars queuing. . . [and that] the policy of charging by the minute has the potential to improve the performance of local commerce," (Caicedo (2012, p67-8), intelligence that might meet with the approval of the local business sector.

Other authors interested in using technology as a means of delivering information-based mechanisms include: (Arnott and Rowse, 1999; Thompson et al, 2001; Berenger Vianna et al, 2004; Bonsall and Palmer, 2004; Geng and Cassandras, 2012; Giuffrè et al, 2012; Thornton et al, 2014).

*Policy design*

Policy design is the bridge between the theoretical basis of how policy seeks to influence car parking behaviour and the reality of the circumstances in which they are applied.

User behaviour seems to be of interest in relation to both on- and off-street car parking locations. Academic literature from the perspective of car parking behaviour that is true to on-street parking includes (Mullan, 2003; Kelly and Clinch, 2006; Bao et al, 2010). Yet the apparent bulk of car parking literature in this area seems divided in effort to either off-street parking (Thompson et al, 2001; Caicedo, 2009; Weinberger, 2012; Bonsall and Palmer, 2004; Gallo et al, 2011; Qian et al, 2011; Ma et al, 2013; van der Waerdena and Timmermans, 2014), or both on- *and* off-street parking; (Young et al, 1991; Hunt and Teply, 1993; Calthrop et al, 2000; Arnott and Rowse, 2009; Mei et al, 2010; Nurul Habib et al, 2012; Feeney, 1989; Shoup, 1999), possibly resulting from the concept that car parking controls can be used in order to influence traffic restraint,(May, 1986; Verhoef et al, 1995; Arnott and Rowse, 1999; Kelly and Clinch, 2006; Kelly and Clinch 2009; Arnott and Inci, 2006).

Policies such as the implementation of car parking charges which are intended to influence user behaviour need to be implemented effectively. For instance, badly implemented policies can impact badly on the success of the policy, in which case thought should be given to any potential barriers to implementation (Banister, 2005). Despite car parking being entrenched in society (Button, 2006), there appears to be a lack of supporting infrastructure and robust policies in place (Pucher and Lefèvre, 1996), with some policies seemingly altogether inadequate (Banister, 2005). From the commercial perspective, some barriers may stem from *a lack of commitment* from employers, or *a lack of governmental regulatory and fiscal measures* which fail to provide adequate incentive (Enoch and Potter, 2003). In which case, car parking behaviour may not be effectively influenced or changed.

### 2.5.2 Contextual factors

Whereas pricing appears to dominate the control mechanisms available for influencing behaviour, contextual factors seem neglected by comparison.

Urban areas often experience unique *geographical characteristics* which some decision makers may feel exclude their cities from implementing policies or strategies to change individual user behaviour, despite experiencing success elsewhere (Attard and Enoch, 2003). A city's previous political environment may impact on parking policy implementation (Bonsall and Young, 2010) which may not always fit within the current administration's structure (Glaister et al, 1998). There are also institutional barriers to policy implementation (Button, 2006); (Banister, 2005); (McShane and Meyer, 1982); (Litman, 2011), which can include institutional change, as well as being subject to complexities and potentially ineffectual approach. For instance, there is the employer cash-out scheme, where the Californian motivation to implement the scheme was to improve air quality by changing individual user *commuter* behaviour. This can impact on and bring benefit at the organisational level also (Enoch, 2002), and bring some equity to the employees of organisations (Shoup, 1997). Yet certain tax allowances offered to Californian participants are not extended to those in the UK. Furthermore, the UK experience suffers from complexities around implementation (Enoch, 2002), resulting in a limited take up to the scheme.

Psychological factors can present themselves in a cultural context. In the case of Czech citizens, for instance, their preference to not use parking garages has resulted in creating an imbalance between the on- and off-street parking supply (COST, 2006). Likewise, the *unpopularity* of a policy can also act as a barrier to its successful implementation due to matters of *acceptance* (King et al., 2007). Indeed Simićević et al (2013) consider the impacts of *changing* parking policies, plus there can be the added complication of inconsistent responsibility for on- and off-street supply to contend with (Young and Currie, 2006). Nevertheless, some parking policies can present the opportunity to develop and incorporate cost effective strategies that can eventually bring social and economic benefits (Litman, 2011).

In summary, contextual factors seem to be multiple and play a significant role in the success of policy implementation as they are representative of the reality of the situation at hand.

In summary, car parking behaviour seems of interest to several authors and appears to attract a diverse range of views. In the work of van der Waerdena and Timmermans (2014) the issue of driver *familiarity* with parking facilities is introduced, whereas other authors find that challenging car parking behaviour through the planning of, or the pricing of it, is the most effective way to stimulate a change in car parking behaviour, which can result in leading to a direct impact on mode choice, (Feeny, 1989; Willson, 1992; Shoup, 1999).

The work of Young et al. (1991) takes stock of car parking behaviour via an overview of policy models, while Hunt and Teply (1993) considers the car parking behaviour of commuters within a parking system and Calthrop et al. (2000) uses a simulation model to assess the efficiency gains of an urban transport market, of which parking behaviour and subsequent choices is an element. Similar to this, Arnott and Rowse (2009) explore the effect of pricing and its impact on parking behaviour choices in a downtown environment where congestion is considered to be problematic. Likewise Thompson et al. (2001) create a detailed model of car parking behavior which describes the impact on queue lengths and Vehicle Kilometers Of Travel (VKT), by using technology to provide consumers with Parking Guidance And Information (PGI) in relation to off-street car parking.

With all of the above in mind, it seems that much of the academic car parking literature is interested in finding ways to influence behaviour by manipulating the choices that users make. However, according to Louviere et al (2000, p1):

*"Individual's choices are influenced by habit, inertia, experience, advertising, peer pressure, environmental constraints, accumulated opinion, household and family constraints, etc. This set of influences reflects the temporal nature of choice outcomes and segments within the constraint set (e.g., income classes of households)."*

This citation suggests that the decisions made by individuals might extend beyond some of car parking controls as discussed above. For instance, some individual users of car parking might feel that they have no choice except to park their car illegally, given the particular circumstances that they might find themselves in at that particular time, on that particular day, Moreover, commuters may find that they have no choice except to park at or close to work, as they live beyond the reach of alternate modes.

As such, the next section will explore in more depth the attributes (sometimes known as *variables*) used in car parking that comprise choices such as the above, which result in determining how something, and in this case, car parking is ultimately valued, (Hair et al, 2010).

**Research proposition 5: Research often assumes that modifying the behaviour of individual users will resolve car parking issues.**

**Research proposition 6: Research relating to changing car parking behaviour predominantly focuses on the price mechanism.**

## 2.6 Attributes of car parking

According to the online Oxford Dictionaries (2014), the noun 'attribute' is:

*A quality or feature regarded as a characteristic or inherent part of someone or something.*

The section immediately before this raised the concept that car parking behaviour can be influenced or manipulated in multiple ways often through the use of certain controls, such as economics and regulation. These controls were found to seek to impact mostly on the choices available to individual users. This section categorises the attributes into five groups, namely: *economic*, *environmental*, *policy*, *user* and *vehicle*. These appear to be used as the basis for decision making as they comprise the 'choices' available in car parking and help to define how car parking is valued by those affected by it. See Appendix 1 for further information.

- **Economic**: *costs (opportunity, land values etc), benefits, free parking, revenue, fiscal controls*
- **Environmental**: *in a broad sense,* as *pertaining to the environment of the car parking space; location, availability, capacity, turnover, trip type, car parking type surface, multi-storey or underground*
- **Policy***: provides context*
- **User**: *safety, socio-demographic information, walking time / distance*
- **Vehicle**: *emissions, fuel, mode, mode alternatives, modal choice, number of vehicles, speed*

Each of these groups contains a number of different attributes deemed relevant in the car parking literature.

*Economic*

This group presents attributes that have an economic take on car parking, such as pricing or revenue raising, and can be found in the work of (Zhang et al, 2008); (Anott and Rowse, 2009); (Kelly and Clinch, 2009). If quantifiable attributes are a priority in car parking modelling literature then attributes such as *costs, price* and *revenue* seem both obvious and reasonable choices to include. Pricing as an attribute to influence individual user behaviour is used by Kelly and Clinch (2006) as they seek to explore Transport Demand Management (TDM) pricing measures by focusing on the influence of parking pricing on different trip types. They use a methodology involving choice modelling of various hypothetical pricing scenarios, incorporating specific parking charges prices, such as: IR£2 per hour, IR£4 per hour and IR£7 per hour, in order to

influence individual user choices. Whereas Wang and Sun (2010), use the pricing perspective to *compare* priced parking with *RUC.*

*Environmental*

This group accommodates attributes such as; *capacity, distance, frequency, occupancy, time* and *turnover*, and possibly as these are readily quantifiable, like the economic attributes above, and so the two groups often seem to go hand in hand. For instance, price sensitivity is tested by Kelly and Clinch (2006) against various 'environment' attributes such as *destination*, *frequency* and *occupancy* and concludes that potentially, it is not until certain thresholds are met that the impacts of some pricing increases become noticeable. These and other similar environmental attributes can be found extensively throughout the car parking literature, including in the work of (Tsai and Chu, 2006; Watters et al, 2006; Batabyal and Nijkamp, 2008; Caicedo, 2009; Bonsall and Young, 2010).

*Policy*

This harder to quantify attribute helps to provide the context in which the research in anchored. For instance, Ligocki and Zonn (1984), who explore *CBD* policy, use it to provide the framework for their work. While Shoup (1995), adopts a descriptive review methodology of various economic policies as the main focus of the paper. Others, such as Willson (1992) spotlight the policy of employer paid parking to study its impact on mode choice and parking demand, and Florian and Loss (1980) and Clayton et al (2014) respectively, investigate the policy of *park and ride*. Policy as an attribute tends to take a more descriptive position as it is not readily quantifiable.

*User*

This group houses any attributes which are linked to the individual users of car parking, *walk* in terms of walking time and walking distance, possibly because this is an attribute that is readily quantifiable. Second to, *walk* is the attribute *safety*, as referred to by Hunt and Teply (1993) and Watters et al (2006). Hunt and Teply (1993) incorporate *safety of driver* into their choice (nested) model with regards to accessibility (p. 259), whereas Watters et al (2006) collated stated preference information from respondents regarding *personal safety* and found that in their study, it came second to *vehicle safety*.

Incorporating elements of socio demographic information are also attributes which would reside in the user group. Such information is considered by Salomon (1986) and in Simićević et al (2013) the authors collect data on *age* and *gender* information in order to explore the effect of parking charges and time limit on car parking behaviour.

*Vehicle*

This attribute considers aspects concerning vehicles such as modes and their choice of or alternatives available. Shi and Luo (2009) use both attributes/aspects to consider a model where parking charges can impact on user travel behavior. Likewise Yang et al (2013), yet their interest in car parking considers congestion and how it is impacted on by commuters who either have, or do not have, a reserved car parking space. On the one hand, Shi and Luo (2009) use the attributes to conclude that a rise in parking charges can stimulate a shift towards users finding alternative modes and therefore result in a positive impact on congestion.

While on the other hand, Yang et al (2013) use the attributes to find that the management of car parking capacity can also achieve a positive result, "because competition for parking spots will force the *u*-commuters to leave home earlier and thus relieve peak-hour traffic congestion at the bottleneck and reduce the total social cost" (p115).

In summary, this family of five key categories of car parking attributes potentially show that typically car parking can be limited to within these parameters. Indeed, Kelly and Clinch advise *increasing the future suite of attributes* to facilitate more comprehensive policy studies (2006, p494), implying that some models or studies may fall short of achieving their potential. What is more, is that the two of the five appear to dominate the rest, economic and environmental.

Conversely, there appear to be fewer references to safety compared with the economic or environmental categories, which could imply that as an attribute, it is troublesome to reckon with as it is not easily quantifiable. The UK parking industry states that 4700 car parks have recently joined the Park Mark Safer Parking Scheme created to reduce crime in car parks (ParkMark®, 2014), in which case *safety* is a valid attribute to be taken into account, despite its non-numerical qualities.

As some of the car parking literature is based on modelling studies, it could be that authors seek out attributes which are readily quantifiable, so those housed by the 'economic' category such as; *costs, price* and *revenue* are both obvious and reasonable ones to include. The same could also be said of the 'environment' category, which accommodates attributes such as; *capacity,*

*distance, frequency, occupancy, time* and *turnover*. Indeed, attributes from the 'economic' and 'environment' categories are present in every modelling paper present in Appendix 1.

Likewise, the *walk* attribute in the 'user' category is an equally measurable type of attribute and as such it is not uncommon in car parking modelling work. However, the citation by Louviere et al (2000), in the previous section would suggest that decisions are influenced beyond more than the measurable, or quantifiable. With this in mind, the next section explores the concept of value in order to gain a deeper insight into the relevance of value to the preferences for in this case, attributes, that comprise decisions.

**Research proposition 7: The restricted attributes previously incorporated into car parking studies could limit potential policy effectiveness.**

**Research proposition 8: Attributes considered to be difficult to quantify are often overlooked in the car parking literature.**

## 2.7 Value

The previous section explored some of the key attributes found in the car parking literature that are used to influence user choices regarding the car parking decisions that they make. It found that five key categories of attributes are used but only two dominate, *economic* and *environmental*, potentially due to their quantifiable nature. When it comes to attributes regarding the *users* of car parking, *walk* is the focus of interest, yet there is evidence in the literature to suggest that decision making is often complex Louviere et al (2000). This section looks beyond this to consider the concept of value and what it means in terms of decision making. It takes a broader perspective and begins by understanding more about thinking in a value focused way.

Keeney (1992) finds that decisions begin with thinking about value and it is the decision maker's values that guide the effort towards forming the decision:

*"Values are principles used for evaluation. We use them to evaluate the actual or potential consequences of action and inaction, or proposed alternatives, and of decisions. They range from ethical principles that must be upheld to guidelines for preferences among choices. Value judgements specify what is important in the decision problem."* Keeney (1992, pp.6-7)

Some examples of what can be construed as reflective of values are given below: (Keeney, 1992)

- Ethics
- Traits
- Characteristics
- Guidelines
- Priorities
- Value trade-offs
- Attitude towards risk

Such examples as given above are considered to be reflective of people's values as they produce consequences that matter to individuals.

Thus, like parking, value appears to be multifaceted in character. As a result, it is important to reflect further on what value means and how it is relevant to an everyday context, as value seems central to decision making and subsequently key to influencing car parking behavioural choices as previously discussed (see section 2.5). For instance, value can be present in the words that people choose to use, often in a deliberate sense, to provoke judgements (value-

laden words), such as ‘murder.’ Or not, such as in more neutral words (non-value laden), like, ‘abortion,’ depending on the underlying motivation (Mueller and Mueller, 1967). Also subtle, are the ways in which problems are both expressed to, and then interpreted by the decision maker, known as *framing* effects, which can offer a range of different perspectives and subsequently influence the individual’s underlying value intentions (Kahneman and Tversky, 2000).

In a similar way, choices may be *unconsciously* motivated by value without the individual possessing full knowledge of a specific value definition (Macklem, 2001). Furthermore, it is thought that an increase in choices may contribute to gaining greater freedom, yet it does not necessarily result in achieving better value, despite individuals assigning value to having greater freedom of choice. Indeed, it is unlikely that most individuals delight in deliberating over their decisions. So the value of enjoying *more choices* may be most apparent in the outcome of revealed preferences, perhaps most useful when analysing customer focussed markets (Dowding, 1992).

Possibly more recognisable, value is linked with money, in the way that antiques are said to hold their value and how other alienable items can be traded for a price. Yet interestingly, value and indeed *values* can be used to describe the opposite, as in *un*alienable things such as family or religion, where monetary worth is not applied (Miller, 2006). Therefore, *value* can suggest both a quality and a monetary figure and *values* can both motivate a decision, such as an ethical perspective, which results in a particular behaviour, *and* be something which can be shared, such as a political view point (Thomson et al, 2003).

A key element of value which influences day-to-day decisions is known as *perceived value*. Most commonly applied within the retail sector, it is useful in understanding the comparison that customers make between price and quality which form the basis of their purchasing decisions (Oh and Jeong, 2004); (Dodds et al, 1991). Perceived value is relative to an individual’s psychological dimension (such as ego, feelings, emotions or mood) (Groth, 1994) and is often linked to their willingness to pay (Netemeyer et al, 2004).

Yet this contributes to deepening complexities as individuals express their meaning of value differently (Zeithaml, 1988) and so perceived value almost exists as an abstract entity amongst its dependents, *perceived price* and *perceived quality*. There is consensus that it is only the consumers themselves who can determine what value truly is (Timo et al, 2007). Perceived value is important in everyday life as it contributes the overall assessment of something’s worth

(Lai and Chen, 2011). Arguably then, the notion of perceived value can be applied in many different situations and to fields other than consumerism.

Typically, evaluating value is usually about choices made from dimensions of either *economics* or *psychology*. Economically, value is often reflected in Contingent Valuation Method (CVM) where individuals state their Willingness To Pay (WTP) for something. Whereas in psychology, value becomes apparent in either *behaviour*, *attitudes*, or in the extent to which objects are reacted to *emotionally*, known as affective valuation (Kahneman et al, 1999). Beneath these perspectives lie the different philosophies which make assumptions about the values being elicited. These fall into three implicit paradigms; *articulated values*, which are a clearly defined response to a specific, unequivocal question; *basic values*, in the sense that the response may be distorted by a deeply held opinion; and *partial perspectives*, where responses are evoked predominantly from one particular perspective, thereby diminishing the opportunity for deliberation across a range of perspectives (Fischhoff, 2000).

In summary, this section has considered the concept of value and the role it can play in motivating people's objectives. It has found that value can: *frame* dilemmas in order to influence other people's decisions; *unconsciously* influence decisions; lead to the availability of *too many choices*; prompt *economically, ethically* or *psychologically* motivated decisions; be *perceived*; and it can be reflected in people's *behaviour*, *attitudes* and *emotion*.

All of these facets suggest that the issue of value can be particularly personal to the *individual* at hand. In returning to the literature regarding car parking behaviour (see section 2.4), there was the implication that individual user choices were being influenced in an attempt to change it to help achieve certain objectives, such as the implementation of a policy. The dilemma it seems, is that choices are made in the context of a value motivation according to the *individual*, yet car parking controls are implemented to manipulate numerous individual users who may experience a diversity of value motivations.

Moreover, the urban goals (see section 2.3) that car parking seeks to achieve, through the various controls it can impose, can impact on stakeholders that reach *beyond* the individual user. In which case, decision making related to car parking issues should not be confined to affecting individuals only as it could benefit other groups of stakeholders too. Indeed, according to Keeney (1992), "Many decisions involve multiple stakeholders who must interact to produce decisions. Value-focused thinking can contribute to the productivity of such interactions," (p.25). With this in mind, the next section aims to explore some of the different stakeholder groups

visible in the car parking literature to help draw out some of the key players relevant to this study.

**Research proposition 9: Decisions are made according to values that vary hugely amongst individuals, yet this diversity is not usually reflected in previous car parking studies.**

## 2.8 Stakeholders

The previous section considered the concept of value and how it is present in the motivation behind individual decision making. It came to the conclusion that not all individuals are motivated by value in the same way and that besides this, as the ramifications of car parking can extend beyond the individual user's reach, to national, regional and local levels (see section 2.4) it is necessary to consider the presence of any other stakeholders of relevance to the literature in order to gain insight into how they might value car parking.

According to Keeney (1992, p226), *"In many decision situations, more than one party is interested in the consequences of a decision. Different stakeholders may have different values, and these may be reflected in differences in their lists of objectives and attributes."*

With this in mind, this section proceeds to unearth some of the different stakeholder types present in the car parking literature, in addition to some of the different types of individual users. It begins by exploring how to best define the term 'stakeholder'.

Conventional definitions of the term *stakeholder* tend to take a strategic, organisational perspective and include this one by Johnson et al. (2002, p.206), "Those individuals or groups that depend on an organisation to fulfil their own goals and on whom, in turn, the organisation depends." This implies that stakeholders are egotistical, yet essential, in ensuring the survival of their group concern. Furthermore, stakeholders can be multiple, consequently their differing perspectives can generate an assortment of engagement methods and produce opportunities for the dynamics involved to be as challenging as they are diverse (Bell et al., 2012).

That said it is understandable that stakeholders may not always be in agreement with each other and, if differences occur, they can engage in jostling for dominant positions for the purpose of satisfying their own aim within a perceived hierarchy, (Johnson et al., 2011). Hence, the relationships stakeholders establish between themselves, including their dependencies, can be significant to understanding more about the levels of power that they are capable of exerting, along with the differing perceptions that they may hold and share (Mitchell et al., 1997).

Stakeholders then, seem to be prone to some sophisticated characteristics. Such intricacies may have a problematic impact on car parking dilemmas as they might blur some of the potential of possible solutions. On top of this, stakeholder identification can be challenging due to the multiple perspectives that exist from which to view and classify them (Mitchell et al., 1997). It seems that the dilemmas stakeholders face, can be complex.

The literature alludes to various stakeholders that are affected by car parking and some of the key ones have been drawn together and organized into Appendix 1. Many of these papers refer to *consumers* of car parking in some way, which is potentially the group of stakeholders which house the different types of individual users.

For instance, *residents* are discussed by (Bao et al, 2010); (van der Waerdena and Timmermans, 2014); (van Ommeren et al, 2011) which are referred to as *householders* by Gillen (1977). While Rye et al (2008) consider residents among a range of other different consumer stakeholders, such as commuters and shoppers, they also explore other stakeholder groups too. For instance, they are attentive to the *non-consumers* and *suppliers* of parking, in their paper which studies the role of market research and consultation in developing parking policy. Still with residents, Chu and Tsai (2011) take a pricing perspective to consider their car parking behaviour with respect to the phenomena of chained trips and their impact on the environment.

Van Ommeren at al (2014) also view residents from the pricing perspective but in their paper they are concerned that in the case of shopping districts, “The ubiquitous provision of residential parking permits substantially increases the costs of parking supply. . . [and that] A parking permits policy provides advantages to local residents that are denied to non-residents,” (p 42). Thus suggesting that not all pricing schemes are equitable to the different stakeholders they affect.

Aside from residents there are also *visitors* (van der Goot, 1982); (Anderson and de Palma, 2006), *employees* (Watters et al, 2006); (Barata et al, 2011) and *business travelers* (Bonsall and Palmer, 2004); (Simićević,J. et al, 2012). Furthermore, sub groups of individual users are expressed in a variety of different ways, such as ‘short’, ‘medium’ or ‘long term’ parkers, (Dirickx and Jennergren, 1975) and those individuals who are, ‘with or without a contract with a parking supplier’ (Tsamboulas, 2001). Other authors are less specific.

For instance, the parking behavior of an undefined set of consumers draws the attention of Mei et al. (2010). They employ choice modelling to incorporate a number of time based alternatives (search time, access time etc), as well as pricing alternatives, to further explore a part of the urban car parking system, which they then successfully apply to a case study for validation. It is possible that the consumers concerned are commuters, but it is not clear. Moreover several other authors fail to specify the type of consumer that they are referring to as Appendix 1 reveals.

One sub group of consumers that seems to have attracted the attention of several authors across several decades is *commuters*; (Salomon, 1986); (Willson and Shoup, 1992); (Zhang et al, 2008); (Weinberger, 2012); (Guo, 2013). In the sample of Appendix 1, there are a total of nineteen different papers which refer to commuters, suggesting that these stakeholders of car parking are the cause of particular concern, possibly due to their impact on CBDs as discussed previously. Away from the consumer group of stakeholders, *non-consumers* of car parking are also mentioned, that is, those people who are not using car parking at all. For instance, Mullan (2003) focuses on young people of non-driving age and Parkhurst (1995) considers non-consumers of car parking in a park and ride context.

Another stakeholder group affected by car parking mentioned in the literature is the *suppliers* of car parking. Employers are identified by (Hunt and Teply, 1993); (Aldridge et al, 2006); (Watters et al, 2006); (Ison et al, 2007) and (Zhang et al, 2008), while (Feitelson and Rotem, 2004); (Arnott, 2006) and (Arnott and Rose, 2009) identify *operators*. Some are more specific, for instance, (Merriman, 1997) outlines a *university*, (Merriman,1998), a *train station*, and (Beunen,R. et al, 2006) a *visitor attraction*. It would seem that the supplier group of stakeholders is indeed a key group where the division between public and private suppliers is the key distinction to make.

G*overnmental* stakeholders seem to be another key group as by Wigan and Broughton (1980) considers the group through a pricing perspective in terms of managing capacity. They explain how they see evidence of a gap between the *suppliers* and *governmental* groups:

*"Analyses of parking capacity tend to be drawn from two widely different standpoints: that of localized parking facility operators for revenue maximization and that of urban planners seeking to accommodate or restrain passenger and goods vehicle movements for social objectives, including that of efficient operation of the total transport system for moving people and commodities, using the infrastructure available."* Wigan and Broughton (1980, p171)

An attempt to bridge this gap is given by Berenger Vianna et al (2004) as they view the situation from the perspective of using technology in order to further the integration of policies between parking facilities and the transport system. Despite providing a potential solution in the form of telematics to assist control routines and the effective management of spaces, they still list among the caveats, "The lack of integration between the government authorities responsible for traffic control and the various parking facility operators," (Berenger Vianna et al, 2004, p146). It

seems that whatever void might exist between suppliers and governmental stakeholders affected by car parking is a persistent issue that time has yet to resolve.

In summary, this section has drawn together some of the different stakeholders present in the car parking literature. It finds that *consumers* of car parking are a dominant group and that several different individual user types are positioned under this umbrella, such as commuters, business travellers, residents and visitors. Further to this is a collection of literature that does not make any distinction at all between the different types of users under observation.

To a lesser extent is the presence of the *suppliers* of car parking, who can be either public or private operators, such as universities, train stations or visitor attractions and from this falls the *governmental* group of stakeholders, such as urban and transport planners. In a minority sense are the *non-consumers* of car parking who tend walk, cycle or use public transport and not drive and therefore park, but are still found to be affected by car parking.

This section also finds evidence that there is a lack of harmony both within and between the different types of stakeholder groups at hand. For instance, there are tensions between resident and non-resident individual users (van Ommeren at al, 2014) and integration is left wanting between private operators and the governmental stakeholder groups (Wigan and Broughton, 1980).

To summarise, car parking literature presents several different stakeholder groups but seems to be particularly preoccupied with those under the consumer category and its associated subgroups. An undercurrent of discord both within and between the groups is also detected, which is perhaps unsurprising given the previous section on value that found that motivations can be uniquely personal and linked to an individual's objectives which are unlikely to be common across all groups.

With this in mind, the next section considers a theory of stakeholder decision making in a value context. As car parking can be controlled by influencing decision making (see section 2.7) the various stakeholders affected will use both *facts* and *value* to form the links between the context and the factors being used to influence that context (Keeney, 1992). Therefore, decision making in a stakeholder value setting is a justified feature of this study.

**Research proposition 10: The car parking literature heavily focuses on the behaviour of individual consumers, sometimes defined and sometimes not, and it only rarely considers other affected stakeholder groups to the same degree.**

## 2.9 Stakeholder value analysis from a decision analysis theory perspective

The previous section explored the different stakeholders present in car parking literature and found that some groups seem to dominate more than others. It also found a connotation of discord in the literature possibly as a result of different stakeholder objectives and value motivations. This study carries this insight forward by introducing Stakeholder Value Analysis (SVA) which maintains that all decisions require subjective judgments which can be estimated.

The objective of this section is to articulate a theory of values as the central issue in stakeholder decision making and to outline a process for eliciting such values. This will provide justification for concentrating on values and will also justify the subsequent methods employed.

First, individuals make their decisions based on a number of attributes, usually assessed either jointly or separately (Hsee, 2000). How important an attribute is to an individual and how easy or hard it is to evaluate also bears impact on an individual's preference choices (González-Vallejo and Moran 2001). In this context attributes can take many forms. For instance, children will use a range of sensory attributes when selecting which chocolate bar to buy, such as melting quality, sweetness of taste or texture. Notably, when compared with the attributes used by chocolate industry experts, while the number of attributes agreed on is the same for both groups, some of the *meanings* behind their descriptions can differ (Sune, et al, 2002). Subsequently, individuals may apply their own meaningful and somewhat sophisticated approach to help them decide something's value.

Second, is the term *utility*, which usually refers to an attribute's weighting and helps to establish how much an attribute is valued. In other words the extent to which an individual prefers an attribute relative to how much they do not prefer another attribute. This can provide useful insights into either *predicting* the choice preferences of individuals or into understanding how individuals ought to make their choices (Fishburn, 1968).

Moreover, decisions can take an economic approach where the utility is the *value* and the decision is the *outcome* with the greatest utility (Bazerman, 1998). Where utility theory is based on the concept that humans display mostly *rational* behavior, psychological approaches may argue that this is unrealistic and that a gap exists in individual behaviour between the normative and descriptive, as reflected in the decisions made (Stanovich and West 2000).

This aside, according to Mendoza and Prabhu (2009), stakeholder values and preferences should be focused on *prior* to using alternatives in order to achieve them. This is because the

values are considered to be more fundamental than the alternatives, so it is *the values of the stakeholders at hand that should determine the set of alternatives to be considered* in any particular study, rather than the other way round. This approach ensures that the values are not framed by a pre-selected set of alternatives which results in the values retaining a more fundamental nature. This is in line with the theory of SVA, as proposed by this section.

Earl and Clift (1999) describe Stakeholder Value Analysis (SVA) as a method that can capture the total stakeholder value from within a particular environment. It aims to elicit stakeholder preferences from various combinations of attributes, presented as alternative sets (usually via discrete choices) by following a particular process whereby the structure is described by figure 1.

The process is adapted (as recommended by earl and Clift, 1999) to suit this study (see figure1) and involves three key parts; 1) SVA inputs, such as stakeholder objectives and values and an understanding of the dilemmas they may face; 2) Multi Attribute Decision Environment (MADE), which outlines the environment from where decision attributes emerge and a decision making, or preference model is constructed, and; 3) SVA outputs, where the analysis is carefully interpreted to feed back to the stakeholders to modify the model, if required. In short, the SVA theory argues that *attributes* are a key means to achieving the fundamental values of stakeholders (Earl and Clift, 1999).

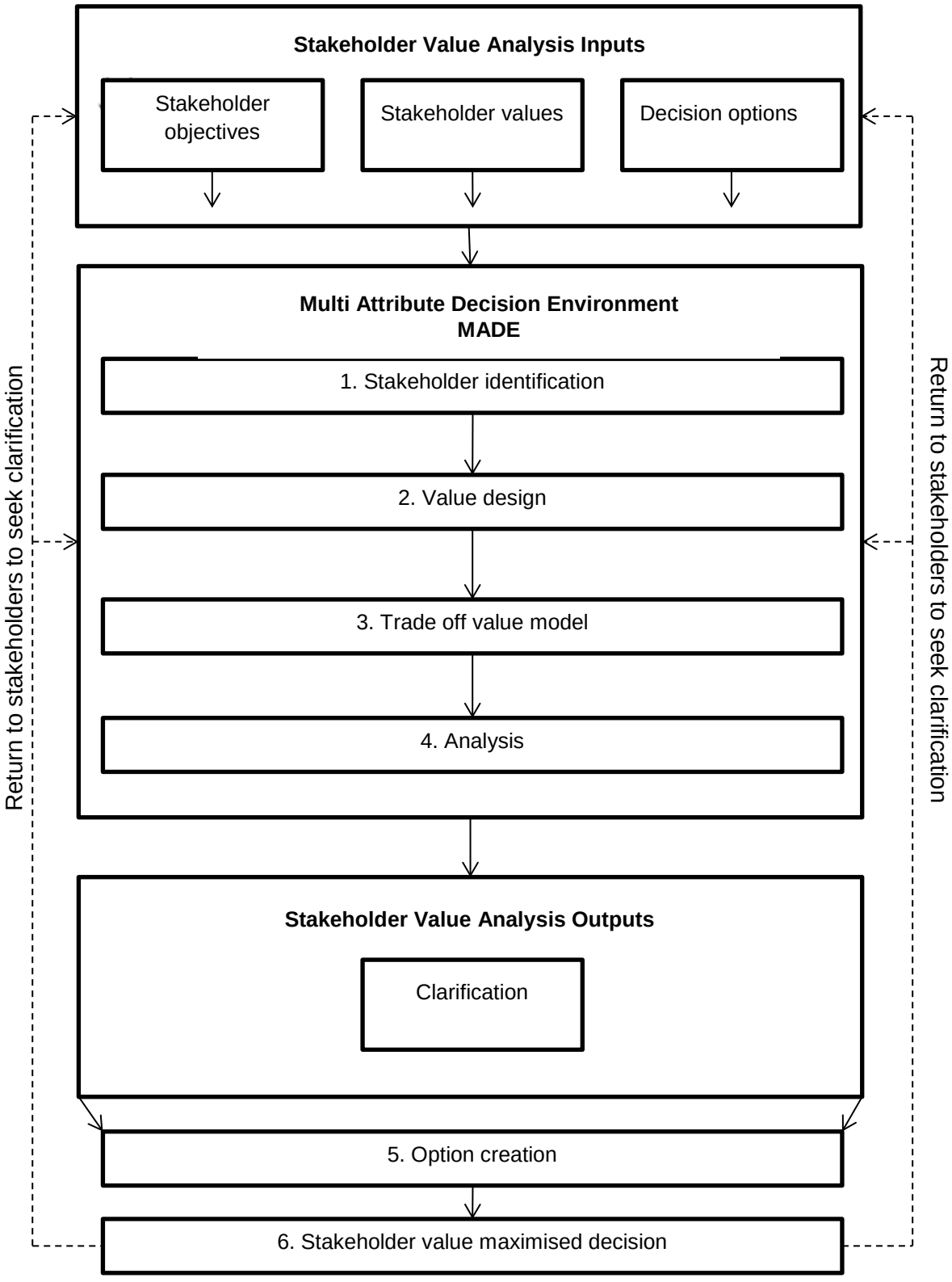


**Figure 1 Stakeholder value Analysis. Source: Earl and Clift (1999) adapted**

The six steps presented in figure 1 which are applicable to SVA are given below.

**Step one**, stakeholder identification: the identification of the relevant stakeholders involved in the decision making process

**Step two**, value design: establish stakeholder values for use in the choice set alternatives

**Step three**, create trade-off model: ensure the attributes are communicable to all stakeholders involved, despite stakeholder's different preferences and values

**Step four**, perform analysis

**Step five**, clarification

**Step six**, stakeholder's value maximised decision: stakeholder value established

These steps help to support and progress this study towards achieving its aim, by providing a theoretical structure to the process.

Also described are that compounding these features are certain characteristics, such as:

*High stakes* – the difference in perceived desirability between alternatives can be enormous, for example, economic costs / environmental costs

*Complicated structure* – features such as those given above can make appraising alternatives more difficult

*No overall experts* – due to the breadth of concerns involved, there are no overall experts, often only experts in particular disciplines

*Need to justify decisions* – decisions are often required to be justified to other parties such as regulatory bodies, the public, or oneself

Such characteristics when coupled with the multiple features of the environment (discussed above) would imply that *complexity* in decision making is unavoidable. In which case, employing a structure of decision making analysis, which Keeney (1982) describes as, "A formalisation of common sense for decision problems which are too complex for informal use of common sense," (p806) is required. In order to achieve *a formalisation of common sense*, determining preferences (values) to decision makers, through the use of trade-offs, whereby value is derived from the potential benefits an alternative can bring despite the potential losses, by presenting

them with a range of different alternatives, is prescribed. The starting point for which, as agreed by both Keeney (1982) and Earl and Clift (1999) is to communicate directly with the decision makers, or stakeholders themselves.

**Research proposition 11: Stakeholder Value Analysis suggests that when establishing stakeholder values, the process should first determine what value means to them before the attributes are identified, validated and tested.**

*Stakeholder value analysis, a decision analysis theory perspective, summary*

This study adopts SVA as an appropriate pathway to follow in order to capture, estimate and validate stakeholder values of car parking and addresses the following research gap.

**The research gap can be expressed in four parts:**

First, the bulk of car parking literature apparently focuses on looking at how to modify the behaviour of individual users. In doing so, it makes an assumption that car parking problems can only be resolved by them. This is not the case.

Second, how the attributes used to represent car parking are derived is not correct. This is because they are typically predetermined prior to acquiring knowledge of how the stakeholders value car parking.

Third, the link between stakeholders and how they value car parking is nowhere made explicit in the literature.

Fourth, the literature is most attentive towards individual car parking users to the exclusion of other affected groups.

## 2.10 Research propositions

Chapter 2 raised the following research propositions which are now categorised into groups and addressed by the relevant objectives (Table1):

**Table 1 Categorisation of research propositions**

| Group | | Research proposition | Objectives |
|---|---|---|---|
| **Car parking** | 1. | There are many 'types' of car parking, it is not a homogenous entity. | E |
| | 2. | Car parking issues typically relate to undersupply and oversupply, achieving balance is challenging. | |
| | 3. | Perception of car parking issues change according to the perspective of the observer. | |
| | 4. | Car parking is fundamental in multiple societal goals | |
| | 5. | Research often assumes that modifying the behaviour of individual users will resolve car parking issues. | |
| | 6. | Research relating to changing car parking behaviour predominantly focuses on the price mechanism. | |
| **Attributes** | 7. | The restricted attributes previously incorporated into car parking studies could limit potential policy effectiveness. | C |
| | 8. | Attributes considered to be difficult to quantify are often overlooked in the car parking literature. | |
| **Value** | 9. | Decisions are made according to values that vary hugely amongst individuals, yet this diversity is not usually reflected in previous car parking studies. | D |
| **Stakeholders** | 10. | The car parking literature heavily focuses on the behaviour of individual consumers, sometimes defined and sometimes not, and it only rarely considers other affected stakeholder groups to the same degree. | A, B, D |
| | 11. | Stakeholder Value Analysis suggests that when establishing stakeholder values, the process should first determine what value means to them before the attributes are identified, validated and tested. | |

## 2.11 Literature review findings

In conclusion, the literature findings can be grouped into four sections, namely: car parking, attributes, value and stakeholders. Car parking, is particularly multifaceted in character which makes it difficult to standardise as there are so many different 'types' and categories involved, such as location and operator authority. This can lead to confusion as different controls may be in place to help to resolve different issues such as undersupply and oversupply, potentially in effect in close proximity to each other. Moreover, in some cases, controls may not be in place at all which can lead to user confusion and impact on other stakeholders. Due to the diversity of car parking issues and spread of ramifications, there is not always consensus regarding which issue should be addressed, which suggests that car parking can be particularly complicated to understand and resolve.

Beyond this is that car parking policy can be useful in helping to achieve multiple desirable urban goals. These range from supporting the local economy and delivering access to easing air pollution and helping to preserve a city's character. Yet these goals can be conflicting. For instance, on the one hand, car parking is considered to be a key factor in drawing in revenue to a town at it enables access to employers and other business activity, while on the other hand it can devalue the land it is built on and compromise the character of a city. The result is that striking the right balance can be a problematic challenge to decision makers. One means of addressing the challenge is to implement controls which are intended to modify individual user behaviour, as it is often perceived that car parking is the *problem* and that users are the *cause* of the problem and so through modifying user behaviour, the problem can be resolved. This can be done through the use of *policy factors* which include economic, regulation, information and policy design which collectively appear extensively within the literature, or *contextual factors* which appear neglected by comparison. Predominately, economic controls are the most popular factor to use in the modification of individual user behaviour as users are responsive to 'price'.

With regards to the attributes found in car parking, five key groups were found to be present in the literature. They supported the finding that users respond to price as the *economic* group was found again to be a dominant theme. Yet the lack of attributes to reflect *contextual* factors, suggests that policy effectiveness could potentially be limited as the reality of practice might not always be reflected in the concept of theory. A suggested logic behind this was that key attributes in car parking, such as 'price' and 'distance' are easier to quantify than contextual attributes such as 'safety'.

In value, it was found that value can be uniquely personal to individuals and is represented by many different factors, including ethics, traits, characteristics and trade-offs. Overlooking the issue of value through the implementation of blanket policies, often aimed at one stakeholder group as a whole, was thought to possibly limit the potential of policy and impact on its overall intention.

Regarding stakeholders, despite the literature describing that car parking experiences impacts at a societal level, the bulk of studies seem to mostly concern one stakeholder group only, individual users of car parking. As society comprises multiple stakeholders, this was thought to be restrictive. Moreover, SVA was considered to be an appropriate pathway to follow when establishing stakeholder value. The technique is supported by the literature which considers that stakeholder values should be identified *prior* to introducing the attributes that comprise them and only when validated should stakeholder value be estimated. In car parking literature, the attributes appear to be prioritised above stakeholder value, which in turn seems somewhat overlooked.

# Chapter 3 Research Methodology

## 3.1 Introduction

This Chapter explains the methodological approach taken that underpins the research design in order to follow the pathway as defined by SVA discussed in the previous chapter. Specifically it comments on how this thesis is positioned in terms of the methods adopted. It considers the research approach taken with regard to the collection of primary data necessary to satisfy the study aim, objectives and research questions. The chapter is structured as follows: Section 3.1 provides a theoretical basis to underpin the study. Section 3.2 presents the aim and objectives. Section 3.3 gives the research design and section 3.4 presents the research map.

## 3.2 Theoretical basis

In determining a methodological underpinning for a piece of research it is necessary to consider different types of approach. In particular, this section discusses whether inductive or deductive and whether qualitative, quantitative or a mixed method perspective are the most appropriate for this study.

### 3.2.1 Inductive and deductive research approaches

Where the inductive approach stems from interpretivism (which aims to understand events by understanding peoples motives for their actions) by contrast, the deductive approach stems from the positivist tradition (where one starts with a theory, generates a hypothesis, rigorously tests before accepting it) (Della Porta and Keating, 2008). Two key figures who both influenced thought about social researching, but in opposing ways, were Plato and Aristotle;

*"Plato argued for deductive thinking (starting with theory to make sense of what we observe) and Aristotle for the opposite, inductive thinking (starting with observations in order to build theories)."* Walliman (2006, p9)

In inductive reasoning specific observations are made which generate perceptible patterns or regularities. This leads to the formulation of tentative hypotheses which can be tested leading to some general conclusions or theories to be drawn (Hammersley, 2011). Deductive reasoning takes an opposing stance. Deductive reasoning is often referred to as a 'top-down' approach as it allows the researcher to begin at the top with a large spectrum of information and work down to the bottom to reach specific conclusions. In other words, deduction yields *valid* conclusions,

which must be true given that their premises are true. These conclusions can then be tested and finally proved (Johnson-Laird, 1999).

More specifically, Curtis and Curtis (2011, p11) describe that an analytical induction approach includes these key elements:

Inductive: bottom-up building new theory from data

- Begins with a case(s) and seeks to understand the key variables and values needed to describe the case
- Has a limited number of cases explored in-depth through multiple variables
- Emphasis on the richness of accounts, using as many variables as possible in the description of the case(s)
- Describes a single-case or relatively few cases in-depth

Whereas they go on to explain that a deductive or hypothesis-testing approach comprises the following key elements:

Deductive: top-down in testing existing theory with new data

- Begins with a theory or a hypothesis about the relationship between variables and seeks to test this proposition across a range of cases
- Emphasises the parsimony of accounts, using as few variables as possible in the hypothesis-testing
- Measures the covariance of or correlation between different sets of variables across a large number of cases

The key strengths and weakness of the two different approaches are given in Table 2:

**Table 2 The strengths and weaknesses of inductive and deductive approaches. Source (Johnson, 1996)**

| Approach | Strength | Weakness |
|---|---|---|
| **Inductive** | New information is derived | Conclusions are not fully certain |
| **Deductive** | Conclusions drawn are fully certain | No new information is derived |

Table 2 Shows that where the inductive method is more exploratory (often qualitative) as it seeks to describe the findings from the data collated, deductive research seeks to test a hypothesis using a more pre-emptive structure with regards to data collection (often quantitative and typically measuring relationships between variables) (David and Sutton, 2004). Despite only being able to provide a plausible explanation of the particular set of observations at hand, when other accounts could exist outside of the data (de Vaus, 2001), inductive methods are often considered to be more empirical whereas deductive methods are thought to be narrower (Heit and Rotello, 2010).

An advantage of an inductive approach over a deductive one is that it provides a direction from which to develop and progress future research (Huitt, 1992). Despite the uncertainty of the conclusion, an inductive approach is also considered to be, “Much richer and more complex because it must provide strong evidence that a particular conclusion is the most probable. With inductive reasoning, the truth of the conclusion does *not* necessarily follow from the truth of the premises and denial of the conclusion does not logically contradict the premises,” (Johnson, 1996, p292).

The research is not based on a theory, as it is with the deductive method, instead that can be constructed as the research progresses (Della Porta and Keating, 2008), which is true to the premise of SVA. The inductive approach is also associated with behaviourism or pragmatism (Hay, 2002), as it aims to understand the motivations that lie behind human behaviour, often from a cultural perspective or context.

*Application*

Taking these justifications into account this study seeks to understand more about the topic by adopting an *inductive* approach to the method, thus supporting the proposition of SVA as discussed in the previous chapter. The greater degree of openness that the inductive method affords (David and Sutton, 2004) when combined with an element of deductive theory testing, helps to guide the research towards achieving its aim.

### 3.2.2 Qualitative and quantitative research approaches

The differences between quantitative and qualitative methods are defined by (Krathwohl, 1998, p5).

**Qualitative methods:**

- Verbal descriptions portray phenomena
- Consists of methods such as interviews in which subjects, expressing their own thoughts, explore the topic with the researcher
- Employs inductive logic to find an explanation
- Develops an explanation for a perceived relationship

**Quantitative methods:**

- Measures and statistics describe phenomena
- Is a tightly designed experiment in which events are controlled by the researcher
- Employs deductive logic to predict the results from the proposed explanation (hypothesis)
- Validates an explanation and demonstrates a relationship

Qualitative research methods include focus groups (see Chapter 4, 4.1.1), documentary research (see Chapter 4, 4.1.2), participant observation (see Chapter 4, 4.1.3), case studies (see Chapter 4, 4.1.4), and interviews (see Chapter 4, 4.1.5), which are all rooted in a phenomenological basis of the study and aim to provide a description of the phenomena meaning, for the culture or people under examination (Newman and Benz, 1998). The data generated are usually coded a posteriori from interpretations of those data (Glaser and Strauss, 1967).

One of the key factors involved in qualitative research is its flexible nature. That is, aside from knowing in advance the points at which future decisions will occur, exactly what else will lie ahead is altogether unknown (Brown, 2010). Instead, the detail of the design emerges as the study is conducted (Robson, 1993) rendering flexibility essential as researchers face, “the prospect of not knowing what they don’t know,” (Guba and Lincoln, 1988, p105). In some cases this could leave the research open to chaos, rather than taking the prepared and organised approach that qualitative work demands, (Mason, 1996; Ritchie, 2003).

Quantitative research is traditionally considered to be empirical and statistical studies, often including experimental (see Chapter 7, 7.2), which seek to generalise from the sample to the

population using the control of variables, randomisation, and valid and reliable measures (Bernard, 2013). Again the data is coded, but this time a priori according to standardised definitions.

### 3.2.3 Mixed method approach

Adopting a mixed methods approach to research involves employing both quantitative and qualitative research methods within a single study to understand a research problem. Traditionally, the two different methods reside in two different camps, each armed with powerful arguments declaring their validity (Datta, 1994); (Guba and Lincoln, 1994), with the qualitative approaches challenging the traditional opinion that the quantitative approach was the only valid research approach to be adopted. Such arguments, known as the *incompatibility theses* (Howe, 1988), continue still (Schwandt, 2000), qualitative; (Maxwell and Delaney, 2004), quantitative).

Adopting a mixed methods approach could be perceived to provide pacification to the dispute with authors such as Wittgenstein (1958) and Campbell (1970) supporting the use of both qualitative and quantitative approaches. In fact, Newman and Benz (1998) reject the dichotomy that one approach is superior to the other, believing that neither is mutually exclusive or interchangeable, "We present them as interactive places on a methodological and philosophical continuum based on the philosophy of science," (pxi).

With regards to conflicting views of using a mixed methods research approach, David and Sutton, (2004, p44):

*"The distinction between qualitative and quantitative approaches to social research has many meanings and many dimensions. The distinction has become a central point of contention within the social research community. . . The dispute hides the fact that all research has a qualitative dimension and a quantitative dimension."*

Indeed they clarify the point by means of an example, David and Sutton, (2004, p43):

*"A researcher who has conducted in-depth interviews may find that certain patterns exist in their data and set out to clarify their findings with a numerical questionnaire.*

*Alternatively, at the end of a survey the findings might be made available to some of the researcher's sample and a focus group discussion might be held."*

This approach is advocated by Barnham (2012) who reasons that notwithstanding their differences (or, competing visions of what constitutes truth), the two methodologies often work

together in successful synergy, each bringing to the other a level of understanding that it would not otherwise achieve if it were employed alone.

Further to the differences in method are the differences in *approach* to the research. Qualitative research is predominantly *inductive* and it rejects positivism. Instead it focuses on how individuals interpret their social world, taking the view that social reality is a constantly shifting and emergent property of an individual's creation (Bryman, 2012). Where the qualitative naturalistic approach is used when observing and interpreting reality with the aim of developing a theory that will explain what was experienced, the quantitative approach is used when there is a theory to begin with which is subsequently tested to confirm (or not) it (Newman and Benz, 1998). The quantitative approach is *deductive* and focused on testing theories. It accepts positivism and embodies a view of social reality as an external, objective reality.

### 3.2.4 Mixed methods in transport research

In academic transport methods literature, there has been a flourish of *quantitative* methods applied to the modelling of human behaviour to explore *choices*, sometimes referred to as *the activity-based approach* (McNally, 2000). This type of approach appears to have brought into question the exclusive use of quantity based variables, which could risk producing models that are too simplistic, or neglectful of other significant factors.

For instance, where all transport variables (i.e. time and other expenses) are quantified, regardless of the descriptor detail levels involved, there is a belief that models might be created which, "Reflect the notion that man is economically rational and that specific human behaviours in the realm of economics can be explained in terms of purely rational (optimal) choices," Książkiewicz (2012, p133). As this concept may seem unrealistic to some, the opportunity to avoid an over dependence for quantitative approaches in academic transport literature, has not been missed. Indeed, Goetz et. al (2009, p323), call for, "Greater incorporation of *alternative* research approaches within the mainstream."

Arguments to consider qualitative approaches where transport decisions are under scrutiny at an individual level can be convincing, as Simons et. al (2013, p2) counter with, "Qualitative research methods offer a broad and in-depth insight into the individuals' experiences and perceptions." Such a perspective seems particularly applicable where this study was concerned as it sought to further knowledge into human stakeholder perspectives. The key issue, according to Newman and Benz (1998, p12), "We believe, should be in improving the quality of research through an integrated way of viewing qualitative and quantitative research methods.

Bearing all of the above reasoning in mind, this study undertook to adopt a mixed methods approach and follow the pathway as given by SVA, which supports first the qualitative exploration of stakeholder value and second, quantitative verification. The study employs both qualitative (see Chapter 4) and quantitative (see Chapter 6) methods not to explore the same question, as in triangulation (David and Sutton, 2004), but to address the different objectives of this study, constructing the theory as it progresses. There are two sequential phases within this study, one and two. Phase one is qualitative and therefore inductive and addresses objectives a and b. Once the interpretations and findings of phase one are captured, phase two (deductive) is primed with the information required to advance the study towards its conclusion. The process is in line with the SVA pathway, whereby values are established prior to attributes.

## 3.3 Aim and objectives

The aim of this study is:

**To investigate the stakeholder values of car parking to support and inform decision makers.**

This is supported by the following objectives:

a) To identify the stakeholders that are affected by car parking and to explore how they are affected by it

b) To examine what the different stakeholder groups value relating to car parking

c) To develop a series of additional attributes to better capture stakeholder value of car parking

d) To estimate the value of car parking from a range of different stakeholder perspectives

e) To develop recommendations for practitioners and policy makers to improve the formulation and implementation of car parking policy

## 3.4 Research design

The research design provides an overview that sets out how the research project has addressed the aim and objectives (Oppenheim, 1992). See Table3:

**Table 3 Research organisation**

| | Objective | Method | Phase | Approach | SVA step |
|---|---|---|---|---|---|
| **a** | To identify the stakeholders that are affected by car parking and to explore how they are affected by it. | Interviews with three different groups of experts | One | Qualitative | 1, 2 |
| **b** | To examine what the different stakeholder groups value relating to car parking | | | | |
| **c** | To develop a series of additional attributes to better capture stakeholder value of car parking | Survey incorporating three different Conjoint analysis choice tasks | Two | Quantitative | 3, 4, 5, 6 |
| **d** | To estimate the value of car parking from a range of different stakeholder perspectives | | | | |
| **e** | To develop recommendations for practitioners and policy makers to improve the formulation and implementation of car parking policy | Discussion | One & two | | |

In reporting this methodology, the thesis is structured as shown in figure 2.

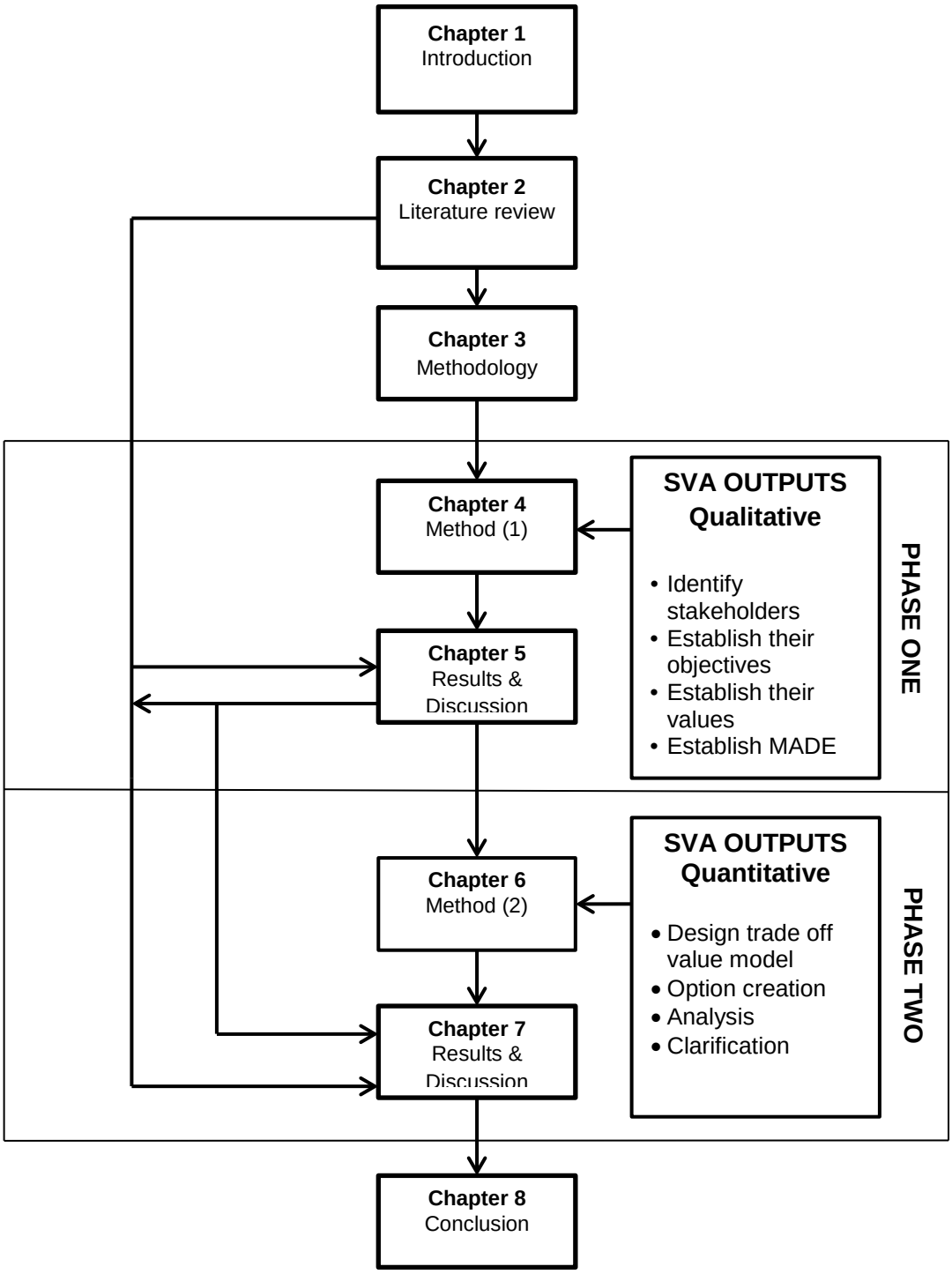


Figure 2 Research map

# Chapter 4 Phase 1 Method

## 4.1 Introduction

Chapter 4 opens phase one of this study which is qualitative and in line with the stakeholder value analysis inputs and the first two steps of the SVA pathway (see Chapter 2). The aim of phase one of the methodology is to satisfy objectives a and b of this study. They are:

A. To identify the stakeholders that are affected by car parking and to explore how they are affected by it
B. To examine what the different stakeholder groups value relating to car parking

In order to satisfy objectives a and b, phase one (this, quantitative phase) comprises three different and sequential steps. The results of each step supply the foundations upon which to build the next. The three steps are consistent in their approach as they all involve in-depth interviews with particular groups of people. Interviews are the suggested method to use in order to best identify stakeholders and capture their values (Earl and Clift, 1999). The three groups are:

- Step 1 Academics with an interest in car parking
- Step 2 Stakeholder group sector leaders
- Step 3 Car parking experts

Both steps one and two collected data from the interviews which served to inject stakeholder insight and meaning into the second phase. Step three was slightly different. In step three the interviews validated the findings from step two plus they were used to translate that data into initiating the *quantitative* aspect of the second phase of the methodology. This resulted in employing a different type of interviewing technique during step three compared with the previous two steps.

In short, each step served a dual purpose: 1) to validate the findings of the previous section, with step one validating the results of the literature review, and 2) to form the foundations of the next, concluding with step three which was also used to bridge the gap between phase one and two of the methodology by *setting the scene* for the quantitative work.

This chapter considers each of the different steps, examining both the theory and practice of the data collection and data analysis. It starts by taking a closer look at some of the different types of qualitative data collection methods available.

## 4.2 Data collection methods

Data can be collated via several different methods and, according to Walliman (2006, p83);

*"You need to mine your subject in order to dig out the ore in the form of data, which you can then interpret and refine into the gold of conclusions."*

Yet excavating for data is not always straightforward as complications and challenges are to be associated with many of the different methods available. Assessments of four common methods for qualitative data collection are presented next along with the applicable rationale behind their suitability for implementation into phase one.

### 4.2.1 Focus groups

After defining focus groups as, "An interview with several people on a specific topic or issue," Bryman (2008, p473), he points out a number of dilemmas that conducting focus groups can raise, including some practical ones;

- How many participants should there be?
- Availability and feasibility of participants to attend the focus groups at the same time, date and place
- How many focus groups should be conducted?
- Challenges over recording and transcribing the focus group
- Whether or not to use a moderator

While on the one hand the benefits of a focus group's dynamic group discussion and the balancing effect of a range of different opinions are considered advantageous to some (Flick, 2002). On the other, these very strengths are also considered by others to act as drawbacks. For instance, lively dialogue can leave patterns to be difficult to identify and the lack of homogenous voice may consign the moderator to making spot decisions regarding intervention in order to steer the group (Flick 2007).

That said, focus groups can be an effective tool in drawing together different views and concerns about a specific subject and can help better understanding of the differences which may exist among a group of individuals (Krueger and King, 1998; Kitzinger, 2004).

With this in mind, the method of using focus groups was dismissed as unsuitable for all three of the different steps largely due to geographical impracticality. As the number of academics with

an interest in car parking seems limited, the eight academics participating in step one were not all based in the UK, but in the USA and Australia also. Likewise, despite the 20 sector leaders participating in step two and the nine car parking experts in step three all being located in the UK, again their geographical distances were considered too great to accommodate. Moreover, "The ideal size of a focus group for most non-commercial topics is five to eight participants," (Guest et al, 2013, p176) and the number of participants in the final two steps lay outside this figure.

### 4.2.2 Documentary research

In documentary research the researcher uses the evaluation of written documents as a method to explore a particular topic or phenomenon, often using both primary (basic or imperfect evidence) and secondary (often books and articles written by others) sources, (Ahmed, 2010). The types of material used can include both public and private documents plus it involves investigating and categorising it, the method is also commonly used to supplement other social research methods (Bailey, 1994).

In terms of advantages, the method is considered as good as using social surveys, interviews, or participant observation as it is often cost effective by comparison and is described as a "rich vein for analysis" (Hammersley and Atkinson, 1995, 173). However, there is reason to be cautious. The authenticity and credibility of the documents under scrutiny places the researcher under considerable pressure to be sure of their legitimacy, plus the documents should be fully representative in terms of relevance and both clear and comprehensible in their meaning (Scott, 1990). A summary of the advantages and disadvantages of documentary research is presented in Table 4, below

**Table 4 Documentary methods, advantages and idsadvantages. Source: Appleton and Cowley (1997)**

| Advantages | Disadvantages |
|---|---|
| Data readily available | Limited by the availability of data |
| Inexpensive and economical form of data | Inaccuracies in original material |
| Save time | Bias - 'selective deposit' |
| 'Non-reactivity' - records unbiased by data collection process | Bias – 'selective survival' – missing / incomplete data |
| Researcher does not have to be present during data collection | Total document or part of document? |
| Useful for hypothesis / problem formulation | Data studied out of context |
| | Preparation before analysis |

Finally, according to (Hakin, 1993, p1141), a common mistake is to think of documentary records “As ready to use research data whereas they usually require more preparation, care and effort than an equivalent analysis of a research data set.” Yet the approach can be useful when the researcher is tasked with analysing several documents with no common format and which appear to have developed without sufficient empirical evidence (Appleton and Cowley, 1997).

Documentary research is not considered to be a suitable data collection method for phase one because of the lack of suitable documents regarding how car parking stakeholders value car parking and phase one is specifically exploratory.

### 4.2.3 Participant observation

According to Jorgensen (1989, pp13-14) participant observation has seven different features which are listed below:

1. A special interest in human meaning and interaction as viewed from the perspective of people who are insiders or members of particular situations and settings
2. Located in the here and now of everyday life situations and settings as the foundation of inquiry and method
3. A form of theory and theorising stressing interpretation and understanding of human existence
4. A logic and process of inquiry that is open-ended, flexible, opportunistic, and requires constant redefinition of what is problematic, based on facts gathered in concrete settings of human existence
5. An in-depth, qualitative, case study approach and design
6. The performance of a participant role or roles that involves establishing and maintaining relationships with natives in the field; and
7. The use of direct observation along with other methods of gathering information

These features span a broad range of components which could imply that participation observation is particularly involved, but this is countered by the the *advantages* of pursuing the method, in a cultural setting, as given by Bernard (2013, p310), who believes that they contribute to a study’s validity:

1. It makes it possible to collect different types of data
2. It reduces the incidence of "reactivity" or people acting in a certain way when they are aware of being observed
3. It helps the researcher to develop questions that make sense in the native language or are culturally relevant
4. It gives the researcher a better understanding of what is happening in the culture and lends credence to one's interpretations of the observation
5. It is sometimes the only way to collect the right data for one's study

In the 1970s, participant observation was seen as a, “A method in which the observer participates in the daily life of the people under study, either openly in the role of researcher or covertly in some disguised role,” (Becker and Greer, 1970, p133), with the aim being to enable, “The researcher to find out how something factually works or occurs,” (Flick, 2006, p215). The method requires researchers, “To involve themselves in the lives of those being studied – looking, listening, enquiring, recording, and so on,” (Ackroyd and Hughes, 1992).

More recently, the term ‘ethnography’ is also used to *imply* that there is more involved to the method than observation alone, despite there being little difference to distinguish between the two. For instance, Bryman (2008, p402) explains that, “Typically, participant observers and ethnographers will gather further data through interviews and the collection of documents,” and adds that either way it can be a lengthy process. Further to its time consuming nature, (Ackroyd, Huges, 1992) consider obtrusiveness as a particular drawback due to its possible impact on the behaviour observed and the accounts offered. Such studies, “Display a formal interest in social activities using substantive material drawn from naturally occurring settings,” (Ackroyd and Hughes, 1992). Neither the inside perspective of a car parking society or culture, nor the everyday *act* of parking a car is at the heart of the study.

### 4.2.4 Case study

Case studies could be considered to be a research strategy, rather than a method, as they are not exclusive to the collation of *qualitative* data. Instead, they house a family of different methods involving preparatory reading, discussion of protocol topics, site visits, fieldwork procedures, interviews and follow-up activities, many of which, or all in cases, can also be qualitative (Yin, 2009). Furthermore, case studies (Yin, 2009, p2):

“Are the preferred method when

a. “how” or “why” questions are being posed

b. The investigator has little control over events, and

c. The focus is on a contemporary phenomenon within a real-life context

This situation distinguishes case study research from other types of social research.” The key differences between the suitability of case studies compared with other forms of research methods, based on the three conditions (a, b, c) above is presented in Table 5 below:

**Table 5 Relevant situations for different research methods. Source: Yin (2009, p8) adapted**

| Method | (1) Form of research question | (2) Requires control of behavioural events? | (3) Focuses on contemporary event? |
|---|---|---|---|
| Experiment | How, why? | Yes | Yes |
| Survey | Who, what, where, how many, how much? | No | Yes |
| Archival analysis | Who, what, where, how many, how much | No | Yes/No |
| History | How, why? | No | No |
| Case study | How, why? | No | Yes |

Consequently, case studies can act as an illuminating descriptor of a ‘case’ and can be applied to *single* or to *multiple* cases, where a range of different evidence is collated from the case setting (Gillham 2000a). Indeed, according to Gerring (2007, p19), “A case may be created out of any phenomena so long as it has identifiable boundaries and comprises the primary object of an inference.”

Yet the case study method is not without imitations. For instance, the issue of researcher subjectivity bias can be a concern, and as Hamel (1993, p23) observes, “The case study has basically been faulted for its lack of representativeness. . .and lack of rigor in the collection, construction, and analysis of the empirical materials”. Furthermore, the issue of case evaluation due to the ethics of the researcher is of concern to Guba and Lincoln (1981, p378), “An unethical case writer could so select from among available data that virtually anything he wished could be illustrated." Yin (2009, p14-15) also raises four potential case study objections:

1. Lack of rigor

2. Concern over scientific generalising

3. Time consuming and the lengthy production of large documents

4. A growing preference for ‘true experiments’

Despite addressing all of the above objections with ease, Yin (2009, p16) remains cautious, “The problem is that we have little way of screening for an investigator’s ability to do good case studies.” Issues around researcher capability could potentially be a limitation that may apply to any of the different research methods.

Using case studies as an appropriate research method was rejected for phase one regardless of satisfying Yin’s (2009) how and why aspect of the research question (Table 5), as it did not fit with either the second or third condition. Rather, this study is not concerned with car parking as an *event* contemporary or otherwise, but instead it is interested in how stakeholders value car parking and why.

### 4.2.5 Interviews: The preferred data collection method

An inner perspective of interviewing is given by Oakley (1981, p41);

*“Interviewing is rather like a marriage: everybody knows what it is, an awful lot of people do it, and yet behind each closed door there is a world of secrets.”*

Possibly a more conventional definition of what interviews are, is, “A form of communication with the aim of producing different forms of information with individuals or with groups,” (Seale, 2011). Also, interviews can be used in conducting qualitative research when, “The researcher is interested in collecting “facts”, or gaining insights into or understanding of opinions, attitudes, experiences, processes, behaviours, or predictions,” (Rowley, 2012, p261). Furthermore, interviews can be conducted on different levels, such as differing levels of formality: *formal*, where the setting and roles are defined, such as ‘office’ and ‘interviewer’ or ‘interviewee,’ and the interview type is generally structured; and *informal*, where the setting and roles are less defined, such as over coffee, and the interview type is usually unstructured (O'Leary, 2004).

*Interviews, types and alternative approaches*

An adapted summary of some of the key features of in-depth interviewing, according to (Wengraf, 2001, pp3-6) is given below:

- **Designed to improve knowledge** – develops a ‘model’ of some aspect of reality in accordance with the ‘facts’ about that reality
- **Similar to a conversation but with special features requiring understanding** – is mindful of human interaction and all of the trappings that accompany it

- **Planned and prepared for but deliberately half-or quarter-scripted** – can be time consuming both during the planning and analysis stages, requires a disciplined researcher
- **Semi-structured, largely improvised by the researcher** – interviewee's responses cannot be predicted
- **A joint production between interviewer and interviewee** – interviewer must be prepared to listen and respond, particularly to interviewee narratives
- **Goes into matters 'in-depth'** – extracts more detailed knowledge, goes beyond the surface

Thus, in-depth interviews provide insight into the interviewee's thoughts, feelings and experiences, where the primary focus for the interviewer is to collate ideas which can help to both thicken and deepen the research by adding further dimensions. This exploratory style of interviewing is time consuming to conduct and to analyse but the benefits of breathing fresh ideas and concepts into the research are considered enough to compensate (Oppenheim, 2005), an opinion shared by Kleinman et al (1994, p43):

*"Respondents may reveal feelings, beliefs, and private doubts that contradict or conflict with "what everyone thinks," including sentiments that break dominant feeling rules."*

Indeed, the flexible nature of interviews produce a narrative that can be further explored if required is what distinguishes them from questionnaires, where the communication is more limited and there is no room for probing preliminary responses. "This gives a richness to the data, allowing many individual differences in opinions and reasoning to be uncovered," (Keats 2000, p20).

For these reasons of flexibility and enrichment, using interviews as a data collection method for all of the steps within phase one of this study was the most attractive option out of the four different alternatives explored.

First, interviews can be undertaken in a number of ways, namely; structured, group, and semi- and unstructured interviews (Schwandt, 2001). Second, they can be conducted via different media, either face-to-face or by the telephone, for example, (Seale, 2011).

The three main types of interview to focus on are: (Walliman 2006, p92)

1. **Structured interview** – standardised questions read out by the interviewer according to an interview schedule. Answers may be closed format.

2. **Unstructured interview** – a flexible format, usually based on a question guide but where the format remains the choice of the interviewer, who can allow the interview to 'ramble' in order to get insights into the attitudes of the interviewee. No closed questions are used.
3. **Semi-structured interview** – one that contains structured and unstructured sections with standardised and open-format questions.

A strength of a structured interview is that the analysis can be quick and simple to perform as the responses can be easily comparable (Patton, 2002). However, there could be weakness where the interviewer is responsible for setting the agenda and directing the responses. For instance, there is little freedom of reply for the interviewee, because the information they are presented with is *imposed*, "By selecting the theme and topics; by ordering the questions and by wording the questions in his or her language," (Bauer, 1996, p2).

For unstructured interviews, there is thought that the interviewee can find the experience enjoyable as they are at liberty to discuss their own ideas, although this can present a challenge for the interviewer to keep the participant focussed in a non-leading manner (O'Leary, 2014). The analysis stage can also be more onerous as interviewees will expound differently so there is less cohesive data to draw together (Patton, 2002).

Semi-structured interviews then, might provide a favourable balance between the two other types, but Wengraf (2001, p5) warns against the notion, "They (semi-structured interviews) are high-preparation, high-risk, high-gain, and high-analysis operations." That said, semi-structured interviews can provide interesting and unexpected data despite the challenges (O'Leary, 2014), and although remaining fairly conversational, with room for logical gaps to be identified and closed, a laborious analysis stage is to be expected (Patton, 2002).

In more practical terms, face-to-face, or *in-person* interviews are considered to have several advantages over telephone interviews as they can be conducted in any relevant location, they are considered to be conducive to gaining particularly detailed data and can incorporate the use of visual aids (Frey and Oishi, 1995). Indeed, "Face-to-face interviewing has become the most common type of qualitative research method used in order to find out about people's experiences in context, and the meanings these hold," (Holloway and Jefferson, 2000). The interviewer is also well placed to assess the quality of responses and body language of the interviewee to ensure correct understanding of the questions and encourage full replies (Walliman, 2006).

Nevertheless, there are also practical disadvantages such as higher field costs (Frey and Oishi, 1995), plus there is the issue of bias. For instance, the personal characteristics of the interviewer, or nuances in the way that questions are asked could influence the responses of the interviewee, likewise the interviewee may wish to give responses (verbally or by using non-verbal gestures) that they feel are socially acceptable, or promote their own surreptitious cause (Seale, 2011).

The advantages of low cost and high convenience make telephone interviewing a popular data collection method among researchers (Nachmias and Nachmias, 2000). Yet, telephone interviews are not without disadvantages too as they give no visual clues such as facial expressions, or details about the business environment (Walliman, 2006), in which case they could be considered to produce less information than face-to-face interviews. Furthermore, telephone interviews are considered to have higher break off rates (when the interviewee terminates the call) than when interviews are conducted in person, plus it can be more difficult to discuss delicate topics via the telephone (Seale, 2001).

Semi-structured interviews, conducted on a one to one interview basis rather than as a focus group or informal group discussion were preferred because they, “can help structure data collection while keeping the focus sufficiently broad to allow for hidden or emerging themes,” (Varvasovszky and Brugha, 2000, p. 341).

As such, the method also seems to be accommodating towards participants (academics, stakeholders and experts) who are open to *discussing* their views and opinions, or in this case, their perspectives on car parking. More specifically, telephone interviews are considered to be both cost effective and convenient when compared with the face-to-face method. With this in mind, a combination of semi-structured, in-depth interviews were thought to be able to provide the richness and quality of data required in order to complete steps one and two of phase one successfully, while unstructured, in-depth interviews were considered the best method for step three.

The purpose of step three was to bridge the gap, between phase one and phase two of the methodology and to set the scene for the quantitative aspect involved in phase two. As such the interviews in step three were required to provide a touch of realism to the context of the experimental nature of phase two. Unstructured, in-depth interviews were selected as, according to (Patton, 2002, p343),

*"Being unstructured doesn't mean that conversational interviews are unfocused. Sensitizing concepts and the overall purpose of the inquiry inform the interviewing. But within that overall guiding purpose, the interviewer is free to go where the data and respondents lead."*

Furthermore, *combining* interview approaches can bring benefits to the research. Room for flexibility allows for topics to be explored at discretion, as different interview participants are afforded freedom to narrate their different individual experiences and perspectives, and the researcher can establish the data relevance, (Patton, 2002).

According to Silverman (2011, p418) there are three main issues that are habitually raised by Western research ethical guidelines:

- Codes and consent
- Confidentiality
- Trust

To address these issues, Loughborough University's Ethical Approval (Human Participants) procedure was followed, whereby; an ethical clearance checklist to conduct the interviews was completed and lodged with the relevant administration; an information sheet providing detailed reassurance regarding confidentiality and the nature of the research and publication issues; and, an informed consent form, were emailed to all of the participating academics.

Once approval was given and the informed consent forms were received back, all three of the issues were considered satisfied and the interviews were undertaken.

The interviews throughout steps one and two were recorded to aid accurate transcription as is recommended by (Oppenheim, 2005), but not for the step three interviews, where a detailed transcription was not necessary and notes would suffice.

## 4.3 Step 1 data collection

The interviews conducted in step one sought to validate the literature review from academics with a published interest in car parking. They also formed the foundations with which to construct insightful questions to pose to sector leaders of the stakeholder groups.

### 4.3.1 Sampling

Initially, the number of academics to include in step one of phase one was guided by Gillham (2000, p12) who believes that interviews, "can be very effective even with as few as four or five

interviews of individuals, carefully selected as typical." In which case, the academics selected as 'typical', were those who had a published interest in parking. In other words, they were considered to be 'experts' (i.e. individuals with specialised knowledge in a specific field with demonstrated experience and involvement which is of particular to a specific study (Gläser and Laudel, 2004). They were first identified from the literature review and second via a 'snowballing' technique whereby participants suggests further experts whose contribution they deemed to be of benefit, in line with inductive theory building analysis, (Miles and Huberman, 1994). Despite the size of the sample not being the most important part of the interview data collection method, (Oppenheim, 2000), 'four or five interviews' felt insufficient as the academics were enthusiastic to put forward names of more individuals whose input they felt would benefit the research. Hence the number of actual interview participants increased from the agreement of four to the agreement of eight. Two additional academics (one based in Europe and one based in Asia) were sought but declined, however the remaining participants all had experience or knowledge of car parking within the UK environment.

Contact was made via email which comprised an invitation to participate, plus an outline of the research under discussion, so that the academics could make a more informed decision about whether or not to accept the invitation (Appendix 2). Eight positive responses were received, and their individual roles and locations are presented in Table 6 below. Once an acceptance had been received, a telephone interview was organised at the convenience of each of the academics concerned, with the exception of Academic C, who consented to the interview but whom specifically requested that it was conducted via Skype. As Skype was something that this particular academic felt comfortable with, as it was a tool he regularly used, this was agreed to without issue.

**Table 6 Academics intervied: role, location and analysis code**

| Academic | Role | Location |
|---|---|---|
| A | Professor of Transport Policy | UK |
| B | Professor of Urban Planning | USA |
| C | Professor of Public Transport | Australia |
| D | Professor of Transport Policy and Strategy | UK |
| E | Professor of Transportation Engineering and Planning | USA |
| F | Professor of Civil Engineering | Australia |
| G | Professor of Urban Planning | USA |
| H | Professor of Sustainable Transportation and Urban Planning | USA |

### 4.3.2 Academics interview questions

The interview questions put to the academics served to answer the three research questions, from an *academic's* perspective:

1. Who are the stakeholders involved with car parking?
2. What are the key car parking issues that are of concern to stakeholders?
3. How do stakeholders value car parking?

Satisfying these three research questions helped to focus the questions for the next set of interviews with representatives of the actual car parking stakeholder groups, that is, *step two*.

The academic interview questions are shown in figure 3 below.

1. Please describe your academic interest in car parking

**Car parking issues**

2. What do you consider to be the main problems currently associated with car parking to be?
3. In your opinion, how serious are the car parking issues in the UK?

**Stakeholder identification**

4. What do you understand by the term stakeholder and why?
5. Which key stakeholders are involved in car parking and what are their roles?
6. How would you categorise these different types of stakeholders into groups?
7. In your opinion, what goals are the groups of stakeholders you have identified aiming to achieve through car parking policy and what approach might they have to achieve this?
8. How do the different stakeholder groups engage with decision making about car parking?
9. Describe what you think are the barriers are to stakeholder engagement when shaping car parking policy and what are the consequences of such barriers?
10. Describe how stakeholders are currently prioritised within the process
11. How is stakeholder satisfaction of car parking currently measured and evaluated?
12. Explain how you think each stakeholder groups perceives the car parking issues that you have identified
13. Describe what impacts their perceptions have on their own goals and on shaping car parking policy
14. What would you identify to be the key car parking policies and in your opinion, how effective are they in achieving the goals of the stakeholders?

**Value and stakeholders in car parking**

15. What do you understand the term value to mean?
16. For each of the groups of stakeholders you have identified, describe how you think each one values car parking
17. What factors influence how these stakeholders value car parking?
18. How much does the way that each stakeholder values car parking impact on decision making in the parking sector?
19. To what extent do you think each one of the stakeholder groups takes the other stakeholder groups perceptions of value into account when setting their own car parking policy agenda?
20. Car parking stakeholder table discussion

**Figure 3 Step 1, interview questions, academics**

The questions were divided into three different sections to reflect the topics of the three different research questions. Also, in line with nature of the interview type; semi-structured, all of the questions were open and no closed or fixed choice questions were asked. The final question involved presenting a Table of car parking stakeholders according to their group and role, as adapted from the literature review, and asking the academics to discuss it in terms of its validity. The stakeholder Table is given below.

**Table 7 Car parking stakeholders according to their group and role**

| Group | Role | Stakeholders | |
|---|---|---|---|
| Non-consumers | Individual non-user | Pedestrians | |
| | | Cyclists | |
| | | Public transport user | |
| Consumers | Individual user | The disabled | |
| | | Residents | owners |
| | | Commuters | |
| | | Employees / trade unions | |
| | | Travellers | business |
| | | | leisure |
| | | Shoppers | |
| | | Visitors | |
| | Local business sector | Retailers | |
| | | Employers | |
| | | Developers | |
| | | Professional associations | |
| Suppliers | Car parking industry | Parking operators | |
| | | Parking entrepreneurs | |
| | | Technology providers | |
| | | Car parking enforcers | |
| Governmental | National Regional Local | Officer | city planners |
| | | | transport planners |
| | | | traffic engineers |
| | | Politicians | councillors |

## 4.4 Step 2 data collection

Step two's interviews served to 1) validate the findings from step one, and 2) offer an insight into the stakeholder perspective which could be fed into the questions posed to the experts interviewed in step three.

The sampling and ethical approach followed during step two's data collection was the same as step's one and three and as such, will not be revisited here.

The key difference between the sampling of the sector leaders and the academics was the number of different car parking stakeholder groups that were identified and their different levels. For instance, Table 7 above, presents the top level groups; non-consumers, consumers, suppliers and governmental, plus any associated sub-groups which are used to divide and describe their roles further.

Therefore, five sets of interviews took place with each set including four different representatives from the following stakeholder groups:

- Non-consumers
- Consumers
- Local business sector
- Car parking industry
- Governmental (national, regional and local levels)

Like the academic interviews, contact was made via email which comprised an invitation to participate, plus an outline of the research under discussion was given, so that the sector leaders could make an informed decision about whether or not to accept the invitation. Twenty positive responses were received, and their groups and roles are presented in Table 8, below. Once an acceptance had been received, a telephone interview was organised at the convenience of each of the sector leaders concerned.

**Table 8 Sector leaders interviewed; group, role and analysis coding**

| Group | Group role | Code |
|---|---|---|
| Non-consumer | British campaigners and organisations supportive of alternates to the car | NC 1, 2, 3, 4 |
| Consumer | British campaigners and organisations supportive of motorists | C1, 2, 3, 4 |
| Local Business Sector | Organisations representative of the British local business sector affected by parking | LBS1, 2, 3, 4 |
| Parking Industry | A broad range of organisations representative of the British Parking Industry | PI1, 2, 3, 4 |
| Governmental | Representatives from local, regional and central UK government | G1, 2, 3, 4 |

### 4.4.1 Sector leader interview questions

The interview questions put to the sector leaders of the identified stakeholder groups served to answer three different research questions, from the *sector leaders'* perspective:

1. What are the key car parking issues of concern from the perspective of the different stakeholder groups?
2. How do the different stakeholder groups perceive each other with respect to car parking?
3. How do the different stakeholder groups value car parking?

Satisfying these three research questions helped to provide a meaningful context for phase two of the methodology and also contributed to the next set of interviews with the car parking experts.

The interview questions are shown in figure 4 below.

1. Please describe your professional interest in parking

**Parking issues**

2. Please describe your perspective on parking issues in England
3. How do you consider these parking issues are being addressed?
4. To what extent do you think parking issues are understood by those involved in making parking policy decisions? Why so?
5. What perceptions do you consider exist about parking and who are they held by?
6. Do you consider that using land for parking is an efficient use of land? Why so?
7. What is your opinion on charging for parking? Why so?
8. What is your opinion on providing free or low cost parking to the user? Why so?
9. What is your opinion on the adequacy of parking provision?

**Parking stakeholders**

10. What impact do you consider politics to have on parking?
11. Please define your goal with regards to parking
12. How significant do you think your goal is compared with others involved in parking? Why so?
13. How much significance is placed on your goal by the parking policy decision makers, compared with the other parking stakeholders?
14. Please describe how you interact with the parking policy decision making process and how satisfactory do you find this to be?
15. To what extent do you think that other parking stakeholders understand your concerns?
16. To what extent do you think that you understand the other parking stakeholder concerns?
17. What do you consider might prevent stakeholders from fully appreciating each other's perspectives?

**Stakeholder parking values**

18. How do you value parking and why?
19. How do you think the other stakeholders value parking?
20. Whose perspective do you consider receives the most importance when considering how stakeholders value parking and why?

**Figure 4 Step 2, interview questions, sector leaders**

Consistent with the academic questions, the sector leader questions were divided into three different sections to reflect the topics of the three different research questions. Also, like the academic questions and in line with nature of the interview type (semi-structured), all of the questions were open and no closed or fixed choice questions were asked.

## 4.5 Step 3 data collection

The unstructured, in-depth style of interviews used in step three served to bridge the gap between phase one and phase two, and validated the findings from step two. As such, they were non-fact finding, less structured and even more flexible than the previous two steps.

Step three called for intuitively identifying key experts, or 'knowledgables' of car parking, as is the data collection method suggested by (Crosby, 1991) and preferred by (Grimble, 1998) as the information gleaned during the interview is more likely to resonate with and open the mind of the researcher. The interviewee selection was also in line with the snowballing technique consistent with (Miles and Huberman, 1994).

The interviewees were selected according to their expert role and are shown in Table 9 below.

**Table 9 Experts interviewed, role and analysis coding**

| Expert | Expert Role | Code |
|---|---|---|
| Chief executive | Town and city member organisation | E1 |
| Principal policy officer | City Council | E2 |
| Parking manager | Regional Council | E3 |
| Business manager | Private operator (national) | E4 |
| Investigator | Local Government Ombudsman | E5 |
| Head of specialist services | City Council | E6 |
| Head of operations | Private operator (regional) | E7 |
| Director of research | Parking member organisation | E8 |
| Chairman | Private operator (local) | E9 |

As with the previous steps, the same ethical procedure was followed and each interviewee was invited to participate via email. Once an acceptance had been received, a telephone interview was organised at the convenience of each of the experts concerned.

### 4.5.1 Experts interview questions

These interviews were conducted to help provide a meaningful context for the qualitative nature of phase two. Accordingly, the interviews were tailored to the different roles and responses of the interviewees and with the research questions already satisfied by steps one and two, their 'questions' were more *conversations*. This approach was considered to be appropriate because it, "Offers maximum flexibility to pursue information in whatever direction appears to be

appropriate, depending on what emerges," (Patton, 2002, p14). With no research questions to satisfy, *topics*, taken from the results of step two, were suggested for deliberation instead:

- Car parking policies
- The income and expenditure of car parking policies
- Ideal hypothetical parking strategies

The topics were left deliberately vague in order to allow the interviewee as much freedom to express their views and opinions as possible and to capture any further insights they might have.

In summary, the data collection method in step one and two was in the form of semi-structured in-depth interviews and for step three was via unstructured in-depth interviews. Step one validated the literature review and step two validated step one, while qualifying phase two of the method by providing more refined, information. Step three validated step two and delivered the link between the two phases. Step three added credibility as it introduced a touch of realism to the second phase.

## 4.6 Data analysis

### 4.6.1 Introduction

This section explores how data collated in steps one, two and three were analysed. It starts by discussing some of the methods available for analysing qualitative data, progresses by presenting a case for the preferred method and concludes by exploring how the preferred method was applied in practice.

It is important to note that all of the recording of the interviews in steps one and two were transcribed verbatim, immediately after each interview. For step three, extensive notes were taken and transcriptions were compiled accordingly.

### 4.6.2 Data analysis methods

The view of (Miles and Huberman, 1994) with regards to the *flow of activity* involved in data analysis include; data reduction, data display, and conclusion drawing/verification. They consider that:

1. Data reduction is where data are coded and is a part of the analysis that, “sharpens, sorts, focuses, discards and organises data in such a way that final conclusions can be drawn and verified,” and that this can be done via multiple methods, such as;
    - Summary
    - Paraphrase
    - Subsumed in a larger pattern
    - Conversion to primitive quantities, such as ‘high’, ‘moderate’, or, ‘low’
2. Data display is a part of the analysis that, “Assembles organised information into an immediately accessible, compact form so that the analyst can see what is happening and either draw justified conclusions or move on to the next step of analysis the display suggests may be useful,” and that this can be done via multiple methods, such as;
    - Matrices
    - Graphs
    - Charts
    - Networks
3. Conclusion drawing/verification is a part of the analysis where, “The qualitative analyst begins to decide what things mean . . . [and where] Conclusions are also verified as the analyst proceeds,” and that conclusions can be drawn by noting;
    - Regularities

- Patterns
- Explanations
- Possible configurations
- Casual flows
- Propositions

(pp.11-12)

The three streams depicting their interactive cyclical flows are represented in figure 5 below;

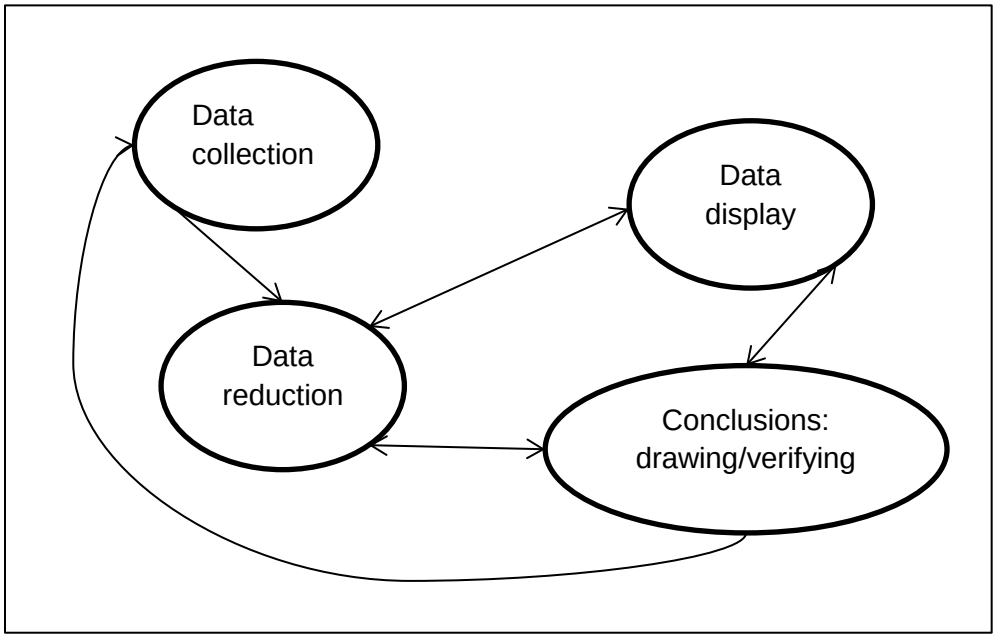


**Figure 5 Components of data analysis: Interactive model. Source: Miles and Huberman (1994, p12)**

This interactive model shows qualitative data analysis as a continuous and iterative process where the researcher moves among the streams accordingly, but qualitative data analysis features a number of analytic approaches, four of which are given by (Silverman, 2011) and a description of each follows afterwards;

- Framework analysis
- Thematic analysis
- Interpretive phenomenological analysis
- Constructivist grounded theory

### 4.6.3 Framework analysis

Framework analysis involves becoming acquainted with the data to the point where a thematic framework can be generated, labelling the data within the framework and organising it into concepts or themes. Then a descriptive account is given where the categories are refined and lastly an explanatory account is presented where explanations of the patterns are offered, (Ritchie and Spencer 1994); (Ritchie et al, 2003).

### 4.6.4 Thematic analysis

As with framework analysis above, thematic analysis also initially involves thoroughly getting to know the data. Next, early thoughts are noted and then codes are systematically applied throughout the data which are then collated together into potential themes. The data are then revisited and reviewed to ensure that all the corresponding data are appropriate to the theme. The themes themselves are ultimately further refined delving deeper into their particulars to seek out relationships, complexities and connexions, (Grbich, 1999); (Braun, Clarke 2006).

### 4.6.5 Interpretive phenomenological analysis

This method starts by reading an individual transcript and logging preliminary concepts which are then developed into themes and listed. Common themes are then grouped together and tabulated to show the theme's sub-themes. The process is then repeated with the next transcript and the table progresses by becoming further refined until finally a list/table is proposed depicting all of the themes and sub-themes together, (Smith and Osborn 2008).

### 4.6.6 Constructivist grounded theory

This method immediately starts to evaluate and code the text and progresses by continually comparing and refining ideas. Theoretical sampling is applied to draw out and test categories, and is repeated until there are no new ones left. Eventually, connexions between the categories are improved until the beginnings of a theory is formed, (Charmaz, 2000); (Charmaz, 2006).

## 4.7 Thematic analysis the favoured analysis method

Thematic analysis is a popular qualitative data analysis method, (Boyatzis, 1998); (Roulston, 2001). It is a foundational method that is often recommended to be the first method of analysis type that researchers should practice, as it provides many of the proficiencies that can be useful for conducting other forms of qualitative analysis. For instance, (Holloway and Todres 2003, p347) believe that "thematizing meanings" is one of a few common skills across qualitative analysis. Rather than seeking patterns thematic analysis aims to profoundly comprehend people's view and experience of reality, in order to gain insight into the phenomenon at hand (McLeod, 2001).

Furthermore, thematic analysis is *flexible* as it is not limited to a specific framework for instance, as found in interpretive phenomenological analysis (Smith and Osborn 2003). In grounded theory, (Glaser, 1992); (Strauss and Corbin 1998) narrative analysis, (Murray, 2003) (Reissman, 1993) and discourse analysis (Burman and Parker, 1993); (Potter, 1987) and (Willig, 2003) the method is expressed differently but within the restrictions of a theoretical framework. Instead, thematic analysis stretches beyond organising and describing the data by deciphering the characteristics of the research topic (Boyatzis, 1998).

Yet, consensus about *precisely how* it should be done appears yet to be reached, (Attride-Stirling, 2001) ; (Boyatzis, 1998); (Tuckett, 2005). Indeed (Braun and Clarke, 2006, p8) take the view that, "What is important is that the theoretical framework and methods match what the researcher wants to know," thus supporting the malleable nature of using the thematic analysis method. They suggest that a number of *decisions* should be considered during the course of conducting a thematic analysis method, including the following two key ones:

- What counts as a theme? *Something important about the data in relation to the research question, prevalence is not always an indication of a theme's importance*
- A rich description of the data set vs a detailed account of one particular aspect. *Depending on what best satisfies the research questions thematic analysis can create an accurate reflection of the content of the entire data set, or it can provide a more detailed and nuanced account of one particular theme, or group of themes, within the data* (pp10-11)

Six phases that the researcher should go through when conducting thematic analysis are provided as *guidelines* only, by (Braun and Clarke, 2006) and are presented in Table 10, below:

**Table 10 Phases of thematic analysis. Source: Braun and Clarke (2006, p35)**

| Phase | | Description of the process |
|---|---|---|
| 1 | Familiarising yourself with your data | Transcribing data (if necessary)<br>Reading and re- reading the data, noting down initial ideas |
| 2 | Generating initial codes | Coding interesting features of the data in a systematic fashion across the entire data set<br>Collating data relevant to each code |
| 3 | Searching for themes | Collating codes into potential themes<br>Gathering all data relevant to each potential theme |
| 4 | Reviewing themes | Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2)<br>Generating a thematic 'map' of the analysis |
| 5 | Defining and naming themes | Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells<br>Generating clear definitions and names for each theme |
| 6 | Producing the report | The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature<br>Producing a scholarly report of the analysis |

These guidelines are given in order to help avoid pitfalls, such as "Weak or unconvincing analysis, where the themes do not appear to work, where there is too much overlap between themes, or where the themes are not internally coherent and consistent," (Braun and Clarke, 2006, p25). Instead the analysis should be clear and explicit, where the "Rigour lies in devising a systematic method whose assumptions are congruent with the way one conceptualises the subject matter" (Reicher & Taylor, 2005, p549). When correctly performed, "A rigorous thematic approach can produce an insightful analysis that answers particular research questions," (Braun and Clarke, 2006), hence it is the preferred analysis method for all aspects of phase one of this study. To clarify, a process of categorising the data into first, second and third order themes was followed and subsequently presented into a series of Tables.

## 4.8 Qualitative data analysis

In the event, the thematic analysis was undertaken using the Computer Assisted Qualitative Data AnalysiS (CAQDAS) software, NVivo™. Analysing qualitative data can be a lengthy process and so the main motive behind using CAQDAS is to improve efficiency. Yet it should be stressed that NVivo™ is basically a *tool* (one of several available) that helps to enable the analysis process rather than an actual analysis method, (Blismas and Dainty, 2010). NVivo™ has five principal ways of supporting the analysis of qualitative data. It can: (Bazeley, 2007, p2)

- Manage data
- Manage ideas
- Query data
- Graphically model
- Report from the data

Moreover, NVivo™ can act as a 'whiteboard' for organising concepts and ideas (Blismas and Dainty, 2010), plus it houses a coding scheme incorporating nodes from which hierarchies can be created, accompanying documents organised, relationships identified and where matrices can be constructed (Lewins and Silver, 2007).

NVivo™ like other types of CAQDAS software experiences both advantages and disadvantages. While advantages include: the ability to handle large quantities of data, efficient and convenient coding and searching of data, facilities to annotate and memo the data and assist with construct building; disadvantages include: the time-consuming nature of learning the software, freedom to *overcode* data, and limitations regarding producing formats outside of the software's scope (McLafferty and Farley, 2006).

With this in mind, the CAQDAS software NVivo™ was used for the main part to organise, annotate, categorise and manage documents belonging to the data, such as transcripts. Attention was paid to (Blismas and Dainty, 2007, p462) who believe that, "Qualitative research is, by its very nature, dependent on human interpretation and understanding of the data for meaningful analysis, and so it is in devising and portraying these aspects of the analytical process that researchers should focus."

While NVivo™ was used as a tool for steps one and two of the analysis, it was considered unnecessary for step three, where the interviews were conducted to stimulate inspiration for the following phase.

# Chapter 5 Phase 1 Results

## 5.1 Introduction

This chapter gives the results for each of the three different steps in phase one. In the main, the results were compiled into Tables and are so accompanied by a textual explanation accordingly. The results of the steps are conveyed in turn starting with step one.

It was important to note that in order to validate all of the results from steps one and two, the findings were disseminated back to all of the participants, via email, for verification and comments. Validation of step three was implicit through the successful completion of the scenario exercise which was at the heart of phase two.

## 5.2 Step 1: Stakeholder identification and classification

The series of interviews in step one asked academics to identify and then classify who they consider to be the key stakeholders affected by car parking. They were also afforded the opportunity to comment on an existing classified set of stakeholders as elicited from the parking literature. This resulted in minor adjustment (highlighted in grey). The findings are presented in Table 11 below.

The academics responses approved four primary groups of parking stakeholders which subsequently served to identify the sector leader interviews to be undertaken for the principal interview stage. As with the original Table given to each of the academics during their interviews, Table 11 presents the same top level groups; non-consumers, consumers, suppliers and governmental. Each of these top level groups comprises the same sub-groups which describe their roles, one sub-group for each group of 'non-consumers' and 'consumers' as *individual non-user* and *user,* respectively. Like the original Table, Table 11s 'supplier' group has the same *two* equivalent sub-groups and the 'governmental' group has the same *three* sub-groups.

The four additions to the Table as made by the academics are at the lower level of stakeholder detail; renters, financiers to developers, architects and public transport providers. With these minor additions, the stakeholder groups and their respective roles are considered to be validated, being first elicited from the literature review and then verified by the academics themselves.

**Table 11 Car parking stakeholders, group and role, according to academics**

| Group | Role | Stakeholders | |
|---|---|---|---|
| Non-consumers | Individual non-user | Pedestrians | |
| | | Cyclists | |
| | | Public transport user | |
| Consumers | Individual user | The disabled | |
| | | Residents | owners |
| | | | renters |
| | | Commuters | |
| | | Employees / trade unions | |
| | | Travellers | business |
| | | | leisure |
| | | Shoppers | |
| | | Visitors | |
| | Local business sector | Retailers | |
| | | Employers | |
| | | Financiers to developers | |
| Suppliers | | Developers | |
| | | Architects | |
| | | Professional associations | |
| | Parking industry | Public transport providers | |
| | | Parking operators | |
| | | Parking entrepreneurs | |
| | | Technology providers | |
| | | Parking enforcers | |
| Governmental | National Regional Local | Officer | city planners |
| | | | transport planners |
| | | | traffic engineers |
| | | Politicians | councillors |

### 5.2.1 Step 1: Car parking stakeholders according to academics

The responses given by the academics to the questions regarding the stakeholders affected by car parking resulted in a rich collection of findings from the data which was organised into Table 12, below. The Table presents five different first order categories. The first, 1.0 car parking goals according to stakeholder levels, indicates that stakeholder goals can vary according to their level. For instance, at an individual level (1.1) C explains, “The drivers are trying to keep free parking free and they don't want to pay the costs of travel or the social costs. The drivers that pay are trying to get it cheaper and as close as they can to their destination.” While A rationalises the organisational perspective (1.2), “airports for instance, they raise revenue from their parking. That is their goal, to optimise their return,” and B the governmental perspective (1.3), “The city is trying to achieve a balance between design objectives, economic development objectives, fiscal solvency, and environmental objectives.”

**Table 12 An overview of car parking stakeholder, according to academics**

| First-order category | Second-order category | Description |
|---|---|---|
| 1.0 Car parking goals according to stakeholder levels | 1.1 Individual level | This level refers to both non-consumer and consumer individuals such as pedestrians, public transport users, commuters and shoppers. |
| | 1.2 Organisational level | This level refers to the non-consumer, consumer and supplier groups of stakeholders who have come together in an organised way. For instance, residents are individual consumers who may belong to an association specifically formed to campaign for a better community environment. Other organisational level groups may include chambers of commerce who act on behalf of the business community, or groups who campaign for retailer etc. |
| | 1.3 Governmental level | This level refers to all government levels, including both national and local authority, and includes the range of different roles employed within those levels that parking touches, such as city planners and traffic engineers |
| 2.0 Stakeholder prioritisation | 2.1 Issue and context dependent | The prioritisation of stakeholders can vary according the both the issue and context at hand |
| | 2.2 In parallel with local authority objectives | Stakeholders with interests connected to local authority objects are often prioritised over others with different aims |
| | 2.3 The vociferous | Individuals acting alone or in groups, usually campaigning to protect their own parking interests |
| 3.0 Stakeholder interaction with process | 3.1 A vague process | Very few structures aimed at engaging stakeholders in the decision making process seem to be in place. Responsibility for stakeholder engagement seems to lie with either the stakeholder or the local authority |
| | 3.2 Varies according to place in group and dimensional level | When stakeholders do engage in parking, the ways can vary depending on their place in the stakeholder groups and their dimensional level (individual, organisational or governmental) |
| | 3.3 Complaints | Parking issues are often raised initially as a complaint, often by the user |
| | 3.4 The media | Parking issues are often raised through media channels |
| | 3.5 As part of a long term strategic plan or vision | where cities use parking to help achieve a long term strategic plan or vision, stakeholder engagement may become part of the process |
| 4.0 Stakeholder perspectives of car parking | 4.1 Insufficient understanding | Mostly, measures of stakeholder satisfaction are deficient, absent or unknown. Indicators of dissatisfaction are driven through stakeholder complaint, or observations of parking availability or accessibility |
| | 4.2 Discrete perspectives | Stakeholder perspectives of parking issues do not usually take other stakeholder perspectives into account |
| | 4.3 Consideration of other stakeholder perspectives | Consideration of other stakeholder perspectives of parking is usually given only in cases where financial gain is under deliberation |
| | 4.4 Limited and lacking in knowledge | Stakeholder perceptions of parking issues are unlikely to be based on either thoroughly understood research or intelligence |
| | 4.5 Inadequate policies | Stakeholder perceptions of parking issues result in ineffectual policies |
| 5.0 Barriers to stakeholder engagement | 5.1 Incongruent stakeholders | As stakeholders are representative of different groups, barriers such as unequal power or unrelated goals are more likely to impact on their ability to engage |
| | 5.2 Political sensitivity | As parking is an emotive topic it may be considered politically sensitive |
| | 5.3 Lack of well-informed knowledge | Due to the complex nature of parking, parking policies are not fully understood. People are often unaware they are not fully informed resulting in a misguided approach to parking |
| | 5.4 Apathy | An uninterested approach to parking serves as a barrier to engaging in parking decision making. Where engagement has been attentive, people have shown support for the policies implemented |

With regards to stakeholder prioritisation (2.0), D feels that the retail community is both In parallel with local authority objectives (2.2) *and* vociferous (2.3) “Retailers are a reasonably well-organised lobby, and local government is bothered by the strength of town centres and sees that as their priorities, so retailers are more vocal.” Concerning their interaction with the car parking process (3.0), A explains how it can vary according to their place in the group and dimensional level (3.2), “Some engagement is ad hoc and some engagement is formalised. It could even be a pet topic for a councillor for example.”

Under the first order category, (4.0) Stakeholder perspectives of car parking, G refers to the stakeholders as taking “A purely selfish point of view”, with regards to 4.3 consideration of other stakeholder perspectives. In reference to 4.4 limited and lacking in knowledge, G believes that stakeholders behave “With very little knowledge and very little thought, and usually subscribing to ideas about parking that they would never take seriously about something that they really knew about.”

One of the barriers to stakeholder engagement (5.0) is incongruence (5.1), as expressed by E, “From the perspective of the private sector, they don't like the public scrutiny, the open process and the politics that are involved in permissions to change parking.”

### 5.2.2 Step 1: Car parking issues according to academics

Table 13 presents the academics perceptions of what the key car parking issues of concern are to stakeholders and how they believe that these issues are currently being addressed. The academics described various car parking *characteristics* which they considered were common causes of most car parking issues troubling car parking stakeholders.

The second order categories 1.2-1.6, were felt by the academics to be of equal significance, however 1.1 *Land used for parking limits other opportunity uses*, was of particular interest to the academics located in America. H referred to dilemmas and consequences, “Cities in America provide way too much parking. By providing more parking they think they are competing with the suburbs and it actually has the exact opposite effect. We find that in cities with the highest amount of parking, there is less population and less jobs per square mile.” G was also frustrated by parking’s emotional characteristic, “Expert knowledge is given no credence compared to emotional knowledge.” He felt that this resulted in, “terrible parking policies.”

2.0 *Potential parking issue solutions*, has three second order category subsets which the academics identified as commonly implemented in policy practice. Dissatisfaction for all three subsets was conveyed across the academics with G venting particular disapproval for 2.3 *Free*

*or low cost to the user*, “If you're giving away something for free, and there are many who do not need it, it leads to a lot of abuse.”

**Table 13 Car parking issues affecting stakeholders, according to academics**

| First-order category | Second-order category | Description |
|---|---|---|
| 1.0 Characteristics of car parking issues | 1.1 Land used for parking limits other opportunity uses | The impacts of dedicating land to parking which then limited other opportunity uses is magnified in urban environments where land is more scarce and populations are higher |
| | 1.2 Parking is complicated | The potential of parking is not fully understood or sometimes recognised. Parking spans both transport and land use, consequently understanding the impacts on one in an effort to resolve the other can be challenging |
| | 1.3 Parking problems usually exist in areas of density | The majority of parking problems are mostly linked to the urban environment |
| | 1.4 Parking is one component | Parking is a part of a mechanism used to achieve a broader aim. For instance, parking can be used alongside improved public transport provision to contribute towards influencing travel behaviour |
| | 1.5 Parking triggers emotion | People often trivialise parking offences, possibly because they believe that parking should both be provided and be provided for free as a matter of course. This can lead to people becoming emotional about parking Some people are starting to take a different attitude to parking |
| | 1.6 Challenging decision making | Parking decisions are challenging due to both the complex nature of parking and a volatile stakeholder environment |
| 2.0 Potential car parking issue solutions | 2.1 Pricing | Parking pricing is often seen as a less effective policy, particularly when compared with road user charging (RUC) |
| | 2.2 Oversupply | Particularly in the US, parking policies have traditionally supplied more parking than might otherwise be required |
| | 2.3 Free or low cost to user | Parking is often provided to the user for free or at a low cost |

### 5.2.3 Step 1: How stakeholders value parking according to academics

The different ways that stakeholders may value parking according to the academics are presented in Table 14, below. It shows the second-order categories in no significant order except for 1.1 Objective based, as the majority of academics felt that how stakeholders might value parking was almost entirely dependent on their primary objective. For example C, “Value is about objectives.” Possibly, the remaining second-order categories may be construed to be stakeholder objectives but the academics spoke about them in terms of *values*. For instance regarding 1.7 *Lifestyle facilitator*, E believes that, “Parking allows you to have accessibility to whatever it is you're doing. It's the most important factor in the way that people value parking.” And B agrees, “Parking is something that makes their lifestyle possible.”

**Table 14 Stakeholder value of car parking, according to academics**

| First-order category | Second-order category | Description |
|---|---|---|
| 1.0 Stakeholder car parking values according to academics | 1.1 Objective based | The value of parking for most stakeholders is motivated by their end goal |
| | 1.2 Revenue stream | For some supplier stakeholders such as parking operators, parking is valued as a direct source of revenue<br><br>For some supplier/ consumer stakeholders such as airports, parking is valued as a supplementary source of revenue<br><br>For some supplier / consumer stakeholders such as independent retailers, parking is valued as an indirect source as they believe that customers rely on parking in order to access their premises |
| | 1.3 Policy facilitator | Some cities may value parking as something which they can use to help them realise their wider vision |
| | 1.4 Lack of complaints | As local authorities respond to complaints, a lack of complaints potentially liberates them to focus on other issues |
| | 1.5 Unwanted cost | Some stakeholder suppliers of parking are required to provide parking and incur the cost |
| | 1.6 User perspective | The user value of parking is the main perspective through which the value of parking is viewed (it comprises multiple factors) |
| | 1.7 Lifestyle facilitator | Most users value parking as something which enables them to go about their daily lives, particularly if they are not charged for their parking |

## 5.3 Step 2 Results: Sector leader interviews

The results of the sector leader, car parking stakeholder group interviews are first presented by their respective stakeholder group, again in Table format and in terms of *car parking issues*, *stakeholders* and *the value of car parking*. The results were then further refined to more specific values of car parking and defined by either positive, negative, or both, values of parking. Following this is a Table which outlines what influences the different groups to value car parking in the different ways that they do. The immediate sections consider each stakeholder group in turn, beginning with the non-consumers of car parking.

### 5.3.1 Non-consumers

Table 15 below presents the results of the non-consumer sector leader interviews.

With regards to car parking issues (NC1.0), the non-consumers seemed particularly concerned that car parking was having a negative impact on public space (NC1.1) which they felt was ignored by policy decision makers, NC1, “People parking on the footpath is a critical issue as it’s advocating the space to vehicles . . . it enforces the ownership of space by *vehicles* rather than by *people*.” NC2 supported the idea that parking intrudes into space allocated for other purposes, “The single thing which is the biggest in terms of the scale of our engagement, is probably going to be the one of parking on the road sections of the National Cycle Network, both legally and illegally.”

**Table 15 Sector leader interview results, non-consumers**

| 1st order category | 2nd order category | 3rd order category | Description |
|---|---|---|---|
| NC 1.0 Car parking issues | NC 1.1 Impact on public space | NC 1.1.1 Unchallenged dominance | Customary occupation of public space by cars potentially detrimental to a public space's intended use |
| | | NC 1.1.2 Inadequate compensation | Parking can devalue public land leaving negative aspects such as social, economic and environmental impacts inadequately recognised or compensated for by the consumer |
| | | NC 1.1.3 Parking breeds parking | Expectation for supply may attract habitual behaviour, a viral reaction, a disregard for alternatives and consequently unsustainable provision |
| | NC 1.2 Car parking management | NC 1.2.1 Parking for profit | Profit driven decisions, heightened by austerity and a lack of transport policy integration can reduce opportunities for community gain choices |
| | | NC 1.2.2 Ill-informed and inconsistent policies | Varying understanding of links between parking and sustainability plus isolated application of policy can mask the adequacy / inadequacy of supply |
| | | NC 1.2.3 Inequity | Imbalance between parking consumers and non-consumers: disproportionate car to cycle provision; range of modal choice information; some consumer employees experience parking benefits. Inequity between individual consumers: policies indiscriminate between managing parking demand and understanding parking necessity (elderly, disabled community) |
| NC 2.0 Car parking stakeholders | NC 2.1 Key perceptions | NC 2.1.1 Individual users | Disproportionate consumer consideration reflected in policy choices; dislike parking charges and levies (including residential parking schemes) |
| | | NC 2.1.2 Retailers | Customers arrive in cars |
| | | NC 2.1.3 Governmental | Parking policy decisions are influenced both by those with commonly held misconceptions about parking, for instance the Local Business Sector, and according to the geographical political landscape most active at the local level |
| | NC 2.2 Non-consumer interaction | NC 2.2.1 Advisors | Advice sought by some local authorities regarding broader transport policy change may touch on parking policy |
| NC 3.0 The value of car parking | NC 3.1 Non-consumer perspective | NC 3.1.1 Negative | The detrimental impact parking has on public space |
| | NC 3.2 Perceptions of other group's value of car parking | NC 3.2.1 Positive | Advantageous across the groups: financially, politically and in terms of social gain (enabler of access to amenities in daily life) |

Of car parking management (NC1.2), NC1, “People see parking as something that they have to sort out profitably rather than as something you have to manage . . .There is no consistent application, and no consistent relationship between parking management and sustainable transport promotion.”

When considering key perceptions (NC2.1) of the first order category, car parking stakeholders (NC2.0), NC3 described a misconception, “We did a survey where we asked retailers how they thought their customers arrived, and then we asked the customers what the reality was, and the retailers massively, massively overestimated the importance of the car in the access of their customers to their business.” Likewise NC1 described an objection, “I think people have a community perception that somehow it's an insult to have to pay for parking, and yet you're occupying public space, and I think that how you impact on the public space should be reflected in a pricing structure.”

The negative value of car parking (NC3.0) that this group of stakeholders seemed to have was described by NC1, in terms of its impact on the value of land use, “In central London, (the Royal Borough of Kensington and Chelsea) it costs about £350 a year for a resident’s parking permit if you compare the space occupied by your car for that permit and how much you would pay for that much space in a flat, the value we place on public space is much lower than the value we place on commercial space, or residential.”

### 5.3.2 Consumers

Table 16 below presents the results of the consumer sector leader interviews. Of C1.0, car parking issues, C4 expressed reservation regarding the devolution of powers to a policy level, “There is a perception that the individuals responsible for its implementation are free to conclude their own interpretations of central government guidance.” Likewise, C1 felt concern over devolution;

“*What needs to be considered is that by the time these policies get around to every local authority they may become somewhat diluted, or people may not understand, simply because some cities may not have the resources to collect data in their area to see the effects of various policies that they might be implementing.”*

Indeed, C2 was concerned about inequitable policies (C1.2), “Parking for some groups such as the disabled can be so inaccessible that access to facilities and daily life activities can be denied.”

With regards to C 2.1 key perceptions, C3 spoke of a misconception, “I think there is a misguided perception that it's not about road traffic safety, and the management of space. Instead it is a misguided belief that it is to maximise revenue and make things inconvenient for the motorist.” And with respect to how the consumer group valued car parking (C.3.0), C1 was positive, stating, “If car parking’s being used during the day to give a whole lot of other people

access to the city centre then I think there is an increased value on that car park land;" as was C3, "We value it really highly . . . we have to have parking, it's as fundamental as that." While C2 called for more, "I think that parking needs to have more value and more investment than it currently does," suggesting that the supply of car parking could be better prioritised.

**Table 16 Sector leader interview results, consumers**

| 1st order category | 2nd order category | 3rd order category | Description |
|---|---|---|---|
| C 1.0 Car parking issues | C 1.1 Devolution | C 1.1.1 Open to interpretation | Parking guidance from central government delivered to local authorities can be both open to interpretation and independent of other issues |
| | C 1.2 Unrefined policies | C 1.2.1 Inadequate parking | Some individual consumers (elderly, disabled community) denied due to inaccessibility, cost or poor management of supply |
| | | C 1.2.2 Multiple enforcement regimes | Traditional, civil or contract law enforcement of parking |
| C 2.0 Car parking stakeholders | C 2.1 Key perceptions | C 2.1.1 Individual users | Car ownership grants a right to park; lack of empathy for individual user groups such as those from rural communities or the disabled who have limited modal options; charging consumers to cover costs of parking considered fair |
| | | C 2.1.2 Supplier: public / private | Supply is motivated by profit and of poor quality or provided for free and recouped from the Local Business Sector |
| | | C 2.1.3 Governmental | Policies designed to restrict driver freedom, can be susceptible to political prejudice and too rigorously enforced |
| C 3.0 The value of car parking | C 3.1 Consumer perspective | C 3.1.1 Positive | Benefits: an efficient use of land, facilitates access, sustains economic activity |
| | C 3.2 Perceptions of governmental value of car parking | C 3.2.1 Positive | A transport panacea: consumer perception of transport officials is that they value parking as a cure-all for transport disorders |

### 5.3.3 Local business sector

Table 17 presents the results of the local business sector leader interviews. The challenges facing local authorities regarding car parking (LBS 1.0) were acknowledged by LBS2, "Local authorities tend to juggle with very limited budgets and their enforcement [of car parking] is consistently challenged with ever changing legal requirements;" while the competition between out of town and town centre retail is suggested to hinge on car parking supply and associated charges/free parking, LBS2;

*"They [consumers] don't like paying for parking so that is why out-of-town retail sites are doing a lot better, because people don't have to pay to park. Whether that rationale is correct I don't know, are you getting better value by driving out to retails parks instead of going into town? I don't know. . .*

*. . . Because of the [town centre] parking you can be quite restricted. People feel that they're not getting value for money sometimes from the parking tariffs in the town centre."*

Regarding stakeholders (LBS2.0) and their key perceptions (LBS2.1), the idea of a 'windscreen perspective' held by drivers was referred to by LBS2 and was defined in more detail as a *perception* by LBS1, "One of the perceptions that drivers have, is that if you are in a car then you should be able to park where you want. That mind-set comes on just from getting behind the wheel." That car parking can attract buyers (LBS2.1.2) was also considered to be a key perception, as discussed by LBS3, "A developer who wants to build an out-of-town or city centre development, if they have parking bays and free parking associated with it, it is perceived as quite a benefit . . . I think it's a good sales tool . . . it helps to increase the rental values of these properties."

Both positive and negative values of car parking (LBS 3.1.1) were derived from the data. For instance, car parking was valued *positively* as a commercial product, LBS2, "I value it as a commercial product. A good car park operation is also a good traffic flow operation. If I allow my car parks to go full or not flow properly they would close. I value it very highly;" but negatively by LBS1;

*"Rationalising parking within the town centre to make it more pedestrianised . . . the traders and retailers don't understand, they see rationalising car parking as a threat. The local councillors also see it as a threat because they are listening to the concerns of the retailers. . .*

*. . . It can work because it would increase the footfall and therefore the economic vitality and make the whole area much nicer, and much more pleasant to be in. It's difficult to sell but it's not an impossible sell. I think initially people don't have that understanding but they appreciate and understand it when it's actually done."*

**Table 17 Sector leader interview results, local business sector**

| 1st order category | 2nd order category | 3rd order category | Description |
|---|---|---|---|
| LBS 1.0 Car parking issues | LBS 1.1 Local authority dilemmas | LBS 1.1.1 Complex challenges | Devolution; conflicting objectives (sustainable access while encouraging economic activity); parking enforcement dilemmas |
| | | LBS 1.1.2 Residents | Local authority intervention prompted by conflict between residents and non-residents (commuters, shoppers), if deemed unsatisfactory can result in residents taking action (paving front gardens to increase supply) |
| | | LBS 1.1.3 Free car parking | Town centre competition with out-of-town ample free parking (retail sites); ability to prompt negative modal shift and cause environmental, transport and social detriment |
| LBS 2.0 Car parking stakeholders | LBS 2.1 Key perceptions | LBS 2.1.1 Individual users | Consumer perspective is dominant; parking is a grudge purchase |
| | | LBS 2.1.2 Developers | Parking integral to a development site in areas of density, can be used to attract buyers |
| | | LBS 2.1.3 Local authorities | Lack entrepreneurial flair, considered to use parking as a 'cash cow' and often use it as a political football to gain constituent support |
| | | LBS 2.1.4 Supplier: public / private | Poor communication and a blinkered approach can stunt progress across sectors; resource disparity can create private sector dominance |
| LBS 3.0 The value of car parking | LBS 3.1 Local business sector perspective | LBS 3.1.1 Positive and negative | Positive: a commercial product. Negative: rationalising parking to improve town centre appeal |

### 5.3.4 Parking industry

Table 18 below presents the results of the parking industry sector leader interviews.

**Table 18 Sector leader interview results, car parking industry**

| 1st order category | 2nd order category | 3rd order category | Description |
|---|---|---|---|
| PI 1.0 Car parking issues | PI 1.1 Consumer focussed industry | PI 1.1.1 Provision and funding | Frustrations from inadequate provision issues experienced by individual users have been responded to by the parking industry. Passing the costs onto the consumer intensifies a negative emotional response to paying for parking |
| | | PI 1.1.2 Supplier challenges: public / private | Both sectors find parking difficult to understand; both sectors challenged by consumer tactical parking behaviour but less so in the private sector (airport, retail sites) than in the public sector (navigation through town centres); dual (public and private) parking enforcement regimes in operation |
| | | PI 1.1.3 Local authority quandaries | Non-specific guidance from central government; inadequate solutions to commuter parking in residential areas; income needed from parking charges is resented by the consumer |
| PI 2.0 Car parking stakeholders | PI 2.1 Key perceptions | PI 2.1.1 Retailers | Parking directly impacts on the retail community's economic success |
| | | PI 2.1.2 Parking industry | Parking can be costly to provide both economically and environmentally and often of poor quality; local authorities reluctant to relinquish ownership of outdated facilities; industry led communication network |
| | | PI 2.1.3 Local authorities | Political pressure to satisfy constituents result in parking solutions (park-and-ride sites) which may not be environmentally beneficial |
| PI 3.0The value of car parking | PI 3.1 Parking industry perspective | PI 3.1.1 Positive | Parking industry pride; private operator success; ability to enable individual user access; convenience; safety; price |
| | PI 3.2 Perceptions of individual user value of car parking | PI 3.2.1 Positive / negative | Convenience; price; safety |

The reasons why car parking has become a consumer focussed industry (PI1.1) are clear to PI1, *"Most people want to leave their cars somewhere and it can be a major problem at the beginning and end of journeys and so it has developed into an industry, an industry around finding places to leave the motor car."* Likewise, the perceptions of the quality standards of car parking provision are understood by PI4,

*"There are issues to do with the quality of parking provision, both on and off street, and a question about the cost of parking operation in some instances . . . if the consumer pays for something then they have expectations about the quality of the service that they are purchasing.*

*To me, free parking sounds great, but actually it doesn't do anything for the quality of the service."*

With regards to how the parking industry value car parking, (PI 3.0), PI2 believes that, "most people choose car parking on the basis of convenience and price. Third and we would like it to be second, is safety." There is both a positive and negative view of using land for car parking, as expressed by PI1;

*"It depends on the land that you're using. The whole highway infrastructure is designed to get you from one parking space to another, so is the whole highway infrastructure an efficient use of land? . . .*

*A car park that's used every day is probably efficiently used. If you create a massive car park for Glastonbury that is only once a year then it's probably not an efficient use of land, except for that one time in the year when it is being used, the rest of the year it can be more efficiently used as agriculture."*

### 5.3.5 Governmental

Table 19 below presents the results of the governmental sector leader interviews.

**Table 19 Sector leader interview results, governmental**

| 1st order category | 2nd order category | 3rd order category | Description |
|---|---|---|---|
| G 1.0 Car parking issues | G 1.1 Local authority dilemmas | G 1.1.1 Understanding | Devolution of parking powers has led to varying degrees of understanding at a local level; local authorities frustrated by public lack of understanding of local parking policies (charging for parking to manage demand rather than for profit); other stakeholder groups have general awareness of governmental objectives |
| | | G 1.1.2 Residents | Local authorities required to intervene in residential areas regarding competition for limited supply |
| | G 1.2 Using land for parking | G 1.2.1 Central government | An essential land use which must be balanced against competing land uses |
| | | G 1.2.2 Regional | An efficient use of land to enable local access particularly in rural areas where modal choice is limited |
| | | G 1.2.3 City | Balancing encouraging sustainable modes with making decisions to stimulate economic activity during times of austerity |
| G 2.0 Car parking stakeholders | G 2.1 Key perceptions | G 2.1.1 Governmental | Politically influenced policies; a bureaucratic process with potentially inadequate structures; limited resources may curb progress; inability to satisfy all stakeholders equally |
| | G 2.2 Key policy influencers | G 2.2.1 Politicians | Pressure from residents instigates political involvement in parking policy |
| | | G 2.2.2 Media | Views of the consumer reflected by the media can fuel the parking debate and potentially incite policy change |
| G 3.0 The value of car parking | G 3.1 Governmental perspective | G 3.1.1 Positive | Facilitates access; revenue stream; as part of an efficient transport system; a stimulating challenge |

An example of a local authority dilemma (G1.1) was given by G3,

*“Speaking as a local authority, the big issue that we have is that we charge for our off-street car parking bays; we charge for our multi-storey car parks; and we charge for our off-street car parks; and we have private companies that do the same. But five miles down the road there is a large shopping centre that has 10,000 free car parking spaces. Is quite a big issue, because parking revenue is very important for a local authority”*

Another is given by G1, “People cling on to strange notions of their right to park on the highway outside their home without exception. . . but there is a reluctance to accept that there is a cost to *everything* and it's just a question of who bears that cost.” Furthermore, is the desire to strike the right balance where using land for car parking is concerned (G1.2), as deliberated by G3;

*“I suppose it depends on your land-use policy to start with, or your vision of localism, and your vision of a sustainable future. In strict commercial terms parking space can be an incredibly commercially viable asset. . . [and] in more rural settings the need for car parks becomes greater because the opportunity for modal shift reduces significantly.”*

With regards to car parking stakeholders (G2), politicians seem to feature as key policy influencers (G2.2.1) as G1 explains how important car parking is to them;

*“Every politician I meet impresses on me how full their post bags are with letters about parking and of course anything that's important to the average person on the street is going to be important to a politician because they can see a vote from it.*

*Equally, the firmly held belief that retail needs parking plays neatly into political hands as it’s something that they can directly influence. They [politicians] will do anything for the short-term gain. Long-term in politics is probably Saturday, that's as long-term as it gets. I think it has an enormous effect on politicians.”*

Finally, the value of car parking (G 3.0) seems to include being a positive facilitator of an efficiently managed transport system. For instance, G2 felt that car parking can have a positive effect on, “Dealing with congestion on the roads, effectively managing road space, promoting economic growth, and also issues such as road safety and time savings.” G3 also noted the significance of the value of car parking, “It's an integral part of our transport policy for the city.”

### 5.3.6 Stakeholder values of car parking

The sector leaders speaking from the perspective of representing the stakeholder groups define their value of parking in eight different ways organised into a matrix, Table 20, below. How the groups value parking is expressed in either a positive way, as a *gain* as they are gaining something that they value, or in a negative way, as a *loss* as they are losing something that they value, or both, such as in the cases of the local business sector, parking industry and governmental groups, which interchange between the two depending on the context of the value.

**Table 20 Stakeholder value of car parking**

| | Non-consumers | Consumers | Local business sector | Parking industry | Governmental |
|---|---|---|---|---|---|
| Efficient use of land | - | + | + / - | + / - | + / - |
| Impact on public space | - | | + / - | | |
| Facilitates access | | + | | + | + |
| Sustains economic activity | | + | | | |
| A commercial product | | | + | | |
| Revenue stream | | | | + | + |
| Convenience, safety and price | | | | + | |
| Part of an efficient transport system | | | | | + |

In the first instance it is visible from Table 20 that the non-consumer group entertain no positive ways to value car parking, Instead they take a negative perspective on two different ways that parking can impact on the environment. In contrast, the consumer group is singularly positive demonstrating values focussing on the environment, access and economics.

The remaining three groups appear divided on at least one environmental value. The local business sector assumes a similar division about an additional environmental value but holds a positive value of the commercial aspect of parking. The parking industry and governmental groups are equally weighted but with one point of difference. The parking industry group

exclusively holds a positive value of the combined *convenience, safety and price* and the governmental group is positive in reference to an efficient transport system. No single group holds all eight values and it seems that occupying a central place in the matrix enables the local business sector to see both sides of a value, which may be indicative of their position within the macro environment. Each of the eight values are explored in turn.

*Efficient use of land*

The question, *do you consider that using land for parking is an efficient use of land*, is responded to by all interviewees. Three of the non-consumer group place a negative value on using land for car parking (NC3 is the exception, “you need to strike a balance”) and NC1’s response is representative, “It's a highly inefficient use of space.” The non-consumer group responses concern wider implications than the unrefined issue of, ‘efficient use of land,’ such as a lack of priority for cycle parking (NC4) and a car dominant mind-set of policy makers (NC2). The non-consumer group seem conscious of the impact parking has on land use only in terms of a loss and therefore manifests as a strong negative value of parking.

In contrast, the consumer group maintains a positive view as they believe that, in some circumstances, using land for parking carries two key gains, facilitating access and helping to sustain economic activity. C1, “I feel that the car brings enormous benefits to sections of the population . . . [the elderly] are engaged in community life, they are also far more self-sufficient than they might be if they were relying on lifts or relying on public transport.” C2 expresses a similar sentiment with regards to the disabled community who are often challenged by alternatives. C3 speaks economically, “For local economies parking is the lifeblood. It is essential to the community and to the economy.” C4 agrees, “If land used for parking contributes to economic activity then there is nothing wrong with that.”

The rest of the groups are divided. On the one hand there is negativity, LBS1 feels that local authorities should, “Hand the town centre back over to pedestrians,” by rationalising its parking and PI4, “If you look at land costs, almost everywhere in the city it would be more economically beneficial to use the land for something else other than parking.” Yet, on the other there is positivity, G1, “Broadly, yes. In as far as its necessary to get people to and from places.” PI1, 2, 3 and G2, and use the phrase, “It depends,” and then describe a balancing act between competing land uses, commercial viability and environmental impacts.

*Impact on public space*

This is a priority for the non-consumer group and stimulates a negative value of car parking as they perceive that it can place public space at risk of experiencing a loss. NC1 gives a typical response from the non-consumer perspective, “People bring vitality, life and economy to a space whereas cars bring dead space to public areas. . . parking on the footpath is a critical issue as it’s advocating public space to vehicles . . . it takes away space for people to walk in and enforces the ownership of space by vehicles.” NC2 raises broader losses potentially caused by parking’s impact on public space such as a loss to quality of life and a negative economic health value.

The issue is not referred to by the other groups except by the local business sector which is split over the matter. On the one hand there is empathy for the non-consumer group’s view, LBS1, “It shouldn’t be allowed to override or displace other attributes of society, or the natural and built environment.” Yet, on the other, there is potential for commercial gain for elements of the local business sector if they are in a position to satisfy demand, such as in the case of developers, LBS1, “Integral parking is perceived as quite a benefit to prospective tenants.”

*Facilitates access*

The consumer group give a sense that parking is intrinsic to everyday life as it enables lifestyles by providing accessibility, which they value as a positive gain. C1, “Parking is important because it allows all of us to do what is considered to be very normal activities that make up life in the United Kingdom. That's engaging in work, sporting activities, social activities, and so on.” C3 agrees and C2 emphasises its importance to particular groups such as rural communities who are otherwise restricted by a lack of alternatives. C4 reiterates the perceived positive gains, “There are many social advantages to car park provision in the same ways that there are social advantages to owning a car.”

Comparable responses emerge from the parking industry. PI1, “Society is dependent on the motor car. Therefore if we want to be a car owning, car-borne society we have to manage parking.” PI4 also sees the positive gains from access and PI3 is consistent yet mindful of the challenges involved, “Parking is an essential part of any journey. You have to have somewhere to park; the question is, what the most efficient way of doing that?”

The governmental group also positively value parking's ability to facilitate access. At a regional level, G1, "It isn't so much to do with parking it is actually to do with access. So let's equate parking with access more readily, let's not make it all about the car." Parking facilitating access and the consequential potential business and community gains is underlined at the national level by G4, "Parking plays an important role for both business and leisure; without it we would not be able to access even our most essential amenities."

*Sustains economic activity*

Sustains economic activity is inferred as a way in which the consumer group find positive gains and therefore value from parking and in particular, *free parking*. For instance, C2's response is representative of the consumer group, "Out-of-town shopping centres have free parking and so customers go out-of-town. What is happening today is that there are fewer shops on the high street, one of the reasons for this I'm sure of, is that parking is so expensive." Valuing parking through its potential ability to sustain economic activity is not referred to by the other sector leaders except for G1, at a regional level, who is sceptical about the motivation behind pro-free parking opinion, "This link between business viability and free parking is a growing one and I have a feeling that it's almost used in some cases as an excuse by smaller shops. *My shop is failing because you've made parking more difficult*, is something I hear even when I show them that I've actually made parking easier and more people are getting there as a result, they still insist on taking the irrational sort of view."

*A commercial product*

The local business sector group allude to a positive value of parking by treating it as a commercial product, LBS2, "I value it as a commercial product." The rest of the group discuss their perceptions of the local business sector environment and how car parking be indirectly used to attract commercial gain. LBS1 whose employer provides consultancy to various entities including developers believes that "Parking is still seen as a benefit, or an advantage, or as a value for developments." Likewise, LBS4 is representative of an organisation with a significant retail portfolio, "Parking is important to me and my business as it provides a major role in our properties." These statements are supported by a sector leader from the governmental group G1, "In strict commercial terms parking space can be an incredibly commercially viable asset," indicating that the local business sector can realise a positive commercial gain from parking, despite it not being their priority business. Most surprising perhaps, is that the word *commercial*, does not feature in any of the parking industry's transcriptions.

*Revenue stream*

Positive gain from parking as a revenue stream is inferred by both the parking industry and the government group's transcripts. From the parking industry perspective, PI1, "Parking is a revenue generator," and PI2 and PI4 expand by detailing how the positive gains can be felt by the user, PI4, "Income needs to go back to the motorist in the form of better quality, facilities, better management, and through the work of Park Mark by the British Parking Association (BPA)." P2, "If you put the right amount of resources in parking has a value to the customer but if parking is given no value, then it has no value."

From the governmental perspective, G4 (national level), "Parking is an important funding stream for local authorities, even more so given the wider financial constraints in which we find ourselves." Equally, the positive value of a revenue stream is emphasised by G3 (local level), "Parking revenue is very important for a local authority . . . The revenue is reinvested into public transport . . . So it's important in terms of our wider transport priorities in the city."

This is further supported by a sum of speculative remarks made by the other stakeholder group respondents, aimed predominantly at the governmental group. PI4's comment is characteristic, "Parking does give them an income and increasingly these days it is an important income particularly in times of austerity." Yet PI3's observation is representative of an underlying unease or suspicion about the issue, "They strenuously deny that they are using parking as a way of generating income . . . it clearly does provide a contribution towards their finances."

*Convenience, safety and price*

Convenience, safety and price are value perceptions held by the parking industry regarding how they perceive that the individual users they serve receive positive gain from parking. PI2, "Convenience is always going to be the first choice, and when having a choice, choose the safe one, rather than the cheapest one. So convenience, safety, price is my view." Two of these values, 'convenience' and 'price,' are understood by PI3 who describes a troubling example of how an outpatient might value parking, "It may seem unfair to charge somebody who is going for cancer treatment to park their car at a hospital, however it may be a better thing than not charging and that person not finding a space because they've been taken up by a lazy commuter who can't walk a bit further to another car park and pay for parking." This is supported by PI3 who is fearful of the impacts of an increasing trend to make hospital parking free of

charge leaving patients struggling to find available spaces, “What was called the *tax* on the sick has now become an *attack* on the sick.”

Price is raised by the majority of the consumer group and their comments imply that they generally accept paying for parking, C1s remark is typical, “I think charging for parking is entirely fair, simply in terms of paying for a service which somebody has had to provide.” The other groups take a similar view by describing priced parking as, NC3, LBS4 and G1, “necessary,” NC2, “fair”, G2, “logical,” NC1, “I take a user payer approach to this”, G4, “it is important that we have a system that is fair to the motorist, but which also recognises the cost of regulating and maintaining parking facilities.”

Priced parking concerns all of the stakeholder groups, yet only the parking industry seem to understand its potential as a positive gain or *value* to the consumer, such as to an outpatient. Instead, the consumer group, along with the other groups, perceive cost as an expected part of a parking activity and are less attentive to its broader potential. With regards to ‘convenience’ and ‘safety,’ the consumer group seem to prefer to discuss *access* to enable a lifestyle (5.1.3), adding a depth to the value. Safety is absent in all the different group’s transcripts, except for C2 who links the *safety* of parking facilities with *price*, concluding safety to be a minor concern outside of the parking industry.

*Part of an efficient transport system*

This is of positive value to the majority of the governmental group. G3 (local level) gives a typical response to the question, *How do you value parking?*, “Parking is an integral part of our transport policy for the city and for the city centre. Our policy in the city is very clear, we will continue to accommodate the car and we will promote public transport.” G4 (national level) develops the point further, “I want a system of parking which supports local businesses and allows local residents and visitors to access our towns and cities conveniently. But it must also help to ease congestion, thereby reducing the time taken to navigate urban areas cutting unnecessary emissions.”

The perceived positive gains resulting from a vision of an efficient transport system demonstrates a depth of understanding by the governmental group of the range of issues that parking can impact on. This is not articulated by the remainder of the sector leader interviewees as discussion is dominated by specific issues, such as managing the high street (NC1), parking

on private land (PI2) or adequate provision (PI3), despite asking all the groups an identical set of questions.

### 5.3.7 Stakeholder value context (Multiple Attribute Decision Environment)

The ways in which the stakeholders describe how they value parking are influenced by a range of parking issues which the sector leaders drew attention to during the interviews. These provide the context for the stakeholder values and comprise the MADE as per SVA and are classified into three key groups: government, land use and consumer (see Table 21)

**Table 21 Stakeholder value context**

| | | Non-consumers | Consumers | Local business sector | Parking industry | Governmental |
|---|---|---|---|---|---|---|
| Key influencers of how stakeholders value parking | Government | ● | ● | ● | | ● |
| | Social | ● | | | | ● |
| | Consumer | | | | ● | |

Each of the key contexts are explained in further detail next.

*Government context*

Four of the five stakeholder groups express negative concerns about issues related to the government, as given in Table 22 below.

**Table 22 Value context, government**

| Influencer | Concern | Description | Elicitations |
|---|---|---|---|
| Government | Parking management | Inconsistency, inadequate policies, insufficient understanding of parking | "There is no consistent application [of parking policies]" (NC3)<br>"There is a willingness on the part of the person setting the policy to do it their way" (C3)<br>"At a local level parking can be a key political football" (LBS1)<br>The UK Coalition Government has pledged to protect and extend the autonomy of local authorities, and I am keen that they take decisions like this which impact their local areas (G4 national level) |

The devolution of UK parking powers from national to local levels is of particular concern and is frequently held responsible by the stakeholder groups for leaving some local authorities feeling isolated and deficient in essential knowledge and expertise, which they believe is necessary to enable them to resolve their local issues. As the instigators of devolution, the UK government

national level seems determined to persevere and encourage a local approach. Through their lack of references the parking industry gives a sense of operating independently from government, possibly due to a lack of national guidelines and standards.

*Social context*

The social context is of most significant concern to the non-consumer and governmental groups and seems to stem from concerns over land take for the purpose of car parking, Table 23:

**Table 23 Value context, social**

| Influencer | Concern | Description | Elicitations |
|---|---|---|---|
| Social | Unchallenged user dominance | Inadequate compensation, competing land uses, centralised amenities, a stimulator of economic activity during times of austerity | "If we reduce the amount of parking, we can increase the amount of public space that is available for people to walk and spend time in. . . how you impact on public space should be reflected in a pricing structure, but people don't feel they should have to pay for parking, they feel annoyed about it and that public space should be managed for parking" (NC1)<br>"Car parking is an efficient use of land . . .but it has to compete with other demands for the use of land" (G2 national level) |

The non-consumer group perceives that the government consistently deliver car dominant policies in terms of the broader social context. Thus disseminating a distorted view of what optimal land uses might otherwise be. For the non-consumers, a consequence of witnessing a car dominant landscape leads to a general tolerance of parking intruding into public space in the absence of any clear alternatives. Public space is found to be something of particular value to the non-consumer group (5.2.6.2) and as such non-consumers feel that government should demonstrate a responsibility for its prioritisation. The governmental levels show awareness of competing land uses but they also experience a broader range of pressures, such as austerity and accessibility, which they perceive as something they must be accountable for and are challenged to prioritise and offset.

C*onsumer context*

The parking industry stakeholder group seems to express their value of car parking through focussing on the consumer such as: facilitates access (5.2.6.3); convenience, safety and price (5.2.6.7). Table 24 presents some of the issues they feel are of concern to the consumer which seem to influence how the parking industry value parking.

**Table 24 Value context, consumer**

| Influencer | Concern | Description | Elicitations |
|---|---|---|---|
| Consumer | Parking provision and funding | Frustrations experienced by users have been responded to by the parking industry yet passing the costs onto the consumer leads to consumer perspective of parking as a 'grudge purchase' | "Individuals have to pay real cash to park, they have to get money out of their purse put it in the machine and the whole process focuses attention on to actually paying money. In addition, people feel that the roads belong to them, they pay our taxes for providing and maintaining them so why should they have to pay any extra to park" (PI3)<br>"There is no such thing as a free parking space. Someone's paying for it so why should that not be the user." (PI2) |

The industry is responsive to consumer parking dilemmas and so endeavour to provide facilities accordingly by delivering competitive standards. It speaks of reforming consumer perceptions of paying for parking as a 'grudge purchase' by supplying consumers with provision and facilities they might instead value, hence *convenience*, *safety and price* (5.2.6.7). Parking consumers are of no concern to the non-consumer group and of secondary value to the local business sector and governmental groups, and as such are scarcely mentioned, but they are of significant interest to the parking industry.

To validate the findings of step two, the results were emailed first back to the sector leader interview participants for comment and then to the experts participating in step three for approval and discussion during their interviews.

## 5.4 Step 3 Results: Experts

The results of the interviews with experts were interpreted to inspire the hypothetical scenario exercise used in phase two of the methodology. They centred around three different, broad topics: car parking policies, the income and expenditure of car parking policies, meaningful yet hypothetical on- and off-street parking strategies. The results of the interviews were configured into Table 25, and will be discussed in turn below.

**Table 25 Step three, interview results**

| | Policies | Income / expenditure | Hypothetical scenarios |
|---|---|---|---|
| E1 | Access | Retail perspective | Tax on out of town retail parks car parks |
| E2 | Trade-off, political sensitivity | Revenue raiser, | Public/private partnerships in off-street parking |
| E3 | Political sensitivity | Revenue raiser | A self-supporting strategy |
| E4 | Local authorities should be more business minded | Revenue raiser, off-street charges help to 'freeze' council tax | Location and convenience |
| E5 | Consistency | Revenue raiser, transparency | Equity |
| E6 | Different governances & political powers: County on-street; City off-street, political sensitivity | Revenue raiser | An integrated strategy |
| E7 | Reinvestment to improve quality, political sensitivity | Tariffs should reflect the market | Using car parks to create a sense of community |
| E8 | Safety, challenge perceptions by raising standards | Tariffs should reflect the market | Location and convenience, Using car parks to create a sense of community |
| E9 | Safety, Reinvestment to improve quality | Tariffs should reflect the market | Safety as a priority |

### 5.4.1 Policy

Of main concern to E1 was reviewing car parking policies where *access* to town centre retail was a priority, "People should be able to access town centres easily and when they arrive it would be preferable to be able to offer high quality facilities." Whereas understanding the ramifications of car parking policies in the context of the trade-offs that result was of significance to E2, who gave this example to make his point:

*"There is the* [named hospital and road] *which is located among Victorian style terraced homes. It has very limited space for parking for both residents and local businesses. The residents complained and demanded a residents parking scheme, yet when they understood the costs involved and realised that they would have to pay what they considered to be a high price for*

*their permits, they abandoned the idea, despite being presented with a convincing business case."*

Both E2, E3 and E7 were mindful of the involvement of politicians when it comes to car parking policies. First E2 with another case:

*"The case in Hulme has been discussed for over five years. Originally, it was driven by a councillor who was a member of* [named] *Party and they were very, very enthusiastic about implementing the scheme.*

*A less interested* [named] *Party Councillor took the seat at an election and took the case on as an election pledge, but it was still dependent on funding which didn't materialise. Since then, the development is imminent and so we are trying again."*

Next E3, who expressed the significance and need for political support to drive car parking policies forward:

*"Highway and parking policy costs are fairly comparable, but parking policies are much more politically sensitive and therefore more expensive in that respect.*

*For instance, there is a new vehicle weight limit restriction strategy underway in various attractive Cotswold villages. This type of strategy seems routine and sensible to the villagers, thus the strategy doesn't face the political opposition that implementing parking charges would, despite the intention behind such a strategy being of equal benefit locally."*

Now E7, who described a challenge of working in a public / private partnership where political input into policy is to be expected:

*"We have to fit in with the council objectives which focus on making parking both accessible and affordable but I think that a conflict exists as the council are also trying to reduce car usage in the city also and the councillors don't want to see an increase in tariffs, so it is important to strike the right balance."*

Aside from political issues, E4 felt that car parking policies could benefit from a change in local authority mind-set. E4, "Local authorities don't appear to be particularly innovative or to spot opportunities that well. I think that they just don't seem to treat parking as a business in the same way that the private sector does." While E5 was interested to see improvements in car parking policy consistency and gave the following example to demonstrate the point:

*"Where the adjacent boroughs of Kensington, Chelsea and Westminster meet, each side of the road has a different set of rules regarding bank holiday Mondays. On the one side, the restrictions are lifted as it is a bank holiday, while on the other, despite it being a bank holiday it is still a Monday and therefore the usual Monday restrictions apply.*

*This sort of confusion reminds me of the decriminalised and criminalised situation that exists with regards to enforcement within the UK. People simply just don't understand that two separate systems exist let alone what the differences are."*

Concerns over policy irregularity were expressed by E6 with regards to the governance of on- and off-street parking and political sensitivity, "It really doesn't help matters when the on- and off-street parking systems operate independently and are governed by different political powers." Furthermore, E7 believed in reinvestment as a means of keeping policies fresh:

*"What we try to do is to keep the profit and then reinvest back into the joint venture. There is always new technology and new markets to reinvest into, such as the way that people pay for their parking. This area has changed so much, we have to keep up with that."*

Similar sentiment was expressed by E8 and E9 whom were both keen to raise car parking industry standards, particularly around *safety*. E8:

*"If the industry doesn't value the car parking they provide then you can't expect the customers who use it to value it either . . . Operators should look for ways to give added value which can help to change perceptions . . . Car parks should feel safe, so operators should be looking to challenge out-of-date perceptions and invest in their offer to make them pleasant and more appealing places for the public to park in."*

Likewise, E9:

*"My car park is guaranteed to be a safe place to park in, that's the whole point about it, that's what makes my car park different from all of the others. You have to invest and reinvest in your product in order to improve the quality and improve the industry image."*

When combined, these results indicated that the experts were clear in how they saw car parking policies currently and how they thought that they would like to see them advance in the future. Some responses gave simple solutions such as more consistency in approach, which they felt had the potential for significant impact, while other responses highlighted frustrations, particularly with respect to political impact.

### 5.4.2 Income / expenditure

With regards to car parking and income and or expenditure, E1 expressed the retail perspective and how they believed that it was important to the extent that its provision could remedy falling sales. He was also clear that he understood that a balance needed to be struck with respect to charging for parking E1:

*"I think car parking is hugely important to the town centre retail community. It seems that they consider it to be a panacea but really parking is about finding the right level and taking more innovative approaches to improving footfall and retail sales."*

E2, E3 and E4 considered that the income received from parking charges was of significant value to local authorities and stretched beyond straightforward parking restriction. With regards to the income and expenditure of implementing a parking policy, E2;

*"The City Solicitors are required to be involved and their time has to be paid for, implementing cycle routes and parking bays both incur similar costs, but this can be covered by parking charges.*

*It's a fine line, raising parking charges to meet the costs involved in delivering a transport policy. If the charges are set too high it can lead to people just not parking there at all and so that approach can backfire."*

E3, explains the revenue motivation behind setting on- and off-street parking charges:

*"Off-street parking charges can be set with the intention to raise revenue in mind however this is not the case for on-street, where you cannot implement a scheme with the intention of making a surplus."*

And the issues around the income / expenditure of introducing pay and display machines:

*"With regard to the cost of pay and display machines, five machines cost about £3,400. We have one machine which generates a £30,000 surplus and another only generates a £30 surplus, so it really is dependent on many factors such as location, demand, tariffs and turnover."*

Yet, E4 was the most explicit in identifying a direct link between off-street car parking revenue and household council tax,

*"We are often keen to increase our tariffs but the council are less so and have a three year strategy to reduce tariffs. It's complicated because at the same time the parking revenue*

*generated has meant that the council has not had to raise its levels of council tax. It really is a balancing act."*

Aside from this, E5 felt that he understood why charging for car parking could be hard for the public to understand and felt the need for better transparency in cases where residents had previously received free parking at their property were later charged for the same. He gave the following narrative:

*"A developer paid a sum to the council in order that his residents could use the adjacent council surface car park free of charge for the next five years. This proved a satisfactory arrangement for the duration until the five years were up.*

*The council investigated how much it would cost them to continue to support the residents' use of their car park and realised that it would be far too expensive for them to do so. Therefore they decided to charge each resident £250 per year if they still wanted to continue to use the facility.*

*Despite this being a very reasonable and competitive market price for the parking, the residents were left feeling unhappy about the situation. However, although I feel that it is a fair situation, I do understand the residents frustrations at suddenly finding themselves being charged for something that they had always receive for free."*

E5 went on to explain that the residents may have comprehended the situation better if they had been informed of a breakdown of how the new charge was comprised. E6, however, pointed out the expense involved in car parking provision, "The average cost of a two hour stay is £3.60, this achieves £9m per annum, but only £1.6m is generated in surplus."

Meanwhile, setting parking tariffs to reflect market prices were an income / expenditure concern to E7, E8 and E9. E7 expressed an opinion as to why this was not always straightforward:

*"We have 41 car parks and so we try to use them to meet a combination of different consumer needs. However, we are charged huge rates for our sites in the city centre and so really that drives our tariffs and leaves us with relatively slim margins.*

*As our sites move out of the city centre we are able to reduce our tariffs as the rates decrease accordingly and so where drivers might pay £18 per day to park in the city centre, further out they may only pay about £2.50 per day."*

This sentiment was echoed by both E8, *"The trouble is that local authorities drive their prices down and so they are not a true reflection of the market. This leaves it hard for a quality operator to compete as so many drivers base their decisions on where to park, purely on price."* And E9, *"Parking provision is all about responding to the market and customers these days have higher expectations than before. It's impossible to meet those expectations without charging a proper price."*

It would seem that using car parking charges to raise local authority revenue was a practice that was well understood by the experts. They seemed aware that the income raised by parking fees could be fed back into the community to be of some benefit, such as halting rising household council tax. Moreover, complications over setting car parking tariffs to reflect market prices seemed equally well recognised by the experts. In most cases, the local authorities were held at fault by the experts for keeping prices low and apparently disregarding the need to charge a more reflective market price. This, they felt, was causing standards to stagnate and contribute to negative user perceptions of car parks.

### 5.4.3 Hypothetical scenarios

The group of people interviewed in step three were informed that the subsequent (second) phase of the research would involve conducting an experiment where respondents would be given a task to complete entailing a car parking related hypothetical scenario. They were asked to consider and discuss what their ideal, hypothetical car parking strategy would be. They all found this topic challenging and they were each unable to provide significant depth.

Still taking the retail perspective and adopting a defensive view of, in his opinion, the plight of the town centre retailing community, E1 was unable to think of a particular hypothetical scenario to be tested, but thought that it should be along these general lines. E1, "I would like to understand more about the possibility of levying a tax on out of town retail car parks as currently they don't have to pay anything which seems unfair." E1 described the context of how out of town retail parks have a perceived advantage over town centre retailing as they have more space for car parking provision which he understood the retailers thought negatively impacted on their sales.

E2 also found the topic of ideal hypothetical car parking strategies challenging to be specific about, but in experiencing the positives of joint venture working between the public and private sector E2 thought that it might make for an interesting context. E2 from the *public* operator perspective:

*"One of the attractions for us to be involved with [a private operator joint venture] is that there was a time when out multi-stories were falling into disrepair and so the maintenance costs alone would have been very high for us to bear, particularly when we have so many other essential areas which need to be priority funded.*

[Named private operator] *picked up these costs through a joint venture with the council and refurbished / upgraded the car parks and now we can share in the profits. It's all about striking a balance."*

E3 pointed out that a contrived hypothetical scenario might not be meaningful to all concerned, particularly with respect to political influences. E3:

*"An actual scenario would have to vary according to local circumstance (including financial!), plus it would also be very much influenced by political consideration, which of course would also vary, which is probably an understatement."*

E4, felt that the hypothetical scenario could perhaps be more straightforward, "It should come down to supply and demand. Convenience and location are always the key." While E5 narrated an example of a non-ideal hypothetical scenario which he felt was unequitable, in order to describe what it should *not* be like:

*"Actually, what springs to mind is the opposite. That is, an example of a really bad parking scenario! In Islington, no new development, or even new changes to an existing development, can incorporate any parking whatsoever. To me, this means that Islington is using its planning policy to enforce a blanket parking strategy which I think in some cases is very unfair.*

*Residents cannot even apply for a parking permit and they are unable to park anywhere, despite there appearing to be no parking problems in Islington."*

Conversely, E6 was clear in the sort of meaningful hypothetical scenario that he would like to see:

*"An integrated strategy with one authority governing transport. That way we could co-ordinate with the bus services, for instance. Also, I would like to see co-ordinated technology, so the same payment method for car parking and bus fares. Currently,* [named city] *is completely disorganised as we have no single way of doing it."*

An integrated policy as an ideal hypothetical scenario was not referred to by E7 and E8. Instead, they were keen to see the potential in car parks to help stimulate a sense of community and they thought that this would make for an ideal hypothetical scenario. This was best expressed by E7, who gave a narrative of how a sense of community had occurred under his watch:

*"Car parks can help to create a community feel within a city if more consideration is given to alternate uses. For instance, we instigated a garden project in partnership with the staff from one particular car park, and the local residents of a block of flats who do not have any gardens.*

*Some patches of land around the car park were gardened by the staff and residents who came together to plant things and make the area more attractive. It was great as I could see how much they enjoyed doing it and so it is still on going."*

E8 believed that when car parks were more integrated into the community, there was a, "knock-on effect which can help to reduce both crime and the *fear* of crime." Likewise, E9 believed that the issue of safety needed to be captured by a hypothetical scenario, because in his opinion, "Safety is a priority for most car park operators as people won't park in places where they feel unsafe."

## 5.5 Phase 1 Discussion

Phase one was qualitative and sought to address the first two objectives of this study through method of in-depth interviews with three different groups of individuals, namely; academics, sector leaders and experts. The objectives correlated with SVA which rationalises that stakeholder values should not be estimated until first, the stakeholders are identified and second, their values established and verified, which should both be conducted within the context of acknowledging their objectives and decision options within a Multi Attribute Decision Environment. This section is informed by the research propositions that emerged from Chapter 2.

The two objectives:

A. To identify the stakeholders that are affected by car parking and to explore how they are affected by it
B. To examine what the different stakeholder groups value relating to car parking

How each objective was fulfilled will be discussed in turn next.

### 5.5.1 Stakeholders and how they are affected by car parking

Objective A was born of the research gap which alleged that the range of stakeholders incorporated into car parking literature fell short of the reality of those affected by it and that the range of attributes in use may not be extensive enough to be meaningful to all stakeholders, potentially limiting understanding of how they are affected by car parking. This was supported by each group of research propositions, as described below (see section 2.10).

*Car parking*

The research propositions in the car parking group claimed that despite car parking being found to be fundamental to multiple societal goals, it was assumed that modifying the behaviour of mostly *one* stakeholder group, namely individual users, could potentially resolve multiple car parking issues.

*Attributes*

In addition to the car parking group above, the research propositions in the attributes group maintained that the range of attributes utilised by the car parking literature was potentially limiting by focusing mostly on the quantifiable. This emphasis could restrict awareness of how stakeholders are affected by car parking.

*Stakeholders*

In the stakeholders group, the research propositions contended that the consideration afforded to the individual users of car parking was not extended equally to any remaining groups

*Stakeholder identification, step 1 of stakeholder value analysis*

In following the pathway presented by SVA, step one of SVA called for the identification of the key stakeholder groups that are affected by car parking. This was done through the literature and the results were verified in step one of the method which was validated by the academics during their interviews. The results were presented in Table 11:

**Table 11 Car parking stakeholders, group and role, according to academics**

| Group | Role | Stakeholders | |
|---|---|---|---|
| Non-consumers | Individual non-user | Pedestrians | |
| | | Cyclists | |
| | | Public transport user | |
| Consumers | Individual user | The disabled | |
| | | Residents | owners |
| | | | renters |
| | | Commuters | |
| | | Employees / trade unions | |
| | | Travellers | business |
| | | | leisure |
| | | Shoppers | |
| | | Visitors | |
| | Local business sector | Retailers | |
| | | Employers | |
| | | Financiers to developers | |
| Suppliers | | Developers | |
| | | Architects | |
| | | Professional associations | |
| | Parking industry | Public transport providers | |
| | | Parking operators | |
| | | Parking entrepreneurs | |
| | | Technology providers | |
| | | Parking enforcers | |
| Governmental | National Regional Local | Officer | city planners |
| | | | transport planners |
| | | | traffic engineers |
| | | Politicians | councillors |

Four key stakeholder groups were found to be affected by car parking, namely: non-consumers, consumers, suppliers and governmental. The lines between each of these different groups were found to be broken, implying stakeholders may have experienced car parking issues from more than one group's perspective. Plus, each group was found to house multiple sub-groups of stakeholders. In the literature there are studies were the types of consumers are left *undefined* (Lautso, 1981); (Gomes, 1986); (Feeney, 1989); (Feitelson and Rotem, 2004); (Arnott, 2006); (Tsai and Chu, 2006); (Arnott and Inci, 2010) and there are studies were only one type of consumer is described, such as 'commuters' (Merriman, 1998); (Voith, 1998); (Zhang et al, 2008); (Qian et al, 2011); (Zhang et al, 2011); (Yang et al, 2013). Thus, on the one hand the literature seems to assume that all consumers of car parking are alike, while on the other only one specific sub-group is of interest. Moreover, in cases where stakeholders are able to see car

parking from perspectives other than their own then it is likely that they would have a better understanding of the effect that car parking can have on other groups.

Likewise in the literature, there appears to be a preoccupation with the consumer group of car parking because they seem to be perceived as the *cause* of parking issues (see section 2.5.1), yet the results of phase one of the study indicate that it could be advantageous to look beyond this group. For instance, the steps taken in Chapter 4 produced a richness of data from stakeholders affected by car parking belonging to *five* different groups each equally vociferous. Depth of feeling towards car parking can be felt from groups other than the consumer, such as that given by NC1, "People parking on the footpath is a critical issue as it's advocating the space to vehicles . . . it enforces the ownership of space by *vehicles* rather than by *people*," (see section 5.2.1). The sentiment in this example, expressed through the use of words such as 'critical,' 'advocating' and 'enforces,' strengthens the notion that other stakeholder groups wish for their input to be heard. There are some stakeholders in some groups, such as the non-consumers of car parking, who are not accommodating of other group's perspectives.

Highlighted in Table 11 (p. 122) are the contributions of the academics to the stakeholders, namely; renters, financiers to developers, architects and public transport providers. These additions suggest that car parking affects a considerably broad reach of stakeholders. To summarise, the findings of phase one of this study would suggest that not only are there more stakeholder types than are generally represented in the literature and that they can overlap, but that they are affected by car parking in different ways within their different groups (see section 5.2). It is possible then that there is an appreciation of the impacts of car parking from different stakeholder groups.

*How stakeholders are affected by car parking, stakeholder value analysis inputs*

In following the SVA pathway, it is important to understand more about stakeholder concerns to provide clarity in order to progress onto establishing their values (Earl and Clift, 1999). This assisted the second part of objective a: *to explore how they (stakeholders) are affected by it (car parking).*

The input from step one of phase one of the study gave valuable input into conceiving the questions posed to the sector leaders of the various stakeholder groups. For instance, the academics described that stakeholder objectives occurred at different levels (see Table 12) and

that car parking issues affected stakeholders in terms of *characteristics* and frustrations over some of the *solutions* implemented to address parking dilemmas (see Table 13). They supported the literature which presents car parking as *complicated* (see section 2.3) yet were reticent that solutions such as *pricing* might not always go far enough in resolving the issues they were implemented to address (see Table 13), however the academics did not divide their conjecture into the individual stakeholder groups. Instead, they gave a starting point by speculating about how car parking affects stakeholders in general. The stakeholders themselves were keen to express how car parking affected them from the view point of their different groups.

The non-consumers felt themselves to be affected by car parking's impingement onto areas of public space which could otherwise be used for activities such as in the case of the national cycle network. Plus they were concerned about the issue of *inequity* as they considered that there was a car user dominated mind-set at a societal level, which they thought might limit people's mode choices (see Table 15). In the literature, Shoup (1995) and Forinash et al. (2003) are sympathetic to this rationale as they recognise the negative impacts that an oversupply of car parking can bring, including restricting modal choice. Outside of this the voice of non-consumers appears to be rarely heard as being affected by car parking.

The consumer stakeholder group, like the non-consumer group, was also concerned about the issue of inequity, but this time from the perspective of how car parking was managed with regards to enabling access, as expressed by C2, "Parking for some groups such as the disabled can be so inaccessible that access to facilities and daily life activities can be denied." It seems that their biggest frustrations lay in how car parking was governed, with issues such as devolution and unrefined policies affecting them in the sense that best practice was left open to interpretation. Moreover, there was inconsistency regarding enforcement regimes (see Table 16) suggesting room for possible error and confusion. Indeed the literature seems to be understanding of how accessibility can be affected by car parking, although its primary areas of focus appear to be more on the problems associated with searching for a car parking space (Arnott and Rowse, 1999); (Arnott, 2006); (Arnott and Inci, 2006); (Arnott and Rowse, 2009); and accessing CBDs (Hensher and King, 2001); (McPherson, 2001); (Simićević et al, 2012); (Kobus, 2013) as a result of undersupply (see section 2.3) than on enabling access for minority groups, such as the disabled.

While there was frustration regarding the governmental group's management of car parking, there was a sense from the consumer group that they could appreciate the dilemmas that the governmental group faced. Despite this, the message was clear: C1, "We have to have parking, it's as fundamental as that." The consumer group's meaning suggested that while they could appreciate the dilemmas, car parking was still essential to them. Modifying consumer behaviour through measures such as *pricing* may not always be affective for all consumers in cases where car parking is considered to be essential.

The local business sector stakeholder group expressed how they were affected by car parking by also showing consideration for the dilemmas faced by local authorities. LBS2, "Local authorities tend to juggle with very limited budgets and with ever changing legal requirements." They felt that they were directly affected by local authority dilemmas as, for instance, shoppers might conflict with residents over sought-after parking spaces and that the free parking provided at out of town retail sites attracted people away from local businesses, making it harder for them to compete (see Table 17). In the literature, there is concern for the local business sector, at least in terms of addressing CBD accessibility (see section 2.3) plus there is acknowledgment that using car parking to achieve urban goals (McShane and Mayer, 1982) is not particularly straightforward for those concerned.

Local authorities often work in partnership with the local business sector in addressing matters of accessibility, such as when resolving CBD dilemmas (see section 2.3), plus they are responsible for implementing resident related car parking schemes, such as CPZ (see section 2.4) which are both aimed to exclude or restrict stakeholders. As such the governmental group is likely to have experienced the pressures of working with both groups independently and perhaps together in cases where residents become shoppers and join forces with the local business sector in their call for more free car parking.

The car parking industry stakeholder group felt that they had been affected by the consumer driven nature of car parking and were frustrated that despite responding to consumer needs by, for instance, providing better quality parking, consumers were of the mind-set that car parking should come at a low cost (see Table 18). They were also mindful of the public / private operator divide in car parking and had little confidence in the public sectors ability to suggest convincing industry guidelines. With regards to the literature, despite the presence of private suppliers of car parking, such as in the work of (Arnott and Rowse, 2013); (Kobus et al, 2013);

(Ma et al, 2013); (Wang et al, 2013), they tend to feature alongside public operators often with regards to optimising equilibrium.

Finally, the governmental stakeholder group felt that car parking affected them in various ways mostly resulting from the challenges they faced due to issues such as devolution. They were concerned that the public were not understanding of their dilemmas and misunderstood the motivation behind charging for car parking, plus they were aware that car parking was not understood to the same extent by all local authorities (see Table 19). Furthermore, they seemed pressured as they explained that politicians played a key role in engaging with constituents over car parking matters as G1 pointed out, “Every politician I meet impresses on me how full their post bags are with letters about parking and of course anything that's important to the average person on the street is going to be important to a politician because they can see a vote from it.” In the literature, the six desirable urban goals as presented by McShane and Meyer (1982) seem to support how the governmental stakeholder group might feel challenged by multiple conflicting demands. That said, the literature seems less productive in exploring the effect of devolution on local authorities and how support from politicians impacts on their decision making.

In summary, objective A is considered to be achieved in full as the stakeholders affected by car parking have been identified, likewise how they are affected by car parking has been established, as the above discussion has shown.

### 5.5.2 Stakeholder values of car parking

Objective B arrives from the research gap which alleged that stakeholder values of car parking are not fully represented in the car parking literature, despite the use of certain key attributes which seem to be more explicit, such as ‘price’. According to the SVA pathway the correct way to establish stakeholder values is to ascertain the values and validate them *before* identifying the attributes which comprise them. This was supported by the values group of research propositions, as described below (see section 2.10).

*Value*

The research propositions in the value group stated that decisions are made according to values that vary hugely amongst individuals, yet this diversity is not usually reflected in previous car parking studies.

*Examining different stakeholder groups value of car parking, step 2 of stakeholder value analysis*

In following the pathway presented by SVA, part of step two of SVA calls for the values according to the different stakeholder groups to be explored, which was done through the interviews with the sector leaders of the different stakeholder groups. Also integral to SVA is the concept that the MADE is examined as this explains the context to which the values apply, as they do not retain validity outside of the MADE (Earl and Clift, 1999).

The key values that the stakeholders were found to have in relation to car parking were presented in Table 20

**Table 20 Stakeholder value of car parking**

| | Non-consumers | Consumers | Local business sector | Parking industry | Governmental |
|---|---|---|---|---|---|
| Efficient use of land | - | + | + / - | + / - | + / - |
| Impact on public space | - | | + / - | | |
| Facilitates access | | + | | + | + |
| Sustains economic activity | | + | | | |
| A commercial product | | | + | | |
| Revenue stream | | | | + | + |
| Convenience, safety and price | | | | + | |
| Part of an efficient transport system | | | | | + |

Table 20 shows that not all of the stakeholder groups expressed positive values of car parking, such as the non-consumer group who felt the value in terms of as loss. For instance, NC1 statement *regarding efficient use of land* was clear, “It's (car parking) a highly inefficient use of space.” Indeed, the literature does show concern for the *oversupply* of car parking (see section 2.3) (Davis et al., 2010); (Paquet et al., 2010) but other stakeholder groups, such as the local

business sector, parking industry and governmental groups could also see the gains G1, “Its necessary to get people to and from places,” (see section 5.3.5).

A key conclusion is that the different stakeholder groups expressed their values of car parking differently which is in line with how values are usually evaluated, with principles such as ethics, characteristics and priorities all playing a part (Keeney, 1992). Where different stakeholder groups were in agreement over a particular value *facilitates access* for instance, they conveyed similar sentiment, in this case the need for *accessibility*. C1 described access to various activities such as engaging in work, sporting activities and social activities; G1 simply stated, “It isn't so much to do with parking it is actually to do with access,” and from a fundamental perspective; G4, “Parking plays an important role for both business and leisure; without it we would not be able to access even our most essential amenities.” While the sector leaders expressed the significance of access in relation to various different daily life activities, the literature seems more interested in resolving access dilemmas to CBDs, particularly for commuters, such as in the work of Arnott et al (1991), or in restricting car parking related access through the use of controls, via policy factors (see section 2.5.1) or contextual factors (see section 2.5.2).

Only the consumer group of stakeholders valued car parking in relation to its apparent ability to sustain economic activity believing, for instance, that it was the pull of *free* parking that attracted shoppers to out of town retail parks. Yet this value was dismissed by G1 who described it as an, “*Irrational sort of view*.” The literature takes a different perspective. While on the one hand it finds that car parking *charges* can raise significant revenue for a town as well as contributing to a town centre’s appearance (Banister, 2005), on the other, it finds that shoppers respond to free provision by occupying spaces for longer thus lowering turnover rates and not necessarily raising customer spend (COST, 2006).

The mind-set of the car parking industry appears to be consumer focused, in which case they were keen to suggest that convenience, safety and price were collectively the way in which car parking should be valued. PI2, “Convenience is always going to be the first choice, and when having a choice, choose the safe one, rather than the cheapest one.” ‘Price’ appears to be used as an attribute extensively in the car parking literature, particularly as a means of impacting on consumer behaviour (see section 2.5.1) such as in the work of (Zhang et al, 2008); (Arnott and Rowse, 2009); (Kelly and Clinch, 2009), whereas the attribute, ‘safety’ appears to be feature less so. What is interesting about this finding is that where the literature appears to use ‘price’

and ‘safety’ as attributes, the findings here present them as a collective value (see section 5.2.6 for further detail)

*The multi attribute decision environment*

In SVA the MADE features to underpin stakeholder values and provide the context for what has influenced the values. These were captured in Table 21:

**Table 21 Stakeholder value context**

| | | Non-consumers | Consumers | Local business sector | Parking industry | Governmental |
|---|---|---|---|---|---|---|
| Key influencers of how stakeholders value parking | Government | ● | ● | ● | | ● |
| | Social | ● | | | | ● |
| | Consumer | | | | ● | |

The three key influencers, namely; governmental, social and consumer shaped the context that established the stakeholder values and are significant because without them, the values would not retain their validity. With regards to decision making, improving the process through a deep and thorough appreciation of the inherent values can yield important insights and contributions, including evaluating alternatives and facilitating involvement in multiple-stakeholder decisions (Keeneley, 1992). With this in mind, Table 21 finds that the MADE can be different for some stakeholders and the same for others, but when combined with the values given in Table 20, a platform is created from which to begin the route to producing better consequences.

The key conclusion here is that despite the literature demonstrating acknowledgement of concerns, such as governmental dilemmas over using car parking to help achieve urban goals (McShane and Mayer, 1982), the literature does not seem to go far enough in neither evaluating stakeholder values nor the MADE. Moreover, the literature appears to fail to show appreciation for the full range of stakeholders affected by the MADE.

Chapter 6 opens the quantitative phase 2 of this study.

# Chapter 6 Phase 2 Method

## 6.1 Theory

*Multivariate techniques*

According to Harris (2001);

*"Statistical procedures provide a set of tools for efficiently summarising the researcher's empirical findings in a form that is more readily assimilated by the intended audience than would a simple listing of the raw data.*

*. . . For very excellent reasons, researchers in all the sciences have long since abandoned sole reliance on the classic univariate design."* (pp1,11)

In which case, *multivariate* techniques, "Collections of methods that can be used when several measurements are made on each individual," Rencher (2002), have become a popular choice. They are an extension of univariate or bivariate techniques as they allow for a single analysis to be performed instead of a series of individual ones, (Tabachnick et al, 2014). Moreover, multivariate techniques are useful when: (Stevens, 2009)

- People are likely to be affected by the issue at hand in multiple ways
- A deeper description of the issue at hand is sought

It is thought that multivariate techniques are likely to progress analytical aspects of research such as in areas of decision making and problem solving (Harris, 2001). They can be categorised as either dependence or interdependence techniques. In this study, the key focus is to estimate the value of car parking from a range of different stakeholder perspectives, in which case *value decision*, or 'choice' becomes the dependent variable.

With the dependence technique, one variable, or set of variables, is designated as the *dependent* variable and the rest are treated as *independent* variables, (Parasuraman et al (2006). Figure 6 (below) depicts the flow of decisions involved when selecting an appropriate technique to use.

With regards to the selection of a multivariate dependence technique, figure 6 shows that where there is one dependent variable, in this case 'choice', in a single relationship and where the measurement scale is metric, two potential options result: multiple regression or conjoint analysis. In multiple regression the relationship between the response and explanatory variables

are explored plus using multiple predictor variables, “Can be useful when predicting human behaviour, as our actions, thoughts and emotions are all likely to be influenced by some combination of several variables,” Brace et al (2012, p264). Yet, according to Sluis et al (2013) the best way to estimate how *stakeholders value* something, is to use Conjoint Analysis (CA).

They explain:

“*The objective of conjoint analysis is to determine which attributes are most influential in decision making processes. . . The conjoint approach models the decision environment by confronting a respondent with choices that are close to real-life choices. As such, the conjoint approach is thought to model decision-making more realistically than the more traditional survey methods” . . .* [it is particularly useful where] *“A compromise exists between different aims and different stakeholder values. The vignette-based conjoint approach explicitly addresses this compromise,”* (pp 5-6).

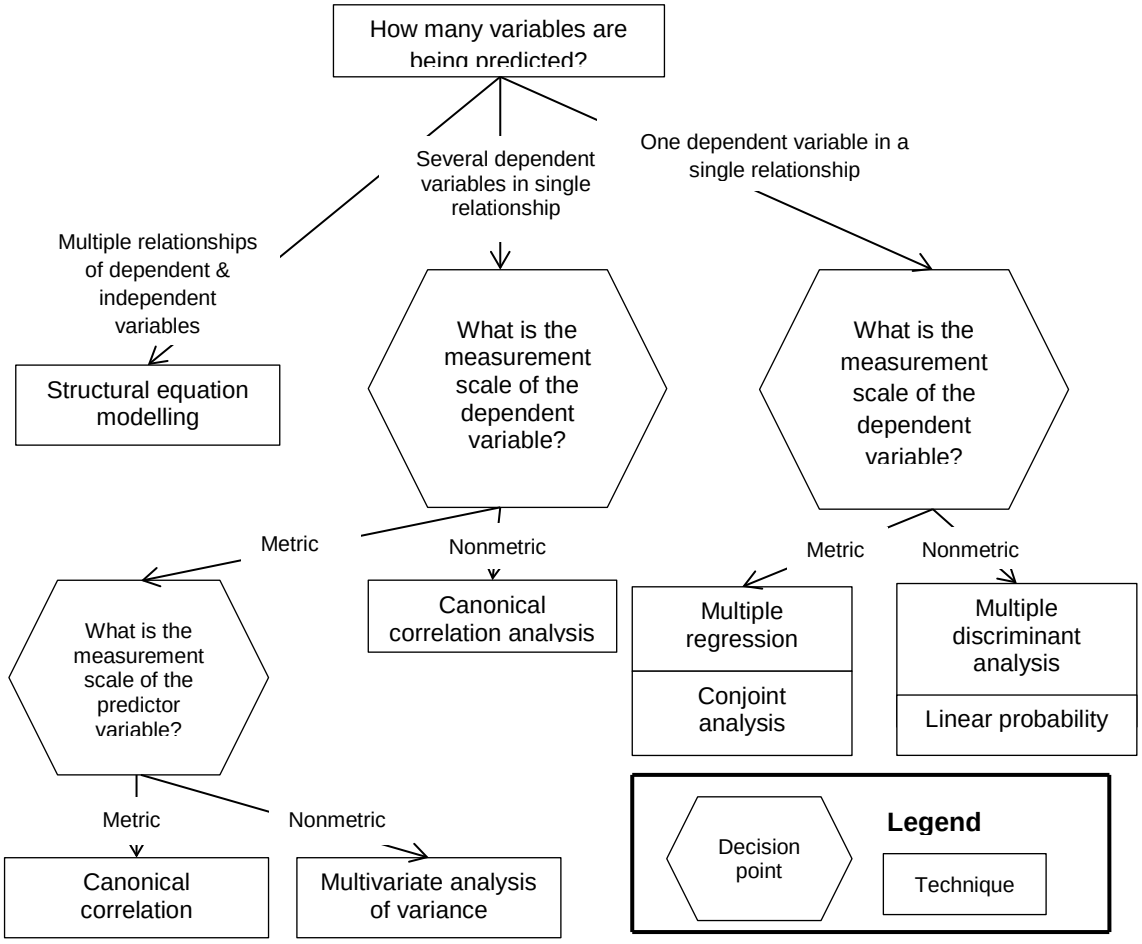


**Figure 6 Selecting a multivariate dependence technique. Source: Hair et al (2010, p12) adapted**

In other words, conjoint analysis is different to multiple regression techniques as it presents respondents with multiple dilemmas embedded in multiple 'vignettes' (hypothetical scenarios) that are each intended to replicate reality. This is explored in more detail in the next section. Moreover, conjoint analysis, according to Hair et al. (2010, p266) is, "The conceptual basis for measuring value." Due to these factors, conjoint analysis was considered the most suitable option for this study.

## 6.2 Introduction

In phase one of the methodology, the various stakeholder groups that are affected by car parking and their different values were established and verified according to the inputs and the first two steps of the Stakeholder Value Analysis model (see 2.9).

Chapter 6 stays with the SVA model in order to address step three of the model; *create trade-off value model*, which will lead to step 4 of the model; the analysis. It does this by taking the work forward by embedding the trade-off value model in an existing online large sample-survey.

Chapter 6 begins by considering the method *theory* that lies behind multivariate techniques in general and then more specifically with regards to conjoint analysis. This is then further narrowed to explore Choice Based Conjoint analysis (CBC), which is selected as the preferred technique to create the trade-off value model which is in keeping with SVA, and uses Mixed Logit (MMNL) as the underlying value estimator. Next, the method *practice* is presented in terms of three different hypothetical scenarios, including an in-depth look at how the scenarios were constructed and an overview of additional questions that participants were asked in support of their responses. It concludes with model estimation and an example of data input.

Further to this, the aim of phase two of the methodology is to address objectives c and d of this study. They are:

c. To develop a series of additional attributes to better capture stakeholder value of car parking

d. To estimate the value of car parking from a range of different stakeholder perspectives

Phase two moves the study forward by incorporating the values found in phase one into three different hypothetical trade-off scenarios, as given by SVA and within their MADE context, in order to estimate the stakeholder value of car parking from the range of different stakeholder groups established. According to Earl and Clift (1999, p155), “Value trade-offs provide the mechanism by which it is possible to reflect the priorities of stakeholders.” With this in mind, this chapter applies a CBC trade-off model to the values and their context, as determined during phase one of this study. It starts by exploring how best to determine which particular technique is best to use in order to estimate stakeholder value.

## 6.3 Conjoint Analysis

Traditionally a marketers tool, conjoint analysis (CA) is a multivariate technique that can help to predict choice probabilities by understanding the trade-off decisions that people make when deliberating over competing products or services, (Green et al, 2001).

The aim of CA is to collate Stated Preference (SP) data from respondents using a systematically constructed experimental design, to infer the value (utility) of given attributes from their relative profile composition. Revealed Preference (RP) data may also be used but this is usually avoided as it can involve problematic challenges associated with the availability of and or, the procurement of, market intelligence.

An experiment is a research design that rules out alternative casual explanations of findings deriving from it (i.e. possesses internal validity) by having at least a) an experimental group, which is exposed to a treatment, and a control group, which is not, and b) random assignment to the two groups. Instead of a control group, an experiment may comprise a further group (or groups) that are exposed to other treatments (Bryman, 2012).

Empirical procedures validate (or not) an a priori hypothesis with the external influences removed in order to produce objective findings (Guba and Lincoln, 1994). The participants or subjects involved can be random or non-random and the experiments themselves can be true or quasi-experiments. In true experiments the participants or subjects are randomly assigned to either a treatment group, or a control group. In quasi-experiments, the subjects are *selected* rather than assigned (Bernard, 2013).

Straight forward SP CA experiments can therefore be efficiently organised in terms of both speed and cost and are also less contentious being free from RP sensitivities (Raghavarao et al, 2011).

There are two main objectives which should be met in order to understand consumer decisions: (Hair et al, 2010)

1. To determine the contributions of predictor variables and their levels in the determination of consumer preferences

2. To establish a valid model of consumer judgements

These objectives help to form the basis for the design of the choice task itself.

### 6.3.1 Key differences of Conjoint Analysis to other multivariate techniques

Unlike other multivariate techniques, CA is decompositional in nature as the values of each attribute have already been specified by the researcher. Therefore in CA, it is the *overall utility* of a profile which concerns the researcher, rather than the analysis of attribute preference to compose overall utility. Also different to other multivariate techniques, in CA the independent variables (attributes) and levels (values) are *both* specified by the researcher with the respondent being the provider of the independent measure only. Regression analysis is used for each independent variable to decompose the respondent's responses into effects for each level, therefore it is essential that a clear and relevant scenario is presented to the respondent (Hair et al, 2010).

Moreover, unlike other multivariate techniques which usually analyse all respondents simultaneously, CA can generate a separate model for predicting preference at both a disaggregate and an aggregate level. At the disaggregate level, respondents are required to undertake multiple evaluations of differing profiles, which can be restricting in terms of how many attributes and levels can be selected by the researcher. At the aggregate level the number of evaluations per individual can be reduced, therefore also reducing the data collection task (Raghavarao et al, 2011).

Depending on the research design, CA has the ability to enjoy flexible relationships between independent and dependent variables. In other words, CA does not require linear relationships as it makes separate predictions for the effects of each level of the independent variable and does not require modification of the model form (Hair, 2010).

### 6.3.2 The development of Conjoint Analysis

The origins of CA lie in psychology (Louviere et al, 2010) where it was frequently used to test consumer preference for prospective new products in the market (Jedidi and Kohli, 1996). Early measuring and analysing of consumer preferences using conjoint analysis was formatively undertaken by the mathematical psychologist Luce (1957) and the statistician, Turkey (1964) with nonmetric contributions from Kruskal (1965) and Young (1972). Figure 7 below presents the early development in part-worth estimation methods associated with CA, as given by Carroll and Green (1995).

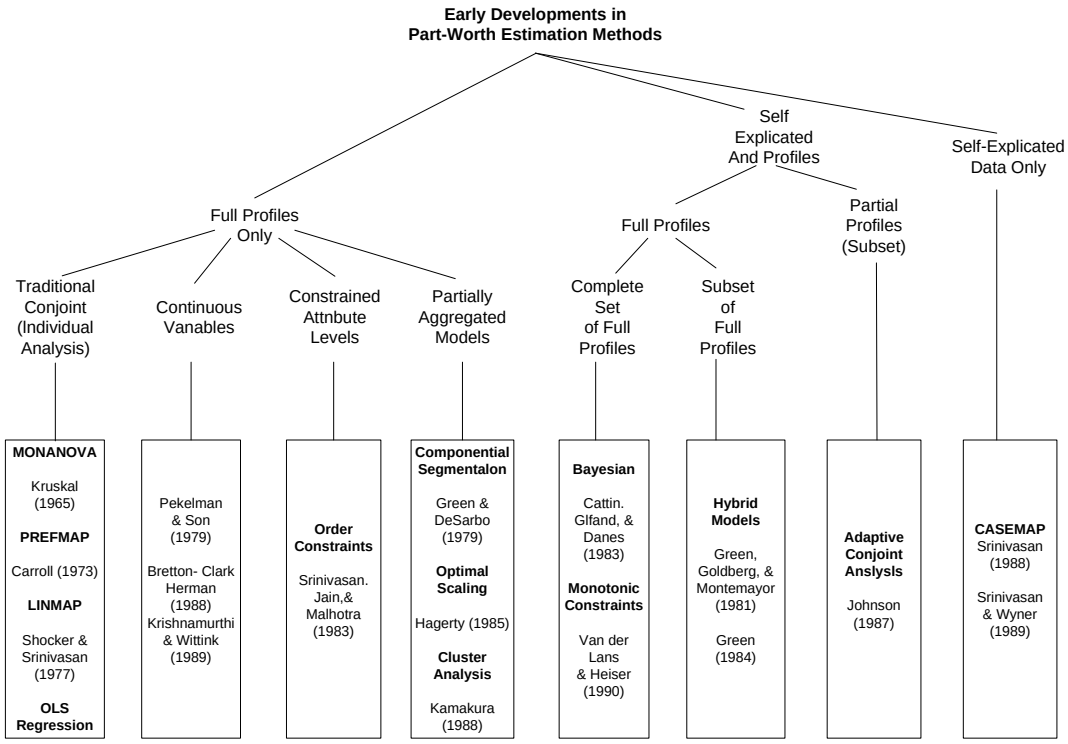


**Figure 7 Early developments in part-worth estimation methods. Source: Carroll (1995) adapted**

This demonstrates a growing need for flexibility as authors such as Huber and Puto (1983) were keen to introduce elements of 'common-sense' into their choice patterns instead of enduring the boundaries of numbers. McFadden (1980) paid particular attention to choice modelling and after reviewing the recent developments concluded that the discipline of transport economics could benefit from choice modelling application as the problems resembled those of market research.

Branching away from the restrictions of traditional CA by focussing on the ways to capture choice has enabled researchers to broaden their reach further still to areas such as tourism, geography, environmental science and health. Common to multiple disciplines is the issue of decision making and choices often involve trade-offs between competing profiles rather than the levels of a single profile as performed in traditional CA (Raghavarao et al, 2011).

### 6.3.3 Different types of Conjoint Analysis

There are three key different types of conjoint analysis:

1. Traditional CA conjoint-task asks the respondent to *evaluate* a discrete choice through method of ranking
2. Adaptive model *adapts* the conjoint as the task proceeds
3. Choice Based Conjoint Analysis (CBC) presents the respondent with a *range* of discrete choices from which they must express their preference for only one

All three tasks are constructed using predetermined attributes and levels intended to mimic real life discrete choices, consequently, they are *hypothetical* representations of theoretically realistic scenarios. The CBC method is considered to be the most convincing because, unlike the other two types, the selection is not made in isolation, as the choices are presented to the respondent within a 'set' (Hair et al, 2010). In application to this study, this means that more than one car parking value can be presented to the respondents at once.

## 6.4 Choice Based Conjoint Analysis the chosen technique

While there are some minor disadvantages of CBC over CA (experiment design can be laborious, the advantages of CBC over traditional CA are: Elrod et al (1992); (Raghavarao et al, 2011).

- The dependent variable is 'choice' which is of particular interest when exploring decision making
- The use of a choice-set is better reflective of a true to life scenario where a range of choices are likely to be available, than mere profile ranking
- In making the choice, consideration of the other alternatives is unavoidable which is of particular interest when investigating the effect of the presence of other alternatives on preference
- The inclusion of a 'no-choice' alternative is thought to evoke a more authentic aspect to the task

The main similarities between CA and CBC are principally in the use of language. For instance, both CBC and CA methods discuss 'attributes', 'levels' and 'profiles.' Traditional CA focusses on the ranking of full profiles, concord with neoclassical utility theory, and then applies the mathematical theory of Conjoint Measure (CM) to rationalise a behavioural choice. CBC on the other hand, retains the traditional language of CA, and to some extent its experiment design, but then moves forward to ally with *Discrete Choice Experimentation* (DCE) (Louviere, 2010} which is most common in the transport discipline for modal choice experiment.

Random utility theory (RUT) underpins both CBC and DCE, and is considered reliable in its ability to explain choice. RUT is able to do this partly because it introduces a latent construct (utility) which remains exclusive to the respondent. In practice this utility is formed of two components namely, a systematic (explainable) component and a random (unexplainable) component, as shown in equation 1 below:

$$U_{in} = V_{in} + \varepsilon_{in} \qquad (1)$$

Where $U_{in}$ is the utility expressed by individual $n$ for alternative $_i$, $V_{in}$ is the systematic component of utility and $\varepsilon_{in}$ is the random component which is assumed to be independent and identically distributed (IID) or Gumbel distributed, and to vary across individuals and choice sets.

This format arose because psychologists assert that individuals are imperfect apparatuses of measure, so the inclusion of an error term can reflect the discrepancies associated not with the choices, but with the actual respondents. Therefore, in terms of modelling, CBC and DCE are united by the strong tie of RUT involving a multinomial process of multinomial logit (MNL) (Liechty et al, 2005).

*Multinomial logit (MNL)*

The multinomial logit model (MNL) is one of the most widely used discrete choice models Louviere et al, 2000); (Hensher et al, 2005) and the above premise results in the probability of choosing an alternative *(a)*, as expressed in equation 2 below.

$$P_{ni} = \frac{exp(\beta_i X_n + \gamma Z_{ni})}{\sum_{j=1}^{J} exp(\beta_j X_n + \gamma Z_{nj})} \qquad (2)$$

Where $P_{ni}$ is the probability that the individual choose alternative *i*; X is a vector of individual specific variables and Z is a vector of the effects if the alternative specific variables; $\beta$ *and* $Z$ *are the parameters to be estimated.*

There are 3 key assumptions underlying the MNL model Bhat (2008):

1. Random components of the benefits or utilities of different choice alternatives are independent and identically distributed (IID).

One of the key assumptions when using MNL is that the ratio of probabilities of choosing any two alternatives is in fact *independent* of the choice set. In other words, the alternative would be selected whether or not another alternative was present, namely the independence from irrelevant alternatives (IIA) property. Hensher et al (2005, p. 700) describe the IIA property as, "A restrictive assumption, which is part of the multinomial logit model; the IIA property states that the ratio of the choice probabilities is independent of the presence or absence of any other alternative in a choice set." In other words, an individual's preference for an alternative in a choice set should not be affected by the introduction of a new alternative in the choice set, as that alternative is irrelevant. The IIA property of MNL models is a criticised component of the model, although through respecting the limitations of the MNL approach, it has been widely applied in the transport research field (Louviere et al, 2000).

2. Does not allow sensitivity or taste variations and keeps all alternatives homogenous

This means that the MNL model does not allow for individuals' sensitivities or taste related variations to an attribute due to unobserved individual factors. If this assumption is violated then parameters and choice probability estimates are considered to be biased and inconsistent (Chamberlain, 1980).

3. The error variance-covariance structure of alternatives is identical.

This assumes that the error variance covariance structure of the alternatives is *identical* across decision making individuals. However, identical variance across individuals is hard to authenticate (Bhat, 2008).

The MNL model can still represent the intended CBC experiment effectively, as long as these assumptions are noted. Other logit models, such as nested logit and mixed logit can provide more flexibility and accuracy (Louviere et al, 2000).

### 6.4.1 Nested MNL models

A nested logit model can be used when a set of alternatives faced by an individual can be partitioned into subsets or a nest, providing the IIA property holds. It follows a similar approach to the MNL model, in that it is utility maximising. As such the set of choice alternatives can be divided into non-overlapping subsets, called nests. Similar to MNL, there is an observable proportion and an unobservable proportion. Nested logit models assume that the unobserved utility is contained in a vector and has a cumulative distribution (Train, 2003).

### 6.4.2 Mixed logit models

Mixed logit models (MMNL) are thought to be stronger as they can house complex patterns of correlation as well as unobserved heterogeneity, resulting in the following benefits: (Bhat, 2008)

1. Flexible with the ability to capture taste variation and flexible substitution patterns

2. Able to show temporal correlation over time

3. It can employ non-normal distributions for random coefficients

4. It is simple and straightforward to simulate different scenarios

With the above taken into account, MMNL was selected as the preferred model as this study seeks to use a commonly applied choice model, as MMNL is well known to be (Adamowicz et al, 1998). The MMNL model is also considered adequate for the purposes of this study because the experiment in mind is *unlabelled*, that is where individuals are not asked to choose between

different objects, or transport modes, such as bus, car or train, for which the MMNL model is adequate (Hensher et al, 2005). In designing an experiment to help measure how stakeholders *value* car parking, objects were redundant.

Bearing in mind the advantages, an understanding that CBC is almost indistinguishable from DCE (an approach common to the transport discipline) and an appreciation for the lengthy design process of the experiment involved, CBC was selected as the most suitable form of CA to help estimate the value of car parking to a range of different stakeholders.

### 6.4.3 Willingness To Pay

Willingness to pay (WTP) is a method typically used to hypothetically determine the amount an individual is willing to pay for something in order to receive a benefit from it. The method is often employed in transport studies to derive a value of travel time savings (VTTS), and more specifically in cases when determining public transport and road pricing (Hensher et al, 2005).

Furthermore, WTP can be found in environmental economic studies and even to give an economic valuation of the impacts on residents of noise exposure as generated by aircraft and airports, and is a method particularly suitable for use in reporting the results in stated choice experiments (Thanos et al, 2011).

*"A common objective in the use of discrete choice models is the derivation of measures designed to determine the amount of money individuals are willing to forfeit in order to obtain some benefit from the undertaking of some specific action or task. Such measures are referred to as measures of Willingness To Pay (WTP,"* Hensher et al (2005, pp 357-8).

In which case, in order to contribute to proving a clearer understanding of stakeholder value of car parking, WTP values were calculated where appropriate.

## 6.5 Practice

In taking this work forward, CBC was used to measure the extent of what is valued about car parking by considering the perspectives of a wider range of stakeholders. Furthermore, it draws on a broader and potentially more meaningful collection of attributes than are currently found in the car parking literature.

A CBC experiment was designed, based on three different hypothetical scenarios from the perspective of the three key value contexts established from phase one of this study (see 5.3.7), consumer, i.e. *drivers*; government, i.e. *strategy makers*; and social, *in the context of considering the wider social implications of parking*. Whilst the scenarios included some time and cost elements, they also introduced four attributes which were designed to better reflect the context which helps to form the values that the stakeholders hold about car parking. They were;

- Safety, *consumer*
- Politics, *government*
- Land use, *from a social perspective*
- Council tax, *from a social perspective*

These were thought to complement the more traditional attributes and to allow for a more meaningful assessment of the value of car parking.

The design phase requires particular attention as the success of the experiment relies on the respondent's perception that they are making a realistic choice, Hair (2010). This was completed in seven steps for each individual scenario, namely: hypothetical scenario development, attribute and associated level identification, profile and choice set construction, respondent selection, choice task completion, respondent evaluation of choice tasks and model estimation.

### 6.5.1 Hypothetical scenario development

In order for meaning of the three different scenarios to be more easily inferred by the respondents engaged in the choice-task, the scenarios were named:

1. Driver
2. Strategy
3. Social

The values which were previously established in phase one of this study were embedded within the three different scenarios, as according to Keenley (1992, p226), "In structuring the values for a problem with multiple stakeholders, you should structure the values separately for each one. It

is useful to develop a combined value structure." This maintains the integrity of the SVA model as the values have been established, prior to the experiment design.

The values, plus the stakeholder groups to whom they relate, and the context in which they are influenced are presented in Table 26 below. It is important to note that all respondents were given the opportunity to complete all three scenarios if they so wished to, no matter which stakeholder group they belonged to, in order to facilitate the capture of a range of parking stakeholder views in a consistent manner.

**Table 26 Scenarios according to stakeholder values and group**

| | Scenarios | | |
|---|---|---|---|
| **Values according to stakeholder groups** | **Driver** | **Strategy** | **Social** |
| | Facilitates access; C, PI, G | Facilitates access; C, PI, G | Efficient use of land; NC, C, LBS, PI, G |
| | A commercial product; LBS | Sustains economic activity; C | Impact on public space; NC, LBS |
| | Revenue stream; PI, G | Revenue stream; PI, G | Facilitates access; C, PI, G |
| | Convenience, safety and price; PI | Part of an efficient transport system; G | Sustains economic activity; C |
| | Part of an efficient transport system; G | | Revenue stream; PI, G |
| | | | Part of an efficient transport system; G |

NC = Non-consumer, C = Consumer, LBS = Local Business Sector, PI = Parking Industry, G = Governmental

The three different hypothetical scenarios will now be discussed in turn.

### 6.5.2 Driver scenario

*Aim*

The aim of the driver scenario was to determine willingness to pay, in the context of the scenario, and to infer parking value from the predetermined attributes and levels according to the stakeholder groups.

The driver scenario stages the façade for 'consumer' which is the value context of the parking industry. Table 26 finds that the parking industry takes a positive view of parking and therefore value that it facilitates access, can create a revenue stream and that it can provide convenience, safety and be suitably priced for the consumer, a value held exclusively by the parking industry. The governmental group share the former two values and in addition, they value parking in its ability to contribute towards an efficient transport system and finally, the local business sector value parking as a commercial product. With this in mind, the following scenario was devised:

*"The Driver Scenario is from the perspective of drivers and the choices that they may have to make when parking their car in a paid for car park if their usual one is unavailable."*

This was considered straightforward for all the stakeholder groups to understand at it is reasonable to assume that all are likely to be familiar with cars, car parks and paying to park. Much of parking literature focuses on these elements and is perhaps most notably reported through the work of (Shoup, 2005). To further simplify the scenario some elements of parking were deliberately omitted and left to the respondent's imagination, such as: defining the car park operator; whether or not the car park was surface, multi-storey, or underground; the method of payment. These things were not considered strictly relevant to the scenario as it was devised to reflect what was usual and familiar to the individual respondent. By adding stipulations the scenario risked excluding authenticity as the actual parking behaviour of stakeholders could vary immensely.

*Attributes and levels*

The scenario gave a brief description of the attributes that the respondents were to encounter in the impending choice task:

There are three attributes to consider:

1. *How long it takes the driver to walk from the parking space in the car park to their usual destination.*
2. *Whether or not to park in a car park that holds a certificate of safety. A certificate of safety means that the area has been vetted by the police and has measures in place which are designed to create a safe environment. Only car parks that have fulfilled this criteria are awarded with one of these certificates.*
3. *The price of two hours parking. Please think about the price of two hours parking in a car park in your town / city and bear that in mind throughout this scenario. If you do not usually pay for parking, a suggested price to base your decision on could be £3.50*

Highlighted are the three attributes as presented in Table 27, along with their respective levels. It is important to remember that the scenario is hypothetical and was meant to apply to a range of stakeholder groups and so the lack of a specific car park location and destination description is deliberate. It was intended that even the non-consumer group of stakeholders would not be

excluded from being be able to conceive a level of awareness for the purposes of the choice task.

*Walk*

This attribute presented its levels in terms of time as given in Table 27. The use of five and ten minute intervals seemed a reasonable amount of time that a driver might be prepared to walk, or hope to save, when parking in a car park. They are also numbers that are commonly referred to in everyday life when compared with other number like four and thirteen, for instance. Therefore, they are both actionable and communicable. In addition, using a car park in the scenario, implies off-street parking which could be deemed to aid to an efficient transport system, it also implies that it offers access to a destination and therefore, convenience.

*Safety*

The inclusion of a car park safety certificate in the scenario comes directly from the parking industry's value of parking. Indeed, safety is an issue that the industry seems to have adopted and is addressing through the introduction of safety standards such as Park Mark (Park Mark Safer Parking, 2013). In the choice task, the respondents have the choice to select whether or not they park in a car park which has been awarded a certificate of safety. The issue of safety seems overlooked in parking literature where the focus of concern is location, destination and price.

*Price*

Price as an attribute in choice tasks is often used when making value judgements as it is conveniently appropriate for making trade-offs (Hair, 2010). Furthermore, most car parks are not free and so price seems an obvious attribute to include in this particular scenario. Price not only reflects the parking industry's value of parking but also the revenue stream and commercial product values of parking.

Less straightforward was setting the levels for the price attribute as in parking the levels of variance are vast depending on geographical location. Therefore, in order to retain a common to all element, two tactics were applied. First, respondents were asked to consider the price they might pay for two hours parking in a car park where they live, and second, in case they were non-consumers, or individuals who do not usually park in a car park, a price of £3.50 was suggested as a figure to base their choices on. The figure of £3.50 was given as a starting point

only and was found using an online search tool of the UKs largest private parking operator (Car Park Price Information, 2013) by comparing the prices between several English towns and cities.

The levels of £1 and 50p were conceived in relation to the UK's current minimum wage of just over £6 per hour (National Minimum Wage Rates, 2013) which would roughly make every ten minutes within an hour worth 1/6 or 1/12 of an hours wage respectively. In addition, these figures were again considered to be easily comprehensible and familiar to all respondents.

### 6.5.3 Strategy scenario

*Aim*

The aim of the strategy scenario was to determine willingness to pay, in the context of the scenario, and to infer parking value from the predetermined attributes and levels according to the stakeholder groups.

Where the driver scenario explored off-street parking, the strategy scenario surveyed on-street parking. It was the frontage for the governmental value context as presented in Table 21 which concerned all but the parking industry stakeholder groups. It also accommodated four of the values given in Table 20. These were; facilitates access, which was valued by the consumer, parking industry and governmental stakeholder groups; sustains economic activity, valued by the consumer group only; revenue stream, valued by the parking industry and governmental stakeholder groups and; part of an efficient transport system, valued only by the governmental group.

The hypothetical strategy scenario was presented, thus:

*"The Car Parking Strategy Scenario is from the perspective of those whose job involves managing parking."*

In this scenario, respondents were required to use imagination as it was considered that the majority of stakeholders participating in the choice task would not be decision makers employed in parking. However, as the respondents were stakeholders affected by parking, it was anticipated that they would have an interest in expressing how they would manage parking, if they were in a position to do so.

The background to the scenario lies less in literature and more from the process and results of the first set of sector leader stakeholder interviews conducted during the preliminary, exploratory research phase. It is representative of the dilemmas decision makers face over:

- Increasing on-street parking spaces to facilitate access, or not
- Charging higher prices to increase turnover, facilitate access, to help maintain an efficient transport system and to create revenue to support the scheme, or not
- Lowering charges to attract drivers and therefore help to sustain economic activity for the locale, or not
- Whether or not the strategy will attract political backing. According to the preliminary phase interviews, political support often leans towards policies which increase parking spaces and decrease parking charges

*Attributes and levels*

The scenario gave a brief description of the attributes that the respondents were to encounter in the impending choice task:

There are three attributes to consider:

*1. The quantity of parking spaces available in a popular on-street location, such as in your town or city centre. You can increase, or decrease them, depending on the choice you make.*

*2. Political support. This is whether or not the strategy you choose has the support of a local Councillor. This may or may not be of significance to you.*

*3. The price of two hours parking charged for the spaces as referred to in Attribute 1 above. You can either increase or decrease the price. Remember to base the price on how much is charged for the parking spaces you have in mind for Attribute 1. A suggested price of 2 hours on-street parking could be £4.*

Highlighted are the three attributes as presented in Table 4, along with their respective levels. As the scenario was expected to be completed by all the stakeholder groups, like the driver scenario, the attributes were conceived to be meaningful across the groups, despite the majority of the respondents not being parking decision makers themselves.

*Spaces*

This attribute was concerned with on-street parking and so respondents were asked to think of a key site that was meaningful to them. As the location was specific to the individual respondent, further description such as the current quantity of spaces or details of the location, such as

close to shops etc were deliberately omitted. In order to receive a sincere response, it was felt that such things were best left to the respondent to determine in their own mind, as everyone's unique 'location' could yield considerable differences.

The 'spaces' attribute was also quantitative. The figures of ten and five spaces were selected as not only were both felt to be communicable and actionable, but in addition it was hoped that they would assist sufficiently in indicating clear levels of determination to either have more or to reduce parking.

*Political Support*

Political support was not only a key theme as part of the parking issues examined during the preliminary interview phase, it was also discussed at length during the nine bridging interviews, as presented in Figure 2, as having influence on parking income. Participant 1, in particular, gave examples where changing councillors had abandoned their predecessors parking strategies which meant that income to support transport related initiatives did not come to fruition. Therefore, this attribute gave the option to the respondents to decide whether their 'strategy' should proceed with or without political support, which would help to determine how strongly it was valued when formulating a desired parking strategy.

*Price*

The reasons for this attribute are the same as those previously expressed for the same attribute in the driver scenario. The reason for the higher price of £4 rather than £3.50 for two hours parking, however, was to show that on-street parking is often priced at a higher rate than off-street parking. Again, the £4 price was given only as a suggestion, in case the respondent was from the non-consumer group or did not usually park on-street, or did not usually pay to park on-street.

The levels of £1 and 50p were also selected for the same reason as those stated in the driver scenario.

### 6.5.4 Social scenario

*Aim*

The aim of the social scenario was to determine willingness to pay, in the stakeholder social value context, and to infer parking value from the predetermined attributes and levels according to the stakeholder groups.

The social scenario incorporated six of the values as given in Table 20 and all of the stakeholder groups: efficient use of land, valued by all the stakeholder groups; impact on public space, valued by the non-consumer and local business sector groups; facilitates access, valued by the consumer, parking industry and governmental groups, sustains economic activity, valued by the consumer group; revenue stream, valued by the parking industry and governmental groups; and finally, as part of an efficient transport system, valued by the governmental group alone.

The hypothetical social scenario was presented, thus:

*"The Social Scenario takes the perspective of those who support other modes of transport aside from the car (such as walking, cycling, buses and trains) as well as those who are concerned about potential negative impacts of parking on society and the environment.*

*In addition, it reflects the views of those who are supportive of public space, (indoor or outdoor places where people can meet and interact in) as some people feel that in some cases, when land is used to build car parks it can impinge on the levels of public space that towns and cities are able to provide."*

This description of the scenario encouraged respondents to think about parking in a broader context. It offered an alternative view by revealing that parking could have a negative impact on both the environment and society. It was felt necessary to assert this opinion as, potentially, this is a side to parking that is not so universally acknowledged or understood.

Providing car parking takes up space (Cutter and Franco, 2012) and land which could have an alternate use, thus restricting urban sprawl (Willson, 1995). This scenario is concerned with off-street car parks and so it is possible that the land they are using could be given over to alternate uses also, including using the land for the benefit of the public. The non-consumer group of sector leaders during the exploratory research phase were concerned that there was a society mind-set of car user dominance and that parking in areas of public space, although often not illegal was inconsiderate of non-users. Therefore, in order to reflect the non-consumer group

perspective effectively, the social scenario was afforded slightly more narrative that the previous scenarios.

Aside from parking's ability to impact on land and public space, car parks can also help to facilitate access and can be part of an efficient transport system as they store cars off-street hence improving traffic flow. Furthermore, the consumer group considers that parking (albeit on- or off-street) can help to sustain economic activity, and finally both the parking industry and the governmental stakeholder groups value the revenue stream that parking (on- and off-street) can generate.

*Attributes and levels*

The scenario gave a brief description of the attributes that the respondents were to encounter in the impending choice task:

*There are three attributes to consider:*

*1. The quantity of car parks in a town or city such as yours. They can be either increased or decreased depending on your choices.*

*2. The quantity of public spaces (public places where people can meet and interact in, such as in a park, a community centre, or in a leisure centre) in a town or city such as yours. For this scenario, there are either the same or more public spaces than there are in your town / city, depending on the choices you make.*

*3. The amount of weekly household council tax which people pay. The amount can be either increased or decreased depending on your choices of whether or not to have fewer or more car parks than in your town / city, and whether or not to keep the same or increase the number of public spaces than in your town / city.*

*Car Parks*

The attribute 'car parks' was quantified in percentage terms. It was considered that it would be more communicable to respondents if they could imagine the approximate number of car parks in their own town or city and then increased or decreased them by the figures of 50% and 25%. This was largely to overcome the issue of inconsistency.

For instance, towns and cities can accommodate any number of car parks in any number of types (surface, multi-storey or underground) and so to introduce a standard of stipulations,

could risk failure to capture the respondent's sincerity during the choice task. It is possible that the respondent might be naturally tempted to relate the stipulations to the situation where they live anyway, which could ultimately add unnecessary complexity and confuse the responses, as they might become less actionable. Therefore, this attribute relied on the respondent to have some knowledge of car parks in their own town or city.

The reasons behind the levels of 50% and 25% are twofold. First, they are linked to the third attribute of 'council tax' which is discussed in detail below, and second, because like the attribute 'spaces' in the Strategy Scenario, it was hoped that they would assist sufficiently in indicating clear levels of determination to either have more or to reduce car parks.

*Public Spaces*

This attribute was selected to provide an alternative use of land to car parks, as it was a way to include the non-consumer and local business sector's value of parking (see Table 5). Similar to 'car parks' above, respondents were asked to use their imagination and refer to the public space situation where they live. The levels of 'same' and 'increase' were used to help maintain an element of authenticity for the respondent.

For instance, it is unlikely that individuals would not be able to think of any areas of public space where they live. As this hypothetical scenario was concerned with offering an alternate point of view, then the levels introduced were either to imagine the same amount of public space, or more. To quantify this attribute was considered unfeasible as pubic space is difficult to measure as even the notion itself is somewhat abstract. The principal concern was that the respondent understood what public space was and could make it applicable to their individual situation.

*Council Tax*

During the nine bridging interviews that were conducted, it became apparent that in some cases, some local authorities use the surplus income generated by their off-street parking facilities to help stagnate or reduce individual household council tax charges. The hypothetical scenario in figure 8 was considered as a basis to underpin the social scenario.

**Hypothetical Scenario**

Town A 49805 households generate £52.5m council tax per household
1 household = £1054 council tax per year

Town A has 16 car parks accommodating 3472 spaces
1 car park = 217 spaces
Town A's car parks generate £9m per year in income*
1 space = £2592 income per year
1 car park = £10817 income per week

£10817 car park income / 49805 households = 22p per week

**50%** more car parks = 8 x 22p = **£1.76**
**25%** more car parks = 4 x 22p = **88p**

* total income, rather than *surplus* income

**Figure 8 Hypothetical scenario, a basis for discussion**

This hypothetical scenario was based on genuine figures for an existing city within England and as such, it has the potential to reflect reality.

The levels of 50% and 25%, discussed in the attribute 'car parks' above, were achieved based on this scenario as were the resulting figures for the council tax levels. In order to make the levels more communicable, they were rounded up to £2 and £1, which is how much the council tax levels could be increased or reduced by per week, depending on the corresponding levels of car parks selected.

In summary, the scenarios are uniform in that they each have the same number of attributes and levels, they have the same aims (within their distinct contexts) and they are each presented in the same way. This was an intentional part of the design in order to ease the burden on the respondent when completing the choice task. Introducing inconsistency into the choice tasks would be unlikely to benefit the results.

Furthermore, the number of attributes and levels in each scenario was limited to just three attributes with four, two and four levels respectively. Keeping the number of attributes low was intentional as increasing the number of attributes would mean increasing the number of profiles and thus choice sets within the design (Hair et al, 2010). As all respondents were to be asked to complete all three choice tasks, increasing the size of the tasks did not seem wise. A summary of the different attributes and levels according to their relative scenario is presented in Table 27 below

**Table 27 Attributes and levels according to scenario**

| Scenario | Attributes | Levels | | | |
|---|---|---|---|---|---|
| **Driver** | Walk | -10 mins | -5 mins | +5 mins | +10 mins |
| | Safe | Yes | No | | |
| | Price | -£1 | -50p | +50p | +£1 |
| **Strategy** | Spaces | -10 | -5 | +5 | +10 |
| | Politics | Yes | No | | |
| | Price | -£1 | -50p | +50p | +£1 |
| **Social** | Car parks | -50% | -25% | +25% | +50% |
| | Public spaces | Same | Increase | | |
| | Council tax | -£2 | -£1 | +£1 | +£2 |

*Constructing the profiles*

With the attributes and levels established, the next stage is to construct the profiles. The minimum number of profiles required to be evaluated by respondents is suggested by Hair (2010, p280):

Minimum number of profiles = Total number of levels across all attributes – number of attributes + 1

For each of the three scenarios then:

Minimum number of profiles = 10 – 3 + 1 = **8**

It is clear from this that by increasing the number of attributes by even one, with another four levels, for instance, would increase the number of profiles to be evaluated to eleven. This would mean that a minimum of 33 profiles would have to be evaluated across the three scenarios, but it is thought that after the point of 30 evaluations, the quality of response is uncertain (Sawtooth software, 2003).

Furthermore, the total number of combinations of attributes and levels for creating each profile, for each of the three scenarios is 4 x 3 x 4 = 32. Therefore presenting all 32 profiles for evaluation across all three scenarios, would result in a total of 96 profiles, which is clearly undesirable. It is important, therefore that the profiles are refined to a manageable number and that all that are included in the design are logical in order for the respondent to make a sensible evaluation.

In the case of each of the three scenarios, only 16 out of a possible 32 combinations are logical. This is because, in the case of the driver scenario for instance, it is unlikely that an individual

would pay more than they usually would to parking in a car park and then walk for longer than they usually would to reach their desired destination. It would be more logical that an individual would pay more and spend less time walking to their desired destination.

Therefore, a subset of 16 logical profiles was constructed for each of the three scenarios from first principles, as presented below in Table 28:

**Table 28 Coded profile design according to scenario**

| | Driver Scenario | | | Strategy Scenario | | | Social Scenario | | |
|---|---|---|---|---|---|---|---|---|---|
| | Attributes | | | Attributes | | | Attributes | | |
| **Profile** | **Walk** | **Safe** | **Cost** | **Spaces** | **Politics** | **Cost** | **C' parks** | **P' space** | **Cost** |
| **1** | 2 | 1 | 4 | 4 | 1 | 1 | 3 | 2 | 2 |
| **2** | 4 | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 4 |
| **3** | 1 | 2 | 4 | 2 | 2 | 4 | 2 | 1 | 4 |
| **4** | 4 | 2 | 1 | 2 | 1 | 3 | 4 | 2 | 1 |
| **5** | 2 | 2 | 3 | 4 | 2 | 2 | 2 | 2 | 3 |
| **6** | 3 | 2 | 2 | 1 | 1 | 4 | 4 | 1 | 2 |
| **7** | 1 | 1 | 3 | 1 | 2 | 3 | 1 | 1 | 3 |
| **8** | 3 | 1 | 1 | 3 | 2 | 1 | 3 | 1 | 1 |
| **9** | 4 | 1 | 1 | 4 | 2 | 1 | 1 | 2 | 3 |
| **10** | 3 | 1 | 2 | 3 | 2 | 2 | 3 | 2 | 1 |
| **11** | 1 | 1 | 4 | 1 | 2 | 4 | 1 | 1 | 4 |
| **12** | 2 | 1 | 3 | 2 | 2 | 3 | 2 | 1 | 3 |
| **13** | 1 | 2 | 3 | 1 | 1 | 3 | 4 | 1 | 1 |
| **14** | 3 | 2 | 1 | 3 | 1 | 1 | 3 | 1 | 2 |
| **15** | 2 | 2 | 4 | 2 | 1 | 4 | 2 | 2 | 4 |
| **16** | 4 | 2 | 2 | 4 | 1 | 2 | 4 | 2 | 2 |

This balanced design ensures that each attribute and level appears the same number of times despite the asymmetry of the second attribute in each scenario, which has only two levels in each case. As a subset of the original full factorial (or full profile) set, the design becomes a fractional one because only a sample of profiles is used, despite the inclusion of double the minimum number of profiles. Any coding could be applied as long as it can be uniquely mapped between the level and assigned value (Hensher et al, 2005}.

The profiles were then organised into the choice sets under each scenario, as presented in Table 29 below:

**Table 29 Profiles arranged according to choice set**

| Choice set | Profile number | | | |
|---|---|---|---|---|
| **1** | 1 | 2 | 3 | 4 |
| **2** | 5 | 6 | 7 | 8 |
| **3** | 2 | 3 | 4 | 5 |
| **4** | 6 | 7 | 8 | 1 |
| **5** | 9 | 10 | 11 | 12 |
| **6** | 13 | 14 | 15 | 16 |
| **7** | 10 | 11 | 12 | 13 |
| **8** | 14 | 15 | 16 | 9 |

This resulted in the final choice set design for each of the three different scenarios, including a 'none of these' option (E), as presented in Table 30 below:

**Table 30 Choice set design for driver, strategy and social hypothetical scenarios**

| Choice set | Driver scenario | | | | |
|---|---|---|---|---|---|
| **1** | **A** | **B** | **C** | **D** | **E** |
| | Walk for 5 mins less<br>Safety certificate: yes<br>Pay: £1 more | Walk for 10 mins longer<br>Safety certificate: yes<br>Pay: 50p less | Walk for 10 mins less<br>Safety certificate: no<br>Pay: £1 more | Walk for 10 mins longer<br>Safety certificate: no<br>Pay: £1 less | None Of these |
| **2** | **A** | **B** | **C** | **D** | **E** |
| | Walk for 5 mins less<br>Safety certificate: no<br>Pay: 50p more | Walk for 5 mins longer<br>Safety certificate: no<br>Pay: 50p less | Walk for 10 mins less<br>Safety certificate: yes<br>Pay: 50p more | Walk for 5 mins longer<br>Safety certificate: yes<br>Pay: £1 less | None Of these |
| **3** | **A** | **B** | **C** | **D** | **E** |
| | Walk for 10 mins longer<br>Safety certificate: yes<br>Pay: 50p less | Walk for 10 mins less<br>Safety certificate: no<br>Pay: £1 more | Walk for 10 mins longer<br>Safety certificate: no<br>Pay: £1 less | Walk for 5 mins less<br>Safety certificate: no<br>Pay: 50p more | None Of these |
| **4** | **A** | **B** | **C** | **D** | **E** |
| | Walk for 5 mins longer<br>Safety certificate: no<br>Pay: 50p less | Walk for 10 mins less<br>Safety certificate: yes<br>Pay: 50p more | Walk for 5 mins longer<br>Safety certificate: yes<br>Pay: £1 less | Walk for 5 mins less<br>Safety certificate: yes<br>Pay: £1 more | None Of these |
| **5** | **A** | **B** | **C** | **D** | **E** |
| | Walk for 10 mins longer<br>Safety certificate: yes<br>Pay: £1 less | Walk for 5 mins longer<br>Safety certificate: yes<br>Pay: 50p less | Walk for 10 mins less<br>Safety certificate: yes<br>Pay: £1 more | Walk for 5 mins less<br>Safety certificate: yes<br>Pay: 50p more | None Of these |
| **6** | **A** | **B** | **C** | **D** | **E** |
| | Walk for 10 mins less<br>Safety certificate: no<br>Pay: 50p more | Walk for 5 mins longer<br>Safety certificate: no<br>Pay: £1 less | Walk for 5 mins less<br>Safety certificate: no<br>Pay: £1 more | Walk for 10 mins longer<br>Safety certificate: no<br>Pay: 50p less | None Of these |
| **7** | **A** | **B** | **C** | **D** | **E** |
| | Walk for 5 mins longer<br>Safety certificate: yes<br>Pay: 50p less | Walk for 10 mins less<br>Safety certificate: yes<br>Pay: £1 more | Walk for 5 mins less<br>Safety certificate: yes<br>Pay: 50p more | Walk for 10 mins less<br>Safety certificate: no<br>Pay: 50p more | None Of these |
| **8** | **A** | **B** | **C** | **D** | **E** |
| | Walk for 5 mins longer<br>Safety certificate: no<br>Pay: £1 less | Walk for 5 mins less<br>Safety certificate: no<br>Pay: £1 more | Walk for 10 mins longer<br>Safety certificate: no<br>Pay: 50p less | Walk for 10 mins longer<br>Safety certificate: yes<br>Pay: £1 less | None Of these |

| Choice set | Strategy scenario | | | | |
|---|---|---|---|---|---|
| **1** | **A** | **B** | **C** | **D** | **E** |
| | 10 more spaces<br>Political support: yes<br>Charge:£1 less | 5 more spaces<br>Political support: yes<br>Charge:50p less | 5 fewer spaces<br>Political support: no<br>Charge:£1 more | 5 fewer spaces<br>Political support: yes<br>Charge:50p more | None Of these |
| **2** | **A** | **B** | **C** | **D** | **E** |
| | 10 more spaces<br>Political support: no<br>Charge:50p less | 10 fewer spaces<br>Political support: yes<br>Charge: £1 more | 10 fewer spaces<br>Political support: no<br>Charge: 50p more | 5 more spaces<br>Political support: no<br>Charge: £1 less | None Of these |
| **3** | **A** | **B** | **C** | **D** | **E** |
| | 5 more spaces<br>Political support: yes<br>Charge:50p less | 5 fewer spaces<br>Political support: no<br>Charge:£1 more | 5 fewer spaces<br>Political support: yes<br>Charge:50p more | 10 more spaces<br>Political support: no<br>Charge:50p less | None Of these |
| | **A** | **B** | **C** | **D** | **E** |
| | 10 fewer spaces<br>Political support: yes<br>Charge: £1 more | 10 fewer spaces<br>Political support: no<br>Charge: 50p more | 5 more spaces<br>Political support: no<br>Charge: £1 less | 10 more spaces<br>Political support: yes<br>Charge:£1 less | None Of these |
| **5** | **A** | **B** | **C** | **D** | **E** |
| | 10 more spaces<br>Political support: no<br>Charge: £1 less | 5 more spaces<br>Political support: no<br>Charge: 50p less | 10 fewer spaces<br>Political support: no<br>Charge: £1 more | 5 fewer spaces<br>Political support: no<br>Charge: 50p more | None Of these |
| **6** | **A** | **B** | **C** | **D** | **E** |
| | 10 fewer spaces<br>Political support: yes<br>Charge: 50p more | 5 more spaces<br>Political support: yes<br>Charge: £1 less | 5 fewer spaces<br>Political support: yes<br>Charge: £1 more | 10 more spaces<br>Political support: yes<br>Charge: 50p less | None Of these |
| **7** | **A** | **B** | **C** | **D** | **E** |
| | 5 more spaces<br>Political support: no<br>Charge: 50p less | 10 fewer spaces<br>Political support: no<br>Charge: £1 more | 5 fewer spaces<br>Political support: no<br>Charge: 50p more | 10 fewer spaces<br>Political support: yes<br>Charge: 50p more | None Of these |
| **8** | **A** | **B** | **C** | **D** | **E** |
| | 5 more spaces<br>Political support: yes<br>Charge: £1 less | 5 fewer spaces<br>Political support: yes<br>Charge: £1 more | 10 more spaces<br>Political support: yes<br>Charge: 50p less | 10 more spaces<br>Political support: no<br>Charge: £1 less | None Of these |

| Choice set | Social scenario | | | | |
|---|---|---|---|---|---|
| **1** | **A** | **B** | **C** | **D** | **E** |
| | 25% more car parks<br>Same public spaces<br>Weekly council tax: £1 less | 50% fewer car parks<br>Same public spaces<br>Weekly council tax: £2 more | 25% fewer car parks<br>Increase public spaces<br>Weekly council tax: £2 more | 50% more car parks<br>Same public spaces<br>Weekly council tax: £2 less | None Of these |
| **2** | **A** | **B** | **C** | **D** | **E** |
| | 25% fewer car parks<br>Same public spaces<br>Weekly council tax: £1 more | 50% more car parks<br>Increase public spaces<br>Weekly council tax: £1 less | 50% fewer car parks<br>Increase public spaces<br>Weekly council tax: £1 more | 25% more car parks<br>Increase public spaces<br>Weekly council tax: £2 less | None Of these |
| **3** | **A** | **B** | **C** | **D** | **E** |
| | 50% fewer car parks<br>Same public spaces<br>Weekly council tax: £2 more | 25% fewer car parks<br>Increase public spaces<br>Weekly council tax: £2 more | 50% more car parks<br>Same public spaces<br>Weekly council tax: £2 less | 25% fewer car parks<br>Same public spaces<br>Weekly council tax: £1 more | None Of these |
| **4** | **A** | **B** | **C** | **D** | **E** |
| | 50% more car parks<br>Increase public spaces<br>Weekly council tax: £1 less | 50% fewer car parks<br>Increase public spaces<br>Weekly council tax: £1 more | 25% more car parks<br>Increase public spaces<br>Weekly council tax: £2 less | 25% more car parks<br>Same public spaces<br>Weekly council tax: £1 less | None Of these |
| **5** | **A** | **B** | **C** | **D** | **E** |
| | 50% fewer car parks<br>Same public spaces<br>Weekly council tax: £1 more | 25% more car parks<br>Same public spaces<br>Weekly council tax: £2 less | 50% fewer car parks<br>Increase public spaces<br>Weekly council tax: £2 more | 25% fewer car parks<br>Increase public spaces<br>Weekly council tax: £1 more | None Of these |
| **6** | **A** | **B** | **C** | **D** | **E** |
| | 50% more car parks<br>Increase public spaces<br>Weekly council tax: £2 less | 25% more car parks<br>Increase public spaces<br>Weekly council tax: £1 less | 25% fewer car parks<br>Same public spaces<br>Weekly council tax: £2 more | 50% more car parks<br>Same public spaces<br>Weekly council tax: £1 less | None Of these |
| **7** | **A** | **B** | **C** | **D** | **E** |
| | 25% more car parks<br>Same public spaces<br>Weekly council tax: £2 less | 50% fewer car parks<br>Increase public spaces<br>Weekly council tax: £2 more | 25% fewer car parks<br>Increase public spaces<br>Weekly council tax: £1 more | 50% more car parks<br>Increase public spaces<br>Weekly council tax: £2 less | None Of these |
| **8** | **A** | **B** | **C** | **D** | **E** |
| | 25% more car parks<br>Increase public spaces<br>Weekly council tax: £1 less | 25% fewer car parks<br>Same public spaces<br>Weekly council tax: £2 more | 50% more car parks<br>Same public spaces<br>Weekly council tax: £1 less | 50% fewer car parks<br>Same public spaces<br>Weekly council tax: £1 more | None Of these |

The above designs facilitated for all 16 profiles to be included twice and in two different choice sets. In addition, the design was strengthened still further by using all of the logical profiles from the original factorial set which was twice the minimum number of profiles required by CBC. Despite using twice the number of profiles required respondent fatigue was avoided as the total number of choice tasks did not exceed 24.

The design was also *unlabelled* which was considered suitable for this type of experiment as the choice task did not involve respondents choosing between different objects in a choice set, such as different transport modes like *car*, *bus*, or *train*, or different brands such as *Q Park*, *NCP* or *Parksafe*, for instance. Instead the titles of the alternatives were left *generic*. In unlabelled experiments the respondent makes an evaluation based on the merits of the attributes and levels only, being unable to infer any additional information from either the name of the label, or any preconceptions that they might attach to a label (Hensher et al, 2005)

Of these three scenarios it was recognised that *driver* was the most straightforward, as most respondents would have been in a position where they were a driver or a passenger in a vehicle when decisions are made about parking. The later scenarios meanwhile adopted the stance of *decision makers* and outlined some of the dilemmas faced in terms of parking strategies and wider strategies with a social remit. In presenting these scenarios it is recognised that a limited number of influencing factors are considered, which can be a criticism of the method. Yet in doing this it has been possible to quantify the relative importance of factors identified in phase one as important stakeholder influences.

## 6.6 Survey pilot and respondent selection

The experiment incorporated the choice tasks as part of a wider online survey (Bristol online survey) the scope of which lies beyond the parameters of this study. The scenarios have been described in terms of their finished design and indeed this is what was presented in the live survey. Bristol Online Surveys (BOS) is a service that allows surveys to be developed, deployed, and analysed via the Web. BOS is considered to be a robust research tool as it is widely used by approximately 130 universities plus by other public bodies and companies (www.survey.bris.ac.uk).

Prior to its distribution, piloting of the choice tasks was undertaken among a class of 40 undergraduate transport students to test for its success. The aim of the pilot was to ensure that the finished choice tasks were both meaningful to respondents and workable. It was hoped that the pilot survey would also help to identify any issues with not only completing the choice tasks, but with cognitive burden and fatigue also. The students were asked if they would be happy to participate in the pilot survey and told that if they did so, they would asked to provide feedback on the following three aspects of the choice tasks:

1. In your opinion, are the hypothetical scenarios
    - Understandable
    - Realistic
2. In your opinion, are the attributes and levels
    - Understandable
    - Realistic
3. Did you experience any issues completing the choice tasks, such as
    - Understanding
    - Fatigue

The class were timed and given verbal instructions on how to complete the choice tests. Although the designs were very similar to those presented, some attributes had more levels which almost a third of the pilot participants expressed that it made the choice tasks harder to do and consequently less enjoyable. Nine of the participants stated that although they could understand the scenarios, they did not completely believe them to be realistic and none of the participants admitted to problems with understanding the choice tasks, one participant commented ‘boring’ next to the final aspect of feedback.

The feedback from the pilot participant survey was taken into account and the relevant refinements were made.

The live choice tasks were distributed through the following stakeholder group channels to gain perspectives from across England: the British Parking Association (BPA), the Association of Town and City Management (ATCM), various local governmental groups (LGG), Living Streets (LS), Disabled Motoring UK (DMUK) and other interested parties (OIP) such as Walk21 or other independent individuals, see Table 31 (below). A total of 1107 completed responses were received. The choice task distribution channels are presented below, Table 31:

**Table 31 Choice task distribution channels**

| | | Stakeholder Groups | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Scenarios** | **Channel** | **NC.C** | **NC.I** | **C.C** | **C.I** | **LBS** | **PI** | **G** |
| **Driver** | ATCM | 11 | | 141 | | 110 | 5 | 37 |
| | BPA | 9 | | 58 | | 12 | 55 | |
| | LGG | | | 19 | | | | 19 |
| | LS | 14 | 12 | | | | | |
| | DMUK | 2 | 2 | 4 | 4 | | | 2 |
| | OIP | 32 | 23 | 107 | 107 | | | 9 |
| | **TOTAL 397** | **68** | **37** | **329** | **111** | **122** | **60** | **67** |
| **Strategy** | ATCM | 14 | | 124 | | 100 | 5 | 33 |
| | BPA | 7 | | 58 | | 12 | 53 | |
| | LGG | | | 17 | | | | 17 |
| | LS | 30 | 21 | | | | | |
| | DMUK | | | 4 | 4 | | | 2 |
| | OIP | 9 | 9 | 97 | 97 | | | 9 |
| | **TOTAL 360** | **60** | **30** | **300** | **101** | **112** | **58** | **61** |
| **Social** | ATCM | 7 | | 130 | | 99 | 5 | 33 |
| | BPA | 2 | | 56 | | 9 | 49 | |
| | LGG | | | 7 | | | | 7 |
| | LS | 12 | 9 | | | | | |
| | DMUK | | | 4 | 4 | | | 2 |
| | OIP | 37 | 19 | 95 | 95 | | | 19 |
| | **TOTAL 350** | **58** | **28** | **292** | **99** | **108** | **54** | **61** |

A link to the survey was posted on each of the different stakeholder channel's websites along with a note inviting their members or associated parties to participate in the survey and complete the three different choice tasks, from their particular stakeholder perspective. Response rates could not be estimated as figures regarding the population sizes connected to each of the different distribution channels were not available as access to the link was not restricted. This was considered to be a particular limitation of the data-collection method. Participants were asked at the start of the survey to assign themselves to one of the pre-determined stakeholder groups and complete the choice tasks accordingly.

## 6.7 Supporting questions

In addition to the choice tasks, respondents were asked ten further questions in order to clarify their choice decisions concerning some of the attributes involved in each of the three different scenarios. The following questions presented to respondents at the end of each of the three separate choice tasks.

**Driver**

Upon reflection

**1.** To what extent do you think safety should be taken into account when choosing which car park to park in?

Please place your answer on a scale of 1 – 5, where:1 = Greater and 5 = Lesser

1 2 3 4 5

**2.** What did you focus on the MOST during the Driver Scenario?

*(select all that apply)*

Increasing walking time Decreasing walking time

Car park safety certificate, **Yes** Car park safety certificate, **No**

Increasing the price Decreasing the price

**3.** What did you focus on the LEAST during the Driver Scenario?

*(select all that apply)*

Increasing walking time Decreasing walking time

Car park safety certificate, **Yes** Car park safety certificate, **No**

Increasing the price Decreasing the price

**Strategy**

Upon reflection

**4.** To what extent do you think political support should influence decisions about how much car parking to supply?

Please place your answer on a scale of 1 – 5, where:1 = Greater and 5 = Lesser

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

**5.** To what extent do you think political support should influence decisions about how much to charge for car parking?

Please place your answer on a scale of 1 – 5, where:1 = Greater and 5 = Lesser

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

**6.** What did you focus on the MOST during the Parking Strategy Scenario?

*(select all that apply)*

☐ Increasing the parking spaces ☐ Decreasing the parking spaces

☐ Political support, **No** ☐ Political support, **Yes**

☐ Increasing the price of parking ☐ Decreasing the price of parking

**7.** What did you focus on the LEAST during the Parking Strategy Scenario?

*(select all that apply)*

☐ Increasing the parking spaces ☐ Decreasing the parking spaces

☐ Political support, **No** ☐ Political support, **Yes**

☐ Increasing the price of parking ☐ Decreasing the price of parking

**Social**

Upon reflection

**8.** How important do you think public spaces are in comparison with car parks?

Please place your answer on a scale of 1 - 5 where:

1= Public spaces are more important than car parks, 2= Car parks are more important than public spaces

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

**9.** What did you focus on the MOST during the Social Scenario?

*(select all that apply)*

☐ Increasing car parks ☐ Decreasing car parks

☐ Increasing public spaces ☐ Decreasing public spaces

☐ Increasing weekly council tax ☐ Decreasing weekly council tax

**10.** What did you focus on the LEAST during the Social Scenario?

*(select all that apply)*

☐ Increasing car parks ☐ Decreasing car parks

☐ Increasing public spaces ☐ Decreasing public spaces

☐ Increasing weekly council tax ☐ Decreasing weekly council tax

## 6.8 Model estimation

The estimation of CBC is considered more complex than traditional CA in part because it can be done at either an aggregate or disaggregate level. In addition, for the aggregate model is the issue of independence of irrelevant alternatives (IIA) (see section 6.3) which is an inherent assumption that can be problematic in the prediction of similar alternatives. It means that adding or removing alternative outcome categories does not affect the odds among the remaining outcomes. A mixed logit model is the optimal method for estimating CBC (Hair et al, 2010) and can be expressed as

$$\Pr(y_i = j) = \int \frac{exp(\boldsymbol{\beta}_j \boldsymbol{X}_i + \boldsymbol{\gamma} \boldsymbol{Z}_{ij})}{\sum_{m=1}^{M} exp(\boldsymbol{\beta}_m \boldsymbol{X}_i + \boldsymbol{\gamma} \boldsymbol{Z}_{im})} f(\boldsymbol{\beta}) d\boldsymbol{\beta}` \qquad j=1,2,3 \ldots M \qquad (3)$$

Where: $f(\boldsymbol{\beta})$ is a density function.

The standard MNL model is a special case of the mixed logit model when **β** are fixed parameters. In a random parameters model, the coefficients **β** are allowed to vary over different individuals and are assumed to be randomly distributed. In this case the random coefficients are specified to be normally distributed, e.g. $\boldsymbol{\beta}_1 \sim N(b,W)$ where $b$ is the mean and $W$ is the variance. Similarly, $y$ may also be specified as random parameters. A parameter is determined as random if the estimated standard deviation (S.D.) is statistically significant. Similarly some parameters of **z** could be considered as random.

The software, Nlogit5, an extension of an integrated econometrics package LIMDEP, as published by Econometric Software, Inc. was used due to its widely accepted capabilities for MMNL in the research community (Hensher et al, 2005).

Specifically, separate models were estimated for each of the individual car parking stakeholder groups, across all three of the different scenarios:

1. Non-consumers *independent* (NCI)
2. Consumers *independent* (CI)
3. Local business sector (LBS)
4. Parking industry (PI)
5. Governmental (G);

As it is logical that some non-consumers and consumers of parking can also belong to a different stakeholder group, the non-consumer and consumer parking stakeholders who participated in the survey and did not indicate that they belonged to any other stakeholder group are marked as '*independent'*.

Three attributes were used in each model, where the Ui is the utility and β is the coefficient of each of the attributes. As the experiments are *unlabelled*, there is no inclusion of the Alternate Specific Constant (ASC). The utility function for each of the three separate scenarios is given below:

**Driver**

$$U_{ij} = \beta_{walk}*Walk_i + \beta_{safe}*Safe_j + \beta_{costdriver}*Cost_j + \varepsilon$$

**Strategy**

$$U_{jk} = \beta_{spaces}*Spaces_j + \beta_{politics}*Politics_k + \beta_{coststrat}*Cost_j + \varepsilon$$

**Social**

$$U_j = \beta_{carparks}*Carparks_j + \beta_{publicspace}*Publicspace_j + \beta_{costsocial}*Cost_j + \varepsilon$$

(4)

According to Hensher et al (2005, p. 357),

*"WTP measures are calculated as the ratio of two parameter estimates, holding all else constant. Provided that at least one attribute is measured in monetary units, the ratio of two parameters will provide a financial indicator of WTP."*

WTP was calculated for each attribute in the design by dividing each attribute coefficient value by the *cost* attribute coefficient value, across each of the individual scenarios. The *cost* attribute can be used as a proxy in the absence of *income* data. This gives WTP as a ratio between two parameters. Only where both attributes are significant is calculated as where either only one or neither attribute is significant, WTP is rendered meaningless (Hasan-Basri, Abd Karim 2013). Where coefficients are significant to a 90% level **WTP,** using 'Walk' (Driver Scenario) as an example, was calculated as:

$$\mathrm{WTPwalk} = \frac{\beta\mathrm{walk}}{-\beta\mathrm{cost}}$$

(5)

Further to this MMNL model in the software, Nlogit5, uses Maximum Likelihood Estimation (MLE), which is an, “Estimator that calculates parameters for which the observed sample is most likely to have observed.” (Hensher et al, 2005) In other words, the maximum likelihood estimates are the set of population parameters that produce the observed sample most often.

## 6.9 Data input

Once collated, the data was input into excel spreadsheets and organised according to scenario and stakeholder group for the purposes of being accepted by the Nlogit5 software. Dummy variables were created to represent the choices, where 1 = alternative chosen and 0 = no alternative chosen, and continuous variables were created to represent the values for the attributes of walking times and the prices of car parking. An example of the data input for one choice task for one individual for the driver scenario is presented in Table 33: Each individual was coded with an ID value, the alternatives were coded 1,2,3,4 and 5 and each choice set contained five choices. As Table 33 shows, each individual required 40 separate rows of data, rendering the input and organisation of data in preparation for its introduction into Nlogit5, both time consuming and repetitive.

**Table 32 Example of data set for one individual's responses to one choice task (driver)**

| ID | ALT | CHOICESET | CHOICE | WALK | SAFE | COST |
|---|---|---|---|---|---|---|
| 1 | 1 | 5 | 0 | -5 | 1 | 1 |
| 1 | 2 | 5 | 0 | 10 | 1 | -0.5 |
| 1 | 3 | 5 | 1 | -10 | 0 | 1 |
| 1 | 4 | 5 | 0 | 10 | 0 | -1 |
| 1 | 5 | 5 | 0 | 0 | 0 | 0 |
| 1 | 1 | 5 | 1 | -5 | 0 | 0.5 |
| 1 | 2 | 5 | 0 | 5 | 0 | -0.5 |
| 1 | 3 | 5 | 0 | -10 | 1 | 0.5 |
| 1 | 4 | 5 | 0 | 5 | 1 | -1 |
| 1 | 5 | 5 | 0 | 0 | 0 | 0 |
| 1 | 1 | 5 | 0 | 10 | 1 | -0.5 |
| 1 | 2 | 5 | 0 | -10 | 0 | 1 |
| 1 | 3 | 5 | 0 | 10 | 0 | -1 |
| 1 | 4 | 5 | 1 | -5 | 0 | 0.5 |
| 1 | 5 | 5 | 0 | 0 | 0 | 0 |
| 1 | 1 | 5 | 0 | 5 | 0 | -0.5 |
| 1 | 2 | 5 | 1 | -10 | 1 | 0.5 |
| 1 | 3 | 5 | 0 | 5 | 1 | -1 |
| 1 | 4 | 5 | 0 | -5 | 1 | 1 |
| 1 | 5 | 5 | 0 | 0 | 0 | 0 |
| 1 | 1 | 5 | 0 | 10 | 1 | -1 |
| 1 | 2 | 5 | 0 | 5 | 1 | -0.5 |
| 1 | 3 | 5 | 1 | -10 | 1 | 1 |
| 1 | 4 | 5 | 0 | -5 | 1 | 0.5 |
| 1 | 5 | 5 | 0 | 0 | 0 | 0 |
| 1 | 1 | 5 | 0 | -10 | 0 | 0.5 |
| 1 | 2 | 5 | 0 | 5 | 0 | -1 |
| 1 | 3 | 5 | 1 | -5 | 0 | 1 |
| 1 | 4 | 5 | 0 | 10 | 0 | -0.5 |
| 1 | 5 | 5 | 0 | 0 | 0 | 0 |
| 1 | 1 | 5 | 0 | 5 | 1 | -0.5 |
| 1 | 2 | 5 | 0 | -10 | 1 | 1 |
| 1 | 3 | 5 | 0 | -5 | 1 | 0.5 |
| 1 | 4 | 5 | 1 | -10 | 0 | 0.5 |
| 1 | 5 | 5 | 0 | 0 | 0 | 0 |
| 1 | 1 | 5 | 0 | 5 | 0 | -1 |
| 1 | 2 | 5 | 0 | -5 | 0 | 1 |
| 1 | 3 | 5 | 0 | 10 | 0 | -0.5 |
| 1 | 4 | 5 | 0 | 10 | 1 | -1 |
| 1 | 5 | 5 | 1 | 0 | 0 | 0 |

## 6.10 Summary

This chapter has progressed the study forward by gathering the key findings from phase one and using them to underpin the experimental aspect of phase two. It has identified that CBC, which is an extension of CA and part of a set of multivariate dependence techniques, is the best way to establish how stakeholders value something. This chapter has also shown how more meaningful *attributes* can be successfully incorporated into three different and hypothetical scenarios, in order to estimate how car parking is valued across a broader range of different stakeholder groups, than considered previously in literature. Moreover, it has described how this can be interpreted into easily comprehended WTP values.

The results of the scenarios were presented to a group of stakeholders representative of all of the different groups for validation purposes at a national meeting held in London by a British parking member organisation.

# Chapter 7 Phase 2 Results

## 7.1 Introduction

This chapter gives the results for the three different hypothetical scenarios and for the subsequent supporting questions which were asked to clarify the stakeholder's choice decisions concerning some of the attributes involved in each of the three different scenarios. There were a total of 1107 observations received from across the stakeholder groups, see Table 34 below, which gives the figures in terms of their groups and sub-groups.

**Table 33 Division of responses to the 3 hypothetical scenarios according to stakeholder group**

| Stakeholder group | **Driver** | **Strategy** | **Social** |
|---|---|---|---|
| All non-consumers *combined* | 68 | 60 | 58 |
| *(Non-consumers independent)* | *(37)* | *(30)* | *(28)* |
| All consumers *combined* | 329 | 300 | 292 |
| *(Consumers independent)* | *(111)* | *(101)* | *(99)* |
| Local business sector | 122 | 112 | 108 |
| Parking industry | 60 | 58 | 54 |
| Governmental | 67 | 59 | 61 |
| **Total** | **397** | **360** | **350** |
| **Total number of responses across all scenarios** | **1107** | | |

The non-consumer and consumer parking stakeholders who participated in the survey and did not indicate that they belonged to any other stakeholder group are marked as 'independent,' as they are a sub-group of each combined group. The two independent group totals are shown with their respective parent *combined* group totals in Table 34. They are separated from their parent groups throughout the rest of this chapter to enable a clearer understanding of the specific stakeholder group results. Analysis has also occurred at a level where *all* of the different groups have been combined to form another all-encompassing stakeholder group, namely; *All Stakeholders*.

The models were estimated using MMNL with Nlogit5 software and where the coefficients were statistically significant, WTP values were calculated.

Validation of the three different hypothetical scenarios and for the subsequent supporting questions took place during a workshop, where the results were presented to a group of stakeholders at a national meeting held in London by a British parking membership organisation.

The results have been presented by dividing them into the three separate scenarios; *driver*, *strategy* and *social*, rather than by the processes involved. Each one begins by exploring the

ratings given to the end of choice task supporting questions, regarding the attributes the respondents were asked to consider when performing their choice tasks.

## 7.2 Driver: Demographic descriptive statistics

Socio demographic information frequency and percentage summaries of all of the different stakeholder groups according to each of the three different scenarios can be found in Appendix 4. In short, in the driver scenario the mean age was similar for all the groups being between 44 and 50. Overall, there were a higher percentage of females belonging to the non-consumer stakeholder groups than males with the opposite being true of the consumer stakeholder group. The local business sector had the most males at between 72-74%, and fewer females at between 26-28% than any other group.

Across the groups the majority of stakeholders were in full time employment with their combined household income falling between the brackets of 25k – 100k. From a locational perspective, most stakeholders were resident in the *suburbs* and with regards to their usual form of transport, the majority used the *car*, in all cases, with the exception of the non-consumer groups, where only five stated this as their usual mode (passengers). For the non-consumer *independent* group, there was a subsequent even division between being a pedestrian, cycling and using public transport.

For the non-consumer *combined* group, there were 3% more females than males participating but this figure increased to 24.8% when the non-consumers became *independent* of all of the other groups. For the consumer combined group, the percentage difference of males was higher than females by 31.4% but the difference dropped to 14.5% when the group became *independent*. The male / female split among the parking industry and governmental groups was closely matched with 16 and 17 more males than females respectively. However, the local business sector experienced the largest division with 74% males and only 26% females, a sample representation which could leave an impression that the parking industry is male dominated.

### 7.2.1 Choice task supporting questions

After each scenario, the participants were asked a series of clarification questions regarding the attribute choices that they had made during the choice tasks. These are explored below. Table 35 presents the responses from all of the stakeholder groups combined to the first question, regarding the attribute *safety.*

**Table 34 Safety: all stakeholder groups**

**All stakeholders combined**

**Q 1. To what extent do you think *safety* should be taken into account when choosing which car park to park in?** Please place your answer on a scale of 1 - 5 where: 1= Greater 5= Lesser (6=Other)

| Extent | % | Number of responses |
|---|---|---|
| 1 | 25.2% | 100 |
| 2 | 23.2% | 92 |
| 3 | 29.0% | 115 |
| 4 | 14.6% | 58 |
| 5 | 5.0% | 20 |
| 6 | 3.0% | 12 |
| **Totals** | **100%** | **397** |

This question was asked to further explore the inclusion of the attribute 'safety' in the choice tasks. The results from all of the stakeholder groups *combined* are indicative of the rest of the results when they are broken down into their individual stakeholder groups (see Table 36 below). For instance, the different groups all seem to rate safety highly, with the majority of responses falling within the top three. Both the local business sector and the parking industry allocate the highest number of responses to '1' on the scale of 'greater extent', with the remaining groups giving their concentration to '3'. The greatest difference is seen in the governmental group, where only four participants rate safety as '1', where 23 rate it as '3'. It seems that on the whole, the different stakeholder groups consider that car park safety should be taken into account when choosing which car park to park in, to a higher extent than not, with only slight disagreement regarding the specifics of that extent.

**Table 35 Safety: individual stakeholder groups**

**Q 1. To what extent do you think *car park safety* should be taken into account when choosing which car park to park in?** Please place your answer on a scale of 1 - 5 where: 1= Greater 5= Lesser (6=Other)

**Non-consumers combined**

| Extent | % | Number of responses |
|---|---|---|
| 1 | 25.0% | 17 |
| 2 | 16.2% | 11 |
| 3 | 33.8% | 23 |
| 4 | 14.7% | 10 |
| 5 | 6.0% | 4 |
| 6 | 4.3% | 3 |
| **Totals** | **100%** | **329** |

**Consumers combined**

| Extent | % | Number of responses |
|---|---|---|
| 1 | 25.0% | 83 |
| 2 | 24.0% | 79 |
| 3 | 28.0% | 93 |
| 4 | 14.6% | 49 |
| 5 | 4.9% | 16 |
| 6 | 3.5% | 9 |
| **Totals** | **100%** | **329** |

| Non-consumer independent | | |
|---|---|---|
| **Extent** | **%** | **Number of responses** |
| 1 | 24.3% | 9 |
| 2 | 16.2% | 6 |
| 3 | 27.0% | 10 |
| 4 | 18.9% | 7 |
| 5 | 8.1% | 3 |
| 6 | 5.5% | 2 |
| **Total** | **100%** | **37** |

| Consumer independent | | |
|---|---|---|
| **Extent** | **%** | **Number of responses** |
| 1 | 24.3% | 27 |
| 2 | 18.9% | 21 |
| 3 | 29.7% | 33 |
| 4 | 14.4% | 16 |
| 5 | 7.2% | 8 |
| 6 | 5.5% | 6 |
| **Total** | **100%** | **111** |

| Local business sector | | |
|---|---|---|
| **Extent** | **%** | **Number of responses** |
| 1 | 29.0% | 36 |
| 2 | 24.6% | 30 |
| 3 | 27% | 33 |
| 4 | 13.9% | 17 |
| 5 | 4.1% | 5 |
| 6 | 1.4% | 1 |
| **Total** | **100%** | **122** |

| Parking Industry | | |
|---|---|---|
| **Extent** | **%** | **Number of responses** |
| 1 | 40% | 24 |
| 2 | 18.4% | 11 |
| 3 | 25% | 15 |
| 4 | 13.4% | 8 |
| 5 | 1.6% | 1 |
| 6 | 1.6% | 1 |
| **Total** | **100%** | **60** |

| Governmental | | |
|---|---|---|
| **Extent** | **%** | **Number of responses** |
| 1 | 6% | 4 |
| 2 | 29.9% | 20 |
| 3 | 34.3% | 23 |
| 4 | 19.4% | 13 |
| 5 | 7.4% | 5 |
| 6 | 3% | 2 |
| **Total** | **100%** | **67** |

The stakeholders were also asked which attribute they most focussed on during the driver scenario choice tasks and the results were compiled from the perspective of all of the stakeholder groups combined, Table 37 below. The stakeholders allocated the majority of their responses to *decreasing the price* of the two hour stay parking, followed by an almost ten percent drop difference to, *decreasing the walking time*, and then by a closer margin of almost

five percent, to *car park safety certificate: yes*. Overall, it seems that stakeholders are keen to reduce the price of car parking, implying that they value *cost* over *walk time* and parking somewhere with a safety certificate.

**Table 36 Driver: attribute most focused on**

| **Q 2. What did you focus on the MOST during the Driver Scenario?** Select as many as you feel are relevant to you | | | |
|---|---|---|---|
| | | **%** | **Number of responses** |
| | Increasing walking time | 11.3% | 61 |
| | Decreasing walking time | 24.2% | 131 |
| | Car park safety certificate: Yes | 19.3% | 104 |
| | Car park safety certificate: No | 1.9% | 10 |
| | Increasing the price | 3.0% | 16 |
| | Decreasing the price | 33.3% | 180 |
| | Other | 7.0% | 38 |
| **Total** | **100%** | | **540** |

Finally, the stakeholders were asked which attribute they had *least* focussed on during the driver scenario choice tasks. The results were also compiled from the perspective of all of the stakeholder groups combined, Table 38 below. In agreement with the previous question regarding the attribute most focused on, *increasing the price* received the majority score, however only a slim margin of half of a percent existed between that and *increasing the walking time*. Next came *car park safety certificate: yes*, followed by *car park safety certificate: no*, at 16% and 15% respectively, which fails to make quite as much sense as expected. It is possible that this question was not at clearly understood as it could have been, by its nature of asking for a negative instead of a positive as the previous question had done. Nevertheless, *increasing the price* and *increasing the walking time* were not attributes generally favoured by the stakeholder groups.

**Table 37 Driver: attribute least focused on**

**Q 3. What did you focus on the LEAST during the Driver Scenario?** Select as many as you feel are relevant to you

| | | % | Number of responses |
|---|---|---|---|
| | Increasing walking time | 20.8% | 110 |
| | Decreasing walking time | 12.3% | 65 |
| | Car park safety certificate: Yes | 16.0% | 85 |
| | Car park safety certificate: No | 15.3% | 81 |
| | Increasing the price | 21.3% | 113 |
| | Decreasing the price | 10.0% | 53 |
| | Other | 4.3% | 23 |
| **Total** | **100%** | | **530** |

The questions regarding the attributes most and least focused on have also been explored in terms of *gender* and the results have been divided into the individual stakeholder groups and are presented in Appendix 5. The results show that the genders with respect to the attribute *most* focussed on, the non-consumer and consumer independent and governmental groups were proportionately in general agreement with each other. In the local business sector, *decreasing the walking* was focussed on more by males than females and *safety certificate: yes*, was focussed on more by females than males. This was also the same for the parking industry.

With respect to the attribute *least* focussed on, the non-consumer independent group females focussed the least on *decreasing the walking*, whereas the males focused the least in equal numbers on *increasing the walking*, *decreasing the walking* and *increasing the price*. Virtually equal numbers (proportionately) between the genders were also seen with respect to *increasing the walking*, *safety certificate: no* and *increasing the price* in the local business sector, yet for the parking industry, the females and males were divided between their least focus on *increasing the price* and *increasing the walking*, respectively.

## 7.3 Driver: Model results

Model summary results for the driver scenario are given in Table 38 below.

**Table 38 Driver scenario: results**

**Driver Scenario**

| | Stakeholder groups | | | | |
|---|---|---|---|---|---|
| | **NC.I (n=296)** | **C.I (n=888)** | **LBS (n=976)** | **PI (n=480)** | **G (n=536)** |
| **Random parameters attribute coefficients** | | | | | |
| *Mean* | | | | | |
| **Cost** | -2.6780*** | -2.521*** | -2.869*** | -.8898*** | -1.5332*** |
| **Walk** | -.0622 | -.1236*** | -.038 | -.1233*** | -.0792*** |
| **Safe** | 1.9393*** | 1.347*** | 1.3234*** | 2.0385*** | 1.3867*** |
| *Standard deviation* | | | | | |
| **Cost** | 2.308*** | 2.717*** | 2.2069*** | 1.569*** | 2.196*** |
| **Walk** | .1409*** | .2146*** | .2973*** | .1409*** | .1464*** |
| **Safe** | 2.9587*** | 1.9427*** | 1.869*** | 1.688*** | 1.9067*** |
| ***, **, * ==> Significance at the 99%, 95%, 90% level. | | | | | |
| **Model Summary** | | | | | |
| McFadden Pseudo R-squared | .36 | .32 | .33 | .288 | .28 |
| Log Likelihood (LL) at convergence | -476.3936 | -1429.1809 | -1570.8114 | -772.5302 | -862.6587 |
| LL constant only | -473.8649 | -1423.5633 | -1552.9916 | -731.4215 | -849.9647 |
| AIC/n | 2.112 | 2.212 | 2.192 | 2.344 | 2.368 |
| **Willingness To Pay** | | | | | |
| Amount WTP more for 2 hours parking in order to walk 1 minute less than usual | | | | | |
| **Walk** | NC | 5p | NC | 14p | 5p |
| Amount WTP more for 2 hours parking in order to park in a car park certified as 'safe' | | | | | |
| **Safe** | 72p | 54p | 46p | £2.29 | 90p |
| NC => Not Calculable | | | | | |

The mean random parameters attribute coefficients are statistically significant at a 1% level across the groups with the exception of the 'walk' attribute for both the NCI and LBS groups, rendering the calculation of WTP for this particular attribute in these cases impossible. The 'safe' attribute presents the strongest coefficients across the groups, with the PI group giving the highest value, as reflected in the PI WTP figure of £2.29, and the lowest standard deviation from the mean.

With respect to the McFadden pseudo $R^2$ all of the models indicate good fits for discrete choice models with values close to 0.3 (Hensher et al, 2005). The log likelihood (null model) and log likelihood final (fitted model) give the models iteration history, which NLOGIT stops reporting at five iterations as the parameter estimates change by less than .001. The low numbers give an indication of a good model fit because there are few unexplained observations (Tabachnick et al, 2014).

The Akaike Information Criteria (AIC) is used in optimal model selection from a set of models where the best model to select is the one with the smallest AIC, or the one closest to 0 (Burnham and Anderson, 2002). In the case of the driver scenario, the non-consumers *independent* group shows the best model fit most likely due to lower number of observations.

In terms of WTP, the stakeholder groups showed a higher WTP for safety than for walking. The CI and G groups were only WTP 5p each in order to walk for one minute less than usual. The highest WTP value for 'safe' which came from the PI, is an expected result as the safety attribute was based on a scheme that the PI devised and currently promotes and uses. The figure of 54p which came from the CI group may be a disappointing result for the PI as it is this group that the safety scheme was devised to attract.

### 7.3.1 Odds ratio

Nlogit5 does not offer any odds ratio, Exp(B), values in its output, therefore Table 38 has been created to address this omission. The odds ratio is the probability of an event occurring divided by the probability of that event not occurring (Field, 2009, p270). Therefore, in Table 38, where the walk attribute increases by one unit, the odds of all of the Consumer *Independent* (C.I) group combined selecting walk increases by 0.884, with the same for safety by 3.85. The odds ratio for the parking industry is consistent with their high value of safety (mentioned above), as the odds ratio achieves the highest increase of 7.68, which makes sense as it is reasonable to assume that they have faith in the safety scheme they devised.

**Table 39 Driver: odds ratio**

| | | walk | safe | cost |
|---|---|---|---|---|
| **NC.I (n=296)** | **coefficient** | -0.06222 | 1.93934 | -2.67806 |
| | **odds ratio** | 0.9396761 | 6.9541597 | 0.0686963 |
| **C.I (n=888)** | **coefficient** | -0.12369 | 1.347 | -2.52178 |
| | **odds ratio** | 0.8836537 | 3.8458706 | 0.0803165 |
| **LBS (n=976)** | **coefficient** | -0.03824 | 1.32339 | -2.8691 |
| | **odds ratio** | 0.9624819 | 3.7561331 | 0.05675 |
| **PI (n=480)** | **coefficient** | -0.12332 | 2.03849 | -0.88988 |
| | **odds ratio** | 0.8839807 | 7.6790051 | 0.410705 |
| **G (n=536)** | **coefficient** | -0.07921 | 1.38667 | -1.53326 |
| | **odds ratio** | 0.9238459 | 4.0015028 | 0.2158309 |

## 7.4 Strategy: Demographic descriptive statistics

In the strategy scenario, in the non-consumer *combined* group, there was a difference of five more males than females yet when the non-consumers became *independent* there were nine more females than males, with an average age of 47 years. In the consumer combined group the gender divide was larger with 28% more males than females and when the consumer group became independent, there was a better balance with 56% males and 44% females and an average age of 50 years. There were also more males than females in the remaining three groups; local business sector 72%, parking industry 66%, and governmental group 59%.

As with the previous driver strategy, across the groups the majority of stakeholders were in full time employment with their combined household income falling mostly between the brackets of 10k – 100k. From a locational perspective, again most stakeholders were resident in the *suburbs* and with regards to their usual form of transport, the majority used the *car*, in all cases, with the exception of the non-consumer groups, where only five stated this as their usual mode (passengers). For the non-consumer *independent* group, most either walked or cycled.

### 7.4.1 Choice task supporting questions

After completing the strategy scenario, the participants were asked a series of clarification questions regarding the attribute choices that they had made during the choice tasks. These are explored below. Table 40 presents the responses from all of the stakeholder groups combined to the first question, regarding the attribute *politics.*

**Table 40 Politics and Supply: All groups**

**Q 4. To what extent do you think political support should influence decisions about how much car parking to supply?**
Please place your answer on a scale of 1 - 5 where: 1= Greater 5= Lesser 6= Other

| | % | Number of responses |
|---|---|---|
| 1 | 11.1% | 40 |
| 2 | 15.0% | 54 |
| 3 | 26.1% | 94 |
| 4 | 13.1% | 47 |
| 5 | 30.3% | 109 |
| 6 | 4.4% | 16 |
| **Total** | **100%** | **360** |

This question was asked to help to understand a little more about the stakeholder's grasp of the attribute 'political support' in the choice tasks. It asked them to rate to a greater or lesser extent the influence over decisions that political support should have with regards to the supply of car parking. Table 49 Shows that the majority score goes to '5' which is the lowest 'to a lesser extent' score available. An almost identical result is given to the next question which rates the influence of political support and car parking *charges* (see Table 41, below).

**Table 41 Politics & charging for parking: Individual groups**

**Q 5. To what extent do you think political support should influence decisions about how much to charge for car parking?**
Please place your answer on a scale of 1 - 5 where:
1= Greater 5= Lesser 6= Other

| | % | Number of responses |
|---|---|---|
| 1 | 8.0% | 29 |
| 2 | 17.7% | 64 |
| 3 | 26.0% | 94 |
| 4 | 14.7% | 53 |
| 5 | 30.2% | 108 |
| 6 | 3.3% | 12 |
| **Total** | **100** | **360** |

The results have been further broken down into the individual stakeholder groups (see Table 42). Both of the non-consumer and the consumers (combined and independent) groups both clearly reflect the opinion of all of the stakeholder groups combined in that decisions over car parking supply and charges should be politically influenced to a lesser extent, rather than to a higher extent. The local business sector is like minded, although their charts also show some higher score towards 'greater extent', indicating that they might be mindful of a need for political support but perhaps are unconvinced.

The parking industry gives even more middling scores, but still leans towards a lesser rather than a greater extent in response to both questions. The governmental group however, allocates 20% of its score to both '1' and '3' and 27% to '5' where political influence and parking supply are concerned, indicating that there could be a conflict among individuals within the group. There is a similar spread of scores between '2' 27%, '3' 13% and '5' 13% in their chart regarding the question of political influence over car parking charges. Possibly the governmental group are more conscious of a need for political support of a strategy than the other groups.

**Table 42 Politics, supply & charging for parking: Individual groups**

**Q 6 & 7. To what extent do you think political support should influence decisions about how much parking to *supply* and how much to *charge* for parking?**

Please place your answer on a scale of 1 - 5 where: 1= Greater 5= Lesser

| **Non-consumers combined: Political support influencing supply** | | |
|---|---|---|
| Extent | % | No of responses |
| 1 | 13.3% | 8 |
| 2 | 18.3% | 11 |
| 3 | 21.7% | 13 |
| 4 | 8.3% | 5 |
| 5 | 28.3% | 17 |
| other | 10% | 6 |
| **Total** | **100** | **60** |

| **Non-consumers combined: Political support influencing charges** | | |
|---|---|---|
| Extent | % | No of responses |
| 1 | 10% | 6 |
| 2 | 23.3% | 14 |
| 3 | 18.3% | 11 |
| 4 | 11.7% | 7 |
| 5 | 31.7% | 19 |
| other | 5% | 3 |
| **Total** | **100%** | **60** |

| **Consumers combined: Political support influencing supply** | | |
|---|---|---|
| Extent | % | No of responses |
| 1 | 10.3% | 31 |
| 2 | 14.3% | 43 |
| 3 | 26.7% | 80 |
| 4 | 14% | 42 |
| 5 | 31% | 93 |
| other | 3.3% | 10 |
| **Total** | **99.7% *** | **299 *** |

| **Consumers combined: Political support influencing charges** | | |
|---|---|---|
| Extent | % | No of responses |
| 1 | 7.5% | 22 |
| 2 | 16.7% | 50 |
| 3 | 27.4% | 82 |
| 4 | 15.4% | 46 |
| 5 | 30% | 90 |
| other | 3% | 9 |
| **Total** | **99.7% *** | **299*** |

| **Non-consumers independent: Political support influencing supply** | | |
|---|---|---|
| Extent | % | No of responses |
| 1 | 10% | 3 |
| 2 | 10% | 3 |
| 3 | 26.7% | 8 |
| 4 | 10% | 3 |
| 5 | 30% | 9 |
| other | 13.3% | 4 |
| **Total** | **100%** | **30** |

| **Non-consumers independent: Political support influencing charges** | | |
|---|---|---|
| Extent | % | No of responses |
| 1 | 6.7% | 2 |
| 2 | 10% | 3 |
| 3 | 20% | 6 |

| | | |
|---|---|---|
| 4 | 13.3% | 4 |
| 5 | 43.3% | 13 |
| other | 6.7% | 2 |
| **Total 100%** | | **30** |

**Consumers independent: Political support influencing supply**

| Extent | % | No of responses |
|---|---|---|
| 1 | 8% | 8 |
| 2 | 12% | 12 |
| 3 | 28% | 28 |
| 4 | 10% | 10 |
| 5 | 39% | 39 |
| other | 3% | 3 |
| **Total 100%** | | **100** |

**Consumers independent: Political support influencing charges**

| Extent | % | No of responses |
|---|---|---|
| 1 | 9% | 9 |
| 2 | 12% | 12 |
| 3 | 26% | 26 |
| 4 | 13% | 13 |
| 5 | 36% | 36 |
| other | 4% | 4 |
| **Total 100%** | | **100** |

**LBS: Political support influencing supply**

| Extent | % | No of responses |
|---|---|---|
| 1 | 8% | 9 |
| 2 | 17.9% | 20 |
| 3 | 26.8% | 30 |
| 4 | 13.4% | 15 |
| 5 | 29.5% | 33 |
| other | 4.5% | 5 |
| **Total 100%** | | **112** |

**LBS: Political support influencing charges**

| Extent | % | No of responses |
|---|---|---|
| 1 | 4.5 | 5 |
| 2 | 19.6 | 22 |
| 3 | 28.6 | 32 |
| 4 | 14.3 | 16 |
| 5 | 29.5 | 33 |
| other | 3.6 | 4 |
| **Totals 100%** | | **112** |

**PI: Political support influencing supply**

| Extent | % | No of responses |
|---|---|---|
| 1 | 10.3% | 6 |
| 2 | 20.7% | 12 |
| 3 | 25.9% | 15 |
| 4 | 19% | 11 |
| 5 | 24.1% | 14 |
| other | 0% | 0 |
| **Totals 100%** | | **58** |

**PI: Political support influencing charges**

| Extent | % | No of responses |
|---|---|---|
| 1 | 5.2% | 3 |
| 2 | 19% | 11 |
| 3 | 29.3% | 17 |

| | | |
|---|---|---|
| 4 | 20.7% | 12 |
| 5 | 25.9% | 15 |
| other | 0% | 0 |
| **Totals** | **100%** | **58** |

| **Governmental: Political support influencing supply** | | |
|---|---|---|
| Extent | % | No of responses |
| 1 | 20.3% | 12 |
| 2 | 10.2% | 6 |
| 3 | 20.3% | 12 |
| 4 | 13.6% | 8 |
| 5 | 27.1% | 16 |
| other | 6.8% | 4 |
| **Totals** | **98.3%*** | **59*** |

| **Governmental: Political support influencing charges** | | |
|---|---|---|
| Extent | % | No of responses |
| 1 | 13.6% | 8 |
| 2 | 27.1% | 16 |
| 3 | 18.6% | 11 |
| 4 | 13.6% | 8 |
| 5 | 22% | 13 |
| other | 3.4% | 2 |
| **Totals** | **98.3%** | **59*** |

* = missing cases of less than 5

The stakeholders were also asked which attribute they had most focussed on during the strategy scenario choice tasks and the results were compiled from the perspective of all of the stakeholders combined, see Table 43 below. The Table reveals that 35% of the stakeholders focused most on increasing the number of parking spaces, closely followed by decreasing the price of car parking at 28% and then, political support: Yes, at 15%. It might be reasonable to assume that this would appear to be an expected result, although some stakeholders might still be expected to value car parking in terms of its *price* rather than its supply of spaces.

**Table 43 Strategy: attribute most focused on**

| Attribute most focussed on | % | Number of responses |
|---|---|---|
| Increasing the parking spaces | 34.5% | 176 |
| Decreasing the parking spaces | 8.2% | 42 |
| Political support: No | 2.4% | 12 |
| Political support: Yes | 15% | 76 |
| Increasing the price of parking | 5.9% | 30 |
| Decreasing the price of parking | 27.8% | 142 |
| Other | 6.2% | 32 |
| Total | 100% | 510 |

Finally, the stakeholders were asked which attribute they had focused on the *least* during the strategy scenario choice tasks. Again, the results were compiled from the perspective of all of the stakeholder groups combined and are presented in Table 44 below. These results show that the stakeholders gave an almost equal score of around the 20% level to increasing the *price of parking*, *political support: No*, and *decreasing the parking spaces*. Although these particular attributes might expect to attract the least focus during the choice task, it is perhaps less expected that there is so little between them, given the rather more distinctive results of the previous question.

**Table 44 Strategy: attribute least focused on**

| Attribute least focussed on | % | Number of responses |
|---|---|---|
| Increasing the parking spaces | 9.7% | 49 |
| Decreasing the parking spaces | 19.6% | 99 |
| Political support: No | 21.0 | 106 |
| Political support: Yes | 14.0% | 71 |
| Increasing the price of parking | 21.4% | 108 |
| Decreasing the price of parking | 9.1% | 46 |
| Other | 5% | 25 |
| Total | 100% | 504 |

The questions regarding the attributes most and least focused on were also explored in terms of *gender* and the results have been divided into the individual stakeholder groups and are presented in Appendix 5. The results show that the genders with respect to the attribute *most* focussed on, the non-consumer males and females were in virtual alignment regarding *decreasing spaces*. Likewise the genders for the consumer groups, although this time with respect to *increasing spaces*. In the local business sector, the males were more focussed on *decreasing the price* of parking than the females whose focus was divided almost equally between *increasing spaces* and *decreasing the price*. The genders seemed likeminded in the parking industry, yet for the governmental group, where the females were equally torn between *increasing the spaces* and *political support: No*, the males were more focussed on *increasing the spaces* and then *decreasing the price*.

With respect to the attribute least focussed on, *increasing spaces* received the majority score from the females of the non-consumer groups, yet the for males in the *combined* group it was

equally divided between *increasing the spaces* and *political support: Yes*, and *political support: Yes* in the *independent* group. For the males of the consumer combined group, *increasing prices* was their least focussed on attribute but for the females, it was fairly evenly divided at around the 33 frequency level between *decreasing spaces*, *political support: Yes* and *increasing prices*. The two genders were like minded in the local business sector group where the least focus appeared to hover between *political support: Yes* and *increasing prices*, whereas as *decreasing spaces* was of least focus to both of the parking industry genders. Finally, for the males of the governmental group, the least focus was on increasing prices followed by decreasing spaces, which was the other way round for the females. It would seem, in general, that both genders were least focussed on *increasing prices*, *decreasing spaces* and on securing *political* support, whereas for the females of the non-consumer groups *increasing spaces* was of least concern.

## 7.5 Strategy: Model results

The results for the strategy scenario are given in Table 45 (below).

**Table 45 Strategy scenario: results**

**Strategy Scenario**

| | Stakeholder groups | | | | |
|---|---|---|---|---|---|
| | **NC.I (n=240)** | **C.I (n=808)** | **LBS (n=896)** | **PI (n=464)** | **G (n=472)** |
| **Random parameters attribute coefficients** | | | | | |
| *Mean* | | | | | |
| **Cost** | -1.89705*** | -1.55249*** | -1.58517*** | -.00127 | -.55405 |
| **Spaces** | -.157* | .4056*** | .2747*** | .3331*** | .2639*** |
| **Politics** | 1.5397*** | 1.3057*** | 1.1894*** | 1.7963*** | 1.4*** |
| *Standard deviation* | | | | | |
| **Cost** | 3.8427*** | 4.1079*** | 3.2709*** | 2.38*** | 2.91*** |
| **Spaces** | .4937*** | .4372*** | .3335*** | .2557*** | .275*** |
| **Politics** | 2.236*** | 1.7735*** | 1.6567*** | 2.4287*** | 2.869*** |
| ***, **, * ==> Significance at the 99%, 95%, 90% level. | | | | | |
| **Model Summary** | | | | | |
| McFadden Pseudo R-squared | .47 | .497 | .46 | .44 | .41 |
| Log Likelihood (LL) at convergence | -386.2651 | -1300.4258 | -1442.0564 | -746.7792 | -759.6547 |
| LL constant only | -374.6537 | -1188.1177 | -1278.4108 | -689.7577 | -725.1376 |
| AIC/n | 1.804 | 1.653 | 1.773 | 1.840 | 1.942 |
| **Willingness To Pay** | | | | | |
| Amount WTP more than usual for 2 hours parking in order to increase parking spaces | | | | | |
| **Spaces** | 8p | 26p | 17p | NC | NC |
| Amount WTP more than usual for 2 hours parking in order to secure political backing | | | | | |
| **Politics** | 83p | 84p | 75p | NC | NC |
| NC => Not Calculable | | | | | |

The mean random parameters attribute coefficients are statistically significant across the groups to at least a 10% level with the exception of the 'cost' attribute for the PI and G groups, rendering the calculation of WTP results impossible for these groups. McFadden Pseudo $R^2$ results of around the 0.4 - 0.5 mark indicate a worse model fit than the previous driver scenario model results, yet this is compensated for by lower AIC values in the strategy results.

With regards to WTP, securing political backing is almost equally valued by both the NI and CI groups to a considerably higher level than increasing car parking spaces, but less so by the LBS group. Potentially this group could be more maverick in their approach to strategy and perhaps less inclined to seek political backing unless deeming it essential. The CI group is WTP the most to increase car parking spaces, which is an expected result, likewise the NCI being WTP the least.

### 7.5.1 Odds ratio

In Table 46, the odds ratio values for the politics attribute give consistently higher increases compared with the spaces attribute across each of the different stakeholder groups, possibly due to the groups understanding political influence when it comes to implementing strategies.

**Table 46 Strategy: odds ratio**

| | | spaces | politics | cost |
|---|---|---|---|---|
| **NC.I (n=240)** | **coefficient** | -0.157 | 1.53978 | -1.89705 |
| | **odds ratio** | 0.8547041 | 4.6635642 | 0.1500105 |
| **C.I (n=808)** | **coefficient** | 0.40555 | 1.30575 | -1.55249 |
| | **odds ratio** | 1.5001273 | 3.6904559 | 0.2117201 |
| **LBS (n=896)** | **coefficient** | 0.2747 | 1.18939 | -1.58517 |
| | **odds ratio** | 1.3161358 | 3.2850767 | 0.204913 |
| **PI (n=464)** | **coefficient** | 0.33314 | 1.79632 | -0.00127 |
| | **odds ratio** | 1.3953426 | 6.0274257 | 0.9987308 |
| **G (n=472)** | **coefficient** | 0.26385 | 1.4001 | -0.55405 |
| | **odds ratio** | 1.3019329 | 4.0556055 | 0.5746179 |

## 7.6 Social: Demographic descriptive statistics

The split between the genders in the non-consumer *combined* stakeholder group was almost equal at 52% female and 48% male, although when the group became *independent*, the divide grew to 68% and 32% respectively. The average age also changed slightly from 45 years to 48 years. The remaining stakeholder groups also had more males in them than females, with the largest differences being with the local business sector and parking industry groups at 75% and 63% male respectively. Again the age range was similar at an average of around the 45 years level, with the consumer independent group having the eldest average of 50 years.

As with the previous two scenarios, the majority of stakeholders were in full time employment, except in this case, 46% of the non-consumer *independent* group did not work. Again the income brackets were similar as per the previous two groups, with the parking industry being having the highest earners, with fifteen individuals earning over *100k*. From a *locational* perspective, the majority of stakeholders lived in the *suburbs*, then *villages*, and then *towns* and most usually travelled by *car*, except for the non-consumers *independent* group who predominantly walked.

### 7.6.1 Choice task supporting questions

After the social scenario, the participants were asked a series of clarification questions regarding the attribute choices that they had made during the choice tasks. These are explored below. Table 47 Presents the responses from the entire stakeholder groups combined to the first question, regarding the attribute *public spaces* compared with *car parks.*

This question was asked in order to seek more understanding of the stakeholders value of public spaces, by comparing their importance with car parks. Table 47 below shows that although the responses lean towards the higher importance end of the scale, the majority rate public space importance level at a three. This middling score could indicate that at the very least, the stakeholders rate both entities as equal.

**Table 47 Public spaces: All groups**

**10. How important do you think public spaces are in comparison with car parks?**
**Please place your answer on a scale of 1 - 5 where:**
1= Public spaces are more important than car parks 5= Car parks are more important than public spaces

| | % | Number of responses |
|---|---|---|
| 1 | 27.9% | 98 |
| 2 | 22.2% | 78 |
| 3 | 36.3% | 126 |
| 4 | 7.1% | 25 |
| 5 | 1.4% | 5 |
| Other | 5.1% | 18 |
| Total | 100% | 350 |

The results were then broken down further into the individual stakeholder groups. These are presented in Table 48 below. The obvious difference between the groups is the perhaps expected response of both of the non-consumer groups who rate *public spaces* over *car parks* far higher than any other group, with 50% and 60% of their groups, respectively, choosing '1'. The consumer independent and local business sector seemed somewhat likeminded in their value of public spaces and car parks, with a closely matched '1' – '3' rated divide. Likewise the parking industry and the governmental group follow suit with their rating of '3' also as the majority choice. Indeed all of the groups seem to support a higher value of public spaces than they do car parks.

**Table 48 Public spaces, individual stakeholder groups**

**11. How important do you think public spaces are in comparison with car parks?**
Please place your answer on a scale of 1 - 5 where:
1= Public spaces are more important than car parks 2= Car parks are more important than public spaces

**Non-consumers combined**

| **Extent** | **%** | **Number of responses** |
|---|---|---|
| 1 | 50.0% | 29 |
| 2 | 19.0% | 11 |
| 3 | 24.1% | 14 |
| 4 | 0% | 0 |
| 5 | 0% | 0 |
| other | 6.9% | 4 |
| **Totals** | **100** | **58** |

| Consumers combined | | | |
|---|---|---|---|
| | **Extent** | **%** | **Number of responses** |
| | 1 | 23.3% | 68 |
| | 2 | 22.6% | 66 |
| | 3 | 38.0% | 111 |
| | 4 | 8.7% | 25 |
| | 5 | 1.7% | 5 |
| | other | 4.8% | 14 |
| | **Totals** | **100%** | **292** |

| Non-consumer independent | | | |
|---|---|---|---|
| | **Extent** | **%** | **Number of responses** |
| | 1 | 60.7% | 17 |
| | 2 | 17.9% | 5 |
| | 3 | 21.4% | 6 |
| | 4 | 0% | 0 |
| | 5 | 0% | 0 |
| | other | 0% | 0 |
| | **Total** | **100%** | **28** |

| Consumer independent | | | |
|---|---|---|---|
| | **Extent** | **%** | **Number of responses** |
| | 1 | 29.3% | 29 |
| | 2 | 20.2% | 20 |
| | 3 | 34.3% | 34 |
| | 4 | 11.1% | 11 |
| | 5 | 2.0% | 2 |
| | other | 3% | 3 |
| | **Total** | **100%** | **99** |

| Local business sector | | | |
|---|---|---|---|
| | **Extent** | **%** | **Number of responses** |
| | 1 | 25.0% | 27 |
| | 2 | 25.0% | 27 |
| | 3 | 33.3% | 36 |
| | 4 | 7.4% | 8 |
| | 5 | 1.9% | 2 |
| | other | 6.5% | 7 |
| | **Total** | **100%** | **107** |

| Parking industry | | | |
|---|---|---|---|
| | **Extent** | **%** | **Number of responses** |
| | 1 | 27.8% | 15 |
| | 2 | 18.5% | 10 |
| | 3 | 44.4% | 24 |
| | 4 | 7.4% | 4 |

| | | | |
|---|---|---|---|
| | 5 | 0% | 0 |
| | other | 1.9% | 1 |
| | **Total** | **100%** | |
| **Governmental** | | | |
| | **Extent** | **%** | **Number of responses** |
| | 1 | 14.8% | 9 |
| | 2 | 24.6% | 15 |
| | 3 | 41.0% | 25 |
| | 4 | 3.3% | 2 |
| | 5 | 1.6% | 1 |
| | other | 11.5% | 7 |
| | **Total** | **96.7%*** | **59*** |

*=missing case of less than 5

The stakeholders were also asked which attribute they had most focussed on during the strategy scenario choice tasks and the results were compiled from the perspective of all of the stakeholders combined, see Table 49 below. The Table reveals an even spread between identical results for *increasing car parks* and *increasing public spaces*, with *decreasing weekly council tax* just having the edge by a slim margin of almost 2%. This could be the clearest indication yet that public spaces are valued to the same extent as car parks, and almost as much as stakeholders value a decrease in weekly council tax.

**Table 49 Social: attribute most focused on**

| **12. What did you focus on the MOST during the Social Scenario?** Select as many as you feel are relevant to you | % | Number of responses |
|---|---|---|
| Increasing car parks | 26.6% | 132 |
| Decreasing car parks | 8.7% | 43 |
| Increasing public spaces | 26.6% | 132 |
| Decreasing public spaces | 1.2% | 6 |
| Increasing weekly council tax | 1.2% | 6 |
| Decreasing weekly council tax | 28.2% | 140 |
| Other | 7.5% | 37 |
| Total | 100% | 496 |

As with the previous two scenarios, the stakeholders were asked which of the attributes they had focussed on the *least* during the social scenario choice tasks (see Table 50). This time when asked in the negative, *cost* achieved a clearer majority with *increasing weekly council tax*

realising 27.6% of the score. Behind that was *decreasing car parks* at 20.5% followed by *decreasing public spaces* at 16.5%.

**Table 50 Social: attribute least focused on**

| **13. What did you focus on the LEAST during the Social Scenario?** Select as many as you feel are relevant to you | % | Number of responses |
|---|---|---|
| Increasing car parks | 14.8% | 71 |
| Decreasing car parks | 20.5% | 97 |
| Increasing public spaces | 6.0% | 29 |
| Decreasing public spaces | 16.5% | 79 |
| Increasing weekly council tax | 27.6% | 132 |
| Decreasing weekly council tax | 9.0% | 43 |
| Other | 5.6% | 28 |
| Total | 100% | 479 |

Finally, the questions regarding the attributes most and least focused on were also explored in terms of *gender* and the results have been divided into the individual stakeholder groups and are presented in Appendix 5. The results show that the genders with respect to the attribute *most* focussed on, for both of the non-consumer groups are very similar with both males and females focussing first on increasing public space and second decreasing car parks. For both of the consumer groups, where the males are focussed most on increasing car parks, the females are most focussed on decreasing council tax.

The males of the local business sector are equally divided between increasing car parks and decreasing council tax, the females are most focussed only on increasing car parks. Decreasing council tax was also the most focussed on attribute of both genders of the parking industry, yet where the females from the governmental group were in agreement, the males were not. Instead they were most focussed on increasing public space and then on decreasing council tax, but only by one individual.

With respect to the attribute least focussed on, the females of both of the non-consumer groups least focussed on increasing car parks, but for the males of the *combined* group it was keeping the same public space and increasing council tax. In the consumer groups and the local

business sector, both of the genders focussed least on increasing council tax, which was almost the same for the parking industry except the males who equally least focussed on decreasing car parks. The females of the governmental group were also divided, as they equally least focussed on increasing car parks and increasing council tax, whereas the males, focussed least on increasing council tax.

## 7.7 Social: Model results

The results for the social scenario are given in Table 51 (below).

**Table 51 Social scenario: results**

**Social Scenario**

| | Stakeholder groups | | | | |
|---|---|---|---|---|---|
| | **NC.I (n=224)** | **C.I (n=792)** | **LBS (n=864)** | **PI (n=432)** | **G (n=488)** |
| **Random parameters attribute coefficients** | | | | | |
| *Mean* | | | | | |
| **Cost** | -.7421*** | -1.3078*** | -1.252*** | -.9957*** | -1.0615*** |
| **Car park** | .00861 | .02222*** | .01434*** | .01325* | .0123* |
| **Public spaces** | 1.3359** | 1.32*** | 1.2863*** | .7046** | 1.1526*** |
| *Standard deviation* | | | | | |
| **Cost** | .3432** | 1.3125*** | .9829*** | 1.1479*** | 1.0123*** |
| **Car park** | .06681*** | .0648*** | .0458*** | .0457*** | .0453*** |
| **Public spaces** | 2.596*** | 1.7656*** | 2.052*** | 1.831*** | 1.941*** |
| ***, **, * ==> Significance at the 99%, 95%, 90% level. | | | | | |
| **Model Summary** | | | | | |
| McFadden Pseudo R-squared | .34 | .39 | .40 | .34 | .39 |
| Log Likelihood (LL) at convergence | -360.5141 | -1274.6748 | -1390.5544 | -695.2772 | -785.4057 |
| LL constant only | -354.4586 | -1264.2750 | -1360.0361 | -692.4343 | -778.9048 |
| AIC/n | 2.219 | 1.967 | 1.947 | 2.168 | 1.977 |
| **Willingness To Pay** | | | | | |
| Amount WTP more in council tax per week to increase the quantity of car parks in towns | | | | | |
| **Car parks** | NC | 2p | 1p | 1p | 1p |
| Amount WTP more in council tax per week to increase the quantity of public spaces in towns | | | | | |
| **Public spaces** | £1.80 | £1 | £1.03 | 71p | £1.09 |
| NC => Not Calculable | | | | | |

The mean random parameters attribute coefficients are statistically significant across the groups to at least a 10% level with the exception of the NCI group's value for the attribute 'car park', which meant that the WTP for this attribute was not calculable. With respect to the McFadden pseudo $R^2$ overall, the results showed better model fits than the previous strategy scenario and almost as good as the driver scenario. The AIC was also low at close to 2.0 across the stakeholder groups.

In WTP, the NCI group were keen to pay the most, £1.80, of any group in order to increase public spaces, which was approximately twice what the CI were WTP and more than double the WTP value of the PI, at 71p. This is an expected result as the NCI group expressed a high value for public spaces during Phase 1, whereas the CI and PI groups did not. Perhaps less expected is the low WTP values to see an increase in car parks, which are similar across the groups. This could indicate that only when an increase in car parks is considered in conjunction with public space, is car parking poorly valued.

### 7.7.1 Odds ratio

In Table 52, where the car parks attribute increases by one unit, the odds of the CI group selecting car parks increases by 1.0, with the same for public space by 3.74.

**Table 52 Social: odds ratio**

| | | Car parks | Public spaces | cost |
|---|---|---|---|---|
| NC.I (n=224) | **coefficient** | 0.00861 | 1.33587 | -0.74211 |
| | **odds ratio** | 1.0086472 | 3.8033034 | 0.4761083 |
| C.I (n=792) | **coefficient** | 0.02222 | 1.32002 | -1.30782 |
| | **odds ratio** | 1.0224687 | 3.7434962 | 0.2704089 |
| LBS (n=864) | **coefficient** | 0.01434 | 1.28628 | -1.2518 |
| | **odds ratio** | 1.0144433 | 3.6192977 | 0.2859896 |
| PI (n=432) | **coefficient** | 0.01325 | 0.70464 | -0.99566 |
| | **odds ratio** | 1.0133382 | 2.0231182 | 0.3694795 |
| G (n=488) | **coefficient** | 0.01212 | 1.15261 | -1.06153 |
| | **odds ratio** | 1.0121937 | 3.1664466 | 0.3459261 |

## 7.8 Phase 2 Discussion

Phase 2 of this study was quantitative and sought to address objectives C and D of this study by; first, developing a series of additional attributes that were meaningful to different stakeholder car parking groups and by second, incorporating them into a trade-off model in order to estimate how a range of different stakeholder groups value car parking. This closely followed the pathway laid out in SVA as phase 2 was based on the previous findings of phase 1, which had *already established different stakeholder car parking values qualitatively*. Once again, this section draws on the research propositions first outlined in Chapter 2. The objectives achieved in phase 2 were:

C. To develop a series of additional attributes to better capture stakeholder value of car parking
D. To estimate the value of car parking from a range of different stakeholder perspectives

### 7.8.1 Attributes fundamental to stakeholder values

Objectives C and D emerged from the research gap which found the range of attributes present in the literature to be potentially restricting of true stakeholder values leading them to not be fully explored. This was considered to be a result of incorporating attributes into car parking studies without first establishing stakeholder values as is the correct way round according to SVA. Moreover, they appear to not necessarily be meaningful to a comprehensive *range* of stakeholder groups as the literature seems dominated by the perspectives of mostly the consumer group. This was supported by the research propositions concerning attributes (see section 2.10).

The research propositions implied that where attributes are difficult to quantify in the car parking literature, they may be overlooked. In phase 2 of this study, an attribute was incorporated into each of the three hypothetical scenarios which may be considered to be awkward to quantify. The attributes were included as they were felt to be representative of some of the value findings of chapter 5. The three attributes:

1. Attribute: **car park safety certificate**, *driver scenario*
2. Attribute: **political support**, *strategy scenario*
3. Attribute: **public space**, *social scenario*

Moreover, a fourth attribute was used which despite being quantifiable was one which had meaning that was felt to be able to carry across stakeholder groups regardless of their differences:

4. Attribute**: household council tax**, *social scenario*

As the choice tasks were successfully completed by all of the different stakeholder groups objective C is considered to be both *fulfilled* and *validated*. This is because the attributes were clearly meaningful to the participants most likely because they were born of the values that were pre-established during phase 1 of this study, which is according to SVA, the correct route to take.

### 7.8.2 Estimated stakeholder values of car parking

The research propositions considered that a range of different stakeholder values might exist but that the literature appears to be selective regarding which groups to explore. Moreover, the values are not articulated explicitly. Potentially this is either because they are not known or because they are not of interest. Three hypothetical scenarios were constructed, namely; *driver*, *strategy* and *social*, which were considered to be reflective of the MADE, with each one housing the different stakeholder values as predetermined in phase one. The three scenarios accommodated a series of choice tasks which were disseminated among all of the different stakeholder groups that phase one identified. Where phase one of this study identified that a range of different car parking affected stakeholders do indeed exist, all maintaining multiple values, phase two has drawn out the *significance* of this knowledge by interpreting the results in terms of WTP. The WTP results are a key finding of phase two and are presented in the Tables below.

Table 38 from the driver scenario found that the consumer independent and governmental groups were like minded in WTP low values of 5p in order to walk for one minute less than usual, whereas the parking industry were WTP almost three times as much at 14p. This describes that the parking industry is WTP more for a convenient parking location. Table 38 also showed that the car parking industry was WTP over four times as much as the consumer stakeholder group for two hours parking in order to park in a car park certified as 'safe,' suggesting that consumers are not as concerned about safety issues as the car parking industry is.

The strategy scenario WTP results were presented in Table 45. They appeared to show that securing political backing for a town centre car parking strategy was of particular importance to both the consumer and non-consumer independent groups but only slightly less so for the local business sector. Potentially this could reflect the feeling that politics is seen as having a role in car parking decision making.

The social scenario results were presented in Table 51. They revealed that the non-consumers of car parking were WTP approximately twice as much in weekly council tax, £1.80, as all of the other stakeholder groups in order to increase the quantity of public spaces in towns. This is a clear reflection of the sense of loss that the non-consumer

stakeholders seemed to feel when they were describing their car parking values (see section 5.2.1). Conversely, the car parking industry were WTP the least, 71p, of all of the stakeholder groups in order to increase public spaces, which could be indicative of how much they value car parks.

Phase two was validated by representatives of all of the different stakeholder groups as the results were presented to them during a meeting held in London at a national level, where there was much interest in the study.

Objective D was achieved by following the CBC method, which is considered to be the best method to use to capture stakeholder values (Sluis et al, 2013). Moreover, using a trade-off model (which is fundamental to CBC) is supported by SVA (Earl and Clift, 1999) which this study has chosen to follow, thus confirming the validation of the *entire* study.

### 7.8.3 Phase 2 Discussion summary

Previous to the second phase of the methodology, the car parking literature showed disinterest in stakeholder values that might exist beyond the scope of economics. Instead it remained focused on the responsive nature of one particular group of stakeholders, *consumers*, by manipulating their behaviour, mostly through pricing controls, in order to ease car parking challenges. The findings from Phase 1 of this study added not only to the range of stakeholders identified in the literature but also expanded the reach of *values* beyond those confined to economics.

Equipped with this new information Phase 2 went on to substantiate and develop the values further by exploring the attributes that comprised them. The attributes observed in the literature that contributed towards addressing car parking challenges had emerged from five key areas: *economics*, *environment*, *policy*, *user* and *vehicle*. Specifically, those that were easily quantifiable were favoured, despite calls for expanding beyond the quantifiable attribute range (Kelly and Clinch, 2006). Contrary to SVA, the literature typically employed attributes to measure stakeholder values without first establishing what they actually were instead it assumed a mostly economic perspective. As a result, the literature could only go so far as to achieve stakeholder relevance among those who held chiefly *economic* values.

Phase 2 addressed this gap by taking the more comprehensive range of stakeholder values generated in Phase 1 and extracting from them a fresh set of attributes in order to better reflect each of them, economic or otherwise; straightforward to quantify or otherwise. Phase 2 advanced the research by incorporating the new set into three different scenarios considered to be reflective of the value MADE, namely; *driver*, *strategy* and *social*. Thus supporting the belief of Keeney (1992) who emphasises that different stakeholders hold

different values, and developing the economic aspect of car parking literature where revenue raising is a key concern, such as in the work of Kelly and Clinch (2009), Zhang et al (2008) and Arnott and Rowse (2009).

The social scenario in Phase 2 delivered a different economic concept from pricing tariffs whereby car parking can have a direct bearing on *household council tax*. Previously the car parking literature showed how pricing can be used to generate income in order to fund other transport related projects, such as the case of the WPL (Ison and Wall, 2002), or Edinburgh's self-financing CPZ intended to ease congestion (Rye et al., 2008). The social scenario in Phase 2 demonstrated how off-street car parking charges can have an unrelated financial impact at an individual *household level*, controversially, whether the household members are consumers of car parking or not, thus introducing the intricate matter of *equity* among stakeholders.

Further to adding to the economic range of attributes found in the existing car parking literature, Phase 2 also contributed to the *environmental* set of attributes by introducing to stakeholders the concept of car parking's bearing on areas of *public space*. Formerly, the literature had noted the impact that an oversupply of car parking can have on land take which can result in urban sprawl, subsequently causing the planning regulation of minimum parking standards to be frequently held to account, particularly when implemented at no or low cost to the user (Shoup, 1995;1997; Fornash et al., 2003). Where once minimum car parking standards were introduced to help to maintain traffic flow (Valleley et al., 1997), in some cases, they are more recently thought to devalue the opportunity cost of land (Kenworthy and Laube, 1996) and to decrease urban sustainability (Shoup, 2005).

Phase 2 opened up these concepts by presenting an explicit dilemma to stakeholders whereby they must decide between their preference for off-street car parking supply and their preference for the provision of public spaces within the towns and cities which they personally inhabit. Thus eliciting *true* stakeholder preferences for factors which are fundamentally linked, while principally at odds. Whereas earlier the car parking literature had identified the relationship between car parking provision and land take, it had failed to enlighten multiple different stakeholders in terms of what it could mean for their individual households and wider community by presenting the dilemma from the perspective of the decision maker.

The social scenario in Phase 2 was especially thought provoking as the stakeholders were given insight into the *financial impact* that their choices could have on their *own* (hypothetical) household council tax. Whether or not the stakeholders were in favour of increasing public spaces, as was the case with the non-consumers, or increasing car parking provision, as

was the case with the car parking industry, the social scenario provided a candid touch of reality that the literature had lacked when making its point regarding land take.

Moving on, Phase 2 also contributed to the span of individual level attributes. For instance, hitherto the literature had yielded little with respect to *safety* and car parking. The issue had been skirted almost entirely with only two papers of the 125 given in Appendix 1 referring to it, yet Phase 1 had found safety to be a key value currently held by the car parking industry. In the case of Hunt and Teply (1993) safety was raised with respect to the driver's ability to access a car parking facility but in their model the coefficients had failed to be estimated as the facilities were found to *always* be accessible.

In Phase 2, the driver scenario gave the matter of safety meaning according to the car parking industry's own safety standards scheme, Park Mark. The results highlighted the seriousness of safety as a value to the parking industry as they were WTP approximately double to park in a Park Mark awarded car park than all of the other stakeholder groups. With all of the coefficients yielding significant values for the attribute of safety it is plain that 'safe' car parks are of relevance across each of the different stakeholder groups and so the case for including the attribute in future car parking literature is strengthened.

This finding is supported by the only other paper to mention safety from those given in Appendix 1, authored by Watters et al (2006). Their study found 'vehicle safety' to sit above 'personal safety' in terms of importance ratings, which were both paramount to all of the other attributes they incorporated into their survey, including 'walking distance' and 'free parking'. The study by Watters et al (2006) was limited in comparison to the driver scenario as it was taken from the perspective of employers and employees only, neglecting input from all other stakeholder groups.

Also at an individual level, Phase 2 addressed the part that politicians can play in decision making by introducing the concept of politics into the strategy scenario. In returning to the car parking literature there are zero politically related attributes reported within Appendix 1 and the issue is afforded only limited attention outside of the attribute realm. Salomon (1986) is one author to raise the significance that the political environment can have in resisting demand for unnecessary low cost provision, yet is mindful that car parking usually catches the attention of politicians only once revenue implications are queried.

The strategy scenario picks up the political undertones expressed throughout the findings of Phase 1 of this study, where politically saturated issues such as devolution have given rise to local authority struggles with residents and consistency of understanding car parking matters (see Tables 15-19), and brings them to the fore. The political sentiment cumulates

as part of the MADE when LSB1 states that, “At a local level parking can be a key political football,” (see Table 22), implying that car parking and politics are inextricably linked, not always harmoniously and are not always welcomed by politicians.

Phase 2 acknowledges the stakeholder frustrations, by shaping *political support* into an attribute and then incorporating it into the strategy scenario. It was used to help to define its presence as either a welcome or an unwelcome intrusion into car parking strategy decision making, sitting alongside the familiar economic implications of an on-street parking tariff, just as it does in reality. The results demonstrated that a convincing political support of a car parking strategy is of consequence predominantly to the *governmental* group, but that other stakeholder groups recognise its significance. This also further confirms the findings of Phase 1 (see Tables 15-19).

In summary, Phase 2 explored in depth the values discovered in Phase 1 by assigning attributes that were both of meaning and relevance to all of the different stakeholder groups. In maintaining value, Phase 2 has advanced the car parking literature by taking a more inclusive approach that stretches beyond car parking consumers and expected economic outcomes in order to reveal otherwise hidden ramifications, such as links to council tax and political sensitivities. It has shown that the opportunity for seizing insight into the perspectives of multiple stakeholder groups by first establishing their values and second incorporating relevant attributes, lends a beneficial contribution to car parking research. The key implication being that the possibilities of seeking alternative solutions to those currently deliberated in the literature is now developed and expanded.

Moreover, based on the findings of Phase 1, Phase 2 has contributed to closing the four parts of the research gap:

- An inclusive stakeholder approach to the research has shown that car parking problems are relevant and interpreted differently by different groups, therefore solutions should not focus on a single group alone
- The attributes incorporated into Phase 2 are certain as they were extracted from the values established during Phase 1
- The stakeholder values defined in Phase 1 were validated as relevant to the different stakeholder groups in Phase 2 as the choice tasks were uncontested
- An equal voice has been granted to all of the different stakeholder groups throughout both Phases of this research to better reflect that each group feels as much affected by car parking as the other, only *differently*

# Chapter 8 Conclusions

## 8.1 Introduction

This chapter ties together the key research findings and provides conclusions and recommendations. It begins by exploring how the aim has been achieved and then proceeds to considering the research's contribution to knowledge and its limitations. Finally, suggestions for further research are made.

## 8.2 Achieving the research aim

The aim of this study was:

To investigate the stakeholder values of car parking to support and inform decision makers.

It was supported by five different objectives, the first four of which were divided into two different phases; one and two. Both of these phases will be looked at in turn according to the objectives they each sought to address in order to achieve the aim.

### 8.2.1 Phase 1

Phase one was based on qualitative methods and accommodates two different objectives:

A. To identify the stakeholders that are affected by car parking and to explore how they are affected by it
B. To examine what the different stakeholder groups value relating to car parking

### 8.2.2 Stakeholders and how they are affected by car parking

**Table 11 Car parking stakeholders, group and role, according to academics**

| Group | Role | Stakeholders | |
|---|---|---|---|
| Non-consumers | Individual non-user | Pedestrians | |
| | | Cyclists | |
| | | Public transport user | |
| Consumers | Individual user | The disabled | |
| | | Residents | owners |
| | | | renters |
| | | Commuters | |
| | | Employees / trade unions | |
| | | Travellers | business |
| | | | leisure |
| | | Shoppers | |
| | | Visitors | |
| | Local business sector | Retailers | |
| | | Employers | |
| | | Financiers to developers | |
| Suppliers | | Developers | |
| | | Architects | |
| | | Professional associations | |
| | Parking industry | Public transport providers | |
| | | Parking operators | |
| | | Parking entrepreneurs | |
| | | Technology providers | |
| | | Parking enforcers | |
| Governmental | National Regional Local | Officer | city planners |
| | | | transport planners |
| | | | traffic engineers |
| | | Politicians | councillors |

The stakeholders were found to be affected by car parking in multiple ways (see Chapter 5), including by its impingement onto public space and by the presence of a consumer dominated mind-set which was the perceptions of the non-consumer group, who considered that consumer dominance exacerbated parking issues. The consumer group was concerned about the effect of the devolution of parking powers on local authorities such as the implementation of unrefined policies which could lead to potentially limiting access. The local business sector were observant of the pressures on local authorities to resolve car parking dilemmas and were also supportive of free parking to stimulate the town centre retail economy. The parking industry felt affected by car parking due to a consumer dominated focus which they believed impacted on their ability to charge market prices. Finally the governmental group felt affected by the challenging dilemmas they face, particularly with

regards to using land for car parking. They strived for a balance which they were frustrated the public did not understand.

### 8.2.3 Stakeholder values of car parking

The core conclusions to objective B are best presented in Table 20. Table 20 shows that the stakeholders had mixed values of car parking, some valuing it by what could be gained from it and some by what they had lost because of it. Some stakeholders shared similar values, for instance both the non-consumers and the local business sector saw the benefits of restricting land use for car parking and felt that it had a negative impact on public space. Yet where the local business sector could see some benefits to using land for car parking, at the cost of impacting on public space for reasons such as access, the non-consumer group simply turned to other modes and so the reasons became invalid. Other stakeholder groups were alone in their values. For instance the car parking industry was convinced by convenience, safety and price as being a significant way to value car parking, this was not referred to quite so explicitly by the other group. Moreover, the governmental stakeholder group saw that car parking was an inherent part of an efficient transport system, but this was not expressed by the other groups.

**Table 20 Stakeholder value of car parking**

| | **Non-consumers** | **Consumers** | **Local business sector** | **Parking industry** | **Governmental** |
|---|---|---|---|---|---|
| Efficient use of land | **-** | **+** | **+ / -** | **+ / -** | **+ / -** |
| Impact on public space | **-** | | **+ / -** | | |
| Facilitates access | | **+** | | **+** | **+** |
| Sustains economic activity | | **+** | | | |
| A commercial product | | | **+** | | |
| Revenue stream | | | | **+** | **+** |
| Convenience, safety and price | | | | **+** | |
| Part of an efficient transport system | | | | | **+** |

In addition to the stakeholder values was the MADE. The results of Chapter 5 showed that the values emerged from a context that was influenced by governmental, social and consumer related concerns, as presented in Table 21.

**Table 21Stakeholder value context**

| | | Non-consumers | Consumers | Local business sector | Parking industry | Governmental |
|---|---|---|---|---|---|---|
| Key influencers of how stakeholders value parking | Government | ● | ● | ● | | ● |
| | Social | ● | | | | ● |
| | Consumer | | | | ● | |

Phase 1 achieved the first two objectives in full, and as a qualitative phase, it served as the precursor to the quantitative phase two, which is in accordance with SVA.

### 8.2.4 Phase 2

Phase one was quantitative and housed two different objectives:

C. To develop a series of additional attributes to better capture stakeholder value of car parking
D. To estimate the value of car parking from a range of different stakeholder perspectives

### 8.2.5 Attributes fundamental to stakeholder values

Objective C was achieved by introducing four attributes into three different hypothetical scenarios, which were considered to be meaningful to a range of different car parking stakeholders. The attributes were positioned alongside more traditional ones, such as ‘price’ and ‘walk time’ and they were developed after stakeholder values had been established during the previous phase.

The four attributes:

1. Attribute: **car park safety certificate**, driver scenario
2. Attribute: **political support**, strategy scenario
3. Attribute: **public space**, social scenario
4. Attribute: **household council tax**, social scenario

### 8.2.6 Estimated stakeholder values of car parking

Objective d was achieved by incorporating the attribute set into the three different hypothetical scenarios, namely; driver, strategy and social, which represented the MADE and incorporated all of the stakeholder values established during phase one. The results were interpreted into willingness to pay values and presented in three Tables (Tables 38, 45 and 51).

In Table 38, the parking industry was found to be WTP the most for convenience and for safety. While in Table 45, the local business sector group was found to be WTP the least to secure political backing for an on-street car parking strategy. Moreover, the non-consumer and consumer independent groups were aligned in their WTP values regarding increasing car parking spaces in a town. Finally, in Table 51, the non-consumers were WTP the most to see public spaces increased, whereas the parking industry were WTP the least for the same.

Objective d was the final objective of phase two of the study. In achieving the final objective, the following recommendations for decision makers are proposed.

## 8.3 Recommendations for stakeholders

This thesis has served to highlight a number of issues regarding stakeholder values of car parking.

This section will seek to provide the recommendations to policy makers and practitioners on how a better understanding of stakeholder value could impact on how car parking issues could be improved, in order to fulfil objective E. Table 53 presents the recommendations and is divided into governmental decision makers, practitioner decision makers and researchers.

**Table 53 Recommendations**

| | Conclusion | Implication | Responsibility | Proposal | Outcome |
|---|---|---|---|---|---|
| 1 | Findings from Phase 1 highlighted that the car parking industry is under pressure to provide a service chiefly motivated by a perceived consumer intolerance of market prices. | The industry considers that by predominantly basing a car parking service on a perception of consumer economic values their offer is devalued in the eyes of consumers and opportunities for service improvement are restricted to reflect a single value, *price*, which was not found to be a consumer related value. | Governmental | The governmental stakeholder group should seek to provide direction and guidelines for tariff setting which is reflective of the provision of a service that is conscious of the range of parking industry stakeholder values:<br>• Efficient use of land<br>• Facilitates access<br>• Revenue stream<br>• Convenience, safety and price<br>Whilst being mindful of the additional consumer group's value:<br>• Sustains economic activity<br>Guidelines should include setting pricing tariffs that are reflective of car parks that work towards realising all of the above values and, where possible, incorporates the values held by the remaining stakeholder groups. Moreover, there should be more emphasis on industry excellence than low cost provision, in order to raise appreciation for the value of car parking. | Aspiring to deliver a more comprehensive service and set pricing tariffs accordingly would assist the car parking industry to realise their values and exploit the chance to impact positively in the districts where their facilities are located. For instance, for the parking industry generating sufficient revenue to enable them to deliver a quality service for consumers should be a key motivation, and for the non-consumers, in order to reduce impact on public space, the case for supporting underground car parks should be opened. |

| | | | | | |
|---|---|---|---|---|---|
| | | | Research | Research should be conducted into the gap between *governmental perceptions* of consumer car parking price tolerance and the *realities* of consumer price acceptance in order to contribute towards setting optimal car parking tariffs. The research should be conducted in a range of different urban locales and should include an analysis of consumer expectations of off-street car parking facilities to equip operators with more detailed information to make improvements to their service. | Closing the gap between price tolerance perception and reality would align the governmental and car parking industry stakeholder groups thinking with regards to tariff setting. This would result in easing the pressure felt by operators to keep prices low, and subsequently provide a quality of service that they feel would no longer fall short of reflecting the true car parking's true value. |
| 2 | Phase 1 found that the different stakeholder groups took issue with national government leadership believing it to currently be deficient in setting the standards for British car parking. | The different stakeholder groups were left unconvinced by devolution complaining that guidance in current circulation:<br>• Is dominated by the consumer perspective<br>• Open to interpretation<br>• Allows for conflicting objectives<br>• Is non-specific<br>• Fails to address | Governmental | National government should revise current guidance by introducing a well-defined set of expectations for both public and private operators to heed during their decision making process to enable operators to be responsive to governmental car parking objectives. Furthermore, opportunities for educating operators in this area and for developing the car parking knowledge of local authority based decision makers should be insisted upon through methods such as | Better defined car parking guidance and improved knowledge and understanding for both operators and local authorities would help to smooth the relocation of parking powers from a top to a local level. Opening lines up of communication would empower operators and local authority decision makers to describe superior |

| | | | | | |
|---|---|---|---|---|---|
| | | insufficient understanding and knowledge<br>The key implication for the management of car parking is inconsistency and the delivery of inadequate policies which negatively on achieving a successful outcome. | | networking events to acquire and circulate knowledge, and the introduction of an operators *qualification* to demonstrate comprehensive understanding of the standards required to operate successfully. | operator service standards and uncover unlimited solutions to car marking management dilemmas that are currently hidden by an absence of best practice sharing. |
| 3 | Phase 2 results of the choice tasks revealed that stakeholders can appreciate and experience the impact of car parking choices on other stakeholder groups. This is supportive of the findings of Phase 1 which found that the lines between the different groups are blurred. | Decision makers perceive that consumers of car parking do not pass between the groups and are therefore hostile to policies which do not directly benefit them. The key implication being that decision makers are cautious to implement policies which are not necessarily advantageous to consumers but which may lead to gains for the remaining stakeholder groups. | Governmental | Car parking related decision makers should be resolute and not misjudge or presume consumer acceptance of policies which seek to make progress at the cost of car parking. Instead they should be transparent regarding the benefits and disbenefits to all stakeholders affected. To do this they should aim to include as broad a section of stakeholders as possible, taking their values into account, during the consultation process where both the direct and *indirect* impacts of the new policy are emphasised and debated. | Local authorities that demonstrate more resolve in their belief of policies despite the adverse impacts to car parking consumers will be prone to experimenting with more innovative and original courses of action and ideas as they will be free from the limitations of pacification. |
| 4 | In Phase 1 a value belonging to the car parking industry was revealed to be that of | Consumers of car parking accept safety as an issue but minor to *convenience* and *price*. They do not hold | Research | Phase 1 identified the following values according to the consumer stakeholder group:<br>• Efficient use of land | Once true consumer values of car parks are known, the information can be divulged to the car |

| | | | | | |
|---|---|---|---|---|---|
| | *safety* with regards to consumers. The choice tasks in Phase 2 supported this value yet found it to be of less significance to the consumer group than the car parking industry might expect. | it as a core value as the parking industry does. The key implication for the car parking industry being that consumers value parking differently to the way in which the industry perceives they do. This could render any opportunities for industry progress in the area of safety irrelevant. | | • Facilitates access<br>• Sustains economic activity<br>These values were extracted in response to questions regarding *car parking values* rather than what consumers specifically value *car parks*. Such questions would be likely to draw a different set of values.<br>Research should be conducted into what precisely consumers value regarding *car park*s, where the matter of *safety* may or may not emerge, in order to bridge the gap between industry perceptions and actual values. | parking industry who will be better placed to meet their customer expectations. Enlightened by the new knowledge, the industry can make sense of where their values match or differ from those of the consumer and seek to advance their offer accordingly, this time with better defined relevance than before. |
| | | | Practitioners | As safety is an industry held value, practitioners should seek to better understand how it impacts their market. They should explore the relevance of schemes such as Park Mark to operators and their customers, by fundamentally investigating to what extent safety exists as a valid concern inside car parks and whether it applies to personal safety, vehicle safety or general perceptions of safety. | Once the dimensions of safety and its relevance to both operators and consumers have been established, practitioners can confidently progress in their decision making towards finding appropriate solutions where necessary and educate consumers where necessary. |

| | | | | | |
|---|---|---|---|---|---|
| 5 | In Phase 1, the findings revealed a persistent undertone of the bearing of a political environment can effect on car parking policy setting. This was reinforced by the strategy choice task of Phase 2 which found that political support was highly valued by the governmental stakeholder group and far less so by the car parking industry. | The significance to the governmental stakeholder group of individual politicians in conjunction with the political environment has key implications with regards to the success or failure of a car parking policy. If a strategy has political support, particularly if driven by a political figurehead it is more likely to succeed than if political support gives ways to the demands of constituents, such as residents and retailers, for reasons of unpopularity. | Practitioners | Where the governmental stakeholder group remain mindful of the significance of securing political backing, the car parking industry would benefit from appreciating the sensitivities of political challenges faced by the governmental group when lobbying for any changes in parking policy programmes.<br>The parking industry should collaborate between the two parties and seek to unite in finding agreeable solutions which benefit constituents either directly or indirectly. | Through collaborative working, the car parking industry would gain more insight into the experiences of the governmental group thus providing opportunities to improve their approach to lobbying so as to secure more productive outcomes.<br>Also, highlighting in their proposals any advantages for constituents would attract key politicians to take note and contribute towards a smoothing the way to success. |

Table 62 presents the recommendations made by this study in terms of the conclusions to the findings, implications, responsibility, the proposals and anticipated outcomes when implemented.

The first recommendation contributes to filling the second and third parts of the research gap outlined on p4 by highlighting how attributes should not be used when based on assumed values and by emphasising the importance of stakeholder values to car parking. The proposal calls for government to consider the full set of both the parking industry and consumer values when devising tariffs and to reduce the emphasis on low cost provision in order to better reflect car parking's true value. Moreover, the proposal invites research to address the findings revealed in both Phase 1 and Phase 2 which points to a disparity between perceived and actual price tolerance in order to realign thinking between stakeholder groups and support the car parking industry in raising quality standards.

The first recommendation also incorporates elements of all of the different objectives as it understands and responds to the frustrations of the parking industry group by asking the governmental group to acknowledge and make use of the industry and consumer stakeholder values of car parking, thus encouraging the car parking industry to make beneficial improvements, for all stakeholders affected, including non-consumers.

The second recommendation contributes to filling the first, third and fourth part of the research gap. With regards to the first part, it points to the governmental stakeholder group as being more instrumental than the consumer group in resolving car parking challenges. With regards to the third part, it strengthens the link between stakeholders and how they value car parking as it is focused on the *government* aspect of the MADE. Finally, with regards to the fourth part of the research gap, it demonstrated how all stakeholder groups are of significance as they were equally united in their criticism of government leadership regarding car parking.

The second recommendation is attentive mostly to the overarching aim of this study rather than to the specific objectives that follow, as it specifically outlines the desire for decision makers to be better supported and informed so that they can exercise with confidence the powers entrusted to them. The findings, particularly from Phase 1 alluded to feelings of confusion and uncertainty with respect to how car parking should be managed and so this recommendation responds by detailing to national government the expectations of the supplier stakeholder groups.

The third recommendation contributes to filling all four parts of the research gap. First, it encourages decision makers to think beyond individual users. Second, it is inclusive of all

stakeholder values, in which case if attributes are required they will be based on predetermined values. Third, by taking an inclusive approach the link between stakeholders and how they value car parking is clear. Finally, with regards to the fourth part of the research gap, the recommendation acknowledges that there are no distinct lines between the stakeholder groups and so it welcomes input from all.

The third recommendation supports objective A in that it seeks to include all stakeholders affected by a policy proposal. It also supports objective B as it asks decision makers to takes into account the values held by all car parking stakeholders affected. The recommendation is considerate of objective C as, similar to its contribution to the research gap, if attributes are required they will be based on predetermined values. Finally, recommendation is supportive of objective D as it calls for the benefits and disbenefits of the new policy to be outlined and presented to the stakeholders affected.

The fourth recommendation emerged from the findings of Phase 1 which found *safety* to be a value held by the car parking industry and was then incorporated as an *attribute* during the choice tasks of Phase 2. This recommendation contributes most specifically to filling the second part of the research gap, in that safety as an attribute was derived in the correct way. It tests the relevance of value further by requesting for research to be conducted into the consumer perspective to and asks operators to consider the extent to which they believe safety in their car parks to be an issue.

The fourth recommendation is supportive of objective B and C. Objective B as it further explores one of the parking industry's key values, safety, and objective C, as it has also considered it from the attribute perspective, revealing that there some disparity exists between how it is perceived by the parking industry and the consumer stakeholder groups. The fourth recommendation seeks to address this issue.

The final recommendation contributes towards filling the second part of the research gap as it explores the *political support* attribute which was derived from values existing in the MADE, which were of relevance to all of the different stakeholder groups. It also contributes to filling the fourth part of the research gap by highlighting the existence of stakeholders other than those belonging to the consumer group. This recommendation is keen to promote collaborative working among the stakeholder groups where individual users are not necessarily at the fore. This would stimulate the car parking industry to exploit the potential for more holistic and inclusive changes to parking policy programmes they wish to make.

Despite being supportive of objective C, in that *political support* was incorporated into the strategy choice task of Phase 2, after it had been derived from the values identified in Phase

1, the fifth recommendation is also supportive of the overarching aim of this study. It helps to provide the car parking industry with the information it needs in order to better equip them to lobby for changes. As this recommendation is encouraging of collaboration, the importance of taking an inclusive approach to decision making is stressed, enabling politicians to fully appreciate the views of all stakeholder groups affected.

The next section considers the contribution to knowledge of this thesis.

## 8.4 Contribution to knowledge

The research gap can be expressed in four parts and each part will be considered in turn in relation to how this thesis has contributed to knowledge.

### 8.4.1 Car parking

1. *The bulk of car parking literature apparently focuses on looking at how to modify the behaviour of individual users. In doing so, it makes an assumption that car parking problems can only be resolved by them. This may not be the case.*

This thesis has expanded the range of stakeholders affected by car parking and in doing so it has opened up opportunities for using other stakeholder groups to contribute towards resolve car parking problems too.

### 8.4.2 Attributes

2. *There are questions regarding how the attributes used to represent car parking are derived. This is because they are typically predetermined prior to acquiring knowledge of how the stakeholders value car parking.*

This thesis has demonstrated that the correct way to estimate stakeholder values of *car parking* is to determine how stakeholders value it *before* identifying the attributes considered to reflect the values. By incorporating attributes derived in this manner, the attributes were shown to be of meaning across the different stakeholder groups that participated in the choice tasks.

### 8.4.3 Value

3. *The link between stakeholders and how they value car parking is nowhere made explicit in the literature.*

This thesis has explicitly established a set of values according to the stakeholders affected by car parking. Understanding more about how the different stakeholder groups value car parking and the context that shapes those values helps to gain insight which can lead to better decisions.

### 8.4.4 Stakeholders

4. The literature is most attentive towards individual car parking users to the exclusion of other affected groups.

This thesis has expanded the range of stakeholder groups affected by car parking by giving them an equal voice to express how car parking affects them and how they value it. Furthering the knowledge of different stakeholder groups opens the door to understanding more about car parking.

### 8.4.5 Published and presented contributions to knowledge

Beetham I F (2014) The Real Value of Car Parking, Presented to the *UTSG Conference*, Newcastle-upon-Tyne, 6-8 January

Beetham I F, Enoch M P, Tuuli M M and Davison L J (2014) Stakeholder perspectives on the value of car parking, *Urban, Planning and Transport Research*, **2**(1), 195-214.

Beetham I F, Enoch M P, Tuuli M M and Davison L J (2013) Stakeholder Perspectives on the Value of Parking, Paper 2194, Session G1.6: Institutional Performance Governance and Decision-making Processes: Stakeholders, Presented to the 13th World Conference of Transport Research, 15-18 July, Rio de Janeiro.

## 8.5 Limitations

Before exploring areas of future research, this section will consider the limitations of the research for this thesis so far.

This study has sought to investigate the stakeholder values of car parking to support and inform decision makers, it achieved this aim by way of a two phase method. Each phase will elaborate on the limitation experienced during each phase.

### 8.5.1 Phase 1

This phase was qualitative and therefore in accordance with SVA as it involved identifying a range of different stakeholders and establishing their values of car parking.

This study was limited by the sample size of the interviews conducted and by the questions asked, plus it focused only on exploring the stakeholder groups and car parking concerns found within England, which may have been different elsewhere.

This study was also limited by not exploring the different sub-groups of stakeholders, for instance, architects were not interviewed and neither were developers who are both a sub-group of the local business sector. Through including an even larger breadth of stakeholders, a different set of values and therefore attributes may have emerged.

### 8.5.2 Phase 2

This phase was quantitative and used choice based conjoint analysis to estimate stakeholder values of car parking, using multinomial logit. The study was limited perhaps because more advanced techniques such as mixed logit could potentially make better use of the data set and overcome some of the limitations of multinomial logit. Moreover, the software used in this phase, Nlogit5, was cumbersome in terms of data input. A more sophisticated software package could potentially lead to improved data entry efficiency.

Overall, the main limitation of this thesis was in sample size as reaching a broader range of stakeholders could have added to and, or enhanced the values found, moreover, estimating the response rate was rendered impossible as the population size was unknown. During Phase 2 of the research, the study population was not known prior to conducting the survey. This means that how representative of the population the sample taken was is not known as the response rate could not be estimated.

## 8.6 Further research

In considering further research, the limitations as found in the previous section should be considered. Further research could include opening up the boarders to look beyond England. First to include the rest of the UK as car parking may differ in these locations, second to Europe and third internationally. In doing so cultural differences may emerge which could be of interest to decision makers in a position to expand their operations, or lean lessons from abroad. Moreover car parking values might be different in different locations which would change the attributes elicited to be meaningful in a different context.

From a content related perspective, this study expanded the dimensions of the car parking literature by introducing more specific value and stakeholder literature. Potentially, there are other dimensions which could be incorporated that could help further explore how different stakeholder groups value car parking.

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# Appendix

## Appendix 1 Car parking literature

| No | Author | Date | Stakeholders | Modelling | Approach | Supply/ demand context | On/off street | Category of main attributes/ aspects | Main attributes/ aspects |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Florian,M.; Loss,M. | 1970 | Consumers: *commuters primarily* | Y | CS, S | Y | Off | Economic | C, PC |
| | | | | | | | | Environment | DES, L, T, Tr |
| | | | | | | | | Policy | P&R |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | MC |
| 2 | Segelhorst, E.W.; Kirkus, L.D. | 1973 | Consumers: *commuters* | Y | E | Y | Undefined *employer provided* | Economic | C |
| | | | | | | | | Environment | T, F |
| | | | | | | | | User | SD |
| 3 | Dirickx, Y. M. I; Jennergren, L. P. | 1975 | Consumers: *undefined categorised as short, medium or long term* | Y | CS, E | Y | Both | Economic | C |
| | | | | | | | | Environment | T |
| | | | | | | | | User | W |
| 4 | Gillen, D.W | 1977 | Consumers: *householders* | Y | CS, E | N | Undefined | Economic | PC |
| | | | | | | | | Environment | L, T |
| | | | | | | | | User | SD |
| | | | | | | | | Vehicle | MC |
| 5 | Wigan, M.R; Broughton, J. | 1980 | Consumers: *undefined categorised as short or long term parkers* Suppliers: *governmental, transport planners, urban planners* | Y | S | Y | On | Economic | PC, R |
| | | | | | | | | Environment | T, To |
| 6 | Lautso, K. | 1981 | Consumers: *undefined* | Y | M | Y | Undefined | Environment | T, To |
| 7 | Van Der Goot, D. | 1982 | Consumers: *visitors* | Y | S | Y | Both + *illegal spaces* | Economic | PC |
| | | | | | | | | Environment | T |
| | | | | | | | | User | W |
| 8 | Goyal,S.K.; Gomes,L.F.A.M. | 1984 | Consumers: *visitors (university)* | Y | E | Y | Off | Economic | C, PC, PM |
| | | | | | | | | Environment | DIS, L, A, T |
| | | | | | | | | User | W |
| 9 | Ligocki,C.; Zonn, L. E. | 1984 | Consumers: *undefined* Suppliers: governmental, *planners, politicians* | N | DMF | Y | Both | Economic | C |
| | | | | | | | | Environment | PT |
| | | | | | | | | Policy | CBD |
| 10 | Gomes, L.F.A.M. | 1986 | Consumers: *undefined* | Y | E | Y | Off | Economic | C, PC, PM |
| | | | | | | | | Environment | DES, A, T |
| 11 | Salomon,I. | 1986 | Consumers: *commuters, non-commuters* | Y | CS, S | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | DES, L, I, IPS |
| | | | | | | | | Policy | CBD in Jerusalem |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | User | SD |
| | | | | | | | | Vehicle | MA, MC |
| 12 | Feeney,B.P. | 1989 | Consumers: *undefined* | N | DR: *S models* | Y | Both | Policy | PP & supply measures: *mode choice, location* |
| 13 | Arnott et al. | 1991 | Consumers: *commuters* | Y | T, E | Y | Both | Economic | C, PC, RUC |
| | | | | | | | | Environment | DIS, L, N, T |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | SP |
| 14 | Young et al. | 1991 | | N | DR: *choice, allocation & interaction models* | Y | Both | Policy | *A review of the developments in parking policy models to introduce the concept of a hierarchy of parking policy analysis* |
| 15 | Glazer, A; Niskanen,E. | 1992 | Consumers: *undefined with an emphasis on commuters* | Y | T, E | Y | Undefined | Economic | C, PC, R, RUC |
| | | | | | | | | Environment | T, To |
| | | | | | | | | Vehicle | NV |
| 16 | Willson, R. | 1992 | Consumers: *commuters* *Suppliers: employers* | Y | AE | Y | Undefined | Economic | C, FP, PC |
| | | | | | | | | Environment | T |
| | | | | | | | | Policy | EPP |
| | | | | | | | | Vehicle | MC |
| 17 | Hunt,J.D; Teply,S. | 1993 | Consumers: *commuters* Suppliers: *employers* | Y | S | Y | Both | Economic | FP, PC |
| | | | | | | | | Environment | DIS, CON, L, PT, T, TR, winter provision |
| | | | | | | | | User | S |
| 18 | Bonnel,P. | 1995 | Suppliers: *public/private, governmental* | N | DR | Y | Both | Policy: Review of European car parking policies | France: *Users free to choose their mode of transport* |
| | | | | | | | | | Great Britain: *Deregulation of city transport* |
| | | | | | | | | | Italy: *Private cars forbidden down-town* |
| | | | | | | | | | Norway: *Urban toll system* |
| | | | | | | | | | Switzerland: *Use of private cars somewhat restrained and public transport promoted* |
| 19 | Matsoukis,E.C. | 1995 | Consumers: *undefined* Suppliers: *private* Governmental: *local, parking enforcers* | N | CS *before & after* | Y | Both | Policy | A before & after study of a city wide parking scheme involving site specific considerations |
| 20 | Parkhurst, G. | 1995 | Non-consumers: P&R users, Consumers: P&R users | N | CS, S descriptive | Y | Off | Economic | Economic impacts of P&R on city centre |
| | | | | | | | | Environment | O, TT |
| | | | | | | | | Policy | P&R: Case studies of Oxford & York |
| | | | | | | | | User | SD |
| | | | | | | | | Vehicle | MA |
| 21 | Shoup | 1995 | Consumers: *citizens, commuters,* | N | DR | Y | Both | Policy | CO, EPP, PBD, PP, RPP, PREQ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *residents, shoppers, visitors* Suppliers: *developers,* local business sector, *public/private employers, governmental, planners* | | | | | | |
| 22 | Verhoef,E. et al. | 1995 | Consumers: *commuters & undefined* Governmental | Y | T, E | Y | On | Economic | C, PC, RUC |
| | | | | | | | | Environment | L, Tr |
| | | | | | | | | Policy | PP, PRS |
| 23 | Merriman,M. | 1997 | Consumers: *students* Suppliers: *university* | Y | E, SIM | Y | Both | Economic | C, PC, SP |
| | | | | | | | | Environment | L |
| 24 | Shoup,D.C. | 1997 | Consumers: *commuters Suppliers: employers Governmental* | N | CS, S *descriptive* | Y | Undefined | Economic | C, FP, SP |
| | | | | | | | | Environment | DIS, E |
| | | | | | | | | Policy | CO: *A case study of 8 US firms* |
| | | | | | | | | Vehicle | Fl, MS |
| 25 | Valleley,M et al. | 1997 | Suppliers Governmental | N | DR | Y | Both | Policy | PREQ |
| 26 | Merriman,M. | 1998 | Consumers: *commuters* Suppliers: *train stations* Governmental | Y | BCA, CS, E, T | Y | Off | Economic | C, PC, SP |
| | | | | | | | | Environment | CAP, L, OCC, T |
| 27 | Thompson,R.G; Richardson,A.J. | 1998 | Consumers: *undefined* Suppliers | Y | S | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | A, DES, L, T, TR |
| | | | | | | | | User | Perceptions, W |
| 28 | Voith,R. | 1998 | Consumers: *commuters* Suppliers: *producers of both labour & parking provision* | Y | E | Y | Undefined | Economic | C, LV, PC |
| | | | | | | | | Environment | CGST, L, MS |
| | | | | | | | | User | SD |
| | | | | | | | | Vehicle | MS |
| 29 | Arnott,R.; Rowse,J. | 1999 | Consumers: *undefined* | Y | E | Y | On | Economic | C, FP, PC |
| | | | | | | | | Vehicle | SP |
| | | | | | | | | Environment | A, CGST, DES, DIS, L, T, TECH, TR |
| | | | | | | | | User | W |
| 30 | Shoup,D.C | 1999 | Consumers: *undefined* Governmental: *transport engineers & planners, urban planners* Suppliers: *undefined* | Y | CS, E | Y | Both | Economic | C, FP, LV, PC, R |
| | | | | | | | | Environment | DES, PT, T, TO, TR |
| | | | | | | | | Policy | PBD, PREQ |
| | | | | | | | | User | W |
| 31 | Calthrop,E. et al. | 2000 | Consumers: *undefined* Suppliers: *undefined* | Y | E, SIM | Y | Both | Economic | C, PC, RUC |
| | | | | | | | | Environment | CGST, NE, T |
| | | | | | | | | Policy | FP, RUC, WPL |
| | | | | | | | | Vehicle | MC |
| 32 | Hensher,D.; | 200 | Non- | Y | CS, S | Y | Both | Economic | PC |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | King,J. | 1 | consumers: public transport users; shoppers, social-recreational, business travellers Consumers: casual car parkers weekday only; shoppers, social-recreational, business travellers | | | | | Environment | DES, L,T, TR |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | MC |
| 33 | McPherson,E.G. | 2001 | Suppliers: *undefined* | Y | CS, E | N | Off | Economic | C, B |
| | | | | | | | | Environment | NE |
| 34 | Thompson,R.G. et al. | 2001 | Consumers: *undefined* | Y | AM | Y | Off | Economic | P |
| | | | | | | | | Environment | A, CP, I, Q, T, TECH, TR |
| | | | | | | | | User | Perceptions, SD, W |
| 35 | Tsamboulas,D.A. | 2001 | Consumers: *with/without a contract with a parking supplier* Suppliers: *public/private* | Y | AS | Y | Off | Economic | C, PC |
| | | | | | | | | Environment | L, T |
| | | | | | | | | User | W |
| 36 | Ison,S.; Wall,S. | 2002 | Academics Governmental: national, regional, local, politicians | N | DR, S descriptive | Y | Both | Economic | R, WPL |
| | | | | | | | | Environment | Urban Network, Workplace |
| | | | | | | | | Policy | Multiple including: Transport network related, P&R, WPL |
| | | | | | | | | User | Attitudes, Health |
| | | | | | | | | Vehicle | NV, MC |
| 37 | Mullan,E. | 2003 | Non-Consumers: young people (11-16yrs) in the context of their home area | Y | DR, S | N | On | Environment | Exploring the relationship between car parking in the area around where young people live & their perceptions of safety and sociability of that area |
| | | | | | | | | Non-user | Well-being |
| 38 | Anderson, S.P.; de Palma, A. | 2004 | Consumers: *shoppers* | Y | E, SIM | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | A, CGST, DES, L, N, NE, T |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | SP |
| 39 | Berenger Vianna,M.M. et al. | 2004 | Consumers: *undefined* Suppliers: *governmental, operators, parking managers* | N | DR: *integration between parking facilities & the transport system* | Y | Both | Economic | C, PC, R |
| | | | | | | | | Environment | CAP, IPS, OCC, T, TECH, TO |
| | | | | | | | | User | SD,W |
| | | | | | | | | Vehicle | MA, NV |
| 40 | Bonsall,P.; Palmer,I. | 2004 | Consumers: *business travellers,* | Y | S | Y | Off | Economic | P |
| | | | | | | | | Environm | DIS, N, Q, TECH |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *shoppers* | | | | | ent | |
| | | | | | | | | User | SD, W |
| | | | | | | | | Vehicle | SP |
| 41 | Feitelson,E.: Rotem,O. | 2004 | Consumers: *undefined* Suppliers: *operators* | Y | E, SIM | Y | Off | Economic | C, Surface Parking Tax, R |
| | | | | | | | | Environment | A, DIS, L, NE, PT, TR, U |
| | | | | | | | | User | W |
| 42 | Enoch,M.; Ison,S. | 2005 | Consumers: *users of private parking* Suppliers: *public/private, governmental* | N | DR: *pricing private parking* | Y | Both | Policy | Information & Regulatory Approaches + Parking Control Mechanisms: WPL, PC, PLF, PPS, PSL |
| 43 | Rye,T.;Ison,S. | 2005 | Consumers: *employees* Suppliers: *public & private employers* | N | DR, S *descriptive* | Y | Both | Policy | WPL |
| 44 | Albert,G.; Mahalel,D. | 2006 | Consumers: *employees* | Y | AS | Y | Off | Economic | PC, RUC, attitudes, stated preference, |
| | | | | | | | | Environment | T |
| | | | | | | | | Vehicle | MC |
| 45 | Aldridge,K. et.al. | 2006 | Consumers: *customers, employees, visitors Suppliers: employers (airport, non-airport)* | N | CS, S *descriptive* | Y | Off | Policy | Case study: Introducing parking management at non-airport sites (pricing), compared with the special case of aiports |
| 46 | Anderson,S.P.; de Palma,A. | 2006 | Consumers: *visitors* Suppliers: *a tourist attraction* | Y | AE | Y | Off | Economic | C, PC |
| | | | | | | | | Environment | CGST, DES, DIS, L, T |
| | | | | | | | | User | SD, W |
| | | | | | | | | Vehicle | MC |
| 47 | Arnott,R. | 2006 | Consumers: *undefined* Suppliers: operators | Y | E | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | CAP, DES, L, T |
| | | | | | | | | Policy | EPP, PP, PREQ |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | SP, MA |
| 48 | Arnott,R.; Inci,E. | 2006 | Consumers: *undefined* | Y | E, SIM | Y | On | Economic | C, PC |
| | | | | | | | | Environment | CAP, CGST, DES, L, NV, T |
| 49 | Beunen,R. et al. | 2006 | Consumers: *visitors* Suppliers: *visitor attractions* | N | CS, S *descriptive* involving traffic & visitor counting in two areas | Y | Both | Policy | PP, PRS |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 50 | Button | 2006 | Consumers: *undefined* *Suppliers: undefined* | N | DR | Y | Both | Policy | Micro economic policies *political environment* |
| 51 | Calthrop,E.A.; Proost,S. | 2006 | Consumers: *undefined* | Y | AE | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | L, NV, T |
| 52 | D'Acierno,L. et al. | 2006 | Consumers: *undefined* | Y | E, SIM | Y | Undefined | Economic | C, PC |
| | | | | | | | | Environment | DES, F, T, O |
| | | | | | | | | Vehicle | MA |
| 53 | Kelly,A.J.; Clinch,P.J. | 2006 | Consumers: *business, non-business* | Y | CS, E, S | Y | On | Economic | PC |
| | | | | | | | | Environment | DIS, DES, F, O, OCC |
| 54 | Marsden,G. | 2006 | Consumers: *commuters, leisure, residents, shopping* Suppliers Governmental | N | DR | Y | Both | Policy | A review of commuter, leisure and shopping and residential parking policies |
| 55 | Ison,S.; Rye,T. | 2006 | Consumers: *various* Suppliers: *undefined* | N | DR | Y | Both | Policy | A review of parking policies as per academic literature |
| 56 | Shoup,D.C. | 2006 | Consumers: *undefined* | Y | E, SIM | Y | Both | Economic | C, PC |
| | | | | | | | | User | W, additional passengers |
| | | | | | | | | Policy | PP |
| | | | | | | | | Environment | DES, T, To |
| | | | | | | | | Vehicle | FI |
| 57 | Tsai,J,A.; Chu,C. | 2006 | Consumers: *undefined* Suppliers: *public/private, governmental* | Y | E, SIM | Y | Off | Economic | C, LV, PC |
| | | | | | | | | Environment | DES, T, To |
| 58 | Watters,P. et al. | 2006 | Consumers: *employees* Suppliers: *employers* | Y | CS, S | Y | Off | Economic | B, C, PC, PM |
| | | | | | | | | Environment | A, DIS, L, |
| | | | | | | | | Policy | CO, EPP, WPL |
| | | | | | | | | User | S, SD, W |
| | | | | | | | | Vehicle | MA, MC |
| 59 | Ison,S. et al. | 2007 | Consumers: *employees (airport)* Suppliers: *employers (airport)* | N | DR | Y | Off | Economic | PC, PM |
| | | | | | | | | Policy | EPP |
| | | | | | | | | Vehicle | MA, MC |
| 60 | Shang,H. et al. | 2007 | Consumers: *employees, students* Suppliers: *employers (university)* | Y | CS, S | Y | Both | Environment | CAP, L, T, TO |
| | | | | | | | | Policy | EPP |
| 61 | Batabyal,A.A.; Nijkamp, P. | 2008 | Consumers: *short/long term (university)* Suppliers: | Y | S, SIM | Y | Off | Policy | EPP |
| | | | | | | | | Environment | OCC, T |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *employers (university)* | | | | | | |
| 62 | Benenson,I. et al. | 2008 | Consumers: *residents* | Y | SIM-A | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | DES, DIS, L |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | SP |
| 63 | Rye,T. et al. | 2008 | Non-consumers: *shoppers, visitors* Consumers: *businesses, commuters, residents, retailers, shoppers, visitors* Suppliers: *businesses, retailers* | N | CS, S *descriptive* | Y | Both | Economic | PC, PM |
| | | | | | | | | Environment | A, DES, L, T |
| | | | | | | | | Policy | CPZ, PP, P&R, PREQ |
| 64 | Zhang,X. et al. | 2008 | Consumers: *commuters* Suppliers: *employers* | Y | E, SIM | Y | Undefined | Economic | C, FP PC |
| | | | | | | | | Environment | L, T |
| | | | | | | | | Policy | PP, RUC |
| | | | | | | | | User | W |
| 65 | Adam,F.; Vanderschuren,M. | 2009 | Consumers: *long & short term (airport)* Suppliers: *airport* | N | CS, S *descriptive* | Y | On | Environment | L, O, T, TO |
| | | | | | | | | Vehicle | MC |
| 66 | Arnott,R.; Rowse,J. | 2009 | Consumers: *undefined* Suppliers: *garage owners* Governmental: *price controllers* | Y | E, SIM | Y | Both | Economic | C, PC, R |
| | | | | | | | | Environment | DES, DIS T |
| | | | | | | | | User | W |
| 67 | Caicedo, F. | 2009 | Consumers: *undefined* | Y | SIM-A | Y | Off | Economic | C, PC |
| | | | Suppliers: *operators* | | | | | Environment | A, OCC, T, TECH |
| 68 | Kelly,A.J.; Clinch,P.J. | 2009 | Consumers: *business, commuters, leisure* | Y | CS, S | Y | On | Economic | PC, R |
| | | | | | | | | Environment | OCC, T, TO, U |
| 69 | Shi,F.; Luo,D. | 2009 | Non-consumers: *bus/taxi users. car-owners* Consumers: *car owners* | Y | S, SIM | Y | Undefined | Economic | C, PC |
| | | | | | | | | Environment | DES, T |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | MA, MC |
| 70 | Ye,Z. et al. | 2009 | Consumers: *undefined Suppliers: undefined* | N | DR, CS | Y | Undefined | Policy | Differentiated zoning |
| 71 | Arnott,R.; Inci,E. | 2010 | Consumers: *undefined* | Y | S | Y | On | Economic | C, PC |
| | | | | | | | | Environment | DES, T, TO |
| 72 | Bao,D. et al. | 2010 | Consumers: *residents* | Y | CS, AS | Y | On | Economic | PC |
| | | | | | | | | Environment | DIS, T |
| | | | | | | | | User | SD |
| | | | | | | | | Vehicle | MC |
| 73 | Bonsall,P.; Young,W. | 2010 | Consumers: *undefined Suppliers: public/private* | Y | CS, S | Y | Both | Economic | PC, |
| | | | | | | | | Policy | PP, RUC |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Environment | T |
| 74 | Caicedo,F. | 2010 | Consumers: *undefined* | Y | S, SIM | Y | Off | Economic | C |
| | | | | | | | | Environment | DES, DIS, T, TECH, TO |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | E |
| 75 | Davis,A. et al. | 2010 | Suppliers: *public/private, governmental, planners* | N | CS, GIS | N | Off | Economic | C |
| | | | | | | | | Environment | LU, NE, TECH |
| | | | | | | | | Policy | PREQ |
| 76 | Jansson,J.O. | 2010 | Consumers: *undefined* Suppliers: *undefined* | N | DR | Y | Both | Economic | PC, |
| | | | | | | | | Policy | PP, RUC, WPL |
| 77 | Meek,S. et al. | 2010 | Suppliers: *governmental (councillors, local authorities, officers, operators)* | N | DR, S *descriptive* | Y | Off | Policy | P&R |
| 78 | Mei,Z.. et al. | 2010 | Consumers: *undefined* | Y | CS, S | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | DES, DIS, T, To |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | SP |
| 79 | Onishi,A. et al. | 2010 | Suppliers: *land use* | Y | CS, SIM | N | Off | Economic | LV |
| | | | | | | | | Environment | Environmental heat island impacts, LU |
| 80 | Wang,J.; Sun,G.. | 2010 | Consumers: *undefined* | Y | S | Y | Undefined | Economic | B, C, PC |
| | | | | | | | | Environment | CGST, DES, L, T, TO |
| | | | | | | | | Policy | PP, RUC |
| 81 | Barata,E. et al. | 2011 | Consumers: *employees (university), other (university)* | Y | CS, S | Y | Both | Economic | PC |
| | | | | | | | | Environment | L, OCC, T, U |
| | | | | | | | | User | SD |
| 82 | Chu,C-P.; Tsai,M-T. | 2011 | Consumers: *residents* | Y | S, SIM | Y | Off | Economic | C, PC, R |
| | | | | | | | | Environment | DES, F, L, O, T, TR |
| | | | | | | | | Policy | PP *environmentally friendly* |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | E |
| 83 | Gallo,M. et al. | 2011 | Consumers: *undefined* | Y | E, SIM | Y | Off | Economic | C |
| | | | | | | | | Environment | A, CGST, DES, O, T |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | E |
| 84 | Ibeas,A. et al. | 2011 | Consumers: *undefined* | Y | CS, AS | Y | Both | Economic | PC, PM |
| | | | | | | | | Environment | CAP, F, L, N, O, T, U |
| 85 | Meek,S. et al. | 2011 | Consumers: *park & ride* | N | CS, S | Y | Off | Policy | P&R |
| 86 | Qian,Z.S. et al. | 2011 | Consumers: *commuters (morning)* Suppliers: *private operators* | Y | S, SIM | Y | Off | Economic | C, PC |
| | | | | | | | | Environment | A, O, T |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 87 | van Ommeren,J. et al. | 2011 | Consumers: *residents* | Y | CS, S | Y | Both | Economic | C, , House prices, PC, PM |
| | | | | | | | | Environment | L, T |
| | | | | | | | | Policy | RPP |
| 88 | Zhang,X. et al. | 2011 | Consumers: *commuters* | Y | S, SIM | Y | undefined | Economic | C, PM |
| | | | | | | | | Environment | DES, O, To, U |
| | | | | | | | | Policy | CPP |
| | | | | | | | | Vehicle | MS |
| 89 | Al-Fouzan,S.A. | 2012 | Consumers: *undefined* Supplier: *undefined* Governmental | N | DR | Y | Off | Policy | Review of PREQ in United Kingdom, United States of America & Kingdon of Saudi Ababia |
| 90 | Barter,P.A. | 2012 | Consumers: *undefined* Supplier: *private* Governmental | N | DR | | Off | Policy | *1) conventional: PREQ 2) parking management: multi-objective, 3)market-oriented: (i) on-street demand-responsive market prices ; (ii) using revenue gains for political gains; and (iii) abolish PREQs* |
| 91 | Caicedo,F. | 2012 | Consumers: *undefined* Supplier: *operators, local business sector* | Y | CS, S | Y | Off *undergro und* | Economic | PC |
| | | | | | | | | Environment | DES, T, TECH, TO |
| | | | | | | | | User | W |
| 92 | Bowman Cutter,W.; Franco,S.F. | 2012 | Supplier: local business sector, *Governmental* | Y | CS, S | Y | Off | Economic | C, Hedonic Prices, LV, PC |
| | | | | | | | | Environment | Neighbourhood & property characteristics |
| | | | | | | | | Policy | PREQ |
| 93 | Deka,D. | 2012 | Consumers: *commuters (non-residents) Governmental* | Y | CS, S | Y | Off | Policy | *non-resident parking restrictions at commuter rail stations* |
| 94 | Geng,Y.; Cassandras,C.G. | 2012 | Consumers: *undefined* | Y | S | Y | Off | Economic | C |
| | | | | | | | | Environment | DES, L, T, TECH, U |
| 95 | Giuffrèa,T. et al. | 2012 | Consumers: *undefined* | Y | DR, Architectural Model SIM | Y | Off | Economic | C |
| | | | | | | | | Environment | DES, DIS, L, TECH, TO, U |
| 96 | Leurent,F.; Boujnah,H. | 2012 | Consumers: *undefined* | Y | S | Y | Off | Economic | C, PC |
| | | | | | | | | Environment | DIS, L, network routes T, Tr, O, U |
| | | | | | | | | User | W |
| 97 | Nurul Habib,K.M. et al | 2012 | Consumers: *undefined* | Y | AE | Y | Both | Economic | C, P |
| | | | | | | | | Environment | DIS, PT, T |
| | | | | | | | | User | SD |
| 98 | Pitsiava-Latinouplou,M. et al. | 2012 | Consumers: *undefined* Suppliers*: public/private* | N | DR, CS | Y | Both | Policy | *Review of policy's impact on urban mobility characteristics, CPZ CS of the city of Giannitsa in Greece* |
| 99 | Qian,Z. et al. | 2012 | Consumers: *commuters (morning)* | Y | S, SIM | Y | Off | Economic | C, PC |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Environment | A, CAP, DES, DIS, L, T |
| 100 | Simićević,J. et al. | 2012 | Consumers: *business, commuter, leisure, shopping, residents* | Y | CS, S | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | TT, U |
| | | | | | | | | User | Additional Passengers |
| | | | | | | | | Vehicle | MC |
| 101 | Spiliopouloua,C.; Antonioub,C. | 2012 | Consumers: *undefined* Suppliers: *enforcers* | N | CS, S *descriptive* | Y | Both | Policy | *Illegal parking in six Greek cities plus analysis of the evolution of controlled parking systems in Athens* |
| 102 | Tsai,M-T.; Chu,C-P. | 2012 | Consumers: *undefined* | Y | S, SIM-A | Y | Off | Economic | C, PC, R |
| | | | | | | | | Environment | DIS, T, U |
| | | | | | | | | Vehicle | E, Fl |
| 103 | van Ommeren,J.A. et al | 2012 | Consumers: *undefined* | Y | AE | Y | Both | Economic | C, PC |
| | | | | | | | | Environment | DES, T, Tr |
| | | | | | | | | User | Additional Passengers, SD |
| 104 | Weinberger,R. | 2012 | Consumers: *commuters, residents* | Y | CS, AS | Y | Off | Economic | C |
| | | | | | | | | Environment | Building characteristics |
| | | | | | | | | Policy | PREQ |
| | | | | | | | | User | SD |
| | | | | | | | | Vehicle | MA, MC |
| 105 | Ahmadi Azari,K. et al. | 2013 | Consumers: *commuters, non-commuters* | Y | S | Y | Off | Economic | C, PC |
| | | | | | | | | Environment | DIS, L, T |
| | | | | | | | | Policy | PP, RUC |
| | | | | | | | | User | SD, W |
| | | | | | | | | Vehicle | MC |
| 106 | Aoun,A. et al. | 2013 | Consumers: *university commuters* Suppliers: u*niversity* | N | CS, S *decriptive* | Y | Both | Policy | Examination of the lessons learned from 5 American university campus parking policies, for the American University of Beirut; PP, alternate modes, enforcement |
| 107 | Arnott,R.; Rowse,J. | 2013 | Consumers: *undefined* Suppliers*: public/private, governmental* | Y | E | Y | Both | Economic | PC |
| | | | | | | | | Environment | DIS, T, T |
| | | | | | | | | Policy | CO, PP, TC |
| 108 | Budd,L. et al. | 2013 | Consumers: *employees & passengers (airport), residents* | N | examination of three UK-based virtual parking market places, , S *descriptive* | Y | Off | Environment | Airport sites, Un-official parking space sites |
| | | | | | | | | Policy | Virtual parking marketplace *off-site residential car parking provision* |
| 10 | Caicedo,F.; | 201 | Consumers: | Y | DR, S, | Y | Both | Economic | B, C, FP, PC, R |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9 | Diaz,A. | 3 | *undefined* Suppliers: *local business sector, operators, governmental* | | SIM | | | Environment | DES, DIS, L, TY |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | MA |
| 110 | Dileka,S.; Top,S. | 2013 | Consumers: *shoppers* Suppliers: *retailers, shopping malls* | Y | AE | Y | Off | Economic | PC, Profit, Rent, R |
| | | | | | | | | Environment | U |
| | | | | | | | | Policy | FP, PP |
| 111 | Guo,Z. | 2013 | Consumers: commuters, *residents* | Y | CS, AS | Y | Both | User | SD |
| | | | | | | | | Environment | LU, PT |
| | | | | | | | | Policy | PREQ, New York residential parking supply & car ownership |
| | | | | | | | | Vehicle | MC |
| 112 | Guo,Z. et al. | 2013 | Consumers: university campus commuters | Y | CS, S, SIM-A | Y | Off | Economic | C |
| | | | | | | | | Environment | A, CAP, DES, DIS, FL, T, Tr |
| | | | | | | | | User | psychological characteristics |
| | | | | | | | | Vehicle | E, FL |
| 113 | Guo,Z. | 2013 | Consumers: commuters, *residents* | Y | CS, AS | Y | Both | Useral | SD |
| | | | | | | | | Environment | CA, DIS, F, L, T, TR, U |
| | | | | | | | | Policy | Residential parking policy; PREQ, RPP |
| | | | | | | | | Vehicle | MA, MC |
| 114 | Kobus,M.B.W. et al. | 2013 | Consumers: *undefined Suppliers: public/private, governmental* | Y | CS, AS, SIM-A | Y | Both | Economic | B, PC |
| | | | | | | | | Environment | DES, T |
| | | | | | | | | Policy | PP on- & off-street in Almere, Netherlands |
| | | | | | | | | User | W |
| 115 | Ma,X. et al. | 2013 | Consumers: *commuters, leisure, residents tourists Suppliers: public/private* | Y | CS, S | Y | Off | Economic | PC |
| | | | | | | | | Environment | F, T, To, |
| | | | | | | | | Policy | E, PP at Lama Temple, Beijing |
| | | | | | | | | User | SD, W |
| 116 | Baldur Ottosson,D. et al. | 2013 | Consumers: *undefined* | Y | CS *before & after*, S | Y | Both | Economic | PC, R |
| | | | | | | | | Environment | CAP, DIS, T, TO |
| | | | | | | | | Policy | PP on-street demand in Seattle, Washington, US |
| | | | | | | | | User | W |
| | | | | | | | | Vehicle | MA |
| 117 | Qian,Z.;Rajagopala,R. | 2013 | Consumers: *undefined, university campus users* | Y | E, SIM-A | Y | Off | Economic | C, PC |
| | | | | | | | | Environment | A, OCC, T, U |
| | | | | | | | | User | W |
| 118 | Simićević,J. et al. | 2013 | Consumers: *commuters, visitors* | Y | CS, S | Y | Both | Economic | PC |
| | | | | | | | | Environment | F, T |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Policy | predicting the effects of introducing or changing parking policy in Belgrade, Serbia |
| | | | | | | | | User | SD |
| | | | | | | | | Vehicle | MA, MC |
| 119 | Wang,R.; Yuan,Q. | 2013 | Consumers: *undefined* Suppliers: *public/private, governmental, enforcers* | N | DR | Y | Both | Policy | A review of parking policies in Chinese cities: 1) deregulation, 2) enforcement, 3) parking requirements, 4) pricing, 5) regulation |
| 120 | Yang,H. et al. | 2013 | Consumers: *commuters with/without reserved parking space* | Y | S | Y | Undefined | Economic | C |
| | | | | | | | | Environment | CAP, CGST, DES, DIS, T |
| | | | | | | | | Vehicle | MA, MC |
| 121 | Clayton, W. et al. | 2014 | Consumers: P&R and city centre car park users (drivers/passengers) Suppliers: local authorities, city centre car parks | Y | S | Y | Off | Environment | F, O, TT |
| | | | | | | | | Policy | P&R |
| | | | | | | | | User | SD |
| | | | | | | | | Vehicle | MA |
| 122 | Costa,A. et al. | 2014 | Consumers: *hospital* Suppliers: *hospital* | Y | CS, AS *descriptive* | Y | Off | Economic | PC |
| | | | | | | | | Environment | DIS, T |
| | | | | | | | | Policy | Investigation of parking management scenarios (pricing or increasing supply); case study from a hospital area located in Algarve, Portugal |
| | | | | | | | | Vehicle | E, Fl, SP |
| 123 | Thornton,D. et.al. | 2014 | Suppliers: *university* | Y | Algorithm | Y | On | Environment | Technological method of monitor parking utilisation in unmarked parallel parking areas |
| 124 | van der Waerdena,P.; Timmermans,H. | 2014 | Consumers: *residents* Suppliers: *retail centres* | Y | CS, AS | Y | Off | Economic | P |
| | | | | | | | | Environment | Residents familiarity with the parking facilities around a shopping area in Veghel,, Netherlands; A, DIS, F, L, T |
| | | | | | | | | User | S, SD, W |
| | | | | | | | | Vehicle | MC |
| 125 | van Ommeren, J. et al. | 2014 | Consumers: *residents/ non-residents* Suppliers: *public/private, retail districts* | Y | CS, S | Y | Both | Economic | C, LV, PM |
| | | | | | | | | Environment | L |
| | | | | | | | | Policy | RPP related to 308 shopping districts in the Netherlands |

| **Key** | |
|---|---|
| Modelling: | Y=yes; N=no |

| | |
|---|---|
| Method | AE=Applied Econometrics, AM=Applied mathematics, AS=Applied Statistics, Benefit-Cost Analysis, CS=Case Study, DMF=Decision Making Framework, DR=Descriptive Review, E=Econometrics, GIS=Geographical Information System, M= Mathematical, S=Statistical, SIM=Simulation Model, SIM-A=Simulation Model Applied, T=Theoretical |
| Supply/ demand context: | Y=yes; N=no |
| Category of main attributes/aspects | Key of main attributes/aspects |
| Economic | B=Benefits, C=Costs *opportunity/social/time etc*, FP=Free Parking, LV=Land Values, PC=Parking Charge, PM=Permits, R=Revenue, SP=Subsidised Parking |
| Environment *related to the parking area, location or situation under study* | A=Availability *of individual space or car park*, CA=Community attributes, CAP=Capacity, CGST= Congestion, CON=Condition *of car park, or parking surface*, DES=Destination, DIS=Distance, F=Frequency, I=Information, IPS=Illegal Parking Space, L=Location, LU=Land Use, N=*Number of parking spaces* NE=Negative Externalities, O=Origin *of trip*, OCC=Occupancy, PT=Parking Type *surface, multi-storey or underground*, Q=Queue, T=Time, TECH=Technology, TO=Turnover, TR=Trips, TT=Trip Type, U=Usage parking space |
| Policy | CBD=Central Business District, CO=Cash Out, CPP=Commuter Parking Permits, CPZ=Controlled Parking Zone, E=Enforcement, EPP=Employer Provided Parking, PBD=Parking Benefit District, PLF=Parking Licence Fee, PP=Priced Parking, PPS=Parking Places Surcharge, P&R=Park and Ride, PREQ=Parking Requirements, PRS=Physical restriction of Supply, PSL=Parking Space Levy, RPP=Residential Parking Permits, RUC=Road User Charge, TC=Time Controlled, WPL=Workplace Parking Levy |
| User | S=Safety, SD=Socio-demographic information, W=Walk |
| Vehicle | E=Emissions, Fl=Fuel, M=Mode, MA=Mode alternatives, MC=Modal Choice, MS=Mode share, NV=Number of Vehicles, SP=Speed |

# Appendix 2 Information sent to academics prior to interview

## Example of an email requesting an academic to participate

From: "Isobel Beetham" <I.Beetham@lboro.ac.uk>

To: "[redacted]

Sent: Wednesday, May 30, 2012 5:13:01 AM

Subject: FW: Request for interview

Dear Professor [redacted]

I am a PhD student at Loughborough University and my area of research concerns stakeholder perceptions on the value of parking to support and inform decision makers, my supervisor is Dr Marcus Enoch, and I would very much like to interview you if you are available during the next two weeks.

I am currently involved in undertaking a qualitative phase of data collection, comprising interviewing both academics and the parking sector community and I very much hoped you would be willing to take part. The data collated from the qualitative phase will be used to form attributes and descriptors for the later quantitative phase.

I have selected yourself as an academic because of your distinguished profile and particular interest in parking and as such your input would add significant depth and potency to my research. I would prefer to conduct the interview over the phone at your convenience (rather than electronically) and due to the open and exploratory style of the questions the duration will be largely dependent upon yourself.

If you would be agreeable to participating in my study I have attached a sheet providing more information and my contact details are below. I would be delighted to hear from you at any time so if you have any questions, please do get in touch.

Best Regards,

Isobel
Isobel Frances Beetham
PhD Student
Transport Studies Group
School of Civil & Building Engineering
Loughborough University
Ashby Road
Loughborough
Leicestershire
LE11 3TU,
UK
Phone: [redacted]
Email:i.beetham@lboro.ac.uk<mailto:i.beetham@lboro.ac.uk>

Example of a participant information sheet

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## Stakeholder values of car parking

## Participant Information Sheet

Isobel Frances Beetham, PhD Student, Transport Studies Group, School of Civil & Building Engineering, Loughborough University, Loughborough, Leicestershire, LE113TU, UK, Phone [redacted] Email: i.beetham@lboro.ac.uk

**What is the purpose of the study?**

The aim of the research is to investigate stakeholder perceptions on the value of parking to support and inform decision makers. This interview is one of a number of interviews involved in the qualitative data collation phase of the study. The interviews will be used to extract criteria to form descriptors for attributes and their associated levels which will feed into the final quantitative study phase. The combined methods are anticipated to assist in measuring the value of parking across a broad range of stakeholders which is an area that has so far received limited attention. The Interviews will represent the views of both academics and the parking sector community deemed either knowledgeable or active within the field.

**Who is doing this research and why?**

**This study will contribute towards Isobel Beetham's PhD supported by Loughborough University, funded by the Department of Civil and Building Engineering.**

PhD Student: Isobel Frances Beetham, phone: [redacted] email: i.beetham@lboro.ac.uk. PhD Supervisors: Dr Marcus Enoch, phone [redacted] email: m.p.enoch@lboro.ac.uk, Dr Martin Tuuli, phone: [redacted] email: M.M.Tuuli@lboro.ac.uk and Dr Lisa Davison email: [redacted]

**Are there any exclusion criteria?**

None

**Once I take part, can I change my mind?**

Yes. After you have read this information and asked any questions you may have we will ask you to complete an Informed Consent Form, however if at any time, before, during or after the sessions you wish to withdraw from the study please just contact the main investigator. You can withdraw at any time, for any reason and you will not be asked to explain your reasons for withdrawing.

**Will I be required to attend any sessions and where will these be?**

Interviews will be arranged at the convenience of the participant and will be conducted either in person or over the phone. They will be recorded, with your consent, for later transcription.

**How long will it take?**

The interview will contain open and exploratory questions so the length will be dependent on the answers the individual gives. You will be given the questions beforehand to aid efficiency. As a guide, please allow 1 – 2 hours.

**Is there anything I need to do before the sessions?**

Please take time to read the questions prior to the interview. Please also have a pen and paper to hand as some questions will refer back to answers you have already responded to in previous questions, you may wish to make your own notes to help simplify this part. Please also have a computer to hand as a pdf will be emailed to you for discussion towards the end of the interview.

**Is there anything I need to bring with me?**

Please be prepared by reading both the immediately above and below points.

**What will I be asked to do?**

You will be asked to respond to questions about identifying and categorising stakeholders who have an interest in parking and parking policy. Questions will also focus on how you think these stakeholders value parking. Towards the end of the interview, there will be an opportunity to discuss a pdf containing a table of stakeholders and how they could potentially be categorised. You will be asked for your opinion of the table and how it might be improved. You will be sent the questions prior to the interview but you will not see the stakeholder table until towards the end of the interview.

**What personal information will be required from me?**

Interview questions will focus on your professional experience and viewpoints, you will not be expected to share any personal information

**Are their any risks in participating?**

No anticipated risks

**Will my taking part in this study be kept confidential?**

The responses you provide will be treated in the strictest confidence, in accordance with the Data Protection Act (1998) and your identity will remain anonymous. Original recordings and transcription of interviews will be stored securely for up to ten years inline with University procedure:
(http://www.lboro.ac.uk/admin/committees/ethical/gn/dcas.htm)

**What will happen to the results of the study?**

Interview recordings will be transcribed and responses analysed to extract criteria (common themes and their importance) to form the basis of the quantitative study method as content for the PhD thesis. You will have the opportunity to review, comment and amend the transcript if required. This will contribute towards furthering understanding of identifying parking stakeholders and measuring how they value parking. Results may be published in journals and presented at conferences. It will not be possible to identify individuals from the articles or presentations.

**What do I get for participating?**

The results of the study may be made available to you if required.

**I have some more questions who should I contact?**

Isobel Beetham, PhD Student, Transport Studies Group, Department of Civil and Building Engineering, Loughborough University, Loughborough, Leicestershire LE11 3TU, i.beetham@Lboro.ac.uk [redacted]

**What if I am not happy with how the research was conducted?**

The University has a policy relating to Research Misconduct and Whistle Blowing which is available online at http://www.lboro.ac.uk/admin/committees/ethical/Whistleblowing(2).htm.

## Appendix 3 Socio-demographic information

**Driver Scenario: Interaction terms frequency and percentage summaries of all stakeholder groups**

| | | NC.C | | C.C | |
|---|---|---|---|---|---|
| **Profile** | age | 68 respondents in total range 20-75 mean 43.9 mode 39 | | 329 respondents in total range 20-98 median 47.6 mode 50 | |
| | | **No.** | **%** | **No.** | **%** |
| | male | 33 | 48.5 | 216 | 65.7 |
| | female | 35 | 51.5 | 113 | 34.3 |
| | disabled | 1 | 1.5 | 31 | 9.4 |
| **Work information** | f/t | 42 | 61.8 | 243 | 73.9 |
| | p/t | 10 | 14.7 | 42 | 12.8 |
| | do not work | 15 | 22.1 | 43 | 13.1 |
| | at home parent | 2 | 2.9 | 2 | 0.6 |
| | student | 3 | 4.4 | 3 | 0.9 |
| | retired | 5 | 7.4 | 24 | 7.3 |
| | unemployed | 1 | 1.5 | | |
| | unable to work | 2 | 2.9 | 7 | 2.1 |
| | other | 1 | 1.5 | 6 | 1.8 |
| **Stakeholder group** | lbs | 13 | 19.1 | 113 | 34.3 |
| | pi | 9 | 13.2 | 55 | 16.7 |
| | g | 10 | 14.7 | 57 | 17.3 |
| **Income** | <10k | 4 | 5.9 | 9 | 2.7 |
| | 10k-25k | 10 | 14.7 | 43 | 13.1 |
| | 25k-50k | 29 | 42.6 | 135 | 41 |
| | 50k-100k | 20 | 29.4 | 116 | 35.3 |
| | >100k | 5 | 7.4 | 24 | 7.4 |
| **Residential location** | innercity | 15 | 22.1 | 21 | 6.4 |
| | innertown | 8 | 11.8 | 23 | 7 |
| | suburbs | 35 | 51.5 | 179 | 54. |
| | village | 5 | 7.4 | 75 | 22.8 |
| | rural | 1 | 1.5 | 16 | 4.9 |
| **Travel information** | driving licence | 48 | 70.6 | 327 | 99.4 |
| | car | 5 | 7.4 | 288 | 87.5 |
| | pedestrian | 20 | 29.4 | 13 | 4 |
| | cycle | 18 | 26.5 | 11 | 3.3 |
| | pub'trans | 23 | 33.8 | 13 | 4 |
| | m'bike | | | 3 | 0.9 |

**Driver Scenario**

| | | NC.I | | C.I | | LBS | | PI | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Profile** | age | 37 respondents range 20-75 mean 45.7 mode 31 | | 111 respondents range 20-80 mean 49.8 mode 63 | | 122 respondents range 21-98 mean 46.5 mode 52 | | 60 respondents range 20-61 mean 44.5 mode 48 | | 67 respondents range 25-68 mean 45.1 mode 38 | |
| | | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| | male | 14 | 37.8 | 66 | 59.5 | 90 | 73.8 | 38 | 63.3 | 42 | 62.7 |
| | female | 23 | 62.2 | 45 | 40.5 | 32 | 26.2 | 22 | 36.7 | 25 | 37.3 |
| | disabled | 1 | 2.7 | 24 | 21.6 | 5 | 4.1 | 0 | 0 | 1 | 1.5 |
| **Work information** | f/t | 16 | 43.2 | 56 | 55.5 | 98 | 80.3 | 55 | 91.7 | 59 | 88.1 |
| | p/t | 5 | 13.5 | 14 | 12.6 | 21 | 17.2 | 5 | 8.3 | 8 | 11.9 |
| | do not work | 15 | 40.5 | 41 | 36.9 | 2 | 1.6 | | | | |
| | at home parent | 2 | 5.4 | 2 | 1.8 | | | | | | |
| | student | 3 | 8.1 | 3 | 2.7 | | | | | | |
| | retired | 5 | 13.5 | 24 | 21.6 | | | | | | |
| | unemployed | 1 | 2.7 | | | | | | | | |
| | unable to work | 2 | 5.4 | 6 | 5.4 | 1 | 0.8 | | | | |
| | other | 1 | 2.7 | 5 | 4.5 | 2 | 1.6 | | | | |
| **Income** | <10k | 3 | 8.1 | 8 | 1.6 | 2 | 1.6 | | | | |
| | 10k-25k | 5 | 13.5 | 24 | 11.5 | 14 | 11.5 | 7 | 11.7 | 3 | 4.5 |
| | 25k-50k | 17 | 45.9 | 38 | 44.3 | 54 | 44.3 | 21 | 35 | 35 | 52.2 |
| | 50k-100k | 11 | 29.7 | 36 | 30.3 | 37 | 30.3 | 25 | 41.7 | 28 | 41.8 |
| | >100k | 1 | 2.7 | 15 | 12.3 | 15 | 12.3 | 7 | 11.7 | 1 | 1.5 |
| **Residential location** | Inner city | 6 | 16.2 | 6 | 5.4 | 10 | 8.2 | 7 | 11.7 | 8 | 11.9 |
| | Inner town | 3 | 8.1 | 10 | 9 | 9 | 7.4 | 5 | 8.3 | 5 | 7.5 |
| | suburbs | 21 | 56.7 | 50 | 51.3 | 68 | 55.7 | 34 | 56.6 | 33 | 49.3 |
| | village | 3 | 8.1 | 29 | 26.1 | 24 | 19.7 | 10 | 16.7 | 13 | 19.4 |
| | rural | 1 | 2.7 | 6 | 5.4 | 6 | 4.9 | 3 | 5 | 1 | 1.5 |
| **Travel information** | licence | 25 | 67. | 109 | 98.2 | 118 | 96.7 | 57 | 95 | 66 | 98.5 |
| | car | 5 | 13.5 | 93 | 83.8 | 101 | 82.8 | 45 | 75 | 49 | 73.1 |
| | pedestrian | 10 | 27 | 6 | 5.4 | 9 | 7.4 | 3 | 5 | 5 | 7.5 |
| | cycle | 10 | 27 | 5 | 4.5 | 5 | 4.1 | 1 | 1.7 | 8 | 11.9 |
| | pub trans | 10 | 27 | 5 | 4.5 | 6 | 4.9 | 11 | 18.3 | 4 | 6 |
| | m'bike | | | 1 | 0.9 | 1 | 0.8 | | | 1 | 1.5 |

**Strategy Scenario: Interaction terms frequency and percentage summaries of all stakeholder groups**

| | | NC.C | | C.C | |
|---|---|---|---|---|---|
| **Profile** | age | 67 respondents in total range 20-75 mean 45 mode 40 | | 300 respondents in total range 21-98 mean 48 mode 50 | |
| | | **No.** | **%** | **No.** | **%** |
| | male | 36 | 46.3 | 192 | 64 |
| | female | 31 | 53.7 | 108 | 36 |
| | disabled | 1 | 1.5 | 29 | 9.7 |
| **Work information** | f/t | 44 | 65.7 | 221 | 73.7 |
| | p/t | 10 | 14.7 | 39 | 13 |
| | do not work | 13 | 19.4 | 39 | 13 |
| | at home parent | 2 | 3 | 1 | 0.3 |
| | student | 2 | 3 | 3 | 1 |
| | retired | 4 | 6.0 | 21 | 7 |
| | unemployed | | | | |
| | unable to work | 2 | 3 | 7 | 2.3 |
| | other | 1 | 1.5 | 6 | 2 |
| **Stakeholder group** | lbs | 13 | 19.4 | 99 | 33 |
| | pi | 11 | 16.4 | 49 | 16.3 |
| | g | 16 | 23.9 | 56 | 21.3 |
| **Income** | <10k | 4 | 6 | 9 | 3 |
| | 10k-25k | 7 | 10.4 | 35 | 11.7 |
| | 25k-50k | 28 | 41.8 | 122 | 40.7 |
| | 50k-100k | 23 | 34.3 | 109 | 36.3 |
| | >100k | 5 | 7.5 | 25 | 8.3 |
| **Residential location** | innercity | 13 | 19.4 | 19 | 6.3 |
| | innertown | 6 | 9 | 19 | 6.3 |
| | suburbs | 37 | 55.3 | 168 | 56 |
| | village | 5 | 7.5 | 66 | 22 |
| | rural | 2 | 3 | 14 | 4.7 |
| **Travel information** | driving licence | 49 | 73.1 | 298 | 99.3 |
| | car | 9 | 13.4 | 264 | 88 |
| | pedestrian | 22 | 32.8 | 12 | 4 |
| | cycle | 17 | 25.4 | 8 | 2.7 |
| | pub'trans | 17 | 25.4 | 13 | 4.3 |
| | m'bike | | | 2 | 0.7 |

| Strategy Scenario | | NC.I | | C.I | | LBS | | PI | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Profile** | age | 31 respondents range 20-75 mean 47.4 mode 46 | | 101 respondents range 22-80 mean 50.1 mode 63 | | 112 respondents range 21-98 mean 46.7 mode 30 | | 58 respondents range 20-68 mean 45.2 mode 48 | | 59 respondents range 25-64 mean 45.3 mode 38 | |
| | | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| | male | 11 | 35.5 | 57 | 56.4 | 81 | 72.3 | 38 | 65.5 | 35 | 59.3 |
| | female | 20 | 64.5 | 44 | 43.6 | 31 | 27.7 | 20 | 34.5 | 24 | 40.7 |
| | disabled | 2 | 6.4 | 24 | 23.8 | 4 | 3.6 | | | 1 | 1.7 |
| **Employment information** | f/t | 15 | 48.4 | 51 | 50.5 | 90 | 80.4 | 52 | 89.7 | 52 | 88.1 |
| | p/t | 4 | 12.9 | 13 | 12.9 | 19 | 17 | 6 | 10.3 | 7 | 11.9 |
| | do not work | 13 | 45.1 | 37 | 36.6 | 2 | 1.8 | | | | |
| | at home parent | 3 | 9.7 | 1 | 3 | | | | | | |
| | student | 3 | 8.7 | 3 | 3 | | | | | | |
| | retired | 5 | 16.1 | 21 | 20.8 | | | | | | |
| | unemployed | | | | | | | | | | |
| | unable to work | 3 | 9.7 | 6 | 5.9 | 1 | 0.9 | | | | |
| | other | 2 | 6.4 | 5 | 5.0 | 2 | 1.8 | | | | |
| **Income** | <10k | 4 | 12.9 | 8 | 6.8 | 2 | 1.8 | | | | |
| | 10k-25k | 3 | 9.7 | 20 | 19.8 | 11 | 9.8 | 6 | 10.3 | 3 | 5.1 |
| | 25k-50k | 14 | 45.1 | 35 | 34.7 | 46 | 41.1 | 21 | 36.2 | 31 | 52.5 |
| | 50k-100k | 12 | 36.7 | 33 | 32.7 | 38 | 33.9 | 24 | 41.4 | 23 | 39 |
| | >100k | 2 | 6.4 | 6 | 6 | 15 | 13.4 | 7 | 12.1 | 2 | 3.4 |
| **Residential location** | Inner city | 4 | 12.9 | 5 | 5 | 8 | 92.9 | 8 | 13.8 | 6 | 10.2 |
| | Inner town | 2 | 6.4 | 7 | 6.9 | 8 | 7.1 | 5 | 8.6 | 4 | 6.8 |
| | suburbs | 22 | 67.7 | 54 | 53.5 | 65 | 58.1 | 32 | 55.2 | 30 | 50.8 |
| | village | 4 | 12.9 | 27 | 26.7 | 20 | 17.9 | 8 | 13.8 | 13 | 22 |
| | rural | 2 | 6.4 | 6 | 5.9 | 5 | 4.5 | 4 | 6.9 | | |
| **Travel information** | licence | 21 | 67.7 | 99 | 98 | 108 | 96.4 | 55 | 94.8 | 58 | 98.3 |
| | car | 5 | 16.1 | 87 | 86.1 | 91 | 81.3 | 43 | 74.1 | 44 | 74.6 |
| | pedestrian | 11 | 35.5 | 5 | 5 | 9 | 8 | 4 | 6.9 | 5 | 8.5 |
| | cycle | 10 | 32.2 | 3 | 3 | 5 | 4.5 | | | 6 | 10.2 |
| | pub trans | 6 | 19.3 | 5 | 5 | 6 | 5.4 | 11 | 19 | 3 | 5.1 |
| | m'bike | 1 | 3.2 | | | 1 | 0.9 | | | 1 | 1.7 |

**Social Scenario: Interaction terms frequency and percentage summaries of all stakeholder groups**

| | | NC.C | | C.C | |
|---|---|---|---|---|---|
| **Profile** | age | 58 respondents in total range 20-75 mean 44.8 mode 38 | | 292 respondents in total range 21-98 mean 48 mode 50 | |
| | | **No.** | **%** | **No.** | **%** |
| | male | 28 | 48.3 | 188 | 64.4 |
| | female | 30 | 51.7 | 104 | 35.6 |
| | disabled | 1 | 1.7 | 29 | 9.9 |
| **Work information** | f/t | 35 | 60.3 | 215 | 73.6 |
| | p/t | 10 | 17.2 | 38 | 13 |
| | do not work | 13 | 22.4 | 38 | 13 |
| | at home parent | 2 | 3.4 | 1 | 0.3 |
| | student | 2 | 3 | 3 | 1 |
| | retired | 4 | 6.9 | 20 | 6.8 |
| | unemployed | | | | |
| | unable to work | 2 | 3.4 | 7 | 2.4 |
| | other | 1 | 1.7 | 6 | 2.1 |
| **Stakeholder group** | lbs | 12 | 20.7 | 96 | 32.9 |
| | pi | 9 | 15.5 | 47 | 16.1 |
| | g | 9 | 15.5 | 55 | 18.8 |
| **Income** | <10k | 3 | 5.2 | 8 | 2.7 |
| | 10k-25k | 7 | 12.1 | 33 | 11.3 |
| | 25k-50k | 24 | 41.4 | 118 | 40.4 |
| | 50k-100k | 19 | 32.8 | 109 | 37.3 |
| | >100k | 5 | 8.6 | 24 | 8.2 |
| **Residential location** | innercity | 12 | 20.7 | 19 | 6.5 |
| | innertown | 6 | 10.3 | 19 | 6.5 |
| | suburbs | 31 | 53.4 | 163 | 55.8 |
| | village | 5 | 8.6 | 64 | 21.9 |
| | rural | 1 | 1.7 | 14 | 4.8 |
| **Travel information** | driving licence | 41 | 70.7 | 290 | 99.3 |
| | car | 4 | 6.9 | 257 | 88 |
| | pedestrian | 20 | 34.5 | 11 | 3.8 |
| | cycle | 17 | 29.3 | 8 | 2.7 |
| | pub'trans | 16 | 27.6 | 13 | 4.5 |
| | m'bike | | | 2 | 0.7 |

**Social Scenario**

| | | NC.I | | C.I | | LBS | | PI | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Profile** | age | 28 respondents range 20-75 mean 48.1 mode 40 | | 99 respondents range 22-80 mean 50.1 mode 63 | | 108 respondents range 21-98 mean 47.2 mode 30 | | 54 respondents range 20-68 mean 45.1 mode 48 | | 61 respondents range 25-64 mean 45.3 mode 38 | |
| | | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| | male | 9 | 32.1 | 56 | 56.6 | 80 | 74.1 | 34 | 63 | 37 | 60.7 |
| | female | 19 | 67.9 | 43 | 43.4 | 28 | 25.9 | 20 | 27 | 24 | 39.3 |
| | disabled | 1 | 3.6 | 24 | 24.2 | 4 | 3.7 | 0 | 0 | 1 | 1.6 |
| **Employment information** | f/t | 11 | 39.3 | 50 | 50.5 | 87 | 80.6 | 48 | 88.9 | 54 | 88.5 |
| | p/t | 4 | 14.3 | 13 | 13.1 | 18 | 16.7 | 6 | 11.1 | 7 | 11.5 |
| | do not work | 13 | 46.4 | 36 | 36.4 | 2 | 1.9 | | | | |
| | at home parent | 2 | 7.1 | 1 | 1 | | | | | | |
| | student | 2 | 7.1 | 3 | 3 | | | | | | |
| | retired | 4 | 14.3 | 20 | 20.2 | | | | | | |
| | unemployed | | | | | | | | | | |
| | unable to work | 2 | 7.1 | 6 | 6.1 | 1 | 0.9 | | | | |
| | other | 1 | 3.6 | 5 | 5.1 | 1 | 0.9 | | | | |
| **Income** | <10k | 2 | 7.1 | 8 | 8.1 | 1 | 0.9 | | | | |
| | 10k-25k | 12 | 42.9 | 20 | 20.2 | 10 | 9.3 | 6 | 11.1 | 2 | 3.3 |
| | 25k-50k | 12 | 42.9 | 33 | 33.3 | 44 | 40.7 | 21 | 38.9 | 33 | 54.1 |
| | 50k-100k | 11 | 39.3 | 33 | 33.3 | 38 | 35.2 | 21 | 38.9 | 24 | 39.3 |
| | >100k | 1 | 3.6 | 5 | 5.1 | 15 | 13.9 | 6 | 11.1 | 2 | 3.3 |
| **Residential location** | Inner city | 3 | 10.7 | 5 | 5.1 | 8 | 7.4 | 8 | 14.8 | 7 | 11.5 |
| | Inner town | 1 | 3.6 | 7 | 7.1 | 7 | 6.5 | 5 | 9.3 | 5 | 8.2 |
| | suburbs | 18 | 64.3 | 52 | 52.5 | 64 | 59.4 | 30 | 55.5 | 30 | 49.2 |
| | village | 3 | 10.7 | 27 | 27.3 | 19 | 17.6 | 7 | 13 | 13 | 21.3 |
| | rural | 1 | 3.6 | 6 | 6.1 | 5 | 4.6 | 3 | 5.6 | | |
| **Travel information** | licence | 19 | 67.9 | 97 | 98 | 104 | 96.3 | 51 | 94.5 | 60 | 98.4 |
| | car | 4 | 14.3 | 85 | 85.9 | 87 | 80.6 | 40 | 74.1 | 45 | 73.8 |
| | pedestrian | 10 | 35.7 | 5 | 5.1 | 9 | 8.3 | 3 | 5.6 | 4 | 6.6 |
| | cycle | 9 | 32.1 | 3 | 3 | 5 | 4.6 | | | 8 | 13.1 |
| | pub trans | 4 | 14.3 | 5 | 5.1 | 6 | 5.6 | 11 | 20.4 | 3 | 4.9 |
| | m'bike | | | | | 1 | 0.9 | | | 1 | 1.6 |

## Appendix 4 Attributes most and least focused on according to gender

### Driver

| | | NC.C | | C.C | | NC.I | | C.I | | LBS | | PI | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Gender | | Gender | | Gender | | Gender | | Gender | | Gender | | Gender | |
| | | F frequency | M frequency | F frequency | M frequency | F frequency | M frequency | F frequency | M frequency | F frequency | M frequency | F frequency | M frequency | F frequency | M frequency |
| Attributes ***most*** focussed on during the driver scenario | increasing walking | 7 | 5 | 20 | 29 | 7 | 3 | 8 | 10 | 4 | 11 | 3 | 4 | 5 | 6 |
| | decreasing walking | 6 | 7 | 34 | 81 | 1 | 1 | 13 | 26 | 8 | 31 | 8 | 16 | 9 | 15 |
| | certificate of safety: yes | 8 | 11 | 37 | 47 | 5 | 5 | 10 | 14 | 12 | 18 | 13 | 16 | 6 | 5 |
| | certificate of safety: no | 2 | 1 | 4 | 3 | 1 | 1 | 1 | 3 | 2 | 0 | 2 | 0 | 0 | 0 |
| | increasing price | 1 | 0 | 8 | 7 | 1 | 0 | 3 | 1 | 4 | 0 | 1 | 1 | 0 | 4 |
| | decreasing price | 15 | 15 | 48 | 10 | 10 | 8 | 17 | 28 | 17 | 48 | 4 | 10 | 14 | 21 |
| | other | 9 | 3 | 11 | 15 | 7 | 0 | 9 | 8 | 2 | 6 | 0 | 0 | 2 | 4 |
| Attributes ***least*** focussed on during the driver scenario | increasing walking | 4 | 11 | 32 | 61 | 2 | 5 | 14 | 21 | 9 | 28 | 7 | 12 | 2 | 6 |
| | decreasing walking | 8 | 7 | 21 | 29 | 8 | 5 | 7 | 7 | 4 | 10 | 3 | 2 | 7 | 11 |
| | certificate of safety: yes | 5 | 4 | 24 | 50 | 2 | 2 | 11 | 11 | 5 | 25 | 3 | 6 | 8 | 10 |
| | certificate of safety: no | 10 | 10 | 16 | 45 | 5 | 3 | 6 | 12 | 9 | 18 | 2 | 10 | 4 | 13 |
| | increasing price | 8 | 11 | 34 | 59 | 6 | 5 | 9 | 22 | 9 | 26 | 12 | 9 | 7 | 8 |
| | decreasing price | 5 | 5 | 17 | 25 | 3 | 1 | 4 | 10 | 6 | 8 | 6 | 6 | 3 | 3 |
| | other | 7 | 2 | 5 | 9 | 5 | 0 | 3 | 5 | 3 | 3 | 0 | 0 | 1 | 3 |

**Strategy**

| | | NC.C | | C.C | | NC.I | | C.I | | LBS | | PI | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Gender | | Gender | | Gender | | Gender | | Gender | | Gender | | Gender | |
| | | F | M | F | M | F | M | F | M | F | M | F | M | F | M |
| | | frequency | | frequency | | frequency | | frequency | | frequency | | frequency | | frequency | |
| Attributes ***most*** focussed on during the strategy scenario | increasing spaces | 10 | 11 | 61 | 94 | 4 | 5 | 28 | 32 | 17 | 31 | 15 | 21 | 7 | 18 |
| | decreasing spaces | 11 | 12 | 8 | 11 | 8 | 4 | 5 | 3 | 3 | 11 | 1 | 2 | 2 | 2 |
| | political support: yes | 2 | 1 | 3 | 6 | 1 | 0 | 1 | 2 | 1 | 1 | 0 | 3 | 2 | 1 |
| | political support: no | 6 | 9 | 24 | 37 | 4 | 4 | 6 | 10 | 6 | 14 | 7 | 8 | 7 | 10 |
| | increasing prices | 3 | 3 | 8 | 16 | 3 | 1 | 3 | 6 | 3 | 6 | 0 | 2 | 2 | 4 |
| | decreasing prices | 5 | 9 | 48 | 79 | 3 | 4 | 19 | 22 | 16 | 42 | 7 | 7 | 8 | 13 |
| | other | 4 | 1 | 7 | 19 | 3 | 0 | 2 | 7 | 1 | 4 | 1 | 6 | 4 | 2 |
| Attributes ***least*** focussed on during the strategy scenario | increasing spaces | 9 | 12 | 11 | 17 | 7 | 3 | 7 | 8 | 0 | 12 | 0 | 3 | 6 | 3 |
| | decreasing spaces | 6 | 5 | 33 | 54 | 2 | 2 | 8 | 15 | 8 | 19 | 13 | 12 | 8 | 11 |
| | political support: yes | 6 | 12 | 35 | 53 | 4 | 5 | 12 | 18 | 12 | 26 | 9 | 5 | 4 | 10 |
| | political support: no | 2 | 4 | 26 | 39 | 0 | 2 | 17 | 12 | 7 | 19 | 2 | 8 | 2 | 3 |
| | increasing prices | 6 | 7 | 31 | 64 | 4 | 3 | 10 | 18 | 10 | 26 | 6 | 10 | 7 | 15 |
| | decreasing prices | 7 | 6 | 9 | 23 | 5 | 3 | 5 | 9 | 3 | 7 | 1 | 3 | 2 | 7 |
| | other | 4 | 2 | 5 | 14 | 3 | 0 | 1 | 6 | 1 | 3 | 1 | 3 | 3 | 3 |

**Social**

| | | NC.C | | C.C | | NC.I | | C.I | | LBS | | PI | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Gender | | Gender | | Gender | | Gender | | Gender | | Gender | | Gender | |
| | | F frequency | M | F frequency | M | F frequency | M | F frequency | M | F frequency | M | F frequency | M | F frequency | M |
| Attributes ***most*** focussed on during the social scenario | increasing car parks | 4 | 6 | 42 | 78 | 2 | 4 | 16 | 26 | 15 | 29 | 7 | 11 | 6 | 14 |
| | decreasing car parks | 11 | 7 | 8 | 17 | 9 | 2 | 4 | 2 | 2 | 13 | 2 | 4 | 2 | 3 |
| | Increasing public space | 13 | 13 | 34 | 71 | 9 | 4 | 15 | 23 | 10 | 31 | 8 | 10 | 5 | 16 |
| | The same public space | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 |
| | increasing council tax | 1 | 1 | 4 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 2 | 0 |
| | decreasing council tax | 9 | 10 | 44 | 75 | 3 | 3 | 19 | 24 | 10 | 29 | 10 | 14 | 11 | 15 |
| | other | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| Attributes ***least*** focussed on during the social scenario | increasing car parks | 10 | 8 | 16 | 36 | 6 | 2 | 8 | 14 | 3 | 17 | 2 | 6 | 7 | 5 |
| | decreasing car parks | 6 | 4 | 27 | 58 | 4 | 1 | 10 | 19 | 8 | 19 | 5 | 12 | 6 | 11 |
| | Increasing public space | 4 | 2 | 10 | 12 | 3 | 1 | 5 | 5 | 2 | 5 | 1 | 3 | 3 | 0 |
| | The same public space | 3 | 10 | 21 | 44 | 2 | 3 | 10 | 13 | 3 | 21 | 6 | 4 | 3 | 13 |
| | increasing council tax | 7 | 8 | 42 | 75 | 4 | 3 | 16 | 20 | 12 | 33 | 10 | 12 | 7 | 15 |
| | decreasing council tax | 6 | 4 | 14 | 19 | 4 | 2 | 6 | 7 | 4 | 11 | 3 | 1 | 3 | 2 |
| | other | 1 | 3 | 7 | 16 | 0 | 0 | 2 | 6 | 2 | 3 | 2 | 5 | 2 | 5 |