# The perception of the urban parking problem

## A survey among parking experts in France

**Master's Thesis**

**August 19, 2010**

**Marcel Buffat**
329952

# Abstract

Parking is an important part of urban traffic and consequently an important factor for the well-being of a city. However, in urban areas parking causes more and more problems which require a goal-oriented and efficient parking policy. In order to implement a policy a consensus about the parking problem is important. So far there has not been fundamental research about the perception of the urban parking problem. This thesis investigates the consensus among experts of the parking world on various issues around the parking problem in France. It is a continuing research to a previous research conducted in the Netherlands. The issues investigated are:

- Parking pricing and the provision of free parking

- Importance of the availability of parking spaces as a location factor for businesses

- Parking regimes in residential areas

- General impact of parking on urban traffic

- The collection and the allocation of parking revenues

- The parking shortage and the prioritizing of user groups

- The future development of parking facilities

- The perception on the definition of parking policy.

The issues are investigated with an online survey. Respondents were asked to rate on a five point Likert scale to what extent they agree to a statement. Thereafter, the results were analysed with SPSS frequency analysis and cross tabulation analysis. Further, the strength of consensus measurement has been applied in order to facilitate the interpretation of the Likert scale. In addition the survey results have been compared to the results from the previously conducted Dutch survey.

The results showed that there are no fundamental differences in the perception between different roles as well as between the different countries.

# Acknowledgments

I would like to thank Jacques Legaignoux for his comments to improve and translate the survey as well as for his support to distribute the only survey. Further I wish to thank my supervisor Giuliano Mingardo for his encouragement and guidance through this project. I am also grateful to my friend Laura Ibrahim for printing and handing in the thesis. None, however, is responsible for any remaining errors.

# Table of Contents

# 1    Introduction

Parking is an important part of urban traffic and consequently an important factor for the well-being of a city for two main reasons: First of all, the start and end point of every car trip is a parking lot. Secondly, a car is parked, according to Button (2006), 95% of its life time. However, in urban areas parking causes more and more problems that threaten the quality of life and the accessibility of the city. Cruising for parking is a reason for congestion in urban areas and the parking shortage in inner-cities is perceived to threaten the central business districts. Stores and shops in central business district fear to lose future returns when the accessibility and the number of free parking spaces are not increased, while residents in urban areas fear the raising amount of traffic and the related pollution when the availability of parking is increased.

Goodwin (2001) characterized the French traffic policy to be in favour of motorists although "the people's elected representatives show their wish to encourage the use of public transport and to control the flows of cars, especially in the city centre". However, Goodwin (2001) concludes that the French parking policy actually leads to an increase in supply.

In France, local governments determine parking policy and they handle the clash between different interests from different stakeholders involved in parking policy. Further, they feel the pressure to cover cost and to increase revenues in times of limited budgets. This results in different parking policies for every city. Interrelations to other subordinated traffic policy are rare since a common agreement on the parking problem and parking policy would be a necessary precondition.

Therefore, this Master's Thesis aims to identify by mean of a survey among French parking experts the consensus on issues in parking policy in order to identify topics where further discussion and further research is necessary. It has to be clarified that the aim is not to judge whether the expressed perceptions are right or wrong but only to investigate whether there is a consensus or not.

Within this survey the most important and most controversial topics within the parking world are treaded. These are especially:
- Parking pricing and the provision of free parking
- Importance of the availability of parking spaces for shopping areas and business
- Parking regimes in residential areas
- Impact of parking on urban traffic
- The collection and allocation of parking revenues
- Parking shortage and the prioritizing of user groups
- Perception on the definition of parking policy

The Master's Thesis is structured in four main parts. Firstly, important literature treating the mentioned topics above is reviewed. Secondly, the survey and the methodology of analysis are described. Thirdly, the results are presented with figures and tables and compared to the results of a similar survey conducted in the Netherlands. Finally the thesis ends with a dis-

cussion of the most important findings and implications for further discussion and research in order to find a consensus.

# 2    Literature Review

This chapter gives an overview over the rising amount of literature about urban traffic and parking.

The literature review is structured among the most important issues regarding parking policy. First of all, the general impact of parking on urban traffic is treated. Secondly, articles about parking pricing are reviewed. Thirdly, the issue of the effect of park and rides and fourthly of parking in residential areas are covered more deeply. Fifthly, opinions about the revenue creation and revenue allocation of parking are reviewed. Lastly, the differences in perception are investigated.

## 2.1    Effects of parking on urban traffic

Various authors investigated impact outcome relationships between parking and urban traffic.

Bendtsen (1967) investigated the relation between the number of parking spaces available and the number of trips to and from the town centre. He found a close correlation between availability of parking spaces and the number of trips in Danish and American towns.

Further, Shoup (2004) analysed the problem of traffic generation through cruising for parking in downtown areas and summarized different studies. On average 30% of urban traffic was cruising for parking and the average search time for a parking space is 8.1 minutes.

Höglund (2004) investigated the impact of parking on the environment and found that especially due to cruising for parking off-street parking creates about 40% les emissions than curb-side parking. This means that 100 parking vehicles off-street give about the same emissions as 50-70 vehicles parking at the curb-side.

This research implies that parking generates traffic on one hand through the sole availability of parking spaces and on the other hand through the scarcity of parking spaces (over demand) and the thus initiated traffic search behaviour. Furthermore, Therefore traffic could be reduced by around 30% only by solving the cruising problem and even by more by reducing the number of available parking spaces.

## 2.2    Parking pricing

The literature focusing on parking pricing investigates on various aspects. The most important are the general economic evaluation of parking pricing, the elasticity of parking demand, the efficient pricing of curb-side parking and off-street parking and the possibilities to use parking pricing as a second best for road pricing.

Button (2006) identifies as the major problem of parking policy that resources are allocated according to time and not according to money. For example in the case of free parking time restriction in downtown areas. He argues with the law of Gresham saying that the bad cur-

rency drives out good currency. He identifies time as the bad currency and money as the good currency. This dual currency approach is identified by Button to have "resulted in the leaching of resources from other, potentially more productive uses". Button criticises current parking fees based on cost recovery to lead to an overuse. He argues that parking is rival and excludable which does not require treating parking as a public good from an economic perspective.

Anderson and de Palma (2006) investigated the economies of pricing parking. Starting point of their analysis is that parking is a common property resource. The analysis is directed towards finding out the benefits of pricing parking. In the case parking is unprized the market equilibrium won't be optimal. The resource will be overused which causes cruising for parking and congestion. They argue that the social optimum can be achieved under private ownership of the parking lots. The coase theorem suggests that externalities from parking, such as congestion can be internalized. Therefore, Anderson and de Palma suggest that the parking operator has to act in a monopolistic manner.

These articles showed that free parking is resulting in an inefficient market equilibrium which does not create a welfare maximum. However, the following reviewed articles show that parking pricing or the reduction of the maximum parking time does not affect all user groups (residents, visitors and commuters) the same way because of different parking demand elasticity.

To determine the elasticity of curb-side parking Kelly and Clinch (2006) analysed the impact of parking pricing on parking occupancy levels for different trip purposes by looking at a survey on 1007 curb-side parkers in Dublin. The results show that a small increase of the parking fee does not cause any difference between business trips and non-business trips. However, a significant increase of the parking fees shows that parking demand from commuters is much more price inelastic than for other user groups (e.g. visitors)

Kelly and Clinch (2009) analysed the price elasticity "of the demand of the curb-side parking market in Dublin city centre when faced with a citywide increase in the hourly cost of curb-side parking of 50%". The analysis showed different price elasticity levels during the day. The most inelastic submarket was the parking demand around 12pm followed by the parking demand around 3pm. The most price elastic sub-market was identified as the parking demand around 9pm, particularly during weekdays. Therefore, Kelly and Clinch (2009) see in charging early morning parking higher a possibility to reduce parking demand and to reduce traffic during rush hours in the morning. Another interesting finding is that the curb-side parking demand is inelastic on Thursday evenings. Kelly and Clinch (2009) raise the late night shopping theory which implies that Thursday night is for some people the only opportunity to shop midweek. As a result, Kelly and Clinch (2009) see evidence that also business and service policy can impact parking behaviour.

Thompson and Richardson (1996) analysed behaviour changes of motorists as well. But they analysed the behaviour change in the case of maximum parking time reduction instead of a change in the parking fee. They used a model considering three generalized cost dimensions: Native (direct fee, expected fee and egress walk time), waiting (waiting time) and access (In-Car Park Search Time, In-Vehicle Travel Time). The authors found out that a parking

time reduction in the downtown area leads car users to choose parking locations outside the city centre. Further a reduction in search time and a significant increase in walking time could be observed. According to the model car users traded increased walking time off for reduced searching time. Moreover, the parking time reduction leaded to an increased attractiveness of off-street parking facilities.

Shoup (2006) analysed cruising for parking in a situation with free but overcrowded curb-side parking and expensive but immediately available off-street parking. He analysed that the car driver has to options: Either he cruises to find a free parking lot at the curb or he pays immediately for an available off-street parking space. He translated this finding into a model including the variables price of curb-side parking, price of off-street parking, parking duration, searching time for curb-side parking, fuel cost of cruising, number of people in the car and value attached to the time spent for cruising. He came to the conclusion that car drivers are more likely to cruise if curb-side parking is cheap, off-street parking is expensive, fuel is cheap and drivers spend a low value on saving time. In conclusion, the model predicts that cruising will be eliminated, when the price for curb-parking at least equals the price of off-street parking.

Calthrop and Proost (2006) developed a model to study the optimal regulation of the curb-side parking market. According to their model the optimum curb-side parking fee equals the marginal cost of off-street parking supply at the optimal quantity. They assumed the marginal cost of parking supply to be constant. If this assumption holds, the optimum curb-side parking fee should match the off-street parking fee.

Arnott and Rowse (2009) developed two models: Firstly, an integrated model of curb-side parking and traffic congestion in the downtown area and secondly, a model on the spatial competition. Afterwards, they combined both models into an integrated model investigating curb-side parking, garage parking and traffic congestion. The model predicts that under-priced curb-side parking and overpriced off-street parking results on one hand in a under capacity of off-street parking and in cruising for parking. The stock of cars cruising is determined by the difference between the full price of curb-side and off-street parking. By equalizing the difference by adding the value of time and the fuel costs the level of cursing is determined. Therefore, the higher the price difference between on-street and off-street parking, the higher is the stock of vehicles cruising. In conclusion, Anrott and Rowse (2009) showed that raising the meter rate would create a double dividend. The reduced search time increase consumer benefit and the revenue increases the cities income.

There is a strong agreement among all authors that curb-side parking should be priced the same as off-street parking in order to reduce cruising and urban traffic. The following authors analysed, whether parking pricing could be an alternative to road pricing in order to create more efficient market equilibrium in the urban traffic.

Mahalel and Albert (2006) compare the potential effect of congestion tolls and parking fees on travel behaviour. They found that an introduction of a parking fee makes that 54% the drivers in the sample would prefer other options. Congestion tolls would impact 72% of respondents to search for an alternative. The findings are reflected by the high demand elastic-

ity which was found. Parking fees have a demand elasticity of -1.2 % while congestion toll has a demand elasticity of -1.8%. Therefore, they conclude that the readiness of parking fees is higher due the fact that technology is available and already implemented, but effectiveness of congestion tolls is higher in period where they are applied.

Zhang et al. (2008) analysed daily commuting patterns in a linear model. Considering the fact that road pricing is difficult to implement they suggested "a location dependent parking fee regime with no road tolls to optimize the morning commute pattern, without improving the evening commute pattern".

Verhoef et al. (1995) investigated the possibility of using parking policies for traffic regulation. They found that parking pricing for traffic regulation can only be used as a "second best" with road pricing as a "first best". Several reasons support this conclusion. Firstly, parking fees are charged at the end of the trip. This makes a parking fee differentiated according to the trip length or the road used impossible. Also differentiation according to vehicle specific externalities seems only to be possible to a limited extent.

D'Acierno et al. (2006) looked at the problem that parking fees cannot consider the length of the trip in contrary to road pricing. He argues that a parking pricing policy which are not only based on the trip destination but also on the origin of the trip can overcome this disadvantage and be advanced to road pricing. The Origin-Destination Parking Pricing (ODDP) is based on a parking license for the origin (residential area). The pricing at the destination is according to the parking license. Therefore, parking fees can be calibrated in order to penalize users that could have used an efficient transit system. Nevertheless, D'Aciarno et al. might do not consider that trips are not only made from the origin destination to another destination but are made out of a multiple chain of trips.

Glazer and Nishkane (1992) investigated the relationship between parking and congestion and measures to overcome congestion as well. However, these authors are more critical if parking fees are a good substitute for congestion pricing. They argue that a lump sum parking fee can increase welfare, but a parking fee per unit cannot. In a setting with congestion an increase of the parking fee per time makes that visitors able to vary the parking time reduce their parking time. This increases the parking spaces available per hours which increase the incentives to use cars for visitors. If visitors are the majority of road users, congestion will not be reduced but increased.

Higgins (1992) evaluated the advantages and disadvantage of implementing parking prices to reduce car use and traffic through parking taxes on parkers or on parking providers. He analysed that taxes on parkers are more effective than taxes on providers, since there is no possibility to absorb taxes.

Petiot (2004) created a parking meter violation model based on the economies of crime founded by Becker (1968). Users can decide if they want to pay or if they want to risk a fine. He found that parking meter violations is high when parking is overcrowded and user want to park for long times. Paradoxically, also an increase of the fine level increases car use and encourages parking violation in the case of large parking congestion.

The review of articles about parking pricing showed that there is a consensus that parking pricing has an effect on urban traffic and that the negative effect caused by free or under-priced parking can be solved when curb-side parking is priced the same as off-street parking. The pricing should be according to the full marginal costs of the supply also including external costs. Internalizing external costs is more efficient when pigovian taxes are charged directly to users instead of parking operators since this prevents possibilities to absorb taxes. However, there are some concerns that the efficient market outcome could also increase parking demand from visitors.

## 2.3    Effects of park and ride on urban traffic

Parkhurst (2000) and Mingardo (2008) studied the effect of park and ride facilities on urban traffic. Parkhurst (2000) used eight case studies about bus based park and ride facilities. He found several negative side effects which contradict the general perception that park and ride facilities reduce traffic. He found that the park and ride facilities actually did significantly reduce urban traffic. However, park and ride significantly increased traffic outside the urban area. This finding suggest that accessibility of the city was increased, that urban traffic was reduced but at the cost of overall traffic increase.

Mingardo (2008) analysed the effects of park and ride in Rotterdam. He basically came to the same conclusion as Parkhurst (2000) that the total amount of kilometre travelled by care increased due to park and ride. By analysing the reaction to a moderate price increase of 1 or two Euros, he identified two main raisons for the increase of kilometre driven. Firstly, cyclists switched to car use for the journey to the next public transport station. Secondly, people using public transport for the total trip drive to the park and ride and continue their trip with public transport.

## 2.4    Effects of resident parking on urban traffic

Balcombe and York (1993) investigated parking behaviour in residential areas. They looked especially at sites faced with parking problems. A site has, according to their definition, a parking problem when car owners park their cars more than 50m away from their home. They found out that the parking shortage detain car user from making short trips by car due to the fear of losing a close parking spot. They further recorded a minor substitution of car trips by public transport. As a reaction to the parking shortage most respondents answered to move to another house. The option to reduce the number of vehicles was only chosen by a minority.

Köller (2010) supports the previous finding and identified the residence to be the place where mobility decisions are taken the most frequent. He states that around 80% of all trips start or end at home. Therefore, he claims that the design of residential areas has a very high importance. The success of alternative car free residential areas, where investment is spent for common areas instead of parking shows that these housing types are in demand. These new

residential areas also show that mobility behaviour changes fast. 57% of residents reported that they abolished their car before moving in.

## 2.5    Availability of parking and attractiveness of city centres

Arnott and Rowse (2009) asked policy makers about why parking fees in downtown areas are significantly lower than garage parking fees. The reason is, according to policy makers, that "downtown merchant associations lobby City Hall to set meter rate low in order to draw shoppers away from suburban shopping centres, where most parking is provided free."

The provision of parking spaces in city centres is often determined by minimum parking requirements[1]. Shoup D.C. (1999) argues in his paper against minimum parking requirements, because these requirements are not based on market equilibrium, but on the peak demand derived from surveys. This causes an oversupply of parking and results in overinvestment. Furthermore, the oversupply of parking creates an excess demand, which results in an excess of car trips to this facility and the creation of further external effects. Therefore, Shoup (1999) suggest to price curb-side parking in central business districts rather than setting minimum off-street parking requirements. This allows the investor to determine by himself the optimum amount of off-street parking required. Due to the competition between the revenue from parking and shops market equilibrium results.

Mingardo et al. (2008) investigated the importance of parking for business. They argue in their article with the metaphoric title "no parking still business" that there is a share of user coming by car but that overall customers travelling by bicycle or by foot contribute also to a big share of the revenue. This implies that the availability of parking is less important when the accessibility via public transport or other means of transport is good.

## 2.6    Revenue and revenue allocation

Shoup (2004) identifies parking as "the ideal source of local public revenue". He defences his thesis with the classic common problem described by Schelling (1977). He argues that "no other source of public revenue can so easily bring in so much money and simultaneously improve transportation, land use, and the environment. He further suggests distributing revenues within the local districts to finance the improvement of the public neighbourhood or quality of live.

Ison and Wall (2002) surveyed policy makers on the issue of workplace parking charges in order to reduce external effects of commuting by car. The survey showed that parking charges as well as other pricing options were considered by respondents the least acceptable. Respondents rather considered positive incentives such as improving public transport, safe walking and cycling routes. If workplace parking charges were in place respondents

---

[1]    Minimum number of parking spaces required according to the estimated number of visitors.

prefer to allocate more than 50% of the money raised to public transport improvement. Further more than 60% of respondents believe that a work place user charge of over 500£ a year would be required to reduce workplace parking provision which implies an inelasticity in workplace parking prices

## 2.7    Perception of parking problems

In Bakersfield a huge discussion about the availability of parking spots occurred lately. Fort the director of the city's Department of Economic and Community development the problem lies only in the perception of the problem. According to her, as an expert, there are enough parking spaces available in the neighbourhood of the central business district and a parking shortage does not exists if people are willing to walk 50 meters more to reach their shopping destination. (Anonymous, 2008)

Rye et al. (2008) investigated the role of market research and consultation in developing parking policy. Interestingly they found a strong difference between a survey among actual users of downtown car parks and telephone interviews of respondent not recently using downtown parking. They found that the different feeling about the availability must be caused either by a lack of knowledge about parking spaces not located in the busiest roads or the believe that the parking fields around the centre are considered to be too far away.

In a study about parking problems in American central business districts Ligocki and Zonn (1984) discovered that the respondents define parking problems according to their needs. In other words that problems are defended according to the own perception. This implies that a different parking situation may be problematic for one group but not for another group.

These examples show that the perception of the problems differs from the perspective. Schoenfeld and Herrmann (1982) investigated the difference in perception between experts and novices. They directly examined student's perception of a mathematical problem before and after training. The study found that trained students perceive a problem in a deeper structure than novice students. This can also be applied to parking experts. Professionals in parking are likely to perceive parking problems more deeply by taking into account more factors.

This implies that a survey among experts in the world of parking from different fields, such as parking operators, local government, consultancies and more are best suited to give an overview over the perception of the urban parking problem.

# 3    Methodology

This thesis is a continuation of a previous research conducted in the Netherlands (c.f. Ale-bretsge, 2009). Therefore, the methodology is based on the previous study. In the following chapter the procedure and the instruments are described first, before a description of the method of analysis follows.

## 3.1    Procedure and Instrument

The research is based on an online survey among parking professionals in France which were contacted by the "Féderation des méteirs de staionnement" the CETE and the CERTU. Participants are asked to fill out an online questionnaire. The questionnaire (Appendix A) is made of 20 statements designed to measure the strength of consensus and the direction of the consensus on controversial statements. Therefore, respondents were asked to rate their overall agreement to the statement using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

**The main topic of the first five statements is parking pricing**. Statement 1 measures to what extend respondents agree that parking should be free to residents, visitors and commuters. It further shows the difference in agreement among the different car user categories (residents, visitors and commuters). Statement 2 investigates the perception of the price elasticity of parking. The results also show the difference in the perceived elasticity among the different categories. Statement 3 investigates experts' perception of people's awareness of the price they pay for parking. Statement 4 and 5 investigate the agreement on future parking pricing methods such as pricing according to the exact time period and price differentiation according to the cars emission category.

**Statements 6 to 8 cover the perception of parking (availability and price) on the attractiveness of city centres**. Statement 6 investigates if respondents perceive the availability of parking as an important factor for the attractiveness of city centres. Statement 7 investigates whether respondents perceive the availability or the price to be the more important factor for the attractiveness. This result indicates whether the parking shortage could be solved by just increasing the parking fees instead of providing new parking spaces. Statement 8 investigates if the availability of parking is perceived as an important factor in the location decision of companies willing to locate in urban areas. Further, respondents also had to answer whether they perceive the availability of free parking to be less important in the case of good public transport service.

**Statement 9 and 10 focuses on parking regimes in residential areas.** Statement 9 investigates respondent's opinion on paid parking in urban residential areas together with parking permits (preferential prices for residents). Statement 10 investigates if the above mentioned regime should be introduced in new residential areas from the very beginning.

**Statement 11 to 13 covers the impact of parking on urban traffic.** Statement 11 investigates respondent's opinion on the ability of park and ride facilities to reduce traffic in city cen-

tres and their ability to increase the overall accessibility of the city centre at the same time. Statement 12 investigates respondent's opinion on long stay parking. The link to urban traffic is the following: The availability of parking generates traffic. Long stay parking used by commuters and residents will generate more traffic during rush hours while short stay parking – generally used by visitors - will generate traffic during the whole day. Short stay parking will further increase the availability of parking which also increases the number of trips made by cars.  Statement 13 generally investigates respondent's opinion on the ability of urban parking policy to reduce urban traffic flows.

**Statement 14 and 15 investigate respondent's opinion on the revenues and the allocation of revenues created with urban parking policy**. Statement 14 investigates respondent's opinion on the legitimacy of generating revenue through parking policy. Statement 15 investigates respondent's agreement on different possibilities of revenue allocations. These five possibilities are differentiated:

- Improve the parking system in the city
- Improve public transport in the city
- Improve the accessibility of the city
- Improve quality of live in the city
- Feed the general budget of the city

**Statement 16 and 18 investigate respondent's perception of the lack of parking space and possible solutions.** Statement 16 investigates respondent's agreement on parking shortage in residential areas. Statement 18 asks about respondent's opinion on giving priority for parking for different vehicle categories. The categories differentiated are:

- Electric vehicles
- Car sharing vehicles
- Disabled persons
- Deliveries and professionals (artisan, doctors, home care etc.)
- Residents

**Statement 17 investigates respondent's perception of data availability necessary to** define effective parking policy.

**Statement 19 investigates respondent's opinion on the future development of parking facilities.** Respondents are asked if they agree that parking garages will evolve into full mobility platforms where also other services, such as for example vehicle maintenance and cleaning or parcel pick-up, are delivered.

**Statement 20 finally investigates respondent's perception on the definition of parking policy.** This statement applies a different five point Likert scale. The scale ranges for this statement from systematic to random.

Finally, respondents reported information in order to determine their role within the parking world.

Firstly, respondents were asked about the branch they work for. This allows a clear distinction between different stakeholders among experts in the parking world. The following roles are differentiated:

- Constructors

- Parking operators

- Public transport companies

- Government and decentralized government

- Public transport authorities

- Local Government

- Universities and knowledge institutions

- Others

Secondly, respondents were asked to indicate what percentage of total work time is dedicated to parking related issues. An ordinal scale starting with the following categories is applied:

- Less than 10%

- Less than 50%

- More than 50%

- Full time

Respondents working for government institutions (local government, government and decentralized services) also had to indicate the size of the municipality they work and to specify their role within the government institutions. Two roles were differentiated: policy making and policy implementation.

## 3.2   Analysis

The analysis was conducted in four steps. In a first step the data set was prepared in SPPS. Secondly, a frequency analysis in SPSS was conducted in order to evaluate the total number of respondents per statement and Likert scale item. The third step included a cross-tabulation analysis in SPSS in order to investigate respondent's answer differentiated by their role. Since the sole interpretation of ordinal scales is difficult, the strength of consensus (sCns) was calculated in order to standardize the interpretation of the Likert scale in a fourth step. The sCns was calculated for the total of all respondents as well as differentiated by role. The sCns is developed by Tastle and Tastle (2005) as a method to assess ordinal scaled data (e.g. Likert scale) to its dispersion around a chosen extreme position (strongly agree or strongly disagree). The strength of consensus (sCns) is calculated as follows:

$$sCns\,(X) = \; 1 + \sum_{i=1}^{n} p_i \, \log_2 \left( 1 - \frac{|X_i - \mu_x|}{2d_x} \right)$$

Where $X$ is a finite discrete random variable with the probability distribution $p$. $\mu_x$ is the mean either forced to 1 (strongly disagree or 5 strongly agree) and $d_x$ the range of the scale $(X_{max} - X_{min})$.

For this thesis the interpretation of the sCns will be done as follows:

- A sCns from 0.5 to 0.7 means no consensus

- A sCns from 0.7 to 0.89 indicates a weak consensus

- A sCns from 0.9 to 1 indicates a strong consensus

Figure 3-1illustrates schematically an example for a sample with two strong consensuses, a weak consensus and no consensus.

**Figure 3-1: Illustration of different consensus values**

| Strongly Disagree | Disagree | Neither agree nor disagree | Agree | Strongly Agree | | sCns |
|---|---|---|---|---|---|---|
| 10 | 0 | 0 | 0 | 0 | ✅ | 1.00 |
| 5 | 5 | 0 | 0 | 0 | ✅ | 0.90 |
| 5 | 1 | 4 | 0 | 0 | ⚠️ | 0.81 |
| 0 | 5 | 5 | 0 | 0 | ⚠️ | 0.70 |
| 0 | 5 | 4 | 1 | 0 | ❌ | 0.67 |

Tested against mean strongly agree

# 4 Results

This chapter aims to present the results comprehendible. Therefore, the chapter is structured as follows:

Firstly, the chapter summarizes the data set focussing on respondents' attributes such as their role within the parking world and the share of working hours spent with parking

Secondly the results are presentment according to the main topics by statement. The presentation of the results per statement starts with a figure showing the results of the Likert scale for all respondents. On the right side the figure contains the strength of consensus value[2] (sCns). The sCns is presented as a value and as a symbol. The green symbol indicates that there is a consensus; the yellow symbol indicates that there is a weak consensus and the red symbol indicates that there is no consensus. Below the sCns value is written against which mean (strongly disagree or strongly agree) the sCns is tested.

Thirdly, a second figure presents the Likert scale for the most frequent roles (parking operators, consultant, government and decentralized government and local government). This figure is followed by a table showing the sCns per role.

Thereafter, in a separate chapter, the sCns values differentiated by role of the French and the Dutch study are compared[3] in order to show similarities and differences between the two countries.

The discussion of the most important results follows in chapter five.

## 4.1 Description of the data set

150 experts started to fill the survey. Thereof 133 filled the survey completely. Most respondents that did not filled the survey completely stopped after the first statement.

Figure 4-1 shows the distribution of respondents among the branch related to parking they work for.

---

[2] The calculation of the sCns value is briefly presented in chapter 4.2 Analysis.

[3] c.f. Alebregtse (2009)

**Figure 4-1: Role within the parking world**



N=133
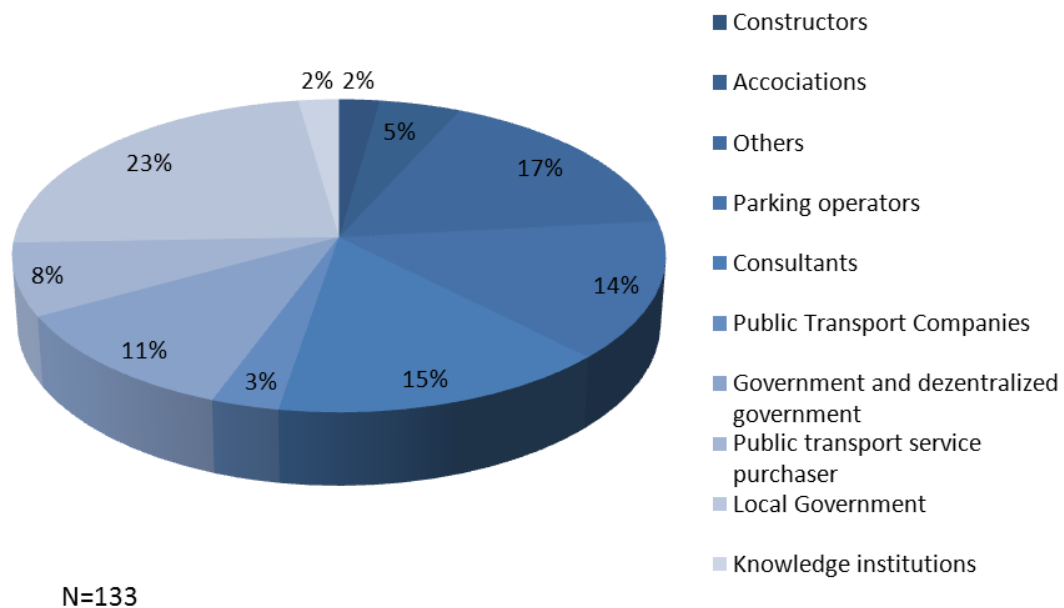
Most respondents (23%) work for the local government followed by consultants (15%), parking operators (14%), and government and decentralized government (11%). The high value of "others" (17%) shows that a lot of respondents had problems to categorize their role within the parking world among the pre-defined categories. This implies that the survey was sent to a too broad range of receivers. Only a few respondents belong to other categories such as constructors, associations, public transport companies, public transport service purchaser and knowledge institutions.

**Figure 4-2: Share of working hours spend on parking**



N=133
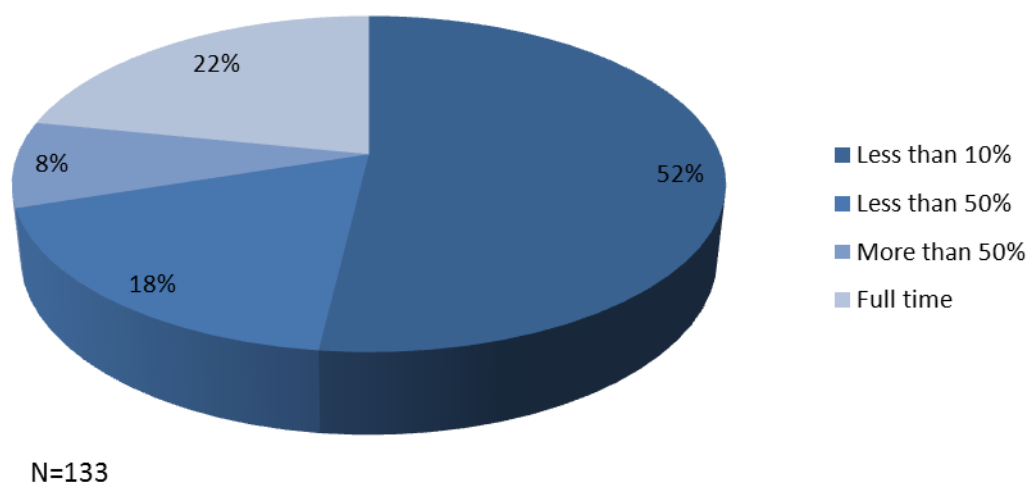
Figure 4-2 shows, that most respondents (52%) are working less than 10% on parking issues while only 22% are working full-time. 18% are working less than 50% and 8 % are working more than 50%.

Government employees such as member of government and decentralized government and local government were further asked about the size of their municipality.

**Figure 3-3: Size of respondent's municipality**
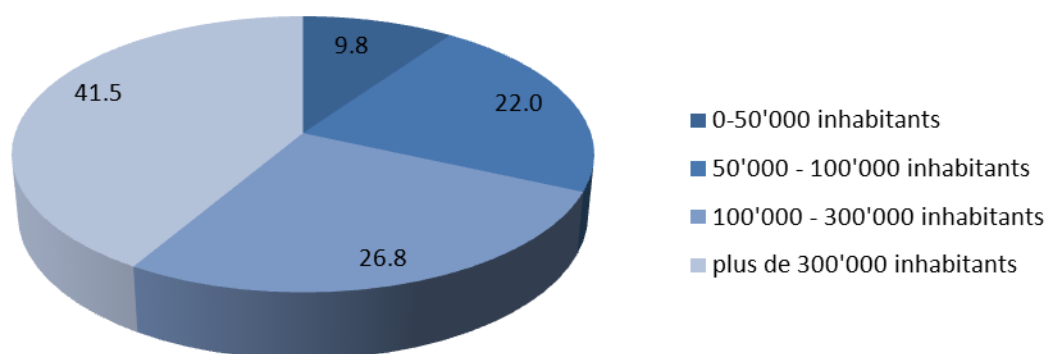


N=41

Most respondents (41.5%) working for a government are working in a large city with more than 300'000 inhabitants. 26% work in cities with 100'000 to 300'000 inhabitants, 22% in cities with 50'000 to 100'000 inhabitants and 9.8% work in small cities with up to 50'0000 inhabitants.

Further the survey differentiated between government employees developing policy and government employees' implementing policy.

**Figure 4-4: Role within the municipality**
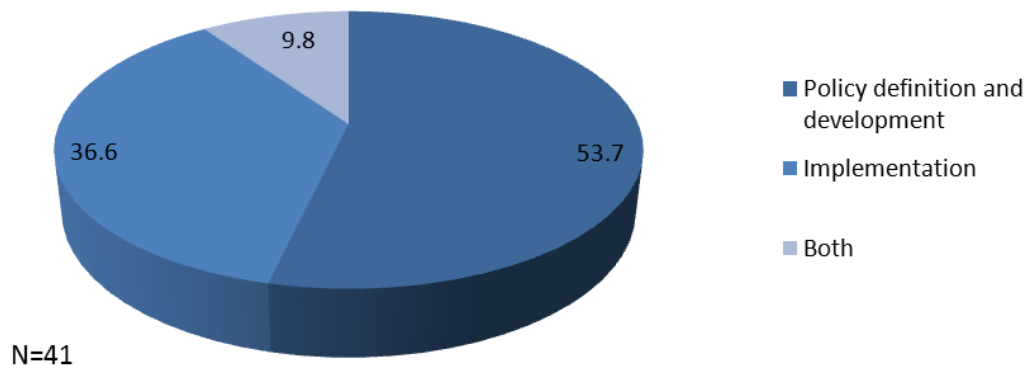


Figure 4-1 shows that most respondents develop policy (54%) or implement policy (40%). Only a minority of 10% is working in policy development as well as also in policy implementation.

## 4.2    Parking Pricing

### 4.2.1    Free Parking

Respondents were asked to what extent they agree that parking should be supplied free of charge to residents, visitors or commuters.

**Figure 4-5: Free Parking, results for all respondents**
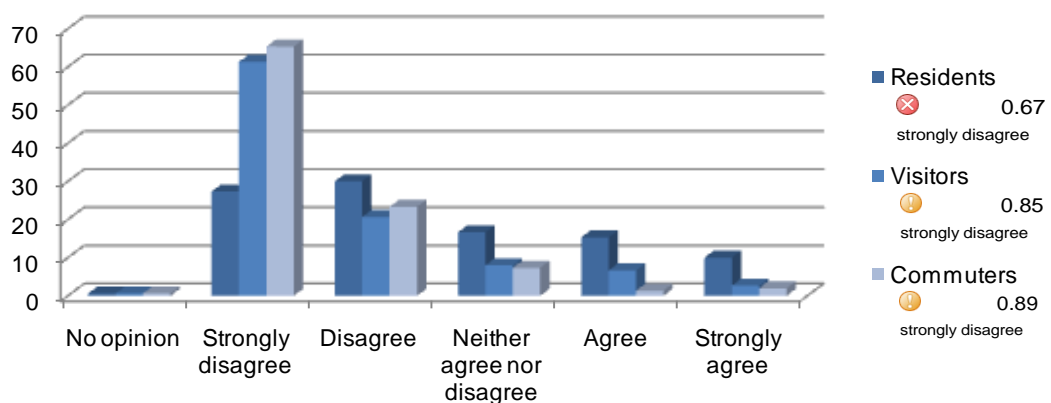


The results (Figure 4-5) show that there is no consensus (0.67) among experts on free residential parking. Even though the majority of respondents (57%) either disagree or strongly disagree that residential parking should be provided free of charge, a minority (25%) of respondents either agree or strongly agree on free residential parking. 17% do neither agree

nor disagree. This is a high amount of undecided respondents compared to the number of respondents being undecided about free visitor parking and free commuter parking. The high percentage of undecided respondents is in this case a good indicator that free residential parking is a controversial topic. This impression is also supported by a low sCns value of 0.67 indicating that there is no consensus among respondents on free parking for residents.

The results for free visitors and free commuter parking are clearer. The sCns value indicates that there is a weak consensus that visitor parking and commuter parking should not be free of charge. 82% of all respondents disagree that parking should be free of charge for visitors and 89% of all respondents disagree that parking should be supplied free of charge for commuters. Only 9.4% of all respondents agree that parking for visitors should be provided free of charge and only 3.3% agree or strongly agree that parking for commuters should be provided free of charge.

### a)  Free parking for residents

Figure 4-7 and Figure 4-6 unsurprisingly show that 73.7% of respondents affiliated to parking operators strongly disagree on free residential parking. 21.1% strongly agree while only 5.3% neither agree nor disagree. No respondent affiliated to parking operators agrees on free parking for residents. Therefore, parking operators also have the strongest consensus that parking for residents should be paid. Respondents affiliated to the local government have the second strongest consensus on paid residential parking, slightly stronger than the consensus for the total of all respondents. On the other hand, government and decentralized government do have the highest amount of respondents either agreeing or strongly agreeing on free residential parking. The amount of respondents agreeing almost matches the amount of respondents disagreeing on free residential parking. This result in the lowest sCns (0.58) value among all roles tested. The sCns value from consultants lies in the middle and close to the value of the total sample.

**Figure 4-6: Free parking for residents, sCns values differentiated by role**

| Role | | sCns |
|---|---|---|
| Government and decentralized government | ⊗ | 0.58 |
| Consultants | ⊗ | 0.65 |
| *Total sample* | ⊗ | *0.67* |
| Local government | ⚠ | 0.73 |
| Parking operators | ✓ | 0.94 |

*Tested against mean strongly disagree

**Figure 4-7: Free parking for residents, results differentiated by role**
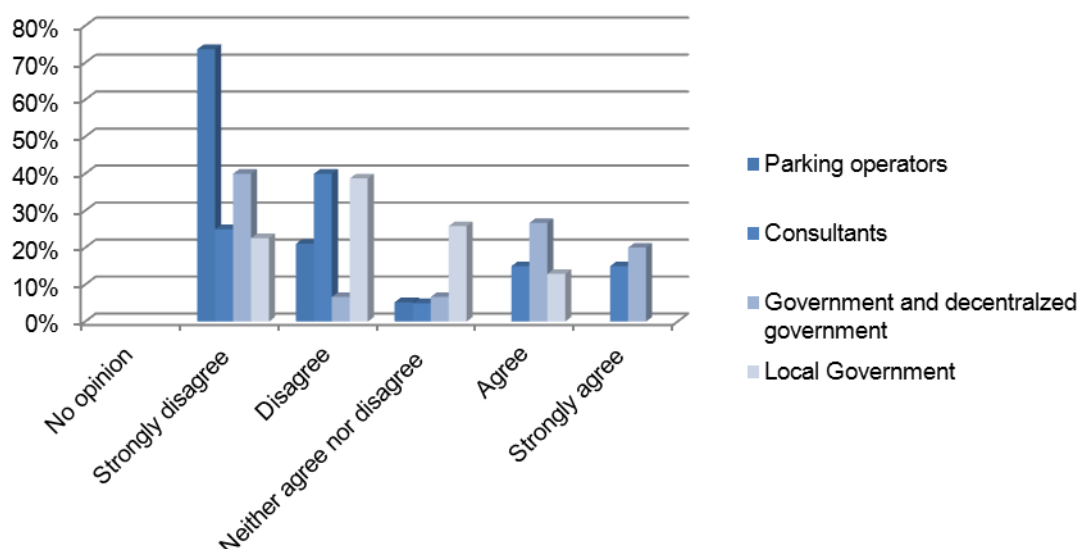


## b) Free parking for visitors

Free parking for commuters causes clear results. Again respondents affiliated to parking operators have the strongest consensus that parking for visitors should pay for parking. 100% of all parking operators strongly agree that visitor parking should not be provided free of charged. Respondents affiliated to consultancies do have a strong consensus on paid parking for visitors as well. 75% of all respondents strongly disagree and 20% disagree while only 5% agree on free visitor parking. Respondents affiliated to local government and government and decentralized government do have a smaller sCns value than the total of all respondents. As Figure 4-6 shows the lower strength sCns value is mainly due to a higher number of respondents agreeing or strongly agreeing that parking for visitors should be supplied free of charge.

**Figure 4-8: Free parking for visitors, sCns values differentiated by role**

| Role | | sCns |
|---|---|---|
| Government and decentralized government | 🟡 | 0.78 |
| Local government | 🟡 | 0.82 |
| *Total sample* | 🟡 | *0.85* |
| Consultants | 🟢 | 0.93 |
| Parking operators | 🟢 | 1.00 |

*Tested against mean strongly disagree

**Figure 4-9: Free parking for visitors, results differentiated by role**
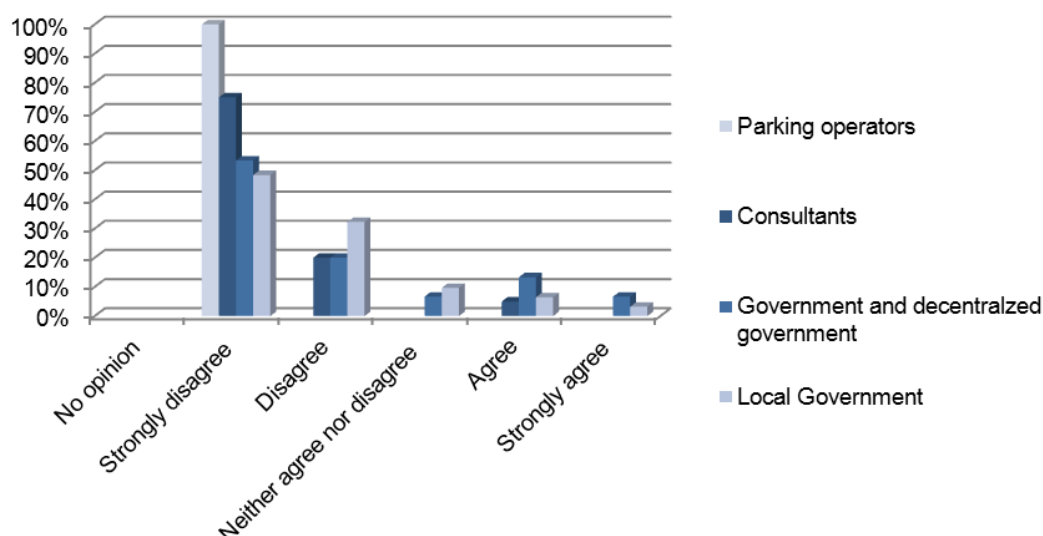


Constructors, parking operators, knowledge institution and consultants have a consensus that parking should not be supplied free of charge for visitors. All the other roles have a weak consensus on paid parking for visitors.

**c) Free parking for commuters**

Figure 4-10 shows that parking operators (1.00) and consultants (0.98) do have the strongest consensus on paid commuter parking. Figure 4-11 shows that 100% of all respondents affiliated to parking operators and 90% of all respondents affiliated to consultancies strongly disagree that parking for commuters should be provided free of charge. Local government and government and decentralized government do have a slightly weaker consensus than the total of respondents. Nevertheless, a strong majority of both roles either disagree or that parking should be provided free of charge. Only a few respondents affiliated to government and decentralized government strongly agree on free commuter parking.

**Figure 4-10: Free parking for commuters, sCns value differentiated by role**

| Role | | sCns |
|------|------|------|
| Government and decentralized government | 🟠 | 0.86 |
| Local government | 🟠 | 0.87 |
| *Total sample* | 🟠 | *0.89* |
| Consultants | 🟢 | 0.98 |
| Parking operators | 🟢 | 1.00 |

*Tested against mean strongly disagree

**Figure 4-11: Free parking for commuters, results differentiated by role**
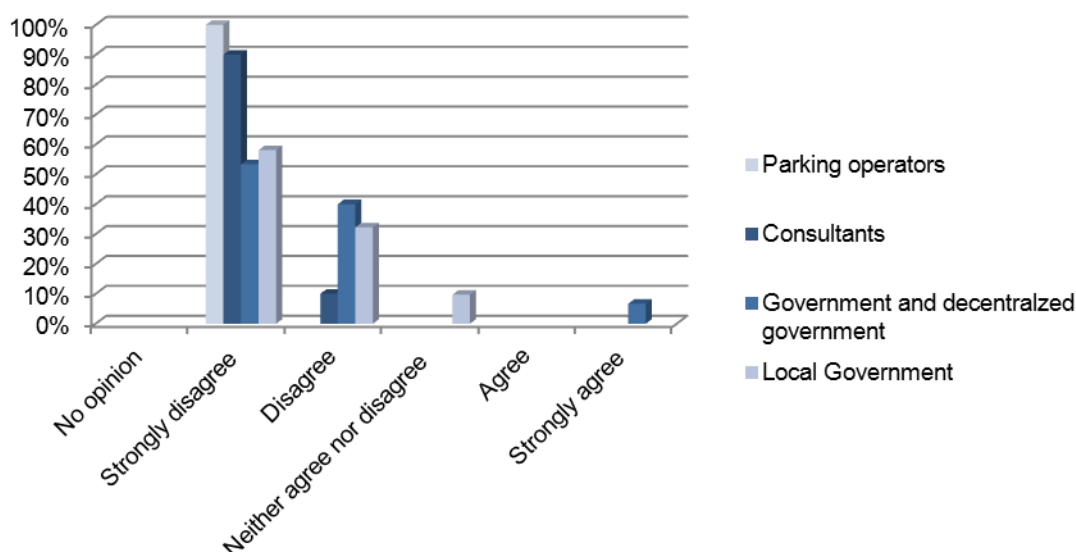


**d) Comparison**

Table 4-4 indicates that paid parking for commuters is the least controversial. All roles do have sCns values lying between 0.86 and 1 indicating either a weak or a strong consensus. With sCns values between 0.78 and 1 paid parking for visitors is a little bit more controversial but still all roles do have at least a weak consensus that visitors should pay for parking. Paid residential parking is the most controversial issue. SCns values range from 0.58 to 0.94. Especially consultants and government and decentralized government do not have a consensus. On the other hand, local government and parking operators do have a much stronger consensus that residential parking should not be provided free of charge.

**Figure 4-12: Free parking, comparison of sCns values**

| Role | sCns Res | | sCns Vis | | sCns Com |
|---|---|---|---|---|---|
| Parking operators | ✅ | 0.94 ✅ | 1.00 ✅ | | 1.00 |
| Local government | ⚠️ | 0.73 ⚠️ | 0.82 ⚠️ | | 0.87 |
| Consultants | ❌ | 0.65 ✅ | 0.93 ✅ | | 0.98 |
| Government and decentralized government | ❌ | 0.58 ⚠️ | 0.78 ⚠️ | | 0.86 |
| *Total sample* | ❌ | *0.67* ⚠️ | *0.85* ⚠️ | | *0.89* |

*Tested against mean strongly disagree

### 4.2.2   Parking price elasticity

Respondents were asked whether they agree or disagree that a significant increase in parking fees will not result in a demand reduction (i.e. that parking demand is inelastic).

Figure 4-8 shows that respondents do not have a consensus or only a weak consensus (parking demand from commuters) that parking demand is inelastic. 45% of all respondents perceive residents parking demand to be elastic while 40% of all respondents agree or strongly agree that parking demand from residents is inelastic.

**Figure 4-13: Parking price elasticity, results for all respondents**
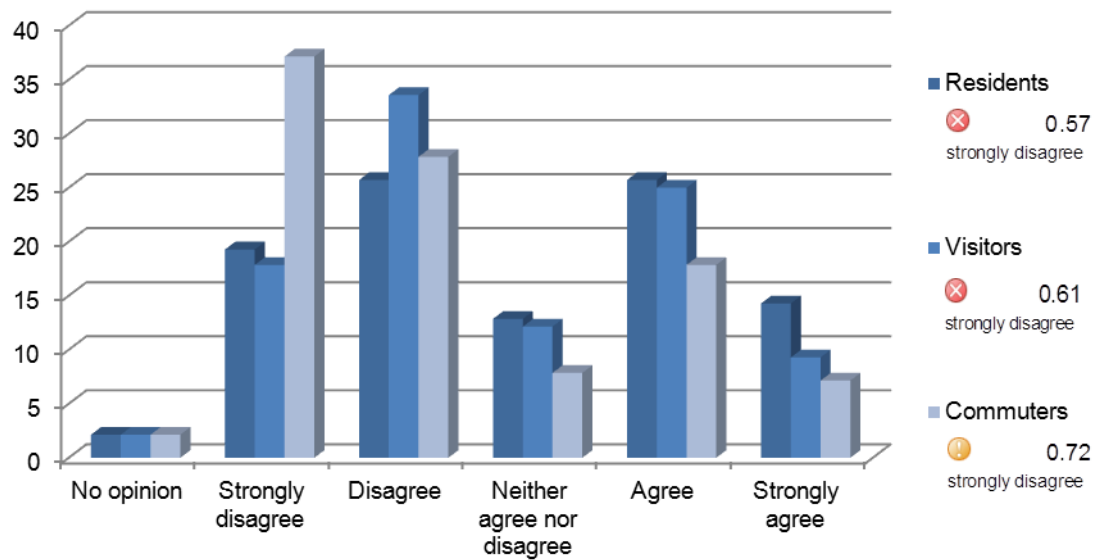


52% of the respondents either disagree or strongly disagree that visitor parking prices are inelastic, while only 35% either agree or strongly agree. The majority of respondents (64%) either disagree or strongly disagree that commuter parking prices are inelastic while only 25% either agree or strongly agrees. To conclude more respondents perceive parking demand to be elastic for commuters than for visitor or residential parking. This implies that more respondents expect that an increase in parking fees will have an effect on commuter parking demand. However, there is a rather strong dissent about this issue.

## a) Elasticities of residential parking demand

**Figure 4-14: Elasticity of residential parking, results differentiated by role**
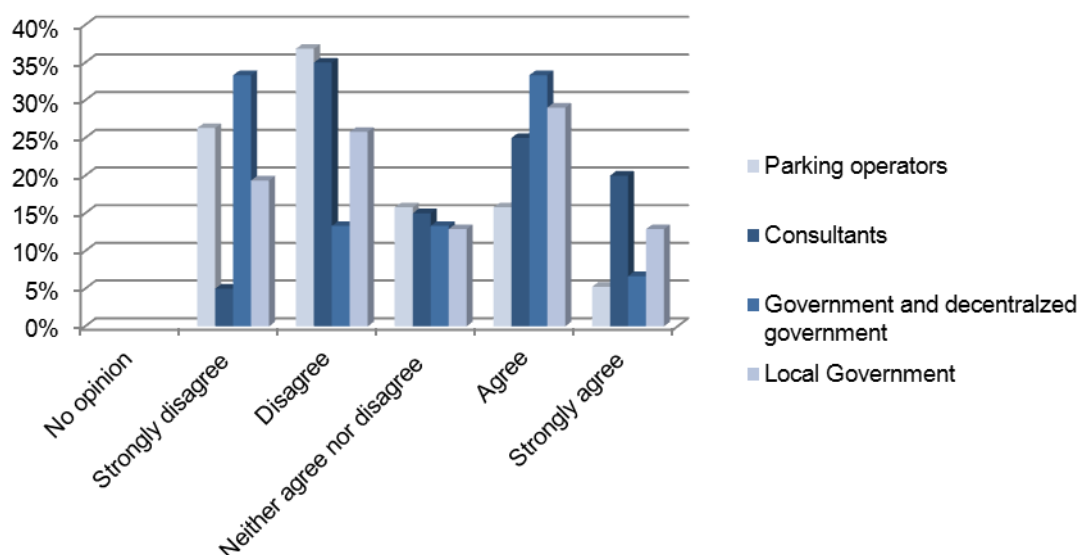


Figure 4-9 shows that consultants do have the more respondents strongly agreeing that parking demand for residents is elastic than strongly disagreeing. All the other roles have more respondents strongly disagreeing than agreeing on the issue at stake. However, the amount of respondents agreeing or strongly agreeing and the amount of respondents disagreeing or strongly disagreeing is rather equally distributed over all respondents. This is supported by the sCns values presented in Figure 4-15.

**Figure 4-15: Elasticity of residential parking, sCns values differentiated by role**

| Role | | sCns* |
|------|---|------|
| Consultants | ⊗ | 0.50 |
| *Total sample* | ⊗ | *0.57* |
| Local government | ⊗ | 0.57 |
| Government and decentralized government | ⊗ | 0.63 |
| Parking operators | ⚠ | 0.70 |

*Tested against mean strongly disagree

Consultants do have the lowest sCns value that parking demand is inelastic (0.50) while parking operators do have the strongest consensus (0.70) that parking demand for residents is elastic. Government and decentralized government as well as local government do have a sCns value around the sCns value of the total of respondents indicating no consensus that parking demand is inelastic.

## b) Elasticity of visitor parking demand

**Figure 4-16: Elasticity of visitor parking differentiated by role**
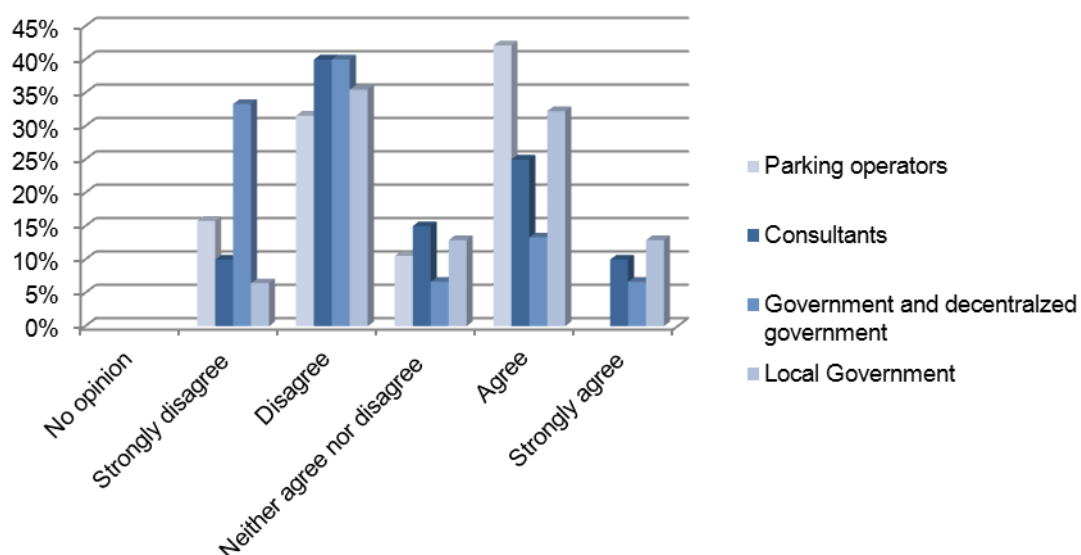


The Likert scale in figure 4-10 shows that the majority of respondents over all roles either disagrees or agrees that resident's parking demand is inelastic. Expect respondents affiliated to government and decentralized government do have a high number of respondents strongly disagreeing that residential parking demand is inelastic. Over all respondents, except government and decentralized government, there is also a high value of respondents neither agreeing nor disagreeing. This is also an indicator that there is no consensus among respondents.

**Figure 4-17: sCns values per role tested against mean strongly disagree**

| Role | sCns* | |
|---|---|---|
| Local government | ⊗ | 0.53 |
| Consultants* | ⊗ | 0.59 |
| Parking operators | ⊗ | 0.61 |
| *Total sample* | ⊗ | *0.61* |
| Government and dezentralized government | ⚠ | 0.74 |

*Tested against mean strongly disagree

Table 4-6 shows that government and decentralized government do have the strongest sCns value and a weak consensus that parking demand for visitor parking is elastic. On the other end, respondents affiliated to local governments do have the lowest sCns value and no consensus. Consultants and parking operators also do not have a consensus with a sCns value lying around the sCns value of all respondents.

## c) Elasticity of commuter parking demand

**Figure 4-18: Elasticity of commuter parking, results differentiated by role**
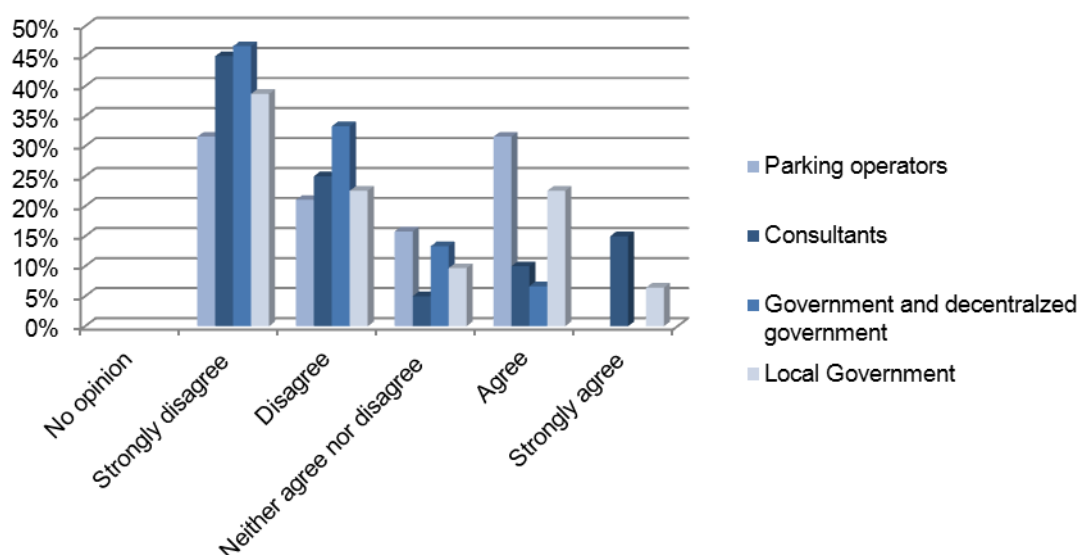


Again respondent's affiliated to governments and decentralized government do have the strongest consensus that commuters parking demand is elastic. As Figure 4-18 show government and decentralized government have the highest number of respondents agreeing or strongly agreeing. On the other hand, respondents affiliated to parking operators and local government do have the highest amount of respondents agreeing that parking demand is inelastic. Nevertheless, these for commuter parking demand also local governments and consultants do have a weak consensus that commuters parking demand is elastic with sCns values lying around the value of the total sample. Also the sCns value of parking operators does not differ much from the value of the total sample. However, it is just below the range indicating a weak consensus.

**Figure 4-19: Elasticity of commuter parking, sCns value differentiated by role**

| Role | | sCns* |
|---|---|---|
| Parking operators | ❌ | 0.68 |
| Consultants* | ⚠ | 0.71 |
| *Total sample* | ⚠ | *0.72* |
| Local government | ⚠ | 0.77 |
| Government and dezentralized government | ⚠ | 0.84 |

*Tested against mean strongly disagree

**d) Comparison**

Government and decentralized government do have in most of the cases (except residential parking demand) the highest sCns values that parking demand is elastic. All roles expect commuter parking demand to be the most elastic and residential parking demand the least elastic. Consultants and local government are always the groups with the lowest sCns values except in the case of commuter parking.

**4.2.3    Knowledge about parking prices**

The majority of respondents (67%) either disagree or strongly disagree that people are not aware of parking prices. Only 20% either agree or strongly agree that people know the price they pay for parking. Therefore, there is a weak consensus among all respondents that people rather do not know the price they pay for parking.

**Figure 4-20: Knowledge about parking prices, results for all respondents**
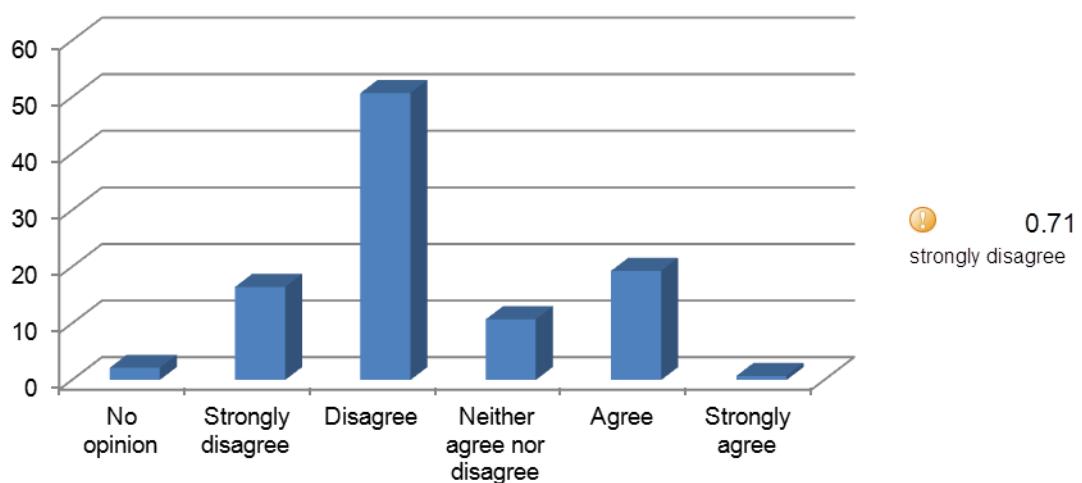
**Figure 4-21: Knowledge about parking prices, results differentiated by role**
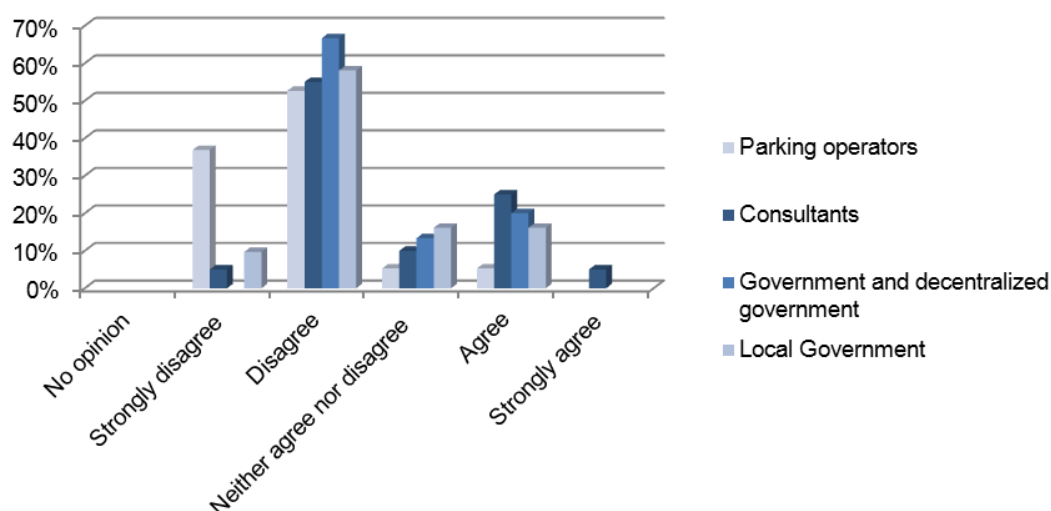


Figure 4-21 shows that most respondents among all roles disagree that people are aware of parking prices. While parking operators do have the highest proportion of respondents strongly agreeing local governments, consultants and government and decentralized government do have the highest value of respondents agreeing that people are actually aware of the price they pay for parking.

**Figure 4-22: Knowledge about parking prices, sCns value differentiated by role**

| Role | | sCns* |
|---|---|---|
| Consultants | ❌ | 0.63 |
| Government and dezentralized government | ❌ | 0.68 |
| *Total sample* | ⚠️ | *0.71* |
| Local government | ⚠️ | 0.71 |
| Parking operators | ⚠️ | 0.84 |

*Tested against mean strongly disagree

Looking at the sCns values differentiated by role shows that respondents affiliated parking operators do have the strongest consensus that people are not aware of the price they pay for parking. On the other hand, consultants do have the lowest sCns value indicating that they do not have a consensus on people's awareness on parking prices. Government and decentralized government as well as local government do have sCns values around the sCns value of the total sample.

### 4.2.4    Calculation of parking prices in the future

#### a)  Time dependent parking prices

**Figure 4-23: Exact time dependent parking prices, results for all respondents**
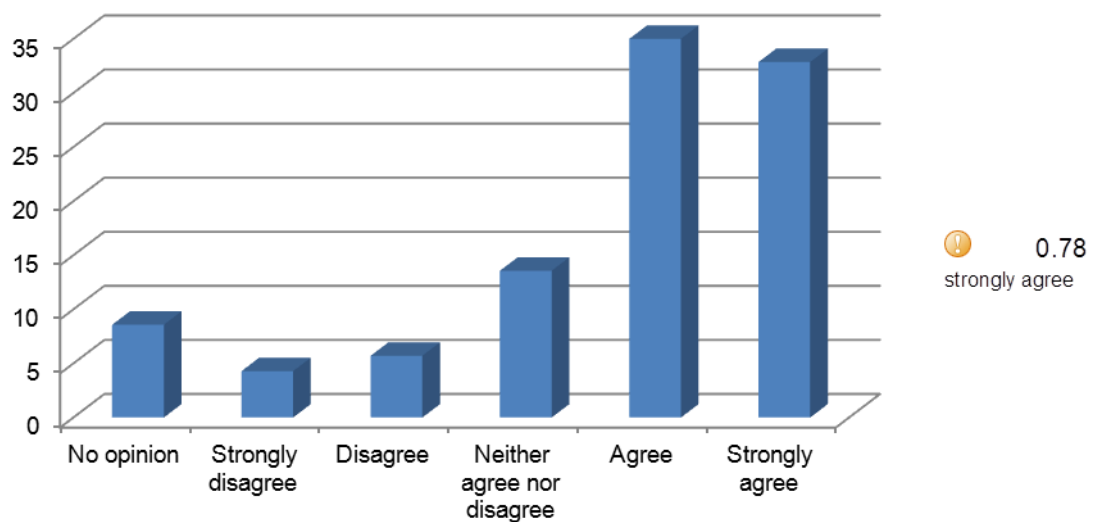


Figure 4-1 shows that 68% of all respondents either agree or strongly agree that parking prices will be calculated based on the exact parking time and not per hour or any other fixed time period. Only 10% of all respondents disagree. However, there is a high share of respondents which do not have an opinion or which do neither agree nor disagree on pricing based on the exact parking time (22%).

Thus, a weak consensus (0.78) among all respondents' results on calculating parking prices according to the exact parking time in future.

**Figure 4-24: Exact time dependent parking prices, results differentiated by role**
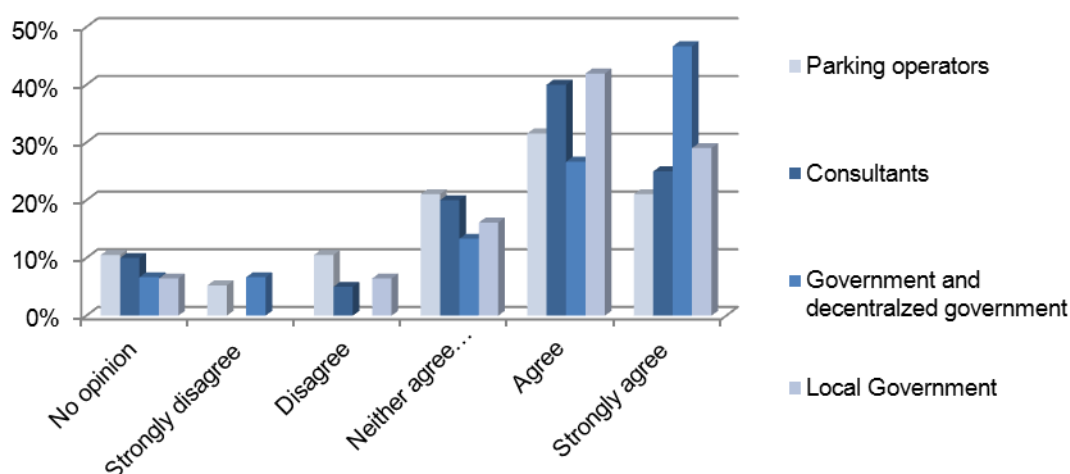


**Figure 4-25: Exact time dependent parking prices, sCns values differentiated by role**

| Role | sCns* | |
|---|---|---|
| Government and decentralized government | 🔶 | 0.83 |
| Local government | 🔶 | 0.81 |
| Consultants | 🔶 | 0.81 |
| Total sample | 🔶 | 0.78 |
| Parking operators | 🔶 | 0.73 |

* Tested against mean strongly agree

Government and decentralized government have the strongest consensus of shifting to a regime of paying parking fees calculated according to the exact parking time. The consensus is slightly stronger than the consensus over all respondents. Parking operators do have the weakest consensus on this issue, slightly weaker than the total consensus among all roles. Local Governments and consultants do have the exact same consensus close to the consensus of the sample.

**b) Emission dependent parking prices**

**Figure 4-26: Emission dependent parking prices, results differentiated by role**
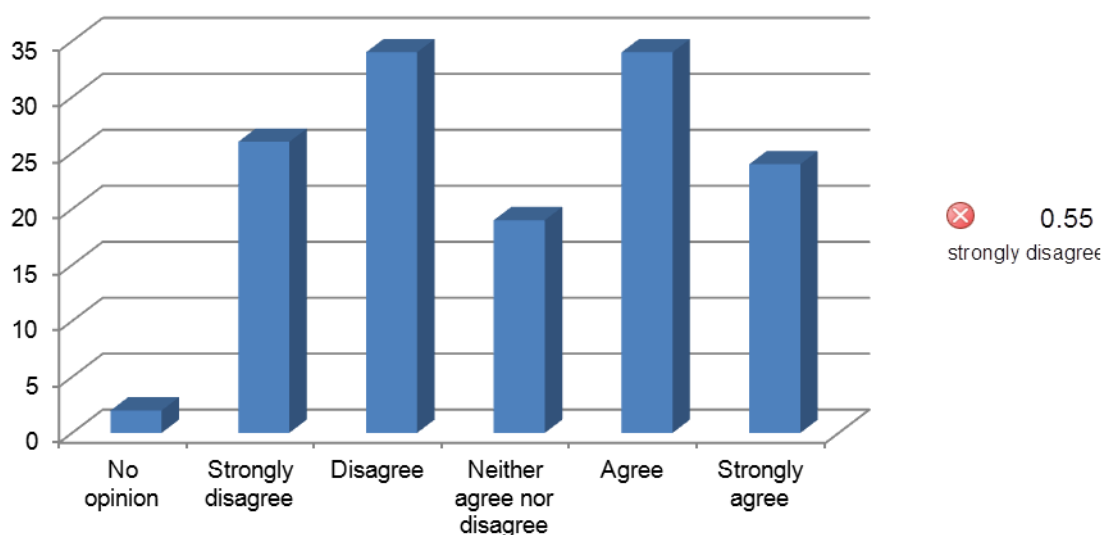


Figure 4-1 shows, that there is no consensus among respondents if parking pricing should be based on the emission category of the vehicle. The numbers of respondents that disagree (43%) almost equals the number of respondents agreeing that parking fees should be differentiated according to the vehicle emission category.

**Figure 4-27: Emission dependent parking prices, sCns value differentiated by role**

| Role | sCns* | |
|---|---|---|
| *Total sample* | ⊗ | *0.54* |
| Parking operators | ⊗ | 0.56 |
| Local government | ⊗ | 0.56 |
| Consultants | ⊗ | 0.58 |
| Government and dezentralized government | ⊗ | 0.65 |

\* Tested against mean strongly disagree

Figure 4-28 shows the distribution of the number of respondents on the Likert scale. Respondent's affiliated to local government do have the highest amount of respondents strongly disagreeing. The figure further shows that the results are rather equally distributed. The number of respondents among all roles either disagreeing or strongly disagreeing is almost matched by the number of respondents either agreeing or strongly agreeing. Most respondents either agree or disagree.

Therefore, the consensus among each role does not differ much from the overall consensus of the total sample. Except respondents affiliated to government and decentralized government services seem to agree slightly more with differentiated parking prices depending on the

vehicle emission category. Nevertheless, there is still no consensus among government and decentralized governments as well as all other roles.

**Figure 4-28: Time dependent parking fees, results differentiated by role**
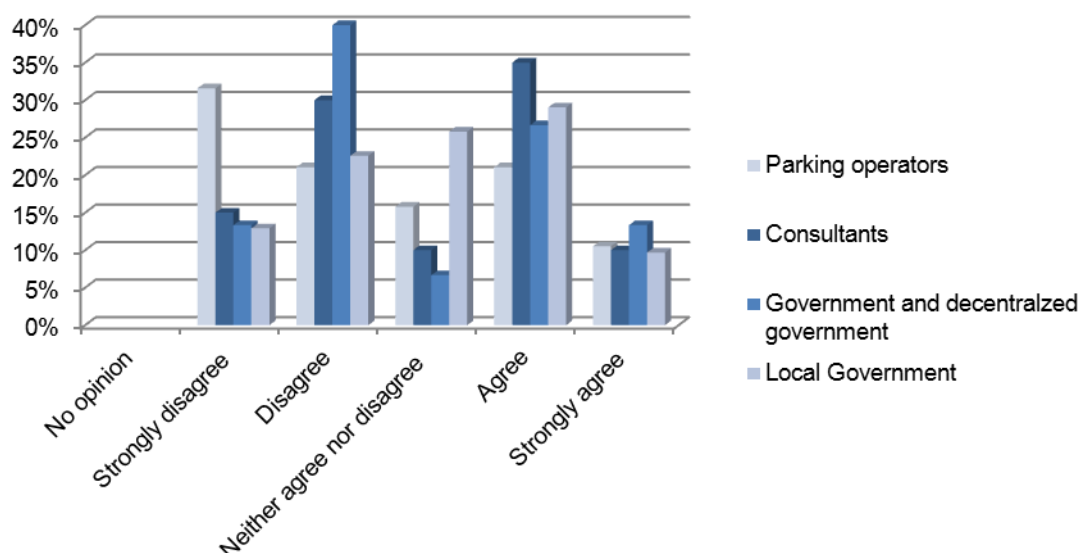


## 4.3    Parking as a location factor

Respondents were asked to respond to the following statements in order to determine the importance of the availability of parking and the price for parking as a location factor for clients and for companies

- For the attractiveness of inner cities the availability of parking spaces is an important attractiveness factor for clients

- For the attractiveness of inner cities the availability of parking spaces is more important than the price

- The availability of parking spaces is an important factor in the location decision of a company.

- Do you think that this factor (availability of parking) is also important when the accessibility via public transport is good?

### 4.3.1    Availability of parking spaces for clients

**Figure 4-29: Availability of parking spaces for clients, results for all respondents**
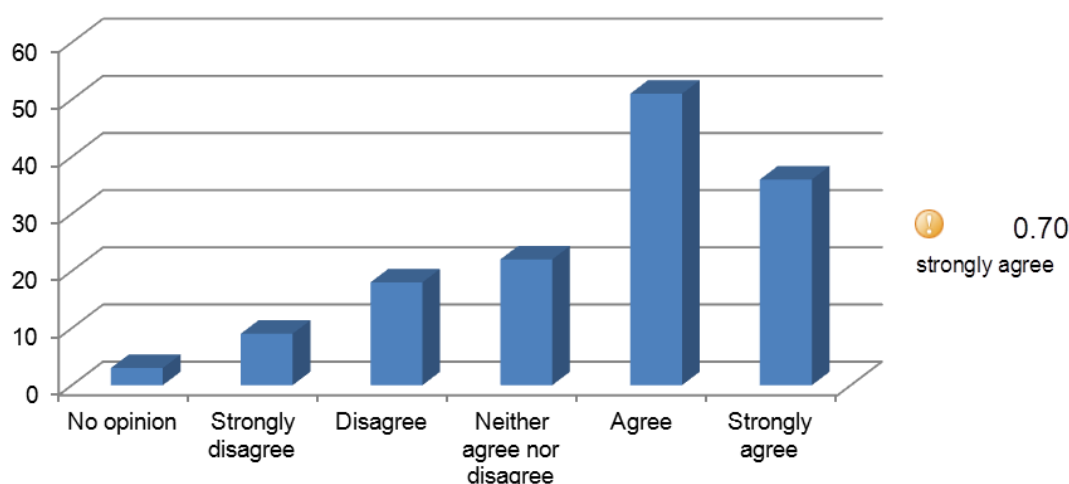


Figure 4-18 shows that the majority of respondents (63%) agree that the availability of parking spaces is an important factor for the attractiveness of city centres for clients. Nevertheless, there is a quite high value of respondents which neither agree nor disagree (20%). Looking at the comments made by respondents this high number of undecided respondents is caused by the fact that the attractiveness of parking spaces depends on the location of the business.

Nevertheless, there is a weak consensus (0.70) that availability of parking is an important location factor.

**Figure 4-30: Availability of parking spaces, sCns values differentiated by role**

| Role | | sCns* |
|------|---|-------|
| Consultants | ⊗ | 0.60 |
| Total sample | ⚠ | 0.70 |
| Local government | ⚠ | 0.74 |
| Government and decentralized government | ⚠ | 0.74 |
| Parking operators | ⚠ | 0.85 |

*Tested against mean strongly agree

**Figure 4-31: Availability of parking spaces, results differentiated by role**
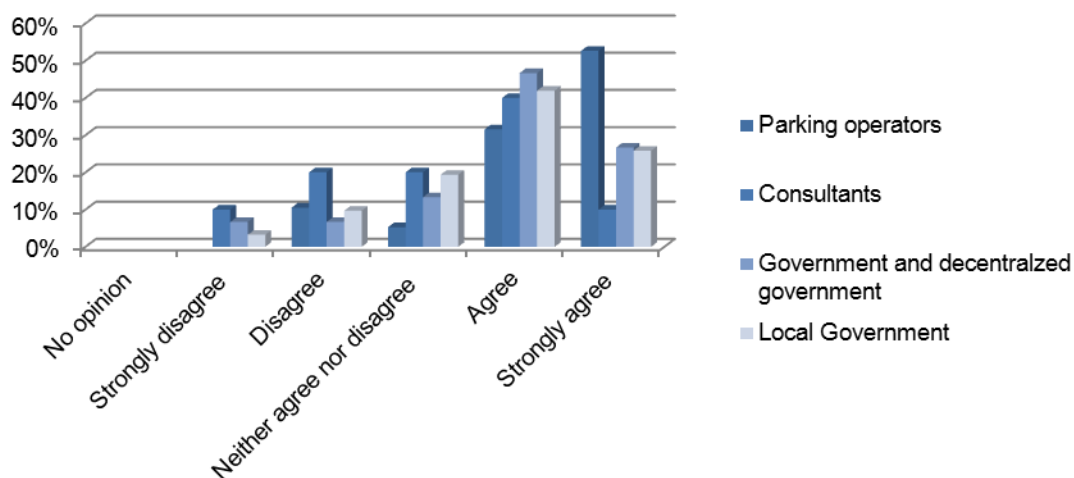


The consensus differs significantly per role. On one hand, parking operators cleary have a stronger consensus that the availability of parking spaces is an important factor for the attractivness of citiy centers for clients. On the other hand, consultants to not have a consensus that the availability parking in citiy centers is important for clients. As Figure 4-19 shows a numch smaller number of consultants does strongly agree that the availability of parking is an important factor for the attractiveness for clients. The sCns values of local government and government and decentralized government lies in the middle close to the sCns value of the total sample.

**4.3.2    Availability of parking for enterprises**

**Figure 4-32: Availability of parking for enterprises, results for all respondents**
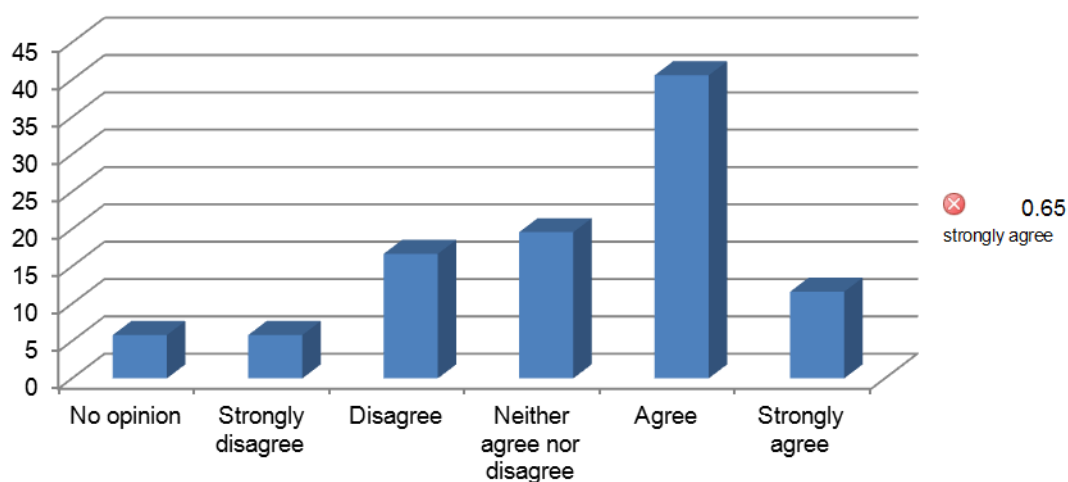
Figure 4-20 shows that the majority of respondents agree (52%) that the availability of parking spaces is an important decision factor in a company's location decision. However, there is no consensus among respondents. Again, there is a high value of respondents that neither agree nor disagree that the availability of parking spaces is important for companies. The comments made by respondents on this question also imply that the outcome depends on the location of the business.

Again parking operators have a stronger consensus than the other respondents that the availability of parking spaces is an important attraction factor for the location of companies while private consultants do have a weaker consensus than the other respondents. As figure 4-21 shows all respondents chose most frequently agree as answer. Strongly agree was chosen the mostly by parking operators and local governments while disagree was chosen mostly by consultants and government and decentralized government.

**Figure 4-33: Availability of parking spaces for enterprises, results differentiated by role**
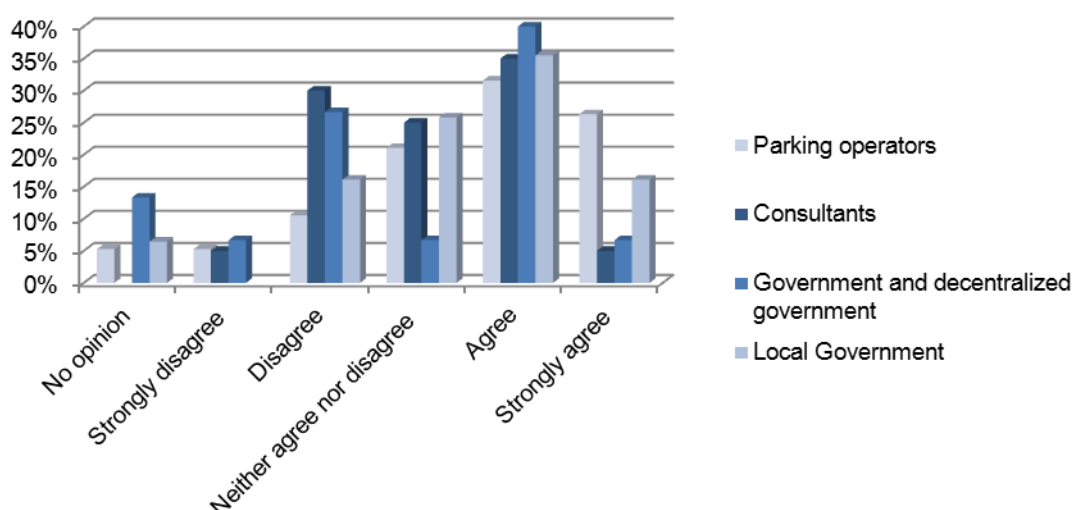


**Figure 4-34: Availability of parking spaces, sCns values differentiated by role**

| Role | | sCns* |
|---|---|---|
| Consultants | ⊗ | 0.58 |
| Government and dezentralized government | ⊗ | 0.65 |
| Total sample | ⊗ | 0.65 |
| Local government | ⚠ | 0.72 |
| Parking operators | ⚠ | 0.73 |

*Tested against mean strongly agree

### 4.3.3    **Price versus Availabilityy**

**Figure 4-35: Price versus availability, results for all respondents**
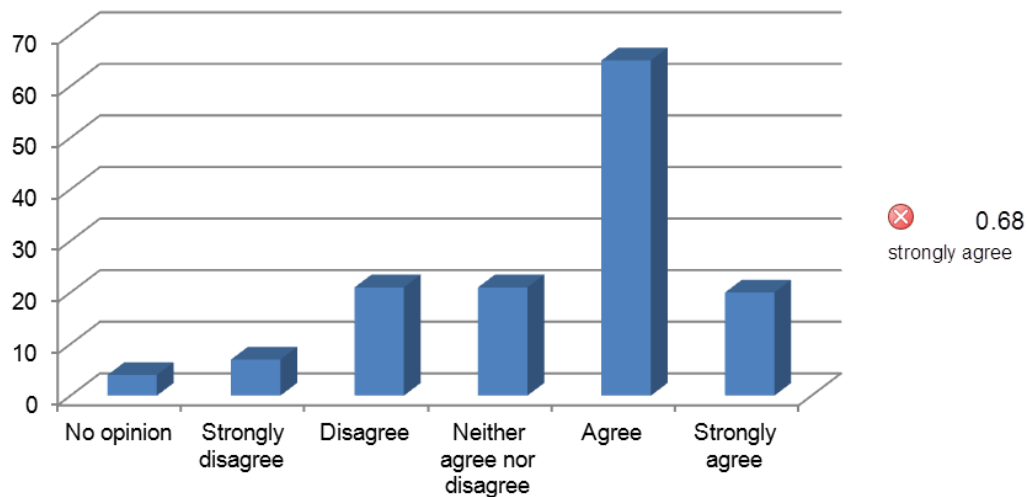


The majority of respondents (61%) either agrees or strongly agrees that the availability of parking spaces is more important than their price. However, applying the consensus formula shows that there is no consensus among respondents. The high number of respondents disagreeing (19%) or neither agreeing nor disagreeing (19%) is responsible for this low sCns value. Only a minority of respondents (5%) strongly disagrees.

**Figure 4-36: Price versus availability, sCns value differentiated by role**

| Role | | sCns* |
|---|---|---|
| Parking operators | ⚠ | 0.74 |
| Consultants | ⊗ | 0.68 |
| Government and dezentralized government | ⚠ | 0.74 |
| Total sample | ⊗ | 0.68 |
| Local government | ⚠ | 0.71 |

* Tested agains mean strongly agree

**Figure 4-37: Price versus availability, results differentiated by role**
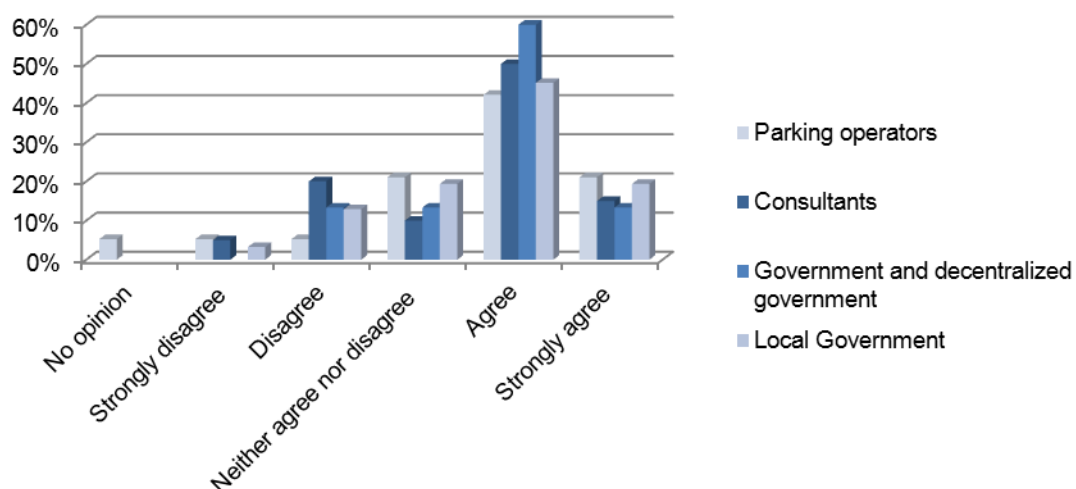


The results differentiated by roles show that parking operators, government and decentralized government and local government do have a slightly stronger consensus that the availability of parking is more important than the price, while consultants do not have a consensus. The sCns of consultants is about the same as the sCns amount the total of respondents.

### 4.3.4 Importance if public transport is good

Almost 75% of all respondents think that the availability of parking is less important when public transport is good. Only 21% believe that the availability of public transport does not have an influence on the importance of parking as a location factor.

**Figure 4-38: Importance if public transport is good, results for all respondents**
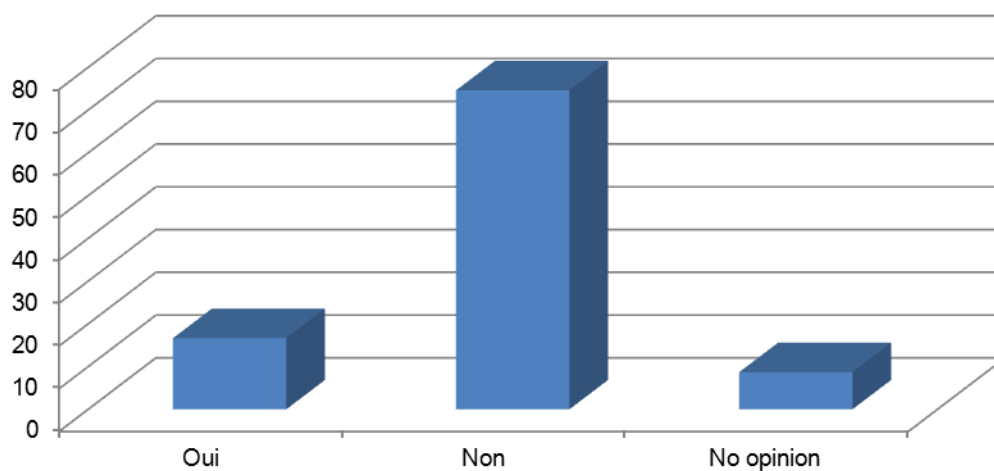
**Figure 4-39: Importance if public transport is good, results differentiated by role**
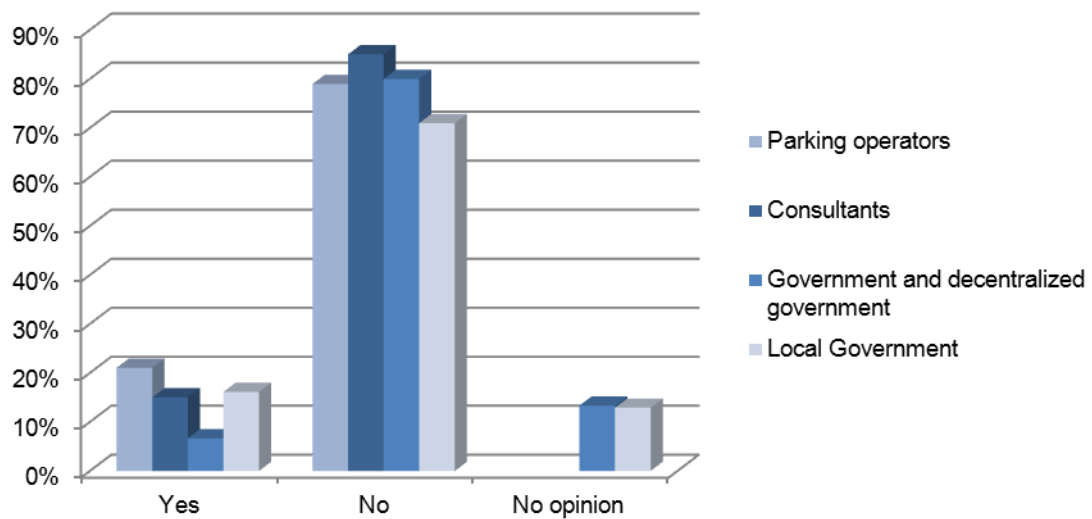


There is not a big difference among different roles. Consultants are the most convinced (85%) that the availability of parking is less important in a situation with good public transport; local governments are the least convinced. Nevertheless, 70% of respondent perceives that if the accessibility via public transport is good, the availability of parking spaces is less important as a factor for the attractiveness.

## 4.4    Parking in residential areas

### 4.4.1    Parking in existing and new residential areas

**Figure 4-40: Existing residential areas, results for all respondents**
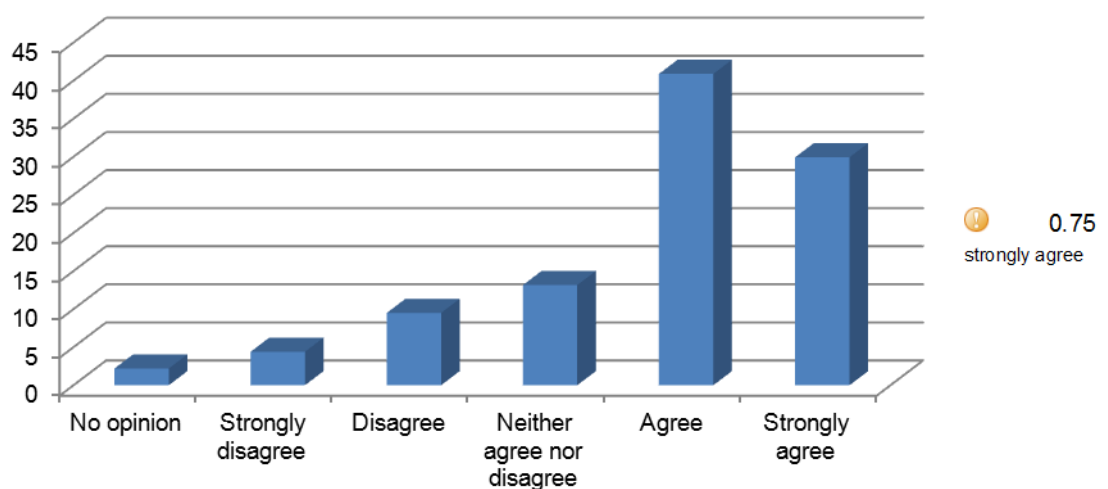
Figure 4-40 shows that the majority of respondents (71%) either agree or strongly agree that in urban residential areas a system of paid parking with preferential prices for residents should be introduced. Only a minority of respondents (10%) either disagrees or strongly disagrees on the regime of paid parking with preferential tariffs for residents. This results in a weak consensus (0.75) among all respondents on the introduction of the system in existing residential areas.

**Figure 4-41: Existing residential areas, results differentiated by role**
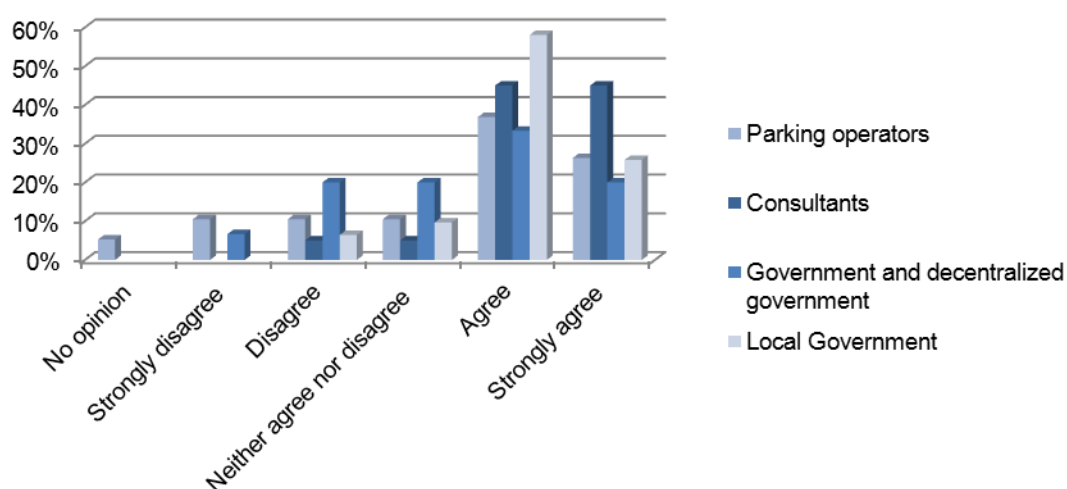


**Figure 4-42: Existing residential areas, sCns values differentiated by role**

| Role | | sCns* |
|---|---|---|
| Government and dezentralized government | ⊗ | 0.65 |
| Parking operators | ⚠ | 0.71 |
| Total sample | ⚠ | 0.75 |
| Local government | ⚠ | 0.80 |
| Consultants | ⚠ | 0.86 |

*Tested against mean strongly agree

The difference by role is shown in Figure 4-41 and Figure 4-42. Figure 4-41 shows that on one hand government and decentralized government have the highest share of respondents disagreeing on the introduction of the proposed parking regime. On the other hand, consultants do have the highest share of respondents either agreeing or strongly agreeing on the introduction of the regime. This is also reflected in the sCns values in Figure 4-42. Consultants have the strongest sCns values (weak consensus) while government and decentralized government do not have a consensus for a system with paid parking in residential areas. Respondents affiliated to local governments have a weak consensus, slightly stronger than the total of all respondents while parking operators have a weak consensus slightly weaker than the total of all respondents.

### 4.4.2    Parking in new residential areas

**Figure 4-43: New residential areas, results for all respondents**
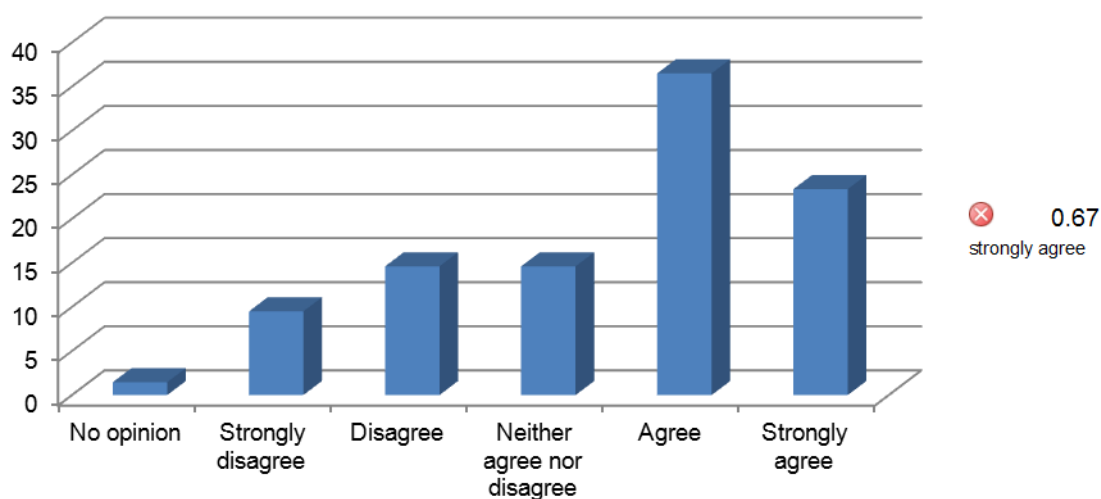


The majority of respondents (59.9%) either agree or strongly agree that in new urban residential areas a system of paid parking with preferential prices for residents (parking permits) should be introduced from the very beginning. The minority of respondents (24.1%) either disagrees or strongly disagree. Thus, there is no consensus (0.67) on this issue among all respondents.

**Figure 4-44: New residential areas, results differentiated by role**
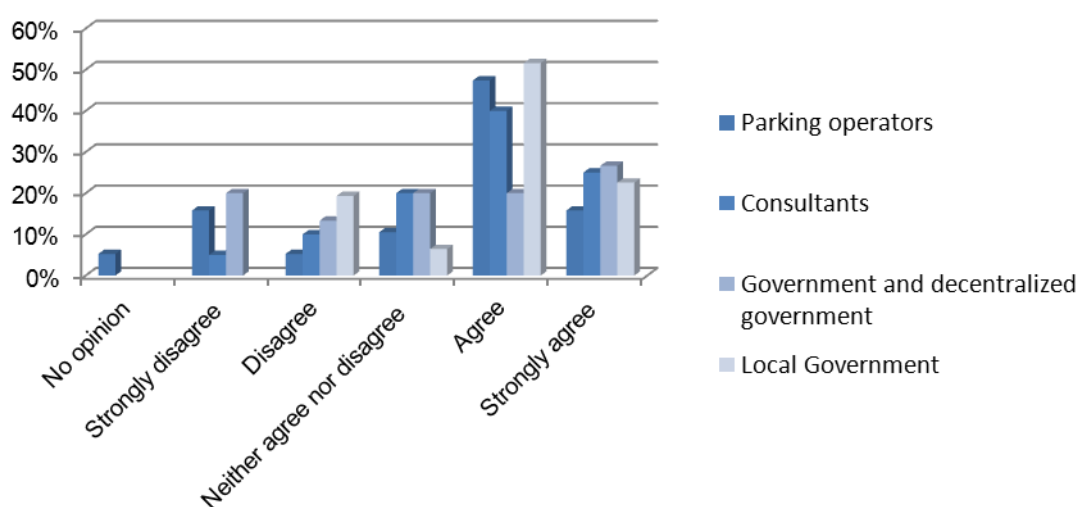
**Figure 4-45: New residential areas, sCns values differentiated by role**

| Role | | sCns |
|------|---|------|
| Government and dezentralized government | ⊗ | 0.59 |
| Total sample | ⊗ | 0.67 |
| Parking operators | ⊗ | 0.67 |
| Consultants | ⚠ | 0.72 |
| Local government | ⚠ | 0.74 |

*Tested against mean strongly agree

Looking at the sCns value per role Figure 4-45 shows that there are differences. Local government and consultants do have a weak consensus that in new residential areas a system of paid parking with preferential prices for residents should be introduced from the very beginning. Parking operators and government and decentralized government do not have a consensus. Government and decentralized government even have the second weakest sCns for system of paid parking in residential areas among all categories investigated.

The comparison to the sCns values on the introduction of the parking regime in existing residential areas shows that there is a much smaller sCns among all respondents on introducing the proposed parking regime from the very beginning. The strongest consensus possess in both cases respondents affiliated to consultants and local governments.

## 4.5    Impact of parking on urban traffic

### 4.5.1    Impact of park and ride facilities on accessibility and traffic in city centres

The majority of respondents (78.1%) agree that park and ride facilities (P+R) reduce on one hand traffic in city centres and increase on the other hand accessibility of city centres. Only a minority (8%) disagrees, while 13.8% neither agree nor disagree. Applying the sCns formula shows that there is also a weak consensus (0.81) among respondents that P+R reduces traffic in city centres and increases accessibility of the city centre.

**Figure 4-46: Park and Ride, results for all respondents**
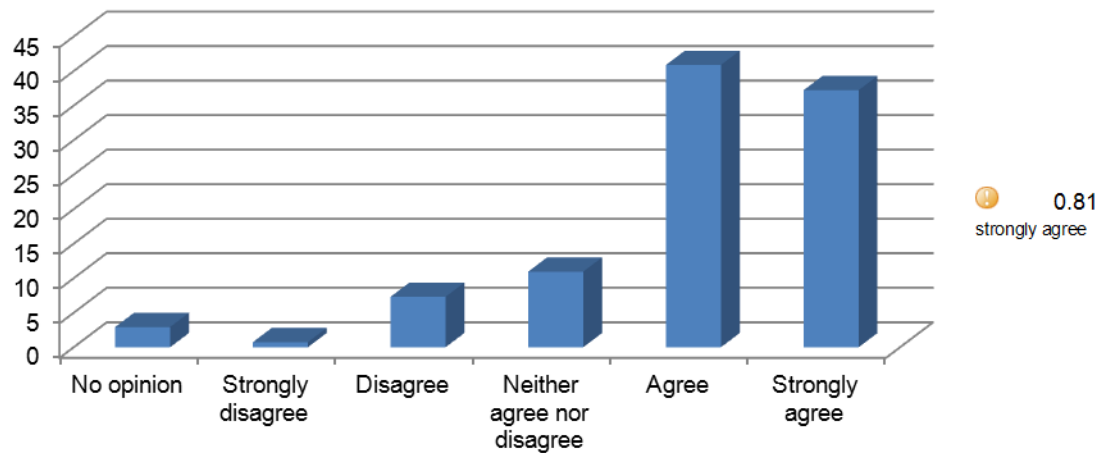


**Figure 4-48** shows that the difference in sCns between the different roles is 0.5 or more. Parking operators do have the weakest consensus (weak consensus) that park and ride facilities will reduce urban traffic. Consultants do have the second weakest consensus which is about the same sCns than the total of respondents. Local government does have the second strongest consensus slightly above the sCns among all respondents. Government and decentralized government do have the strongest consensus which is even a strong consensus that park and ride facilities reduce urban traffic and increase accessibility of the urban centre.

**Figure 4-47: Park and Ride, results differentiated by respondents**
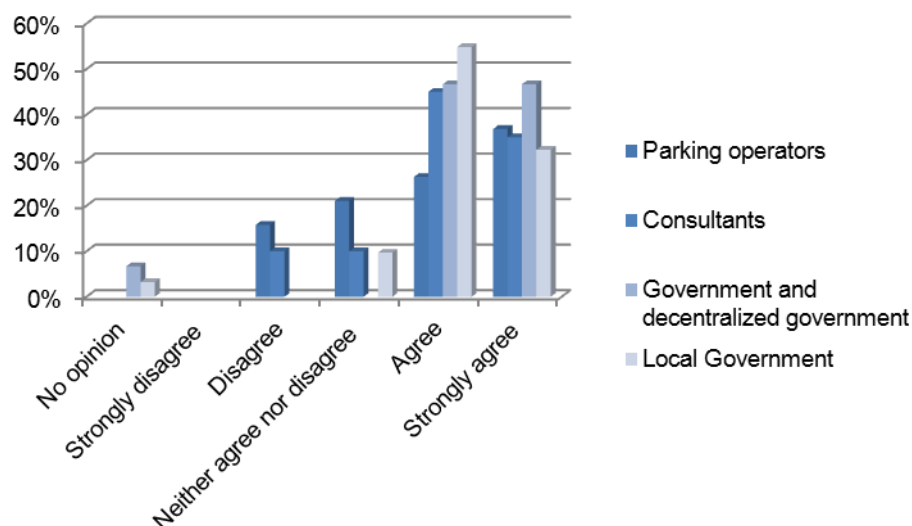
**Figure 4-48: Park and Ride, sCns values differentiated by respondents**

| Role | | sCns* |
|---|---|---|
| Parking operators | ⚠ | 0.75 |
| Consultants | ⚠ | 0.80 |
| Total sample | ⚠ | 0.81 |
| Local government | ⚠ | 0.85 |
| Government and decentralized government | ✅ | 0.91 |

*Tested against mean strongly agree

### 4.5.2 Long term parking

The majority of respondents (73.7%) agree that long term parking of non-residents (visitors and commuters) should be discouraged in urban areas. Only a minority (16%) disagrees and only few (8.8%) neither agree nor disagree. The sCns value indicates that there is a weak consensus that long term parking should be discouraged.

**Figure 4-49: Long term parking, results for all respondents**



47
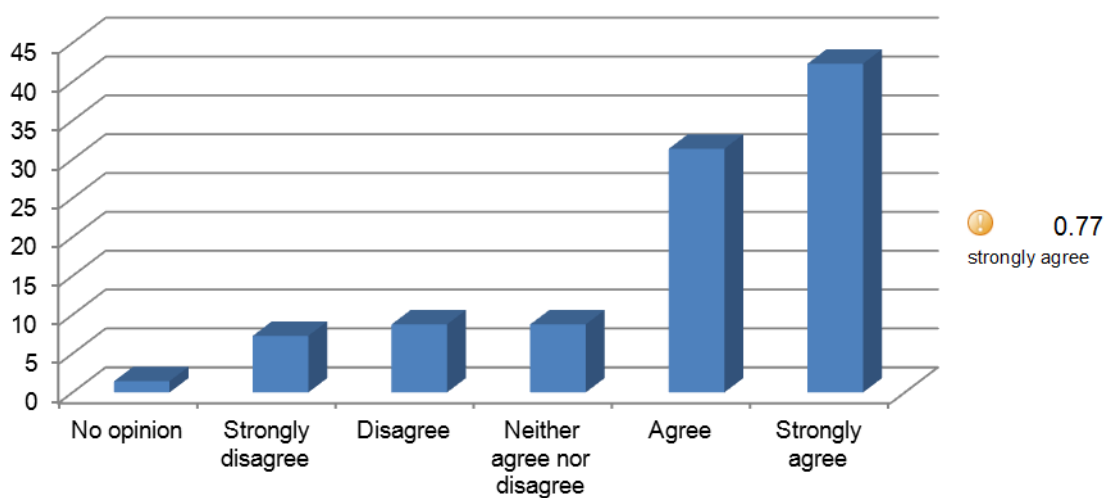
**Figure 4-50: Long term parking, results differentiated by role**
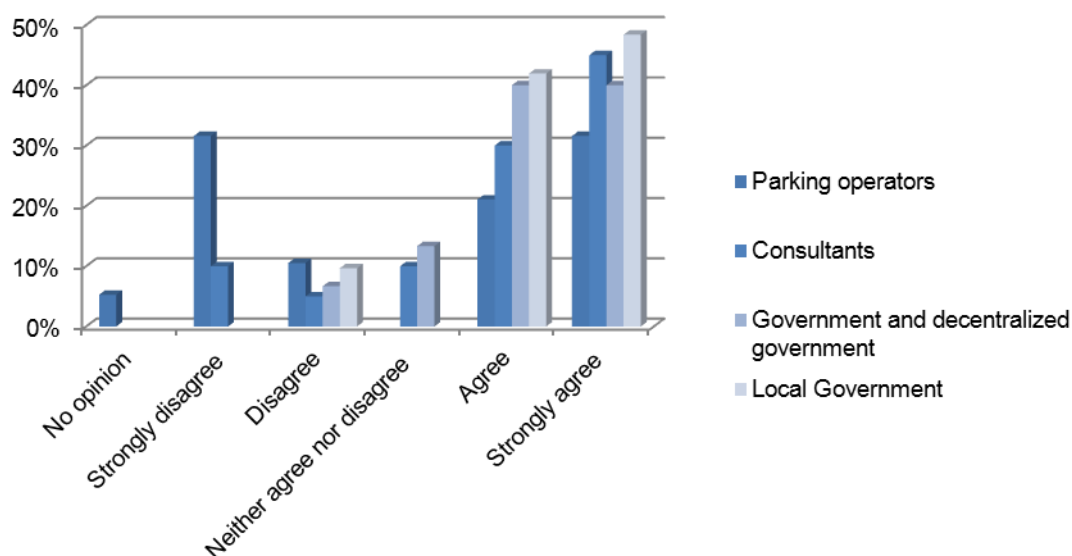


**Figure 4-51: Long term parking, sCns value differentiated by role**

| Role | | sCns* |
|---|---|---|
| Parking operators | ❌ | 0.57 |
| Consultants | ⚠️ | 0.77 |
| Total sample | ⚠️ | 0.77 |
| Government and decentralized government | ⚠️ | 0.82 |
| Local government | ⚠️ | 0.85 |

*Tested against mean strongly agree

Figure 4-51 shows that there the sCns values significantly differ per role. Parking operators have a sCns significantly lower than the other roles indication no consensus at all on discouraging long stay parking. Figure 4-50 shows that only parking operators do have a minority of 42.1% respondents either disagreeing or strongly disagreeing which almost equals the majority of 52.6% respondents either agreeing or strongly agreeing. On the other hand respondents affiliated to local government do have the strongest consensus (0.85). Also government and decentralized government have a weak consensus slightly stronger than the sCns of the whole sample. Consultant's sCns is on the level of the sCns of the whole sample which is also a weak consensus.

### 4.5.3   General importance of parking policy to reduce urban traffic

The waste majority of respondents (90.6%) either agrees or strongly agrees that parking policy plays an important role in the reduction of urban traffic. Only a small minority (3%) disagrees and 3.6% do neither agree nor disagree. Not surprisingly a strong consensus (0.91) results on the importance of parking policy among all respondents.

**Figure 4-52: General importance of parking policy, results for all respondents**
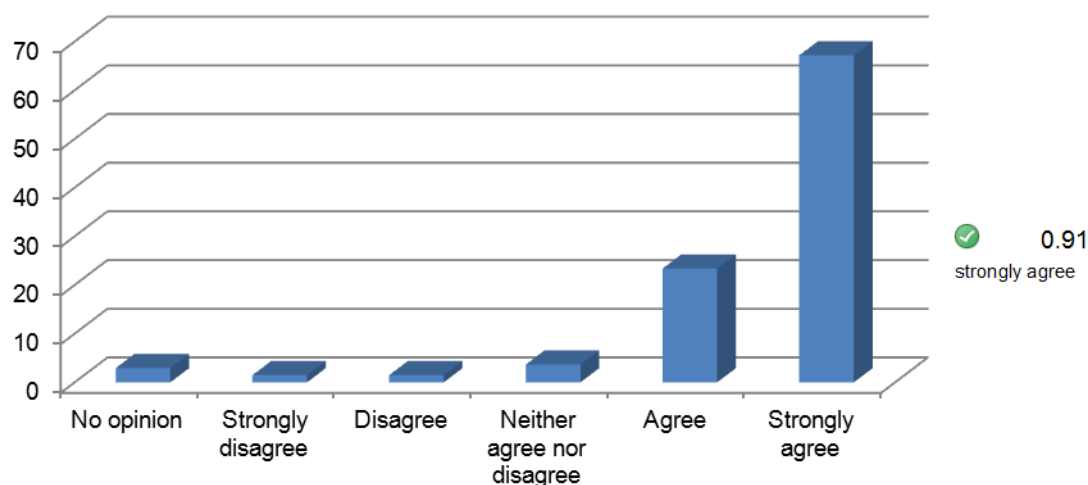


Figure 4-53 shows that there is not a big difference in the agreement among different roles. However, more respondents affiliated to parking operators and local government only agree that parking policy plays an important role when it comes to the reduction of urban traffic while more respondents affiliated to consultancies and government and decentralized government do strongly agree.

**Figure 4-53: General importance of parking policy, results for all respondents**
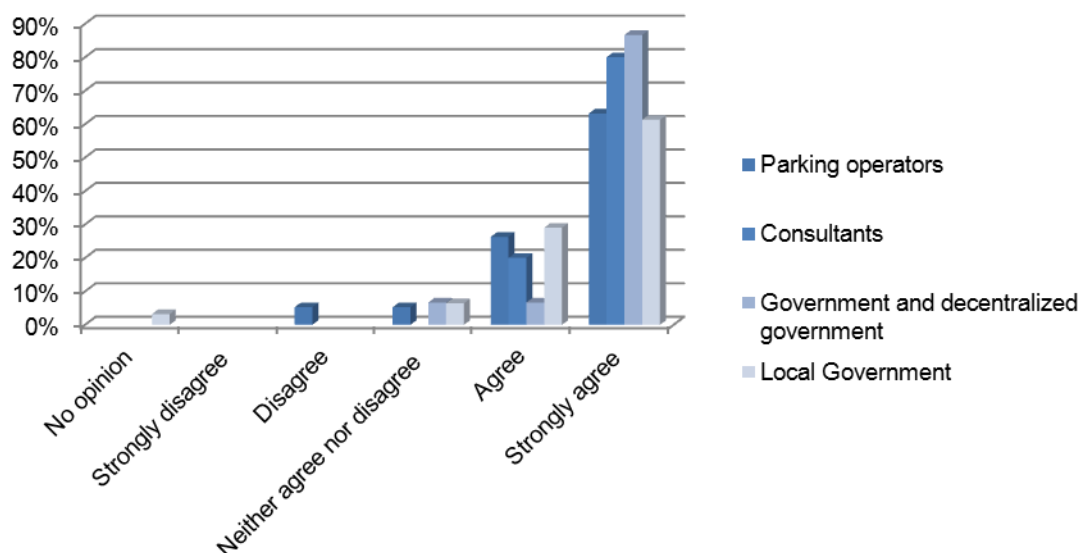
**Figure 4-54: General importance of parking policy, sCns values differentiated by role**

| Role | | sCns* |
| --- | --- | --- |
| Parking operators | ⚠ | 0.89 |
| Total sample | ✅ | 0.91 |
| Local government | ✅ | 0.92 |
| Government and decentralized government | ✅ | 0.96 |
| Consultants | ✅ | 0.96 |

*Tested against mean strongly agree

This is also reflected in the strength of consensus shown in Figure 4-54. Parking operators do have the weakest consensus on the importance of parking policy while consultants, government and decentralized government and local government all do have a strong consensus on the importance of parking policy for the reduction of urban traffic. Among all categories, the influence on parking policy on urban traffic is not doubted.

## 4.6 Revenue generation and allocation

### 4.6.1 Revenue generation

The majority of respondents (82.5%) agree that it is acceptable to use parking policy to generate financial sources for the city. A minority (8%) disagrees and 7.3% do neither agree nor disagree.

Thus, among all respondents there is a weak consensus (0.83) that it is acceptable to use parking policy to generate financial sources for the city.

**Figure 4-55: Revenue generation, results for all respondents**



⚠ 0.83
strongly agree
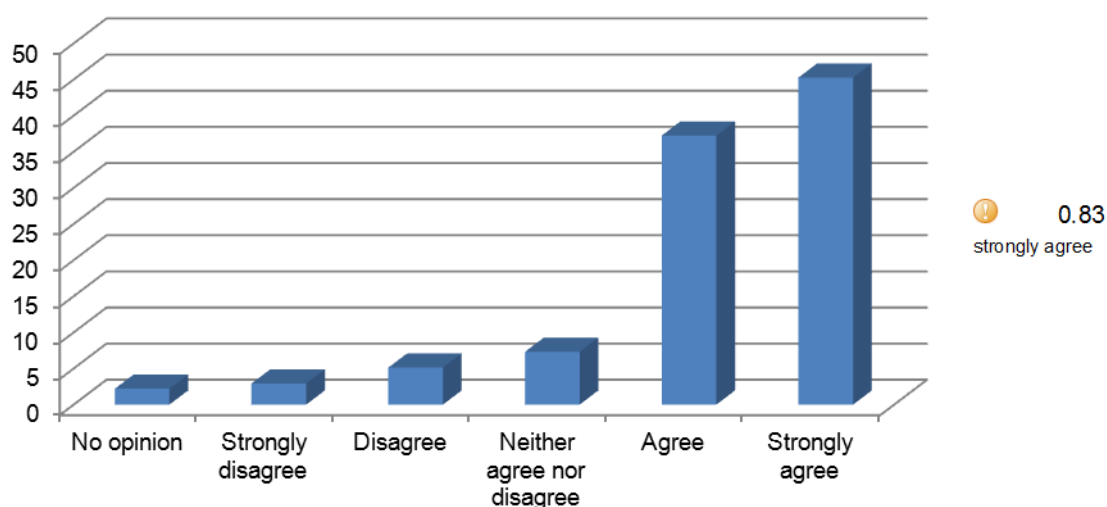
**Figure 4-56: Revenue generation, results differentiated by role**
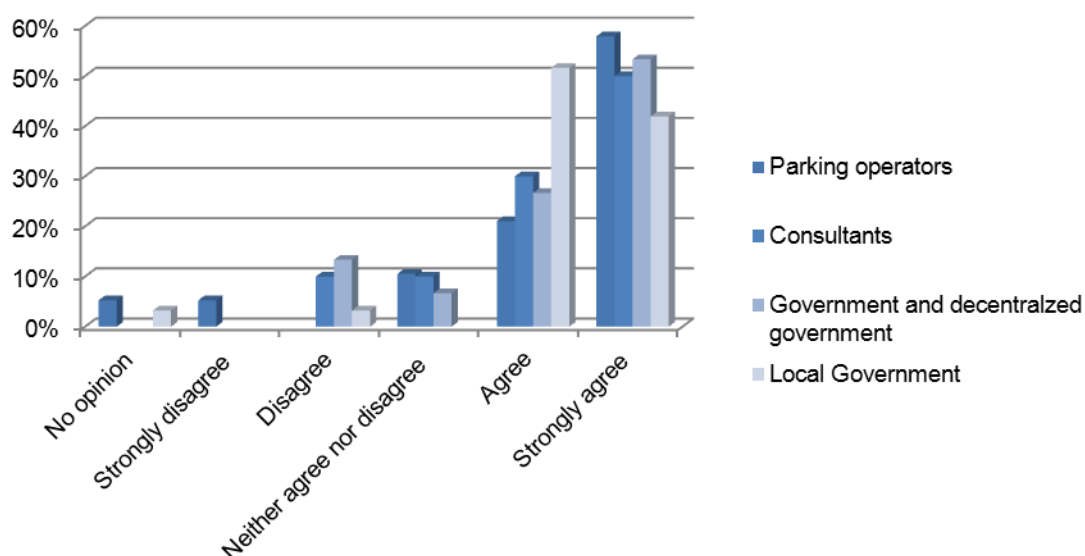


Figure 4-55 shows that there are only small differences in the answer among respondents. However, respondents belonging to local government do have a much higher percentage of people only agreeing while respondents affiliated to parking operators, consultants, government and decentralized government do have higher frequency of answering strongly agree.

**Figure 4-57: Revenue generation, sCns value differentiated by role**

| Role | sCns* | |
|------|-------|---|
| Total sample | ⚠ | 0.83 |
| Government and decentralized government | ⚠ | 0.83 |
| Consultants | ⚠ | 0.83 |
| Parking operators | ⚠ | 0.86 |
| Local government | ⚠ | 0.88 |

*Tested against mean strongly agree

However, as the strength of consensus value in Figure 4-57 shows that the lower frequencies of respondents belonging to local government answering strongly agree is compensated by a lower frequency of disagreement. The difference between the lowest and the highest is not more than 0.5.

This shows that among all respondents there is a weak consensus that it is legitimate for parking policy to generate revenue for the city. Figure 4-58 shows that the distribution of revenues is more controversial:

**Figure 4-58: Revenue allocation, results for all respondents**
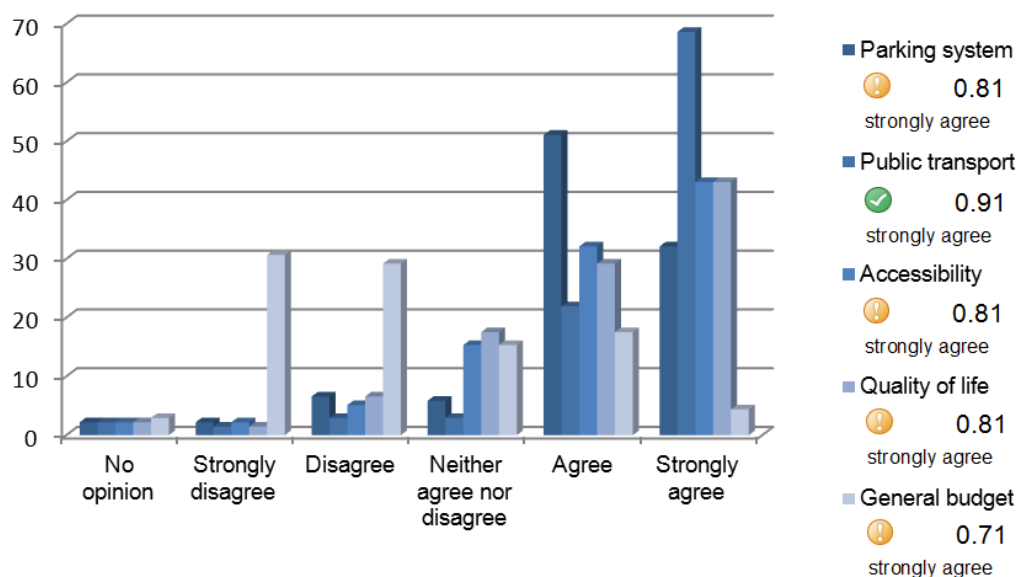


Among all respondents the allocation of parking revenues to the general budget is not an option. However, it is also the most controversial topic which indicates the lowest sCns value (0.71). The majority of respondents (59.9%) do not agree that parking revenues should be allocated to the general budget, although there is a strong minority (21.9%) that agrees on the allocation of parking revenues to the general budget.

Less controversial and more accepted is the allocation of revenues from parking to the improvement of the parking system, the improvement of the accessibility of the city and to the improvement of the quality of life within the city. The agreement on these allocation possibilities is rather equally distributed, as Figure 4-58 shows. The majority of respondents, around 75% either agrees or strongly that parking revenues should be allocated to these categories while a minority, around 8%, either disagrees or strongly disagrees. This is finally reflected by a weak consensus of 0.81 for all categories. Therefore, respondents rather agree that revenues from parking policy should be allocated to improve the parking system, to improve the accessibility and to improve the quality of live.

The highest acceptance level has the allocation of parking revenues to improve the public transport system. The waste majority of respondents (90.5%) either agrees or strongly agrees that parking revenues should be invested in public transport. Only a small minority (4.4%) disagrees while also a few people neither agree nor disagree (2.9%). Therefore, a strong consensus results that revenues from parking policy should be allocated to the improvement of public transport.

### a) Parking system

**Figure 4-59: Revenue generation for parking system, results differentiated by role**
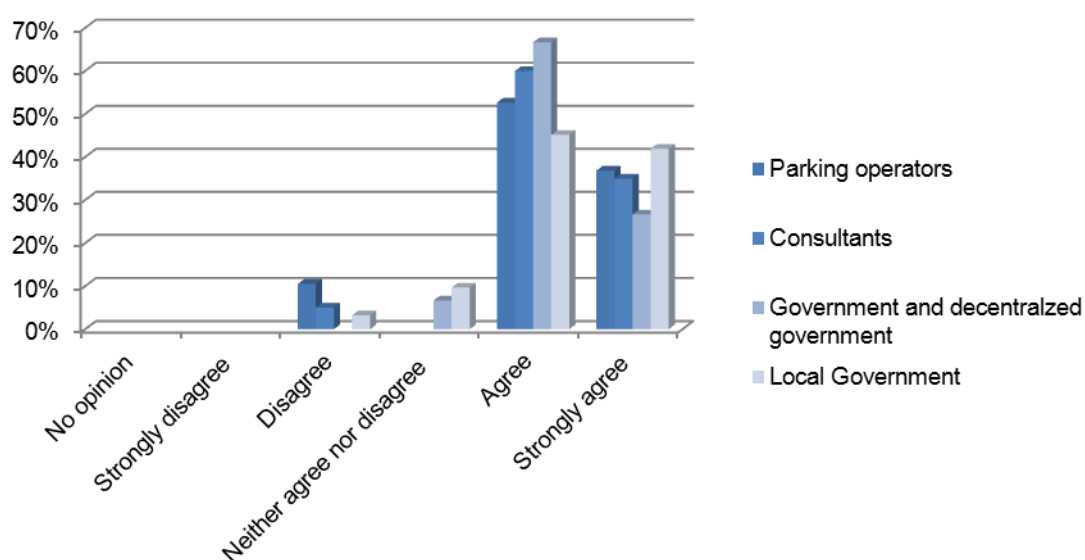


**Figure 4-60: Revenue generation for parking system, sCns value differentiated by role**

| Role | sCns* | |
|------|:---:|---|
| Total sample | ⚠ | 0.81 |
| Parking operators | ⚠ | 0.83 |
| Government and decentralized government | ⚠ | 0.84 |
| Consultants | ⚠ | 0.85 |
| Local government | ⚠ | 0.85 |

*Tested against mean strongly agree

Figure 4-60 shows that respondents affiliated to parking operators, consultants, government and decentralized government and local government do agree with each other. The answers by respondents are distributed almost equally, as Figure 4-59 shows. The only differene visible is that respondents affiliated to parking operators have the highest number of respondents disagreeing (10.5%). Nevertheless, the sCns values differ not more than 0.4, which makes interpretations of any differences difficult.

### b) Public Transport

**Figure 4-61: Revenue generation for public transport, results differentiated by role**
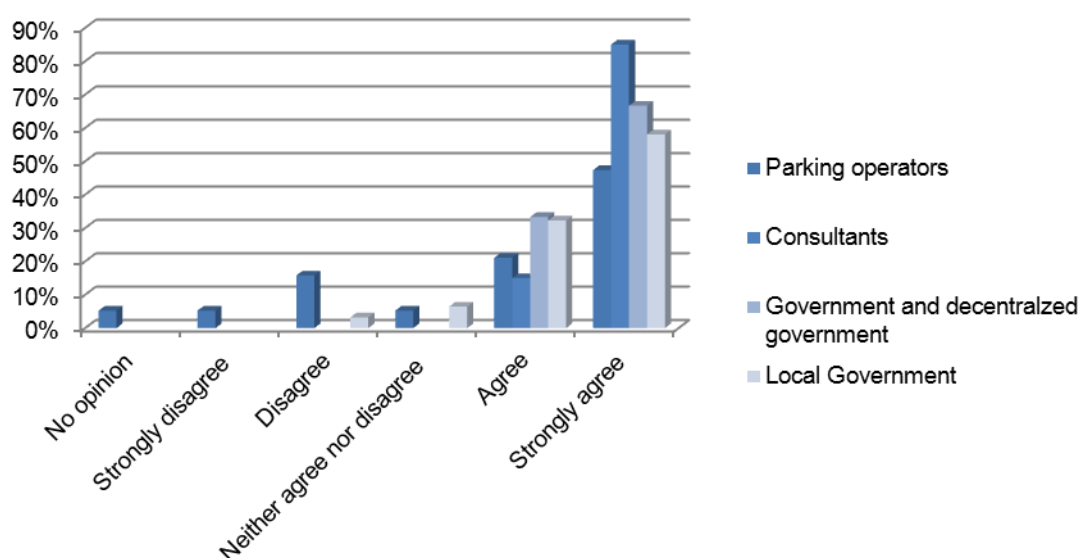


**Figure 4-62: Revenue generation for public transport, sCns value differentiated by role**

| Role | | sCns* |
|------|--|-------|
| Parking operators | ⚠ | 0.78 |
| Local government | ⚠ | 0.89 |
| Government and decentralized government | ✓ | 0.94 |
| Total sample | ✓ | 0.91 |
| Consultants | ✓ | 0.97 |

*Tested against mean strongly agree

Even if the the consensus among all respondents is the strongest the sCns values differenciated by role differs significantly between the different roles. Parking operators have the highest number of respondents disagreeing on allocation revenue to improve the public transport system. Thus, the sCns is the weakest. Local government do have a high sahre of respondents neither agreeing nor disagreeeing which results in a strength of consensus value just below the strong consensus. Government and dencetralized government as well as consultants do have a strong conensus that money rosen from public transport policy should be invested in the improvement of public transport. The strongest consensus have consultants. Almost 100% of all consultants agree that parking revenue should be allocated to improve the public transport system.

## c) Accessibility

**Figure 4-63: Revenue generation to improve accessibility, results differentiated by role**
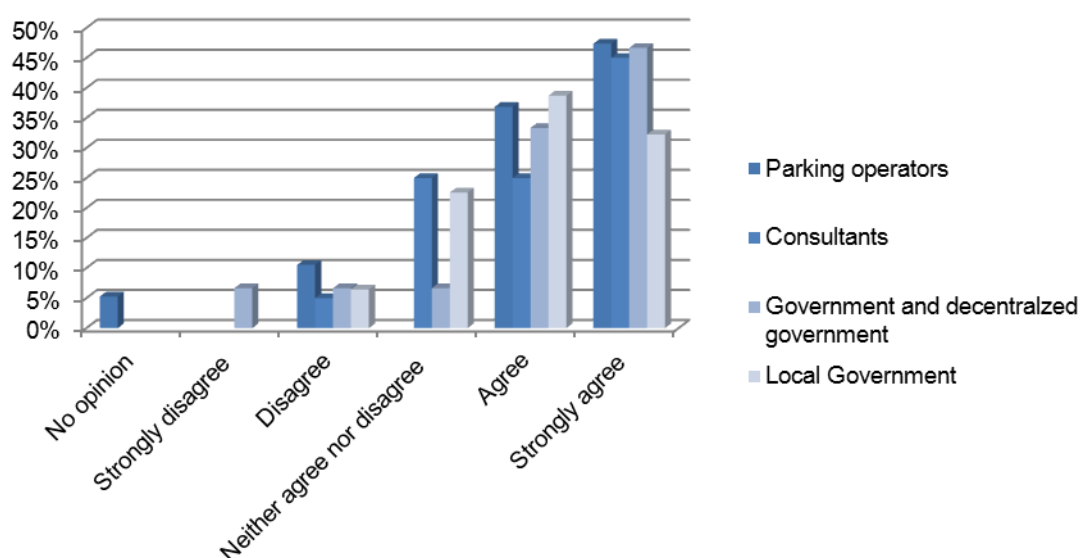


**Figure 4-64: Revenue generation to improve accessibility, sCns value differentiated by role**

| Role | | sCns* |
|------|---|-------|
| Local government | ⚠ | 0.79 |
| Government and decentralized government | ⚠ | 0.80 |
| Consultants | ⚠ | 0.81 |
| Total sample | ⚠ | 0.81 |
| Parking operators | ⚠ | 0.86 |

*Tested against mean strongly agree

Figure 4-63 show that local government, government and decentralized government do have a similar answer pattern resulting in a weak consensus around 0.8 (c.f. Figure 4-64) which is almost the strength of consensus as calculated among all respondents. Only parking operators do have a stronger consensus (0.85) than the other roles. The stronger consensus is mainly caused by less respondents strongly disagreeing and less respondents neither agreeing nor disagreeing.

**d) Quality of life**

**Figure 4-65: Revenue allocation to improve quality of life, results differentiated by role**
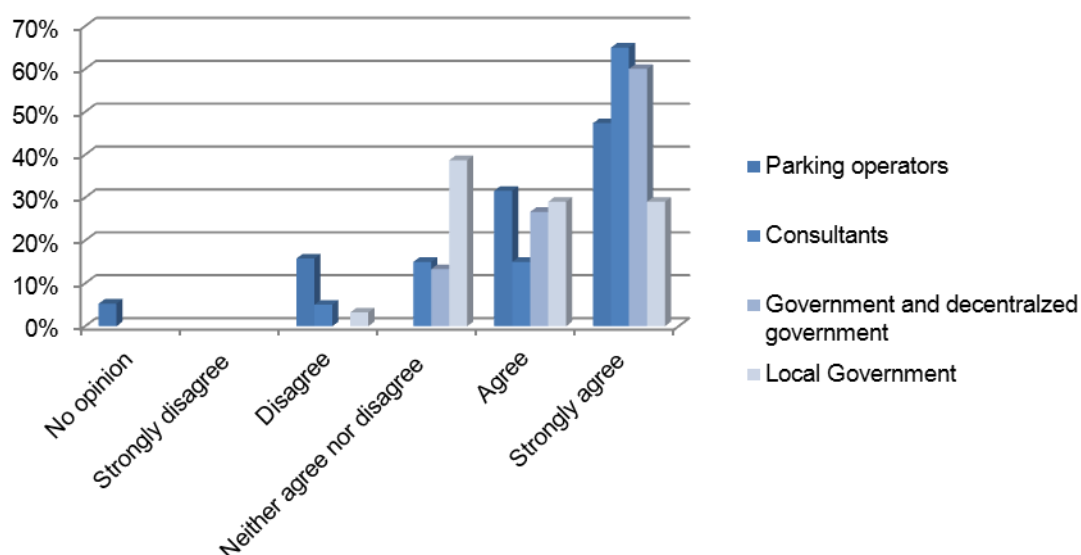


**Figure 4-66: Revenue generation to improve quality of life, sCns value differentiated by role**

| Role | | sCns* |
|---|---|---|
| Local government | 🟠 | 0.76 |
| Parking operators | 🟠 | 0.83 |
| Consultants | 🟠 | 0.87 |
| Total sample | 🟠 | 0.81 |
| Government and decentralized government | 🟠 | 0.89 |

*Tested against mean strongly agree

The strength of consensus over all respondents is 0.81. Respondents affiliated to local gov-ernment do have a weaker consensus than the other roles. Figure 4-65 shows that this is mainly caused by a higher amount of respondents neither agreeing nor disagreeing. Respondents affiliated to local governments are with 38.7% the most undecided.

Consultants and government and decentralized government do have the strongest consensus on using the revenues from parking policy to improve the quality of life within the city. Parking operators do have a sCns close to the sCns over all respondents.

**e) General Budget**

As already mentioned the allocation of parking revenues to the general budget is the most controversial. This is also reflected in the answers differentiated by respondents.

Local governments do have the strongest consensus on disagreeing to use revenues for the general budget. Consultants and government and decentralized government do have the weakest consensus.

**Figure 4-67: Revenue generation for the general budget, results differentiated by role**
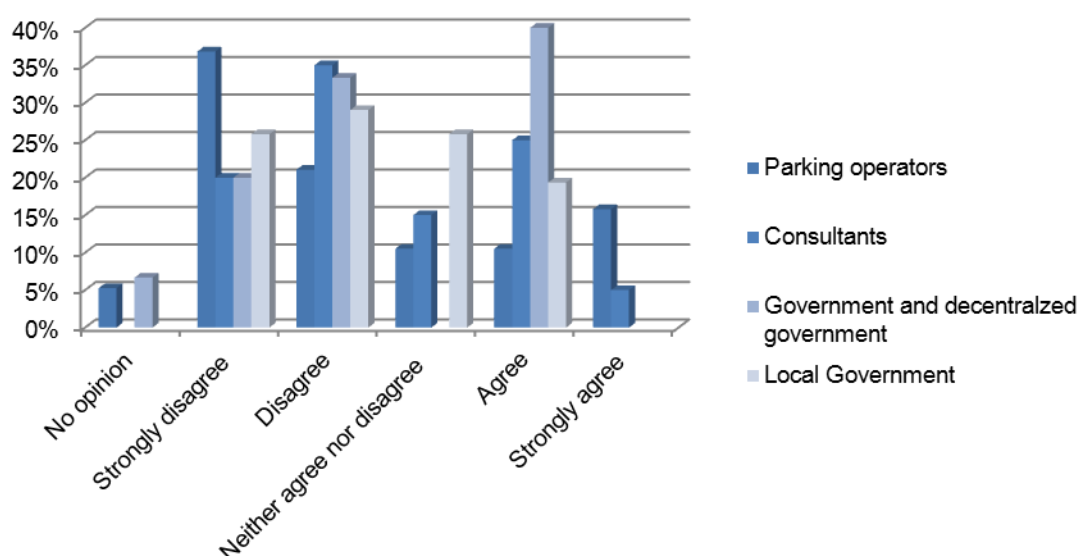


**Figure 4-68: Revenue generation for the general budget, sCns value differentiated by role**

| Role | | sCns* |
|------|---|-------|
| Consultants | ⊗ | 0.65 |
| Government and decentralized government | ⊗ | 0.66 |
| Parking operators | ⊗ | 0.69 |
| Total sample | ⚠ | 0.71 |
| Local government | ⚠ | 0.71 |

*Tested against mean strongly disagree

These results shows that respondents from all roles except parking operators prefer to allocate revenues from parking policy to the improvement of public transport as a first priority. Only parking operators prefer to improve the general accessibility of the city as a first priority. For all respondents allocation to the general budget is no option. Local government even have a weak consensus, all other respondents do not have a consensus on transferring parking revenue to the public budget.

## 4.7    Limited space for parking

### 4.7.1    Limited space for parking in residential areas

**Figure 4-69: Limited space for parking, results for all respondents**
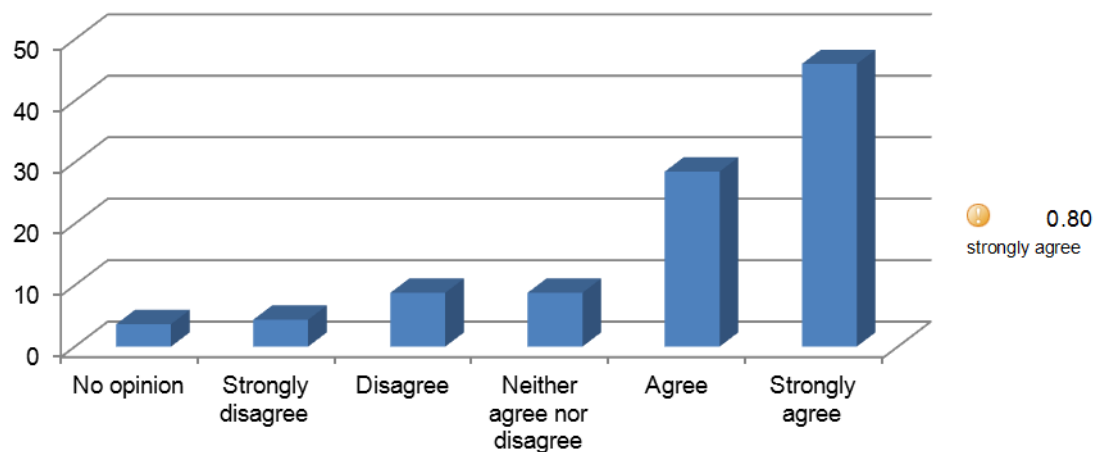


The majority of respondents (74.5%) either agrees or strongly agrees that one of the most important challenges within parking policy is to convince people that parking in front of the door won't be possible in the future. A minority (13.1%) either disagrees or strongly disagrees. 8.8 % of all respondents do neither agree nor disagree. This results in (0.80) a weak consensus among all respondents. Therefore, it can be concluded that the total of respondents rather agree that in future (or may even already now) there will be not enough space for every car to park in front of the own residence.

**Figure 4-70: Limited availability of space, results differentiated by role**
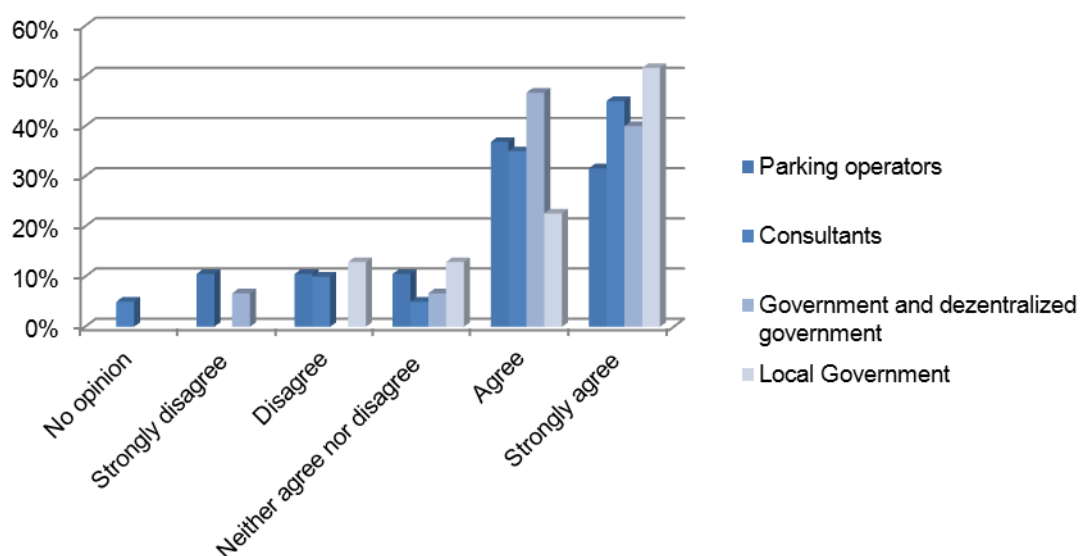


**Figure 4-71: Limited availability of space, sCns value differentiated by role**

| Role | sCns |
|------|------|
| Parking operators | ⚠ 0.71 |
| Consultants | ⚠ 0.84 |
| Government and decentralized government | ⚠ 0.82 |
| Total sample | ⚠ 0.80 |
| Local government | ⚠ 0.82 |

*Tested against mean strongly agree

As Figure 4-71 shows, parking operators (0.71) have a much weaker consensus than the other roles. This is mainly due to a higher numbers of respondents affiliated to parking operators that are strongly disagreeing with the statement (Figure 4-73). Consultants, government and decentralized government and local government also have a weak consensus which lies around the strength of consensus over all respondents (0.80).

### 4.7.2   Priority for parking

The previous chapter showed that there is a weak consensus that there is a lack of space for parking in future. However, as Figure 4-72 shows it is much more controversial what kind of vehicles should have priority for parking.

**Figure 4-72: Priority for parking, results for all respondents**
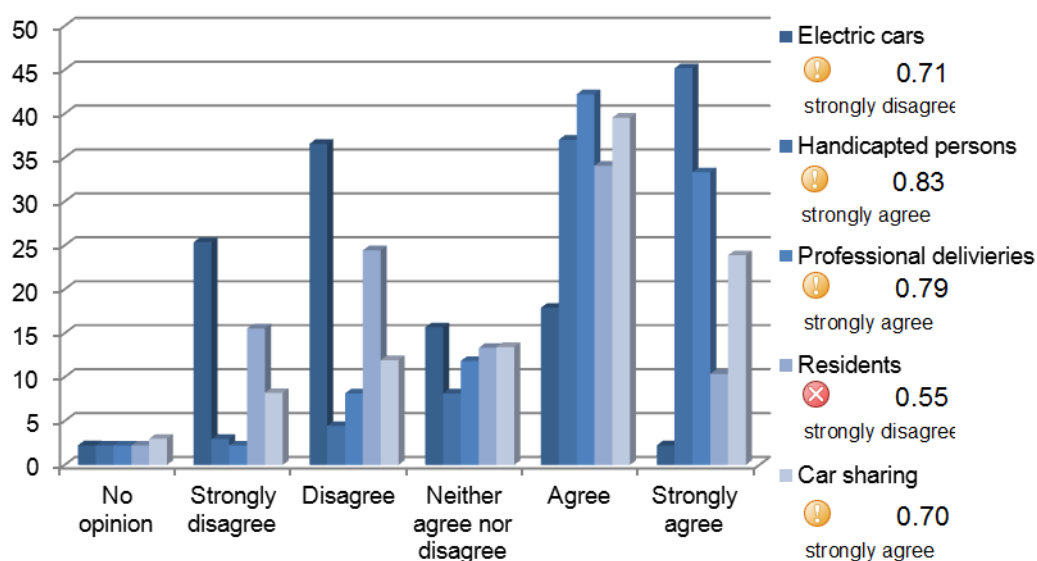


There is no acceptance among respondents that electric cars should be prioritized. The majority of respondents (61.9%) do not agree that electric cars should be prioritized in parking. A minority of respondents (20.1) agrees on prioritizing electric cars. 15.7% of all respondents are undecided. This is reflected by a weak consensus of 0.71 that electric cars should not be prioritized.

The majority of respondents (82.2%) agree that handicapped persons should be prioritized in parking. A small minority of respondents disagrees (7.4%) and another small minority is undecided (8.1%). The sCns value is 0.83 which reflects a weak consensus among respondents that handicapped persons should be prioritized.

The majority of respondents (75.6%) also agree that professional deliveries such as artisans, doctors and home care should be prioritized. A minority (10.4%) disagrees and 11.9% are undecided. This is reflected by weak consensus (0.79).

44.4% of respondents either agree or strongly agree that residents should be prioritized in urban parking while 40% either disagree or strongly disagree. 13.3% are undecided which is marginally more than for other user types (electric cars, handicapped persons and others). Obviously there is no consensus among respondents which is also confirmed by a low consensus value of 0.55 that residents should not be prioritized.

Priority for parking for car sharing vehicles has more acceptances. The majority of respondents (63.4%) either agrees or strongly agrees that car sharing vehicles should be prioritized. A minority (20.1%) of respondent's disagrees. 13.4% are do neither agree nor disagree. Consequently, there is a thin consensus (0.70) among respondents that parking should be prioritized for vehicles.

In conclusion, respondents do have the highest consensus – although it is still a weak one – on prioritizing parking for handicapped persons, followed by professional deliveries and car

sharing vehicles. Respondents do not have a consensus whether parking for residents should be prioritized or not and a weak consensus that parking for electric cars should not be prioritized.

## a) Electric cars

**Figure 4-73: Priority for electric cars, results differentiated by role**
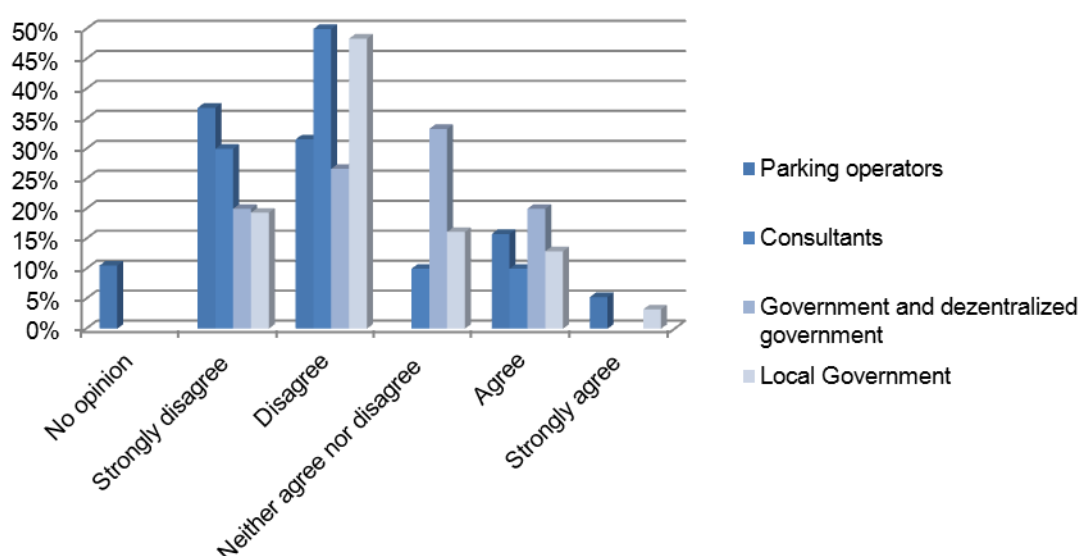


**Figure 4-74: Priority for electric cars, results differentiated by role**

| Role | sCns* | |
|---|---|---|
| Government and decentralized government | ⊗ | 0.67 |
| Total sample | ⚠ | 0.71 |
| Local government | ⚠ | 0.72 |
| Parking operators | ⚠ | 0.78 |
| Consultants | ⚠ | 0.79 |

*Tested against mean strongly disagree

The results differentiated by role show that not all roles disagree to the same extent that electric cars should be prioritized for parking. While governments and decentralized governments do not have a consensus on disagreeing, parking operators and consultants do have the strongest consensus, although it is still a weak one. Figure 4-73 shows that government and decentralized government have the lowest number of respondents disagreeing or strongly disagreeing that parking for electric cars should be prioritized.

## b) Handicapped

**Figure 4-75: Priority for handicapped, sCns value differentiated by role**

| Role | | sCns* |
|------|---|-------|
| Local government | ⚠ | 0.78 |
| Parking operators | ⚠ | 0.80 |
| Total sample | ⚠ | 0.83 |
| Consultants | ⚠ | 0.84 |
| Government and decentralized government | ✅ | 0.94 |

*Tested against mean strongly agree

**Figure 4-76: Priority for handicapped, results differentiated by role**
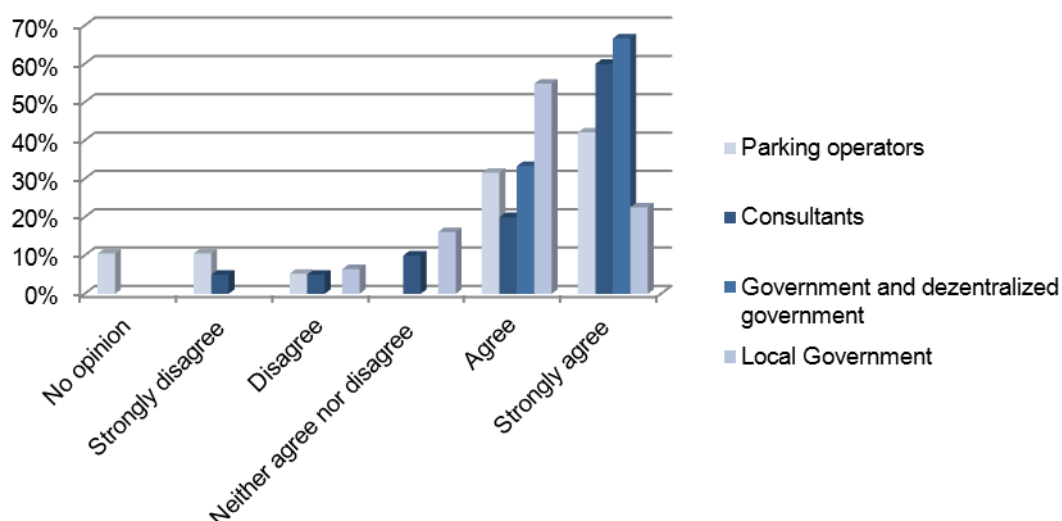


For government and decentralized governments it is unquestioned that parking for handicapped persons should be prioritized. These respondents do have a strong consensus (0.94) on this issue while local governments, parking operators, and local governments do have a weak consensus lying within 0.5 of the consensus of all respondents.

### c) Professional deliveries

**Figure 4-77: Priority for professional deliveries, results differentiated by role**
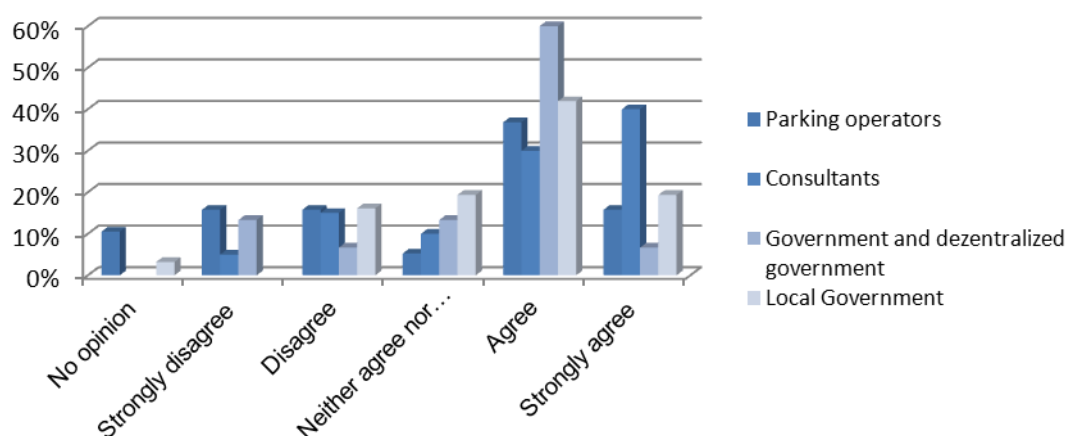


**Figure 4-78: Priority for professional deliveries, sCns values differentiated by role**

| Role | sCns* | |
|------|:---:|---|
| Local government | ⚠ | 0.72 |
| Parking operators | ⚠ | 0.77 |
| Total sample | ⚠ | 0.79 |
| Consultants | ⚠ | 0.80 |
| Government and decentralized government | ⚠ | 0.87 |

*Tested against mean strongly agree

Government and decentralized government do have a stronger consensus (0.87) than the total of respondents and the other roles analysed. However, local governments do have a much lower consensus, although both are still weak consensuses parking operators and consultants do have strength of consensus lying within 0.5 of the strength of consensus calculated for all respondents.

### d) Residents

**Figure 4-79: Priority for residents, sCns values differentiated by role**

| Role | sCns* | |
|------|:---:|---|
| Government and decentralized government | ✖ | 0.45 |
| Local government | ✖ | 0.46 |
| Total sample | ✖ | 0.55 |
| Consultants | ✖ | 0.64 |
| Parking operators | ⚠ | 0.72 |

*Tested against mean strongly disagree

**Figure 4-80: Priority for residents, results differentiated by role**
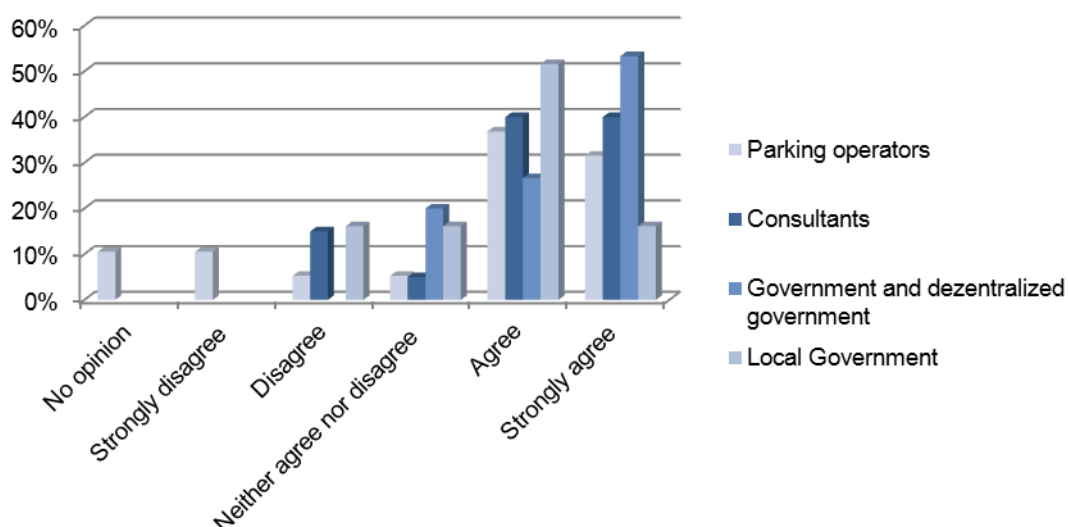


The fact that there is no consensus among respondents on prioritizing parking for residents is also reflected by the results differentiated by role in Figure 4-79. Parking operators and consultants do have the lowest consensus of 0.45 respectively 0.47. The value below 0.50 is due to the fact that the majority of parking operators (52.6%) and the majority of consultants (50%) disagree that residential parking should be prioritized while only a minority 31.6% respectively 30% agree. Local governments and government and decentralized government also do not have a consensus on this issues. However, sCns values of 0.65 imply that the majority of respondents belonging to government either agreed or strongly agreed that residential parking should be prioritized. As shown in Figure 4-80, 58.1% respondents affiliated to local government and 60% of respondents affiliated to government and decentralized government agree that residential parking should be prioritized. Nevertheless, there is still a large share of respondents disagreeing so that there is no consensus resulting.

**e) Car sharing**

**Figure 4-81: Priority for car sharing, sCns value differentiated by role**

| Role | | sCns* |
|------|---|-------|
| Parking operators | ❌ | 0.64 |
| Government and decentralized government | ❌ | 0.65 |
| Total sample | ⚠ | 0.70 |
| Local government | ⚠ | 0.73 |
| Consultants | ⚠ | 0.75 |

*Tested against mean strongly agree

**Figure 4-82: Priority for car sharing, results differentiated by role**
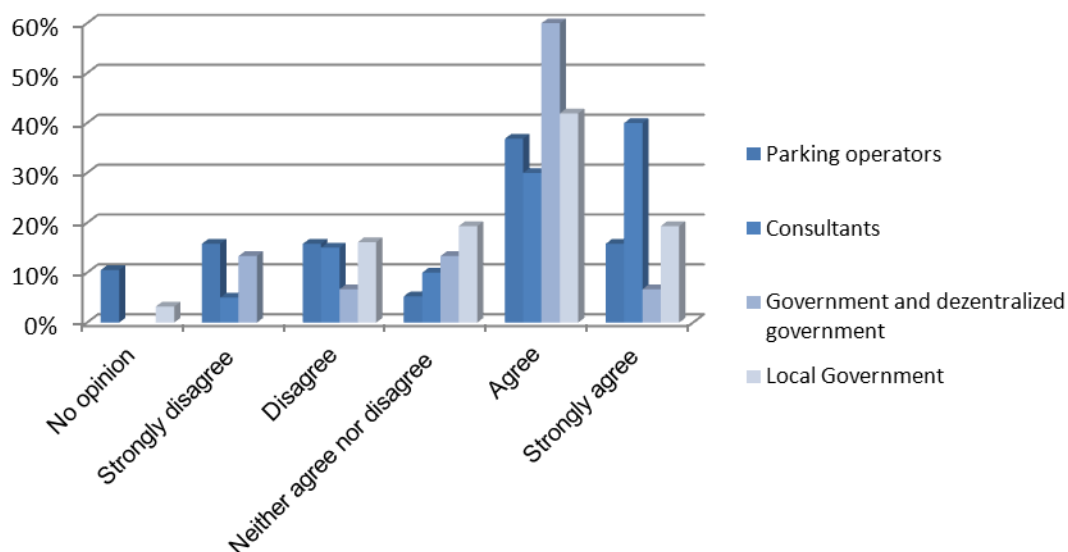


Consultants and local government employees do have the highest share of respondents (70%;61.3%) agreeing that parking should be prioritized for car sharing vehicles. This results in the strongest consensus, although it is still a weak one. Parking operators and government and decentralized government do not have a consensus on this issue, although there is a majority of respondents agreeing.

In conclusion priority of electric cars is for all roles not an option. More controversial is the prioritizing for residential parking. Government and decentralized government, as well as local government do have a higher number of respondents agreeing or strongly agreeing that parking should be prioritized. Nevertheless, among all roles there is no consensus resulting and over all roles respondents are rather against the parking priority for residents. Priority for handicapped persons is unquestioned with a weak consensus over all respondents. Also priority for special professional deliveries is not at question.

## 4.8    Data Availability

**Figure 4-83: Data availability, results for all respondents**
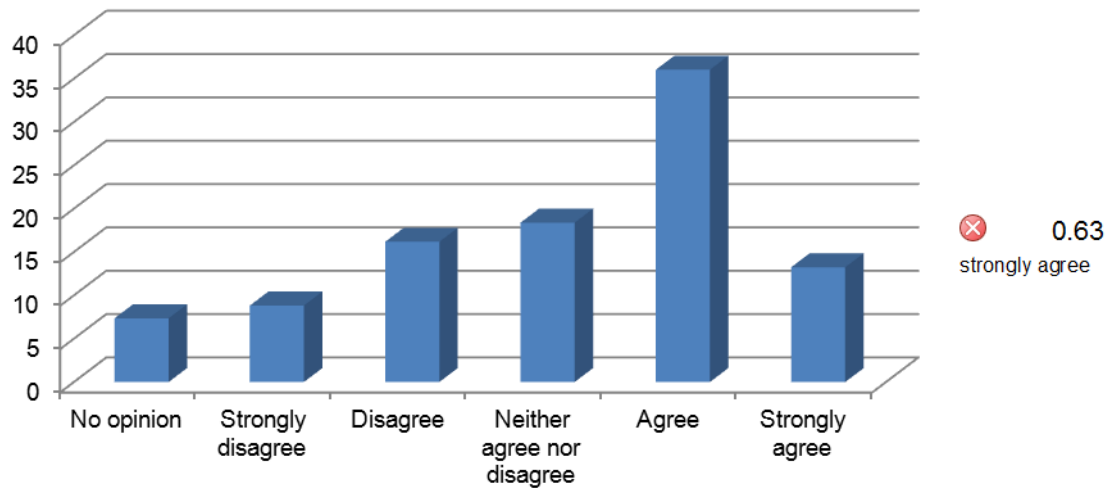


Figure 4-83 shows that there are slightly less than 50% of respondents agreeing that the lack of data is a problem for the definition of parking policy while 26% of all respondents disagree. 18.4% neither agrees nor disagrees which is a high value of undecided respondents.

The strength of consensus values shows that there is no consensus among respondents if the lack of data is a problem for the definition of parking policy.

**Figure 4-84: Data availability, results differentiated by role**
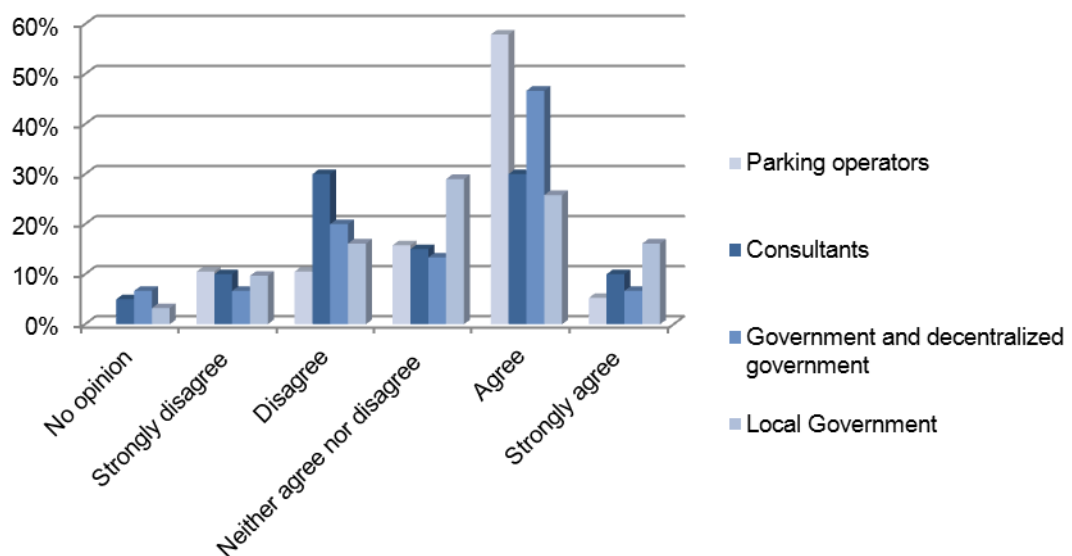
**Figure 4-85: Data availability, results differentiated by role**

| Role | | sCns* |
|------|---|-------|
| Parking operators | ⊗ | 0.65 |
| Consultants | ⊗ | 0.58 |
| Government and decentralized government | ⊗ | 0.65 |
| Total sample | ⊗ | 0.63 |
| Local government | ⊗ | 0.62 |

*Tested against mean strongly agree

The strength of consensus among all respondents lies within the 0.5 of the strength of consensus among all respondents. However, Figure 4-85 shows that respondents affiliated to parking operators and government and decentralized governments have a higher frequency of agreeing that the absence of data is a problem and a smaller frequency of respondents disagreeing.

## 4.9 Future of parking facilities

**Figure 4-86: Parking facilities, results for all respondents**
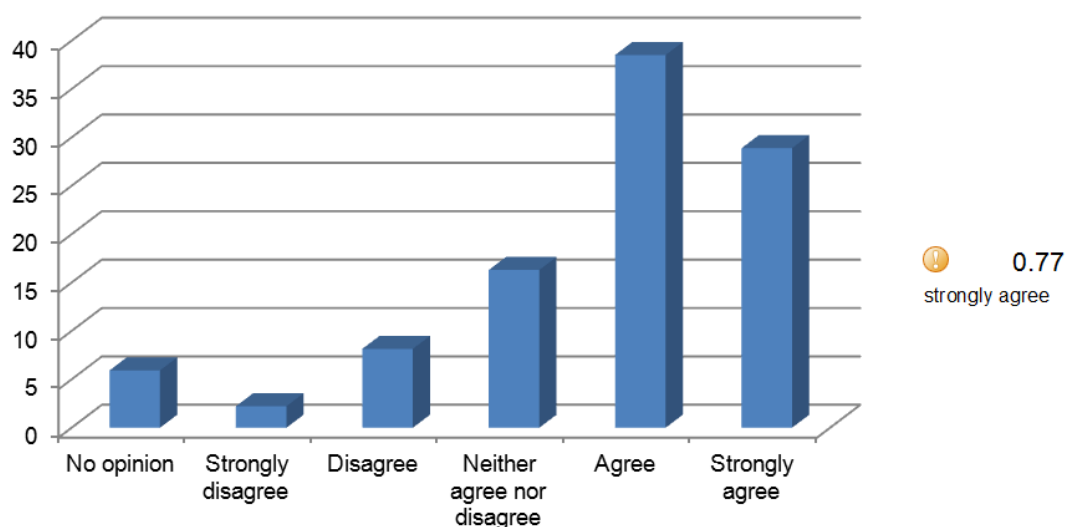


Figure 4-86 shows that the majority (67.4%) of respondents either agree or strongly agree that the parking facilities will evolve in the future in to mobility platforms and service centres. A minority of respondents (10.3%) either disagrees or strongly disagrees 16.3% are undecided and 5.9% do not have an opinion. This are quite high values and responsible for the weak consensus (0.77).

**Figure 4-87: Parking facilities, sCns value differentiated by role**

| Role | | sCns* |
|------|------|------|
| Local government | ⚠ | 0.76 |
| Parking operators | ⚠ | 0.77 |
| Consultants | ⚠ | 0.79 |
| Total sample | ⚠ | 0.77 |
| Government and decentralized government | ⚠ | 0.82 |

*Tested against mean strongly agree

**Figure 4-88: Parking facilities, results differentiated by role**
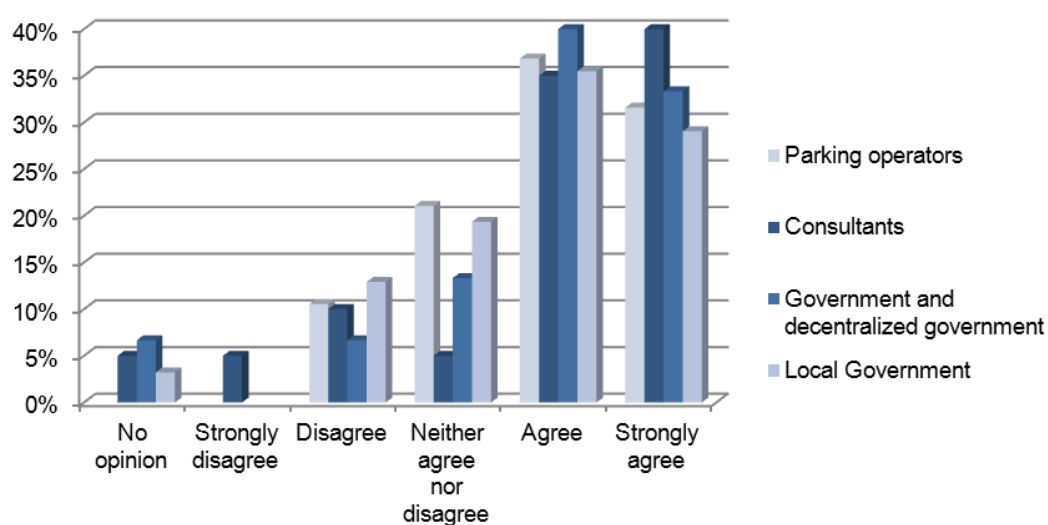


Looking at the results by branch shows that there are is not a big difference in the answer patterns of different roles. The strength of consensus values all lie within 0.05 of the strength of consensus among all respondents. Figure 4-88 shows that consultants do have the most pronounced results and the smallest number of respondents neither agreeing nor disagreeing. Further, no respondents affiliated to government and decentralized government strongly disagree which explains the rather stronger sCns of 0.82 that parking facilities will evolve in full service centres.

## 4.10    Perception of the definition of parking policy

**Figure 4-89: Parking policy, results for all respondents**
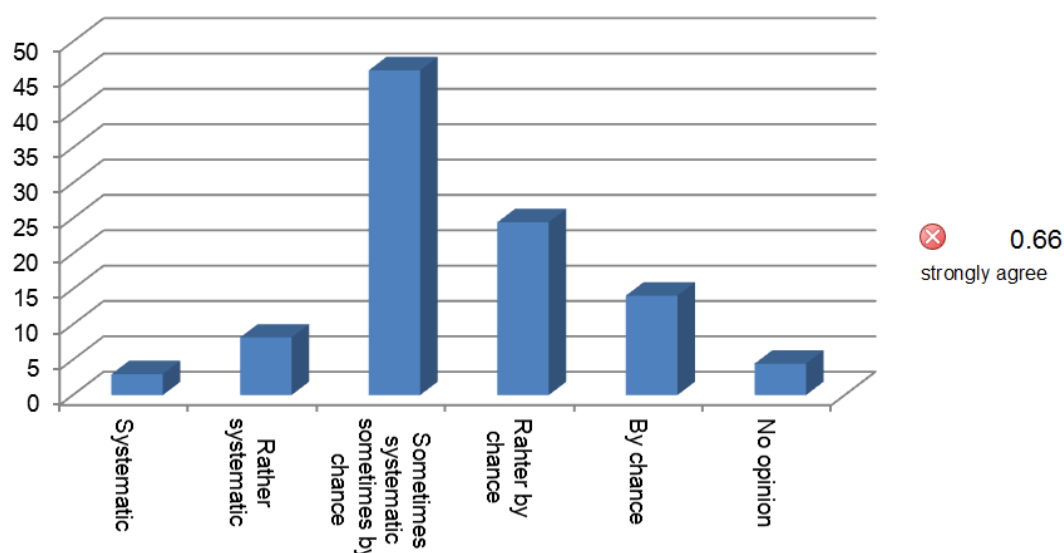


Figure 4-86 shows that most of respondents (45.9%) judge parking policy to be sometimes systematic and sometimes by chance. The second most frequent respondents perceive parking policy to be rather by chance and the third frequent respondents perceive parking policy to be by chance. Only a minority judge parking policy systematic or rather systematic. However, there is no consensus resulting that parking policy is only by chance. Furthermore, respondents seem to agree that parking policy is sometime systematic and a little bit more often change but more rather by chance.

**Figure 4-90: Parking policy, sCns value differentiated by role**

| Role | | sCns |
|------|---|------|
| Parking operators | ⊗ | 0.67 |
| Local government | ⊗ | 0.67 |
| Consultants | ⊗ | 0.69 |
| Total sample | ⊗ | 0.66 |
| Government and decentralized government | ⚠ | 0.72 |

*Tested against mean systematic

**Figure 4-91: Parking policy, results differentiated by role**
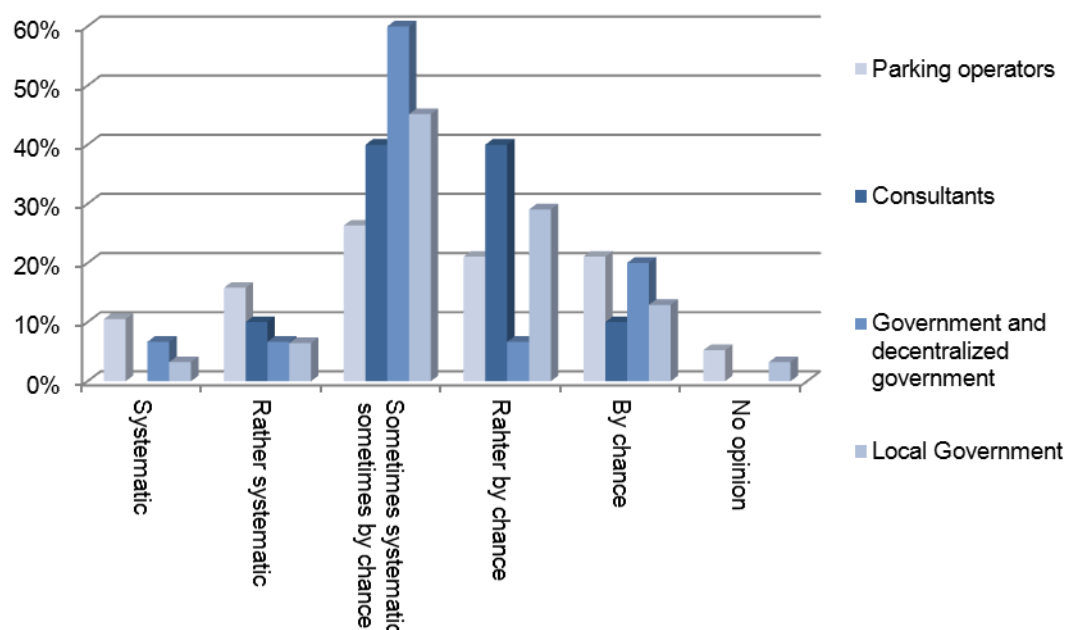


The results differentiated by role do not show clear differences between responses from different roles. The strength of consensus values all lie within 0.05 around the strength of consensus of the total set. The distribution of respondents as shown in the Likert scale above shows some pronounced differences. On one hand governments and decentralised governments do have the highest share of respondents answering that parking policy is sometimes systematic and sometimes by chance. On the other hand consultants have the highest proportion of respondents perceiving parking policy to be rather by chance.

## 4.11    Differences between the Dutch and the French survey

### a) The Dutch and the French Data set

The Dutch survey was filled completely by 154 respondents which are slightly more (21) respondents than in the French survey.

The role within the parking world of the respondents participating in the survey is not equal in the French and the Dutch survey. Although, a slightly different categorization had been chosen for the French survey, the main categories remained the same. Figure 4-92 show the difference between the Dutch survey (left) and the French survey (right). In the Netherlands over 56% of respondents participating belong to the local government. In France the categories are more equally distributed only 23% belong to the local government. The proportion of respondents belonging to a consultancy is in the Netherlands (18%) and in France (15%) almost the same. Parking operators are with 14% of all respondents better represented in the French survey than in the Dutch survey (6%). The high amount of respondents belonging to

the category others (17%) indicates that the access to the survey was less target oriented distributed in the French than in the Dutch survey with only 1% respondents belonging to the category others. Only a marginal proportion of respondents belong to the other categories. Therefore, the French and the Dutch survey are only compared against the difference between consultants and local government. By using only this categories it can be guaranteed that in France, as well as in the Netherlands one category consist out of at least 20 respondents.

**Figure 4-92: Respondent's role within the parking world in the Dutch (left) and the French survey (right)**
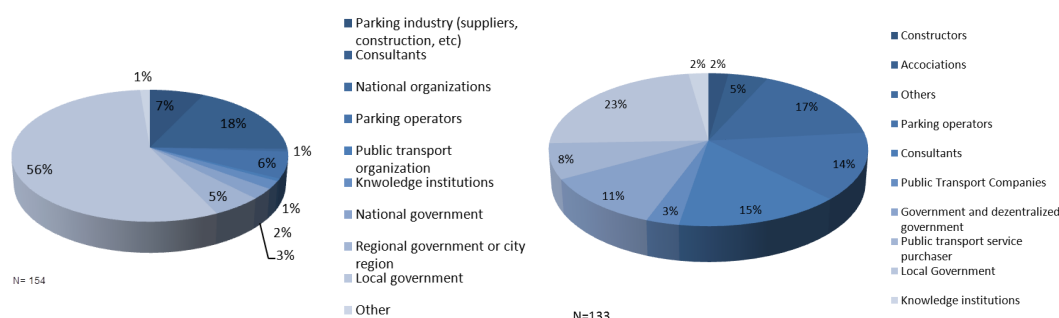


**b) Parking pricing**

**Figure 4-93: sCns values for free parking**

| Within urban areas parking should be supplied free of charge to: | | sCns* NL | sCns* F |
|---|---|---|---|
| **Residents** | | | |
| | Local Government | ❌ 0.67 | 🟡 0.73 |
| | Consultants | 🟡 0.73 | ❌ 0.65 |
| **Visitors** | | | |
| | Local Government | 🟡 0.86 | 🟡 0.82 |
| | Consultants | 🟡 0.88 | ✅ 0.93 |
| **Commuters** | | | |
| | Local Government | 🟡 0.90 | ✅ 0.98 |
| | Consultants | ✅ 0.90 | 🟡 0.87 |

\* Tested against mean strongly disagree

Figure 4-93 shows the sCns values for free parking tested against the mean strongly disagree. In both countries respondents affiliated to consultancies as well as respondents affiliated to local government do have the strongest consensus that commuter parking should not be provided free of charge, the second strongest consensus that commuter parking should not be provided free of charge for visitors and the weakest consensus that parking should not be provide free of charge for residents. Interesting is that in the Netherlands the local government has no consensus on paid visitor parking while in France the local government does have a weak consensus that parking for visitors should not be supplied free of charge. Furthermore, consultants do have in France no consensus that parking should be supplied free

of charge, while in the Netherlands consultants have a weak consensus that parking for residents should not be provided free of charge.

**Figure 4-94: sCns values for parking price elasticity**

| A significant increase of parking fees does not result in a lower demand for parking for: | | sCns* NL | sCns* F |
|---|---|---|---|
| **Residents** | | | |
| | Local Government | ⊗ 0.39 | ⊗ 0.57 |
| | Consultants | ⊗ 0.37 | ⊗ 0.50 |
| **Visitors** | | | |
| | Local Government | ⊗ 0.52 | ⊗ 0.53 |
| | Consultants | ⊗ 0.43 | ⊗ 0.59 |
| **Commuters** | | | |
| | Local Government | ⊗ 0.62 | ⚠ 0.77 |
| | Consultants | ⚠ 0.73 | ⚠ 0.71 |

* Tested against mean strongly disagree

Figure 4-94 shows the sCns values for parking price elasticity for residents differ significantly between the Dutch survey and the French survey. In France the sCns values shows that there is no consensus among respondents that parking prices are inelastic. In the Netherlands the majority of respondents agree that that parking prices are inelastic for residents. The sCns values for visitors and consultants are almost equal. Except that in the Netherlands more consultants agree that parking fees are inelastic also for visitors while in France more consultants disagree that parking fees are inelastic for visitors. A further difference can be found in the French responses from respondents affiliate to local government. They do have a higher amount of respondents agreeing that parking fees for residents are inelastic. Nevertheless, it can be concluded that in both survey respondents expect that a change in parking prices has a higher impact on commuters than on residents.

**Figure 4-95: sCns values for knowledge about parking prices**

| Generally speaking people are aware of the price they pay for parking | | sCns* NL | sCns* F |
|---|---|---|---|
| | Local Government | ⊗ 0.61 | ⚠ 0.71 |
| | Consultants | ⊗ 0.70 | ⊗ 0.63 |

* Tested against mean strongly disagree

Figure 4-95 shows the sCns values for awareness of the parking prices in the Netherlands and in France. In both countries there is no consensus or only a weak consensus that people are aware of parking prices. French local governments even have a weak consensus that people are not aware of parking prices.

**Figure 4-96: sCns value for parking pricing according to the exact parking time**

| Within 5 years parking will only be charged based on the exact parking time and not per hour or other fixed time period anymore | | | | |
|---|---|---|---|---|
| | | sCns* NL | | sCns* F |
| Local Government | ⚠ | 0.71 | ⚠ | 0.81 |
| Consultants | ⚠ | 0.79 | ⚠ | 0.81 |

\* Tested against mean strongly agree

Figure 4-96 shows the sCns value for parking pricing according to the exact parking time. In both countries local government and consultants do have a weak consensus that parking will be priced in future according to the exact parking time. However, in the Netherlands local governments seems to be less convinced that parking will be charged according to the exact parking time, although there is still a weak consensus.

**Figure 4-97: sCns value for the availability of parking as an attraction factor for clients**

| For shopping areas with the urban area the availability of parking is an important attraction factor for customers | | | | |
|---|---|---|---|---|
| | | sCns* NL | | sCns* F |
| Local Government | ⚠ | 0.79 | ⚠ | 0.74 |
| Consultants | ❌ | 0.65 | ❌ | 0.60 |

\* Tested against mean strongly agree

Figure 4-97 show the sCns value for the availability of parking as an attraction factor. The results in France and the Netherlands are almost equal. In both countries respondents belonging to the local government do have a weak consensus that the availability of parking is an important location factor while consultants do not have a consensus that availability of parking is an important factor for the attractiveness.

**Figure 4-98: sCns values for the availability of parking is more important than the price**

| For shopping areas within the urban area the availability parking is an important attraction factor for customers | | | | |
|---|---|---|---|---|
| | | sCns* NL | | sCns* F |
| Local Government | ⚠ | 0.79 | ⚠ | 0.71 |
| Consultants | ⚠ | 0.81 | ❌ | 0.68 |

\* Tested against mean strongly agree

Figure 4-98 shows the sCns value for the statement that the availability of parking is more important than the price. In the Netherlands the consensus on the fact that the availability is more important than the price is stronger. Especially Dutch consultants do agree much stronger than the French consultants that the availability of parking is more important than the price.

**Figure 4-99: sCns value for parking as a location factor for companies**

| Parking is an important location factor for companies | | sCns* NL | | sCns* F |
|---|---|---|---|---|
| Local Government | ⚠ | 0.74 | ⚠ | 0.72 |
| Consultants | ✗ | 0.69 | ✗ | 0.58 |

\* Tested against mean strongly agree

In both countries local government do have the stronger consensus, although it is still a weak one that the availability of parking is an important location factor for companies. Consultants do not have a consensus that parking is an important location factor. However, in France the sCns value is much lower which indicates that more consultants in France either disagree or neither agree nor disagree that parking is an important location factor for companies.

**Figure 4-100: sCns value for regime of paid parking and resident parking permits in existing residential areas**

| In the future (next 5-10 years) a regime of paid parking and resident parking permits should be introduced in all residential areas of large cities | | sCns* NL | | sCns* F |
|---|---|---|---|---|
| Local Government | ✗ | 0.66 | ⚠ | 0.80 |
| Consultants | ✗ | 0.63 | ⚠ | 0.86 |

\* Tested against mean strongly agree

Figure 4-100 shows clear results. In France the consensus on introducing a regime of paid parking and resident parking permits (preferential tariffs for resident) is much higher indicating a weak consensus. In the Netherlands there is no consensus among consultants and local government. There is also no big difference between the sCns from consultants and local governments. In France consultants do have a slightly lower sCns while in the Netherlands consultants do have a slightly higher sCns.

**Figure 4-101: sCns value for regime of paid parking and resident parking permits in new residential areas**

| When planning for new residential areas, planners should include a regime of paid parking and residents parking permits from the very beginning | | sCns* NL | | sCns* F |
|---|---|---|---|---|
| Local Government | ✗ | 0.51 | ⚠ | 0.74 |
| Consultants | ✗ | 0.47 | ⚠ | 0.72 |

\* Tested against mean strongly agree

The sCns value for a regime of paid parking and resident parking in new residential areas shows the same patter as the sCns value for a regime of paid parking in existing residential areas. Again the sCns values are for both categories in France higher resulting in a weak consensus while the values in the Netherlands are lower. Compared to Figure 4-100 the strength of consensus is in both countries for both categories lower for a regime of paid parking in all new residential areas.

**Figure 4-102: sCns for Park and Ride facilities**

| Park and Ride facilities reduce car traffic within the city centre and increase the accessibility of the urban area as a whole | | sCns* NL | | sCns* F |
| --- | --- | --- | --- | --- |
| Local Government | ❌ | 0.68 | ⚠ | 0.85 |
| Consultants | ⚠ | 0.73 | ⚠ | 0.80 |

* Tested against mean strongly agree

Figure 4-102 shows that the in France the consensus that park and ride facilities reduce car traffic within the city center and increase the accessibility of the urban area as a whole is much stronger than in the Netherlands. While in the Netherlands respondents affiliated to local government do not have a consensus that park and ride facilities reduce urban traffic consultants do have a weak consensus on this statement. In France it is exactly the other way around. Respondents affiliated to local government do have the slightly stronger consensus on this issue.

**Figure 4-103: sCns value on discouraging long stay parking**

| Long stay parking (for visitors and commuters) in the inner-city should be discouraged | | sCns* NL | | sCns* F |
| --- | --- | --- | --- | --- |
| Local Government | ⚠ | 0.75 | ⚠ | 0.85 |
| Consultants | ⚠ | 0.73 | ⚠ | 0.77 |

* Tested against mean strongly agree

Figure 4-103 shows in both countries a weak consensus that long stay parking should be discouraged. In France this consensus is slightly stronger. Especially French local governments do have the strongest consensus that long stay parking should be discouraged. Also in both countries consultants do have a slightly weaker strength of consensus than local government employees that long stay parking should be discouraged.

**Figure 4-104: sCns value on the importance of parking policy to reduce traffic**

| Parking policy is an important tool to reduce car traffic within urban areas | | sCns* NL | | sCns* F |
| --- | --- | --- | --- | --- |
| Local Government | ⚠ | 0.78 | ✅ | 0.92 |
| Consultants | ⚠ | 0.82 | ✅ | 0.96 |

* Tested against mean strongly agree

Figure 4-104 shows a strong consensus in France among respondents from both categories that parking policy is an important tool to reduce car traffic within urban areas. In the Netherlands the consensus is weaker, although there is still a weak consensus on the statement. In both countries local government do have a slightly lower sCns than consultants.

**Figure 4-105 : sCns value on acceptance to use parking policy to generate financial resources**

| It is acceptable to use parking policy to generate financial resources | | sCns* NL | | sCns* F |
|---|---|---|---|---|
| Local Government | ❌ | 0.63 | ⚠️ | 0.88 |
| Consultants | ⚠️ | 0.73 | ⚠️ | 0.83 |

\* Tested against mean strongly agree

Figure 4-105 shows in France a stronger acceptance to use parking policy to generate financial resources, although it is still a weak consensus. In the Netherlands respondents affiliated to local government do not have a consensus that it is acceptable to use parking policy to generate financial resources.

**Figure 4-106: sCns on acceptability of revenue allocation**

| It is acceptable to use the income from parking policy to: | | sCns* NL | | sCns* F |
|---|---|---|---|---|
| **Improve the parking system in the city** | | | | |
| Local Government* | ✅ | 0.91 | ⚠️ | 0.85 |
| Consultants* | ✅ | 0.90 | ⚠️ | 0.85 |
| **Improve the accessibility of the city** | | | | |
| Local Government* | ⚠️ | 0.88 | ⚠️ | 0.79 |
| Consultants* | ⚠️ | 0.85 | ⚠️ | 0.81 |
| **Improve the quality of life in the city** | | | | |
| Local Government* | ⚠️ | 0.80 | ⚠️ | 0.76 |
| Consultants* | ⚠️ | 0.76 | ⚠️ | 0.87 |
| **Feed the general budget of the city** | | | | |
| Local Government** | ⚠️ | 0.78 | ⚠️ | 0.71 |
| Consultants** | ⚠️ | 0.76 | ❌ | 0.65 |

\* Tested against mean strongly agree
\*\* Tested against mean strongly disagree

Figure 4-106 shows the acceptance of different parking revenue allocations in France and the Netherlands among respondents affiliated to local government and consultants. In both countries to earmark revenues to where there are generated has the highest acceptance. In the Netherland there is a strong consensus while in France the consensus on improving the parking system is slightly lower. The second acceptable allocation of parking revenues is improving the general accessibility of the city by generally financing better parking, roads and public transport. The third highest consensus results in both countries to earmark revenues to improve the quality of life in the cities. In France consultants have a significantly higher sCns values to improve the quality of life than local government employees in France, as well as consultants and local government employees in the Netherlands.

No acceptance exist do use the revenue for the general budget. There is a weak consensus in both countries that local that parking revenue should not be used to feed the general budget. In France consultants do have no consensus that parking revenue should not be allocated to the general budget. However, this there are still more respondents either undecided or disagreeing that parking revenues should be allocated to the general budget. Therefore, it cannot be said that consultants have a higher level of acceptance to allocate revenue to the general budget.

**Figure 4-107: Data availability**

| One of the most important problems within parking policy is the lack of data regarding parking capacity and the use of parking | | sCns* NL | | sCns* F |
|---|---|---|---|---|
| Local Government | ❌ | 0.60 | ⚠️ | 0.82 |
| Consultants | ⚠️ | 0.75 | ⚠️ | 0.84 |

\* Tested against mean strongly agree

Figure 4-107 shows that data availability is perceived in France as a bigger problem for parking policy than in the Netherlands. The sCns values in France are higher than in the Netherlands. In France the difference between consultants and local governments is only marginal while there is much larger difference between the categories in the Netherlands. The Dutch respondents belonging to local government do not have a consensus that the lack of data is a problem for policy, while there is a weak consensus among consultants that the lack of data is a problem.

**Figure 4-108: sCns on lack of space for paring in the future**

| One of the most important challenges within parking policy is to convince people that parking in front of the door will not be possible in the future. | | sCns* NL | | sCns* F |
|---|---|---|---|---|
| Local Government | ❌ | 0.69 | ❌ | 0.62 |
| Consultants | ❌ | 0.69 | ❌ | 0.58 |

\* Tested against means strongly agree

Figure 4-108 show that local governments as well as consultants in both countries do not perceive convincing people that parking in front of the door is not a challenge in the future. In France respondents are less convinced that parking in front the door is a challenge for future parking policy. The results among both categories are in both countries about the same.

# 5    Discussion

## 5.1    Parking pricing

The results in Table 5-1 showed that pricing parking for commuters and visitors is undisputed. A waste majority among all roles in France, as well as in the Netherlands disagree that parking for visitors and commuters should be provided free of charge. There is a weak consensus among respondents affiliated to local government and a strong consensus among respondents affiliated to consultants and parking operators.

Paid parking for residents is more controversial. There is no consensus among respondents affiliated to consultants and government and decentralized government that parking for residents should be priced. However, respondents generally agree, what the literature about the economics of parking pricing suggests. Parking is a use of public space which cannot be provided for free in order to reach an effective market outcome with less negative effects of parking, such as cruising for parking. Nevertheless, in the case of free parking for residents respondents hesitate more often. Arguments against paid residential parking are that residents already pay for this service through the residence tax[4]. Visitors and commuters do not pay this tax. A further argument is the lack of social cohesion, when only rich people can afford to park in residential areas and therefore only rich residents can afford to own a car. This shows that from a policy perspective paid parking for residents is a politically difficult topic. Therefore, it is surprising that respondents affiliated to local governments do have a weak consensus on this issue. In the Dutch survey respondents affiliated to local governments did not had a consensus on paid residential parking. This shows that in the rather car favourable country of France the raising parking problems probably lead to a mind shift towards a more economical approach on solving parking problems.

There is a weak consensus among all respondents that commuter parking is elastic. This contradicts research from Kelly and Clinch (2006), that parking prices for commuters are more price elastic than parking prices visitors. Interesting is that parking operators, as experts in the field of parking pricing, do have the strongest consensus that residential parking demand is elastic. Further interesting is that in the French survey only a weak consensus result that residential parking demand is elastic in the Dutch survey a weak consensus resulted that resident's parking demand is inelastic. This indicates that there is no real consensus on the elasticity of parking pricing from residents and visitors. As Kelly and Clinch (2009) showed the elasticity of parking demand can not only vary between different user types but also between different time periods during the day. Therefore, it can be concluded that there exists confusion about the elasticity of parking prices. Since knowledge about the elasticity of parking prices is important to evaluate the impact of an increase of parking fees on travel behaviour, further investigation, also on long term effect is necessary.

---

[4]   A tax imposed on the **occupier** of a property in which they were resident on 1st January of each year.

**Table 5-1: Summary results parking pricing**

| Statement | The Netherlands | | France | | Mean* |
|---|---|---|---|---|---|
| | Lilkert scale | sCns | Likert scale | sCns | |
| **Within urban areas parking should be supplied free of charge to:** | | | | | |
| **Residents** | | | | | |
| Total sample | n/a | n/a | ▬ ■ ▬ ▬ | ❌ 0.67 | SD |
| Local Government | ▬ ■ ▬ ▬ | ❌ 0.67 | ▬ ■ ■ ▬ | ⚠ 0.73 | SD |
| Government and decentralized gov. | n/a | n/a | ■ ▬ ▬ | ❌ 0.58 | SD |
| Consultants | ▬ ■ ▬ ▬ | ⚠ 0.73 | ▬ ■ ▬ ▬ ▬ | ❌ 0.65 | SD |
| Parking operators | n/a | n/a | ■ ▬ ▬ | ✅ 0.94 | SD |
| **Visitors** | | | | | |
| Total sample | n/a | n/a | ■ ▬ ▬ ▬ | ⚠ 0.85 | SD |
| Local Government | ▬ ■ ▬ ▬ | ⚠ 0.86 | ▬ ■ ▬ ▬ ▬ | ⚠ 0.82 | SD |
| Government and decentralized gov. | n/a | n/a | ■ ▬ ▬ ▬ | ⚠ 0.78 | SD |
| Consultants | ■ ■ ▬ | ⚠ 0.88 | ■ ▬ | ✅ 0.93 | SD |
| Parking operators | n/a | n/a | ■ | ✅ 1.00 | SD |
| **Commuters** | | | | | |
| Total sample | n/a | n/a | ■ ▬ ▬ ▬ ▬ | ⚠ 0.89 | SD |
| Local Government | ■ ▬ ▬ | ⚠ 0.90 | ■ ▬ ▬ | ✅ 0.98 | SD |
| Government and decentralized gov. | n/a | n/a | ■ ▬ ▬ | ⚠ 0.86 | SD |
| Consultants | ■ ▬ ▬ | ✅ 0.90 | ■ ▬ | ⚠ 0.87 | SD |
| Parking operators | n/a | n/a | ■ | ✅ 1.00 | SD |
| **A significant increase of parking fees does not result in a lower demand for parking for:** | | | | | |
| **Residents** | | | | | |
| Total sample | n/a | n/a | ▬ ■ ▬ ■ ▬ | ❌ 0.57 | SD |
| Local Government | ▬ ▬ ■ ▬ | ❌ 0.39 | ▬ ■ ▬ ■ ▬ | ❌ 0.57 | SD |
| Government and decentralized gov. | n/a | n/a | ■ ▬ ▬ ▬ | ❌ 0.63 | SD |
| Consultants | ▬ ▬ ■ ▬ | ❌ 0.37 | ▬ ■ ■ ▬ ▬ | ❌ 0.50 | SD |
| Parking operators | n/a | n/a | ▬ ■ ▬ ▬ ▬ | ⚠ 0.70 | SD |
| **Visitors** | | | | | |
| Total sample | n/a | n/a | ▬ ■ ▬ ▬ ▬ | ❌ 0.61 | SD |
| Local Government | ▬ ■ ▬ ■ ▬ | ❌ 0.52 | ▬ ■ ▬ ■ ▬ | ❌ 0.53 | SD |
| Government and decentralized gov. | n/a | n/a | ■ ■ ▬ ▬ | ⚠ 0.74 | SD |
| Consultants | ▬ ■ ▬ ■ ▬ | ❌ 0.43 | ▬ ■ ▬ ▬ ▬ | ❌ 0.59 | SD |
| Parking operators | n/a | n/a | ▬ ■ ▬ ■ | ❌ 0.61 | SD |
| **Commuters** | | | | | |
| Total sample | n/a | n/a | ■ ■ ▬ ▬ ▬ | ⚠ 0.72 | SD |
| Local Government | ▬ ■ ▬ ▬ | ❌ 0.62 | ■ ▬ ▬ ▬ | ⚠ 0.77 | SD |
| Government and decentralized gov. | n/a | n/a | ■ ▬ ▬ | ⚠ 0.84 | SD |
| Consultants | ▬ ■ ▬ ▬ | ⚠ 0.73 | ■ ▬ ▬ ▬ ▬ | ⚠ 0.71 | SD |
| Parking operators | n/a | n/a | ■ ▬ ▬ ■ | ❌ 0.68 | SD |
| **Generally speaking people are aware of the price they pay for parking.** | | | | | |
| Total sample | n/a | n/a | ▬ ■ ▬ ▬ ▬ | ⚠ 0.71 | SD |
| Local Government | ▬ ■ ▬ ■ ▬ | ❌ 0.61 | ▬ ■ ▬ ▬ | ⚠ 0.71 | SD |
| Government and decentralized gov. | n/a | n/a | ■ ▬ ▬ | ❌ 0.68 | SD |
| Consultants | ▬ ■ ▬ ▬ | ❌ 0.70 | ▬ ■ ▬ ▬ | ❌ 0.63 | SD |
| Parking operators | n/a | n/a | ▬ ■ ▬ ▬ | ⚠ 0.84 | SD |
| **In the near future parking will only be charged based on the exact parking time and not per hour or other fixed time period anymore.** | | | | | |
| Total sample | n/a | n/a | ▬ ▬ ▬ ■ ■ | ⚠ 0.78 | SA |
| Local Government | ▬ ▬ ■ ■ ▬ | ⚠ 0.71 | ▬ ▬ ■ ■ | ⚠ 0.81 | SA |
| Government and decentralized gov. | n/a | n/a | ▬ ▬ ■ ■ | ⚠ 0.83 | SA |
| Consultants | ▬ ▬ ■ ▬ | ⚠ 0.79 | ▬ ▬ ■ ■ | ⚠ 0.81 | SA |
| Parking operators | n/a | n/a | ▬ ▬ ■ ■ ▬ | ⚠ 0.73 | SA |
| **In the near future parking fees should depend on the type of vehicle, with the price related to the emission category of the vehicle.** | | | | | |
| Total sample | n/a | n/a | ▬ ■ ▬ ■ ▬ | ❌ 0.54 | SD |
| Local Government | ▬ ▬ ▬ ■ ▬ | n/a | ▬ ■ ■ ■ ▬ | ❌ 0.56 | SD |
| Government and decentralized gov. | n/a | n/a | ▬ ■ ▬ ▬ ▬ | ❌ 0.65 | SD |
| Consultants | ▬ ▬ ▬ ■ ▬ | n/a | ▬ ■ ▬ ■ | ❌ 0.58 | SD |
| Parking operators | n/a | n/a | ■ ▬ ▬ ▬ | ❌ 0.56 | SD |

* SD = Tested against mean strongly disagree; SA = Tested against mean strongly agree

Respondents have a weak consensus that people are generally not aware of what they pay for parking. Although not all roles within the parking world agree to the same extent. Consultants do not have a consensus while parking operators do have the strongest consensus. As various respondents commented, the knowledge about parking prices varies among different user groups. While commuters know what they pay for their long term parking, visitors that occasionally use parking facilities at different locations rather do not know how much they pay for parking. In a forthcoming study this difference could be investigated. Nevertheless, the lack of knowledge about parking prices causes severe problems for parking policy. Since parking prices are not known, respondents would not react to a price increase. Therefore, price increases should be communicated within the media in order to create awareness which could result in a behaviour change.

In the Netherlands, as well as in France, respondents have a weak consensus that the method of pricing parking should change towards a system based on the exact parking time. The current system based on fees calculated per hour or another fixed time period should be abandoned. The second solution to calculate parking prices based on the emission category could not find a majority. There is no consensus among all roles. This implies that respondents judge the problem of cruising for parking and the lack of space caused by the inefficient market outcome as a problem. Furthermore, respondents perceive the possibility to reduce pollution by limiting cruising higher than the possible reduction by privilege low emission vehicles. Respondent further suggest that actually the space used by a car is the cost driver for parking spaces. Therefore the size of the car should be the main criteria for price differentiation. This would privilege smaller cars and require only smaller parking lots which would allow more parking spaces on the same surface. The acceptance of this solution could be investigated in a further research.

## 5.2    Parking as a location factor

The results in Table 5-2 show that the impact of the availability of parking on the attractiveness of inner-cities business district for clients and for companies is difficult to interpret. There are major differences in the strength of consensus per role. Consultants do not have a consensus that the availability for parking is important, while parking operators do have unsurprisingly the strongest consensus that parking is important for the attractiveness. Further, there is no consensus that the availability of parking is an important location factor in a company's location decision and there is no consensus among respondents that the availability of parking is more important than the price. However, there is a large majority of respondents agreeing that the availability of parking is less important in the case that public transport is good. The difficulty for the interpretations is caused by the fact that it is likely that the importance of the availability of parking varies per business and per location. Therefore, further research, such as Mingardo et al. (2009), is necessary in order to create knowledge about characteristics of locations where the availability of parking is less important. These findings would help planners to plan and improve cities that make car use redundant.

Furthermore, as Kelly and Clinch (2009) suggest, could also be further investigated what influence business and service policy could have (e.g. opening hours etc.) in order to reduce the importance of parking spaces.

**Table 5-2: Summary results parking as a location factor**

| Statement | The Netherlands | | France | | |
|---|---|---|---|---|---|
| | Lilkert scale | sCns | Likert scale | sCns | Mean* |
| **For shopping areas with the urban area the availability of parking is an important attraction factor for customers.** | | | | | |
| Total sample | n/a | n/a | | 0.70 | SA |
| Local Government | | 0.79 | | 0.74 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.74 | SA |
| Consultants | | 0.65 | | 0.60 | SA |
| Parking operators | n/a | n/a | | 0.85 | SA |
| **For shopping areas within the urban area the availability parking is an important attraction factor for customers.** | | | | | |
| Total sample | n/a | n/a | | 0.68 | SA |
| Local Government | | 0.79 | | 0.71 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.74 | SA |
| Consultants | | 0.81 | | 0.68 | SA |
| Parking operators | n/a | n/a | | 0.74 | SA |
| **Parking is an important location factor for companies (location decision).** | | | | | |
| Total sample | n/a | n/a | | 0.65 | SA |
| Local Government | | 0.74 | | 0.72 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.65 | SA |
| Consultants | | 0.69 | | 0.58 | SA |
| Parking operators | n/a | n/a | | 0.73 | SA |

\* SD = Tested against mean strongly disagree; SA = Tested against mean strongly agree

## 5.3 Impact of parking on urban traffic

**Table 5-3: Summary results impact of parking on urban traffic**

| Statement | The Netherlands | | France | | |
|---|---|---|---|---|---|
| | Lilkert scale | sCns | Likert scale | sCns | Mean* |
| **Park and Ride facilities reduce car traffic within the city centre and increase the accessibility of the urban area as a whole.** | | | | | |
| Total sample | n/a | n/a | | 0.81 | SA |
| Local Government | | 0.68 | | 0.85 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.91 | SA |
| Consultants | | 0.73 | | 0.80 | SA |
| Parking operators | n/a | n/a | | 0.75 | SA |
| **Long term parking (for visitors and commuters) in the inner-city should be discouraged.** | | | | | SA |
| Total sample | n/a | n/a | | 0.77 | SA |
| Local Government | | 0.75 | | 0.85 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.82 | SA |
| Consultants | | 0.73 | | 0.77 | SA |
| Parking operators | n/a | n/a | | 0.57 | SA |
| **Parking policy is an important tool to reduce car traffic within urban areas.** | | | | | SA |
| Total sample | n/a | n/a | | 0.91 | SA |
| Local Government | | 0.78 | | 0.92 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.96 | SA |
| Consultants | | 0.82 | | 0.96 | SA |
| Parking operators | n/a | n/a | | 0.89 | SA |

\* SD = Tested against mean strongly disagree; SA = Tested against mean strongly agree

Park and Ride facilities are perceived by all respondents to be effective to reduce traffic in urban areas and to increase accessibility of the city. A weak consensus results among all roles, respondents affiliated to government and decentralized government even have a strong consensus. In the Netherlands the consensus is much weaker. The perception of respondents supports academic research (c.f. Parkhurst (2000), Mingardo (2008). However, these studies also discovered that the number of trips outside the inner-city area increased. As a result, the traffic reduction in inner-cities is at the costs of a traffic increase in areas around the city centre. Therefore, further research is necessary in order to benefit from the effects of park and ride without having the disadvantages. For example investigate possibilities to vary parking tariffs according to the origin of the trip, such as D'Acierno et al (2006) suggest. This system allows charging users with a good transport connection from the origin of their destination higher.

Long term parking is more controversial among each of the different roles. There is a weak consensus among all respondents that long term parking in cities should be discouraged. However, parking operators do not have a consensus on discouraging long term parking. This is not surprising since measures discouraging long term parking would affect the commercial freedom of parking operators which is not in their interest. On the other hand local government as well as government and decentralized government see discouraging long term parking as a mean to reduce urban traffic. Nevertheless, Glazer and Nishkane (1992) found that visitors can vary their parking time and are consequently able to reduce it when long term parking is discouraged. Therefore, the supply of parking increases. As a result, discouraging long term parking could actually increase the number of visitor trips while the number of commuter trips is reduced.

In general the waste majority of respondents agree that parking has an impact on urban traffic. There is a strong consensus among all respondents on this issue. Therefore, respondents agree with academic research that an increase in parking fees will reduce urban traffic. Further, it would be interesting to further investigate whether respondents agree that parking fees are used as an alternative to road pricing (c.f. Verhofe et al. (1995) in order to reduce urban traffic.

## 5.4    Parking in residential areas

The strength of consensus varies, as Table 5-4 shows, between the introduction of a regime of paid parking with preferential tariffs (parking permits) in large cities and the introduction at the very beginning in all urban areas. There is a weak consensus that a regime of paid parking with preferential tariffs for residents should be introduced in large cities. One hand, there are also critical voices saying that preferential tariffs for residents are only for electoral purposes. On the other hand, there is also the fear that city centres would desert if people could not afford to park their car close to their house. This is also supported by a research of Balcombe and York (1993). Within their research respondents answered that they would move to another house in the case of a parking shortage.

**Table 5-4: Summary results parking in residential areas**

| Statement | The Netherlands | | France | | |
|---|---|---|---|---|---|
| | Lilkert scale | sCns | Likert scale | sCns | Mean* |
| **In the future (next 5-10 years) a regime of paid parking and resident parking permits should be introduced in all residential areas of large cities.** | | | | | |
| Total sample | n/a | n/a | | | 0.75 | SA |
| Local Government | | 0.66 | | | 0.80 | SA |
| Government and decentralized gov. | n/a | n/a | | | 0.65 | SA |
| Consultants | | 0.63 | | | 0.86 | SA |
| Parking operators | n/a | n/a | | | 0.71 | SA |
| **When planning for new residential areas, planners should include a regime of paid parking and residents parking permits from the very beginning.** | | | | | |
| Total sample | n/a | n/a | | | 0.67 | SA |
| Local Government | | 0.51 | | | 0.74 | SA |
| Government and decentralized gov. | n/a | n/a | | | 0.59 | SA |
| Consultants | | 0.47 | | | 0.72 | SA |
| Parking operators | n/a | n/a | | | 0.67 | SA |

* SD = Tested against mean strongly disagree; SA = Tested against mean strongly agree

There is no consensus on the introduction of the same regime in all urban residential areas Respondents believe that there must occur a parking problem first in order to legitimate parking pricing.

## 5.5 Revenue allocation

This results shows that there is a weak consensus that it is legitimate to raise revenue from parking policy and respondents from all role except parking operators prefer to allocate revenues from parking policy to the improvement of public transport as a first priority. Only parking operators prefer to improve the general accessibility of the city as a first priority. For all respondents allocation to the general budget is no option. Local government even have a weak consensus, all other respondents do not have a consensus on transferring parking revenue to the public budget.

**Table 5-5: Summary results revenue allocation**

| Statement | The Netherlands | | France | | Mean* |
|---|---|---|---|---|---|
| | Lilkert scale | sCns | Likert scale | sCns | |
| **It is acceptable to use parking policy to generate financial resources.** | | | | | |
| Total sample | n/a | n/a | | 0.83 | SA |
| Local Government | | ⊗ 0.63 | | 0.88 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.83 | SA |
| Consultants | | ⚠ 0.73 | | 0.83 | SA |
| Parking operators | n/a | n/a | | 0.86 | SA |
| **It is acceptable to use the income from parking policy to:** | | | | | |
| **Improve the parking system in the city** | | | | | |
| Total sample | n/a | n/a | | 0.83 | SA |
| Local Government | | ✓ 0.91 | | 0.85 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.83 | SA |
| Consultants | | ✓ 0.90 | | 0.85 | SA |
| Parking operators | n/a | n/a | | 0.86 | SA |
| **Improve public transport** | | | | | |
| Total sample | n/a | n/a | | ✓ 0.91 | SA |
| Local Government | n/a | n/a | | 0.89 | SA |
| Government and decentralized gov. | n/a | n/a | | ✓ 0.94 | SA |
| Consultants | n/a | n/a | | ✓ 0.97 | SA |
| Parking operators | n/a | n/a | | 0.78 | SA |
| **Improve the accessibility of the city** | | | | | |
| Total sample | n/a | n/a | | 0.81 | SA |
| Local Government | | ⚠ 0.88 | | 0.79 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.84 | SA |
| Consultants | | ⚠ 0.85 | | 0.81 | SA |
| Parking operators | n/a | n/a | | 0.83 | SA |
| **Improve the quality of life in the city** | | | | | |
| Total sample | n/a | n/a | | 0.81 | SA |
| Local Government | | ⚠ 0.80 | | 0.76 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.89 | SA |
| Consultants | | ⚠ 0.76 | | 0.87 | SA |
| Parking operators | n/a | n/a | | 0.83 | SA |
| **Feed the general budget of the city** | | | | | |
| Total sample | n/a | n/a | | ⚠ 0.71 | SD |
| Local Government | | ⚠ 0.78 | | ⚠ 0.71 | SD |
| Government and decentralized gov. | n/a | n/a | | ⊗ 0.66 | SD |
| Consultants | | ⚠ 0.76 | | ⊗ 0.65 | SD |
| Parking operators | n/a | n/a | | ⊗ 0.69 | SD |

* SD = Tested against mean strongly disagree; SA = Tested against mean strongly agree

The improvement of public transport will harm parking operator's business, since less car trips to the city result in a lower demand for parking. Therefore, it is interesting that parking operator still have a weak consensus. Further, it is interesting that even local government have a weak consensus that revenue from parking should not be allocated to the general budget. Hence, the allocation to the general budget would allow local government to spend the money much freer than when it is earmarked with a specific purpose. It seems that local government are more aware of the political situation. They learned that it is necessary to earmark revenues in order to create acceptance for revenue collection. Further this results support findings by Ison and Wall (2002) in England. They investigated that policy makers prefer to allocate revenues from work place parking charges to public transport. The logic behind is that improvement of public transport is perceived to replace the need for parking in inner-cities. This was shown in chapter 5.2.

## 5.6    Limited space for parking

All respondents in France agree that the space for parking will be limited in future. In the Netherlands the strength of consensus is much weaker which is difficult to explain. Both countries do have high density cities which would suggest that both countries would have about the same strength of consensus.

Since there won't be the possibility for everyone to park in front of their house, the question raises about which user groups should be prioritized. This question is not as controversial as expected.

**Table 5-6: Summary results limited space for parking**

| Statement | The Netherlands Lilkert scale | sCns | France Likert scale | sCns | Mean* |
|---|---|---|---|---|---|
| **One of the most important challenges within parking policy is to convince people that parking in front of the door will not be possible in the future.** | | | | | |
| Total sample | n/a | n/a | | 0.80 | SA |
| Local Government | | 0.69 ⊗ | | 0.82 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.82 | SA |
| Consultants | | 0.69 ⊗ | | 0.84 | SA |
| Parking operators | n/a | n/a | | 0.71 | SA |
| **Within 10 years curb-side parking should be prioritized for:** | | | | | |
| **Electric cars:** | | | | | |
| Total sample | n/a | n/a | | 0.71 | SD |
| Local Government | n/a | n/a | | 0.72 | SD |
| Government and decentralized gov. | n/a | n/a | | 0.67 ⊗ | SD |
| Consultants | n/a | n/a | | 0.79 | SD |
| Parking operators | n/a | n/a | | 0.78 | SD |
| **Handicapped persons:** | | | | | |
| Total sample | n/a | n/a | | 0.83 | SA |
| Local Government | n/a | n/a | | 0.78 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.94 ✓ | SA |
| Consultants | n/a | n/a | | 0.84 | SA |
| Parking operators | n/a | n/a | | 0.80 | SA |
| **Professional deliveries** | | | | | |
| Total sample | n/a | n/a | | 0.79 | SA |
| Local Government | n/a | n/a | | 0.72 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.87 | SA |
| Consultants | n/a | n/a | | 0.80 | SA |
| Parking operators | n/a | n/a | | 0.77 | SA |
| **Residents** | | | | | |
| Total sample | n/a | n/a | | 0.55 ⊗ | SD |
| Local Government | n/a | n/a | | 0.46 ⊗ | SD |
| Government and decentralized gov. | n/a | n/a | | 0.45 ⊗ | SD |
| Consultants | n/a | n/a | | 0.64 ⊗ | SD |
| Parking operators | n/a | n/a | | 0.72 | SD |
| **Car sharing vehicles** | | | | | |
| Total sample | n/a | n/a | | 0.70 | SA |
| Local Government | n/a | n/a | | 0.73 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.65 ⊗ | SA |
| Consultants | n/a | n/a | | 0.75 | SA |
| Parking operators | n/a | n/a | | 0.64 ⊗ | SA |

* SD = Tested against mean strongly disagree; SA = Tested against mean strongly agree

The results in Table 5-6 show that respondents weight in their decision the importance of a person's need to park higher than the pollution a vehicle causes. Prioritizing handicapped parking reaches the strongest strength of consensus and professional deliveries reaches the

second strongest strength of consensus. Handicapped persons need their car to reach an acceptable level of mobility while professional deliveries such as artisans need to transport their equipment. In contrast a weak consensus result that electric cars should not be prioritized and prioritizing car sharing vehicles reaches only a weak consensus among respondents affiliated to consultants and local government. Also prioritizing residents does not reach a consensus. Parking operators even have a weak consensus that residents in general should not be prioritized. This implies parking operator's intention to let market forces allocate parking spaces.

## 5.7    Various results

Parking facilities will according to respondents evolve in the future to full service centres where also other services are offered. This implies that respondent believe that parking facilities will become hubs the urban transport system which is interesting for service providing companies. Especially postal services such as parcel pick up could be offered at parking garages and solve the distribution problem causing many trips to unavailable customers. But also more obvious services such as car maintenance could be offered.

**Table 5-7: Summary results future of parking facilities**

| Statement | The Netherlands | | France | | |
|---|---|---|---|---|---|
| | Lilkert scale | sCns | Likert scale | sCns | Mean* |
| **Within 10 or 20 year parking facilities will evolve in to full mobility platforms and centres for the provison of services.** | | | | | |
| Total sample | n/a | n/a | | 0.77 | SA |
| Local Government | n/a | n/a | | 0.76 | SA |
| Government and decentralized gov. | n/a | n/a | | 0.82 | SA |
| Consultants | n/a | 0.75 | | 0.79 | SA |
| Parking operators | n/a | n/a | | 0.77 | SA |

\* SD = Tested against mean strongly disagree; SA = Tested against mean strongly agree

Data availability is not a problem for parking policy in France. There is no consensus about this issue. In the Netherlands only consultants agree that data availability is a problem while in France consultants do have the weakest consensus. Alebregtse (2009) concluded that consultants are more often faced by the problem of lacking data. This conclusion does according to this Thesis not hold in France. Therefore, it can be concluded that the lack of data is not perceived as a problem. However, this result could also be influenced by respondent's misperception on the advantages of better data availability for policy making.

**Table 5-8: Summary results data availability**

| Statement | The Netherlands | | France | | |
| --- | --- | --- | --- | --- | --- |
| | Lilkert scale | sCns | Likert scale | sCns | Mean* |
| **One of the most important problems within parking policy is the lack of data regarding parking capacity and the use of parking.** | | | | | |
| Total sample | n/a | n/a | | ⊗ 0.63 | SA |
| Local Government | | ⊗ 0.60 | | ⊗ 0.62 | SA |
| Government and decentralized gov. | n/a | n/a | | ⊗ 0.65 | SA |
| Consultants | | ◐ 0.75 | | ⊗ 0.58 | SA |
| Parking operators | n/a | | | ⊗ 0.65 | SA |

* SD = Tested against mean strongly disagree; SA = Tested against mean strongly agree

# 6     Conclusion

In general respondents perceive parking policy to be sometimes systematic and sometimes by chances but rather by chance. This implies that, parking policy should be more systematic based on measures that have proven their efficiency and aligned with the whole urban and national traffic policy. This would allow parking policy to be much more goal-oriented and efficient in future.

The aim of this research was to show the consensus among experts within the parking world. It was shown that there are differences in the perception of issues between different roles but also between experts from Franc and from the Netherlands. However, there are no fundamental differences. The strength of consensus looked always[5] into the same direction which implies that most respondents among all roles at least rather agree or rather disagree. Therefore it can be concluded that the more systematic definition of parking policy is not impeded by fundamentally different opinions among experts. Nevertheless, within this chapter there are some issues identified that requires further research. Furthermore, the data set used could be analysed using more advanced statistical tools in order to investigate answer patterns between different roles which are not visible on the first sight.

---

[5]    Except for the perception of parking demand elasticity for residents, which is only a minor issue.

# References

Anonymous (2008, February 30). Parking problem "perception". There's plenty of downtown parking if employees don't hog parking spots on the street and if people are willing to walk a few blocks. McClatchy-Tribune Business News. Retrieved from http://proquest. umi.com/pqdweb?did=1435326541&sid=1&Fmt=3&clientId=5072&RQT=309&VName=P QD

Alebregtse, R. (2009). The perception of the urban parking problem (Master's Thesis). Erasmus University, Rotterdam, NL.

Albert, G. and Mahalel, D. (2006). Congestion tolls and parking fees. A comparison of the potential effect on travel behaviour. *Transport Policy, 13,* 496-502.

Anderson, S. P. and de Palma A. (2004). The economics of pricing parking. *Journal of urban economics, 55,* 1-20.

Arnott, R. and Rowse J. (2009). Downtown parking in auto city. *Regional science and urban economics*, 39, 1-14.

Balcombe, R. J. and York, I. O.(1993). The future of residential parking. Project Report 22. Transport Research, Crowthorne, Berkshire, UK. cited in Marsden, G. (2006). The evidence base for parking policies – a review. *Transport Policy, 13,* 447-457.

Bendtsen, P.H. (1967). Traffic generation. *Socio-Economic Planning Science, 1*(1) , 33-42.

Button, K. (2006). The political economy of parking charges in "first" and "second-best" world. *Transport Policy, 13,* 470-478.

Calthrop, E. and Proost, S. (2006). Regulating on-street parking. *Regional science and urban economics, 36,* 29-48.

D'Acierno, L., Gallo, M. and Montela, B. (2006). Optimisation models for the urban parking pricing problem. *Transport Policy, 13,* 34-48.

Glazer A. Nishkane E. (1992). Parking fees and congestion. Regional Science and Urban Economics, 22, 123-132.

Higgins, T. J. (1992). Parking taxes: Effectiveness, legality and implementation. Some general considerations. Transportation, 19, 221-230.

Ison, S. and Wall, S. (2002). Attitudes to traffic related issues in urban areas of the UK and the role of workplace parking charges. *Journal of transport geography*, 10, 21-28.

Kelly, A. and Clinch, P. (2006). Influence of varied parking tariffs on parking occupancy levels by trip purpose. *Transport Policy, 13,* 478-495.

Kelly, A. and Clinch, P. (2009). Temproal variance of revealed preference on-street parking price elasticity. *Transport Policy, 16,* 193-199*.*

Köllinger, C. (2010, March). Mobilität entscheidet sich zu Hause. *Vcö-Magazin,* 5.

Ligocki, C. and Zonn L. E. (1984). Parking Problems in central business district. *Cities, 1,* 350-355.

Mingardo, G., Mouter, N. and Talens, H. (June 2009). No parking, still business. *Verkeerskunde 4.*

Parkhurst, G. (2000). Influence of bus-based Park and Ride facilites on users' car traffic. *Transport Policy, 7,* 159-172.

Petiot (2004). Parking enforcement and travel demand management. *Transport Policy, 11,* 399-411.

Rye, T., Hunton K., Ison, S. and Kocak N. (2008). The role of market research and consultation in developing parking policy. *Transport Policy, 15,* 387-394.

Schoenfeld, A. H. and Hermann, D. J. (1982). Problem perception and knowledge structure in expert and novice mathematical problem solvers. Journal of Experimental Psychology: Learning, Memory and Cognition, 8, 484-494.

Shoup, D. C. (1999). The trouble with minimum parking requirements. Transportation research part A, 33, 549-547.

Shoup, D. C. (2006). Cruising for parking. *Transport Policy, 13,* 479-486.

Tastle, J. M and Tastle, W. J. (2005). Extending the consensus measure: Analyzing ordinal data with respect to extrema. Retrieved from http://isedj.org/4/72/ISEDJ.4(72).Tastle.pdf

Thompson, R. G. and Richardson, A. J. (1996). A parking search model. *Transportation Research Part A, 32 (3),* 159-170.

Höglund, P. (2004). Parking, energy consumption and air pollution. *Science of the total environment 334-335,* 39-45.

Proost, S. and Calthrop, E. (2006). Regulating on-street parking. *Regional science and urban economics, 36,* 29-48.

Verhoef, E., Nijkamp, P. and Rietveld, P. (1995). The economies of parking management systems: the (im)possibilities of parking policies in traffic regulations. Transportation Research Part A, 29, 141-156.

# Appendix A: Questionnaire

## La perception des problèmes de stationnement

### Introduction

Cette enquête est réalisée en coopération avec le CETE Méditerranée, le CERTU, la Fédération Nationale des Métiers du Stationnement et l'Université Erasmus de Rotterdam (Pays-Bas). Cette enquête vise à mieux comprendre la perception des acteurs, collectivités locales, exploitants, industriels et prestataires des politiques et des outils du stationnement.

Cette enquête concerne plus particulièrement le stationnement dans les centres-villes.

Cette enquête, déjà réalisée aux Pays-Bas, sera aussi conduite en Italie et en Grande-Bretagne.

Le CETE Méditerranée, le CERTU et la Fédération Nationale des Métiers du Stationnement demandent à l'ensemble des acteurs du stationnement d'y participer.

L'enquête comprend 20 questions. Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées. Vous pouvez également si vous le souhaitez apporter des commentaires supplémentaires à la fin de l'enquête.

10 à 15 minutes seulement sont nécessaires pour répondre aux 20 questions.

Les résultats seront disponibles à l'automne sur les sites internet du CERTU et de la FNMS.

L'enquête est complètement anonyme. L'Université Erasmus utilise une connexion cryptée garantissant la confidentialité des réponses

Nous vous remercions pour votre participation

## Question 1

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

### Le stationnement public dans les zones urbaines devrait être mis à disposition gratuitement pour :

|  | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| Les résidents | ○ | ○ | ○ | ○ | ○ | ○ |
| Les visiteurs | ○ | ○ | ○ | ○ | ○ | ○ |
| Les pendulaires | ○ | ○ | ○ | ○ | ○ | ○ |

Commentaire

## Question 2

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

### Une augmentation significative des tarifs n'induirait pas une baisse de la demande de stationnement pour :

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| Les résidents | ○ | ○ | ○ | ○ | ○ | ○ |
| Les visiteurs | ○ | ○ | ○ | ○ | ○ | ○ |
| Les pendulaires | ○ | ○ | ○ | ○ | ○ | ○ |

Commentaire

## Question 3

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

### Le public connaît généralement le prix du stationnement sur voirie et dans les parcs de stationnement.

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ○ | ○ | ○ | ○ | ○ | ○ |

Comment

## Question 4

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

La tarification du stationnement devrait être calculée en fonction du temps passé et non plus sur une durée prédéterminée (à l'heure ou autre) dans un futur proche.

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ○ | ○ | ○ | ○ | ○ | ○ |

Commentaire

## Question 5

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

La tarification du stationnement devrait différencier les types de véhicules, en prenant en compte plus particulièrement leurs émissions polluantes (par exemple, les véhicules propres devraient payer moins cher que les véhicules polluants).

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ○ | ○ | ○ | ○ | ○ | ○ |

Commentaire

## Question 6

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

Pour l'attractivité des centres-villes la disponibilité des places de stationnement constitue un facteur d'attractivité important pour les clients

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ○ | ○ | ○ | ○ | ○ | ○ |

Commentaire

## Question 7

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

### Pour l'attractivité des centres-villes, la disponibilité des places de stationnement est plus importante que leur prix

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Comment

## Question 8

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

### La disponibilité en places de stationnement est un facteur de décision d'implantation important pour les entreprises qui souhaitent se localiser dans une agglomération

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Commentaire

### Pensez-vous que ce facteur soit aussi important si l'accessibilité en transport public est bonne?

◯ Oui

◯ Non

◯ Sans opinion

## Question 9

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

Dans le futur (5-10 ans) le stationnement payant avec des tarifs préférentiels pour les résidents devrait être introduit dans l'ensemble des zones résidentielles dans les grandes villes

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Commentaire

## Question 10

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

Lors de la création de nouvelles zones résidentielles, des zones de stationnement payant avec des tarifs préférentiels pour les résidents devraient être introduites dès le début

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Commentaire

## Question 11

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

Les parcs relais (P+R) diminuent la circulation dans les centres-villes et améliorent l'accessibilité de la zone urbaine dans son ensemble

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Commentaire

95

## Question 12

Il vous est demandé d'indiquer votre appréciation sur les affirmations énonœées

### Le stationnement de longue durée des non-résidents (visiteurs et pendulaires) dans les centres urbains doit être découragé.

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Commentaire

## Question 13

Il vous est demandé d'indiquer votre appréciation sur les affirmations énonœées

### Les politiques de stationnement jouent un rôle important pour réduire la circulation dans les centres urbains.

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Commentaire

## Question 14

Il vous est demandé d'indiquer votre appréciation sur les affirmations énonœées

### Il est légitime que les politiques de stationnement génèrent des ressources financières aux collectivités.

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Commentaire

## Question 15

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

### Il est légitime d'utiliser les revenus du stationnement payant pour:

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| Améliorer la gestion du stationnement dans la ville | ○ | ○ | ○ | ○ | ○ | ○ |
| Améliorer les transports publics | ○ | ○ | ○ | ○ | ○ | ○ |
| Améliorer l'accessibilité à la ville | ○ | ○ | ○ | ○ | ○ | ○ |
| Améliorer la qualité de vie en ville | ○ | ○ | ○ | ○ | ○ | ○ |
| Alimenter le budget général de la ville | ○ | ○ | ○ | ○ | ○ | ○ |

Commentaire

## Question 16

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

### Convaincre la population que le stationnement à l'avenir ne sera plus possible devant son lieu d'habitation constituera un des plus grands défis des politiques de stationnement demain

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ○ | ○ | ○ | ○ | ○ | ○ |

Commentaire

## Question 17

Il vous est demandé d'indiquer votre appréciation sur les affirmations énoncées

### Un des plus grands problèmes des politiques de stationnement est l'absence de données sur l'offre et l'usage du stationnement.

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ○ | ○ | ○ | ○ | ○ | ○ |

Commentaire

## Question 18

Il vous est demandé d'indiquer votre appréciation sur les affirmations énonœes

### D'ici 10 ans, le stationnement sur voirie devra selon vous être réservé en priorité :

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| aux voitures électriques, même si elles sont utilisées par des pendulaires | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| aux véhicules en autopartage et/ou en co-voiturage | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| aux personnes à mobilité réduite | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| aux livraisons, professionnels (artisans, médecins, infirmières, aides à domicile…) | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| aux résidents, même s'ils utilisent des véhicules thermiques | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

## Question 19

Il vous est demandé d'indiquer votre appréciation sur les affirmations énonœes

### D'ici 10 ou 20 ans, les parcs de stationnement de centre-ville auront profondément évolué et seront devenus de véritables plateformes de mobilité et des lieux de services

| | Pas du tout d'accord | Pas tellement d'accord | Ni d'accord ni pas d'accord | D'accord | Tout à fait d'accord | Sans opinion |
|---|---|---|---|---|---|---|
| > | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Commentaire

## Question 20

Il vous est demandé d'indiquer votre appréciation sur les affirmations énonœes

### Les politiques de stationnement menées aujourd'hui peuvent être définies comme :

◯ volontaristes

◯ plutôt volontaristes

◯ parfois volontaristes parfois au coup par coup

◯ plutôt au coup par coup

◯ au coup par coup

◯ sans opinion

## Votre rôle dans le monde du parking

### Dans quel secteur des métiers du stationnement travaillez-vous ?

- ○ Constructeurs, équipementiers
- ○ Gestionnaires de stationnement en parcs ou sur voirie
- ○ Consultants privés
- ○ Entreprises de transport public
- ○ État et services déconcentrés de l'État
- ○ Autorités organisatrices de transport
- ○ Mairies
- ○ Universités, centres de recherche publics
- ○ Associations
- ○ Autres

### Quelle part de votre temps de travail consacrez-vous à la question du stationnement?

- ○ moins de 10 %
- ○ moins de 50 %
- ○ plus de 50 %
- ○ à temps plein

## Maries

### Combien d'habitants compte votre agglomération?

- ○ 0 - 50'000 habitants
- ○ 50'000 - 100'000 habitants
- ○ 100'000 - 300'000 habitants
- ○ plus de 300'000 habitants

### Quelle est votre activité dans le stationnement?

- ☐ Principalement la définition de la politique de stationnement;
- ☐ Principalement la mise en oeuvre de la politique de stationnement

Commentaire

## Quels commentaires souhaiteriez-vous apporter ?

Merci de votre collaboration

### Comments